# Transmittal

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| 1 | 2 | 5/17/2017 | Site Characterization Report / Remedial Action Completion Report for Aboveground Storage Tanks PB 552, PB 669, and PB 1937, Philadelphia Energy Solutions Refining and Marketing LLC, Philadelphia Refining Complex, Point Breeze Refinery, Philadelphia, Pennsylvania, prepared for Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC |

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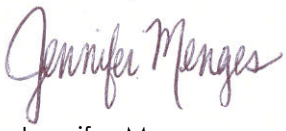

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**SITE CHARACTERIZATION REPORT / REMEDIAL ACTION COMPLETION REPORT FOR ABOVEGROUND STORAGE TANKS PB 552, PB 669, AND PB 1937**

Philadelphia Refining Complex
Point Breeze Refinery
3144 Passyunk Avenue
Philadelphia, Philadelphia County, Pennsylvania
Point Breeze Facility ID No. 51-19781
PADEP Incident No. 31920, 5912, 5914 and 45965
PADEP Tank No. 070A, 090A, and 131A

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Philadelphia Refinery Operations,
a series of Evergreen Resources Group, LLC

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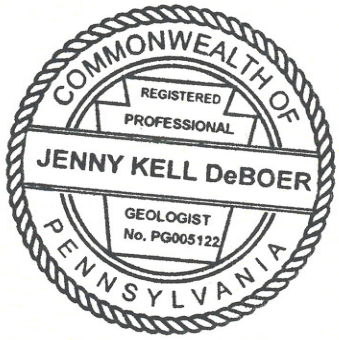


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May 17, 2017

**SITE CHARACTERIZATION REPORT / REMEDIAL ACTION COMPLETION REPORT FOR ABOVEGROUND STORAGE TANKS PB 552, PB 669, AND PB 1937**
**Philadelphia Refining Complex, Point Breeze Refinery**
**3144 Passyunk Avenue, Philadelphia, Pennsylvania**

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**SITE CHARACTERIZATION REPORT / REMEDIAL ACTION COMPLETION REPORT FOR ABOVEGROUND STORAGE TANKS PB 552, PB 669, AND PB 1937**
**Philadelphia Refining Complex, Point Breeze Refinery**
**3144 Passyunk Avenue, Philadelphia, Pennsylvania**

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# Executive Summary

Stantec Consulting Services Inc. (Stantec) has prepared this Site Characterization Report/Remedial Action Completion Report (SCR/RACR) on behalf of Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC (Evergreen) regarding the Philadelphia Energy Solutions Refining and Marketing LLC (PES) Philadelphia Refining Complex (Complex) located at 3144 Passyunk Avenue, Philadelphia, Pennsylvania.

There are several open storage tank related incidents within the Point Breeze Refinery at the Philadelphia Refining Complex. This SCR/RACR provides information to support closure of four incidents associated with aboveground storage tanks (ASTs) located in Area of Interest (AOI) 8 of the Point Breeze Refinery North Yard at the PES Complex. These incidents are in varying stages of the Pennsylvania Department of Environmental Protection (PADEP) Storage Tank Corrective Action (CAP) Process. This report will present background information, summaries of the characterization investigations, selection of remediation standards for soil, demonstration of attainment of remediation standards for soil, and conclusions.

Soil investigation activities, associated with product releases, tank closure and/or the AOI 8 Remedial Investigation (RI), have been performed for all four incidents. Some of the concentrations of constituents of concern (COCs) exceeded the Statewide Health Standards (SHS); however, there were no exceedences of the non-residential direct contact Medium-Specific Concentrations (NRDC MSCs) or the site-specific standard (SSS) for lead.

The SHS is usually driven by the soil-to-groundwater numeric value, and the soil-to-groundwater pathway is being addressed in the AOI 8 Remedial Investigation Report (RIR) under the One Cleanup Program. SHS are chosen as the applicable cleanup standards for all COCs that meet or are below the SHS. For COCs that exceed the SHS, the site-specific standard via pathway elimination is considered by comparing the results to the NRDC MSCs or the SSS for lead. The selected remediation standards for soil have been attained for these incidents; therefore, the remedial actions for soils at tanks PB 552, PB 669, and PB 1937 are complete. Evergreen requests approval of this SCR/RACR and closure of PADEP Incident No. 31920, 5912, 5914, and 45965.

# 1.0 Introduction

Stantec has prepared this SCR/RACR on behalf of Evergreen regarding the PES Complex located at 3144 Passyunk Avenue, Philadelphia, Philadelphia County, Pennsylvania (**Figure 1**). Sunoco, Inc. (R&M) (Sunoco) previously operated the former Philadelphia Refinery including the Schuylkill River Tank Farm and on September 8, 2012, Sunoco conveyed it to PES. As part of that transaction, Sunoco retained responsibility for remediation activities for environmental conditions existing at the time of the transfer. As of December 30, 2013, Evergreen assumed the responsibility for remediation liabilities occurring at the former Philadelphia Refinery and Schuylkill River Tank Farm on or before September 8, 2012.

Several open storage tank related incidents occurring prior to September 8, 2012 exist within the Point Breeze Refinery at the PES Complex. This SCR/RACR addresses four open incidents for three ASTs located within AOI 8. AOI 8 occupies approximately 250 acres of the PES Complex in the northern portion of the Point Breeze Refinery **(Figure 2)**. The No. 3 Tank Farm is located within AOI 8.

This SCR/RACR provides information in support of closure of these incidents associated with tanks located in AOI 8 of the Point Breeze Refinery North Yard. The incidents are in varying stages of the Storage Tank CAP program. The incidents addressed in this SCR/RACR are summarized in the table below:

| Release/ Incident Date | PADEP Incident ID | Sunoco Tank Number | PADEP Tank Number | Product Description |
|---|---|---|---|---|
| 7/8/2003 | 31920 | PB 552 | 070A | Gas Oil |
| 9/16/2000 | 5912 | PB 669 | 090A | Gas Oil |
| 8/5/1989 | 5914 | PB 1937 | 131A | Diesel |
| 2/7/1995 | 45965 | PB 1937 | 131A | Gas Oil |

## 1.1 SITE BACKGROUND AND OWNERSHIP HISTORY

The PES Complex has a long history of petroleum transportation, storage, and processing. The oldest portion of the PES Complex started petroleum related activities in the 1860's, when the Atlantic Refining Company was established as an oil distribution center. In the 1900's, crude oil processing began and full-scale gasoline production was initiated during World War II. In addition to refining crude oil, various chemicals, such as acids and ammonia, were also produced at the site for a period of time. Current operations at the PES Complex are limited to the production of fuels and basic petrochemicals for the chemical industry.

The previous owner of the PES Complex, Sunoco, and the PADEP entered into a Consent Order & Agreement (CO&A) in December 2003 with respect to the former Philadelphia Refinery and Schuylkill

River Tank Farm. Since 2003, Sunoco has completed site characterization activities at all eleven AOIs in accordance with the 2003 CO&A. In October 2006, Sunoco submitted a Notice of Intent to Remediate (NIR) to the PADEP, entering the former Philadelphia Refinery into the Act 2 program. In November 2011, the former Philadelphia Refinery was formally entered into the PA One Cleanup Program between the Environmental Protection Agency (EPA) – Region III and PADEP. Sunoco submitted a revised Work Plan for Sitewide Approach Under the One Cleanup Program to document the sitewide remedial approach extending beyond the requirements of the 2003 CO&A.

On September 8, 2012, Sunoco conveyed the former Philadelphia Refinery and Schuylkill River Tank Farm, which became known as the PES Complex, to PES. Site remediation at the PES Complex is ongoing as part of previously established programs and a 2012 Buyer Seller Agreement signed among Sunoco, PES, and PADEP. As part of the agreement, Sunoco retained responsibility of remediation activities for environmental conditions existing at the time of the transfer, and PES is responsible for environmental conditions caused by events following the purchase agreement. Effective December 30, 2013, Evergreen assumed Sunoco's legacy remediation liabilities with respect to the former Philadelphia Refinery and Schuylkill River Tank Farm. All remediation of Sunoco's historic environmental liabilities at the PES Complex are managed by Evergreen.

## 1.2 LOCAL GEOLOGY

Stantec is currently preparing a RIR for AOI 8 that includes a detailed discussion of regional and site-specific geologic conditions. In the context of this SCR/RACR, the geologic framework present beneath the PES Complex can be summarized as follows:

- The PES Complex occurs within the up-dip limits of the Atlantic Coastal Plain, generally within two miles of the "Fall Line," where crystalline bedrock of the Appalachian foothills intersects the ground surface (outcrops) (Greenman et al., 1961). The Atlantic Coastal Plain is defined as having relatively flat topography and as being underlain by a characteristic wedge of unconsolidated sediments that thicken in a southeasterly direction atop a sloping and deepening bedrock surface.

- Depositional environments for the Coastal Plain strata observed were complex fluvial, estuarine, and marginal marine environments along the passive Atlantic Continental Margin (Trapp, 1992). The resulting sedimentary record is complicated, largely incomplete, and under-represented through time by only Cretaceous and Quaternary deposits, separated by a regional disconformity.

- Coastal Plain deposits and associated thicknesses observed beneath the PES Complex have been interpreted to include, with increasing depth and age, the following (note that correlations to published geologic units have been included for reference purposes only) (Low et al., 2002):

    1. *Anthropogenic Fill*: heterogeneous in nature and primarily composed of an admixture of sand and gravel, mud, and anthropogenic debris including cinders, slag, brick, crushed stone, and other construction materials; generally less than 5 feet thick and commonly only a thin veneer at ground surface however, can be over 20 feet thick along the axes of buried streams.

2. *Recent (Holocene) alluvium*: fine-grained, brownish gray to dark gray silt/clay with occasional lenses of gray silty sand, gravel, and peat; silt/clay lithology commonly grades with depth to include some-to-and sand; thickness ranges from a few feet to more than 70 feet at locations proximal to the Schuylkill River.
3. *Pleistocene "Trenton gravel":* brownish yellow, yellowish brown, and reddish brown silty, clayey, poorly-sorted sand with gravel, including secondary sandy gravel and clay/silt lithologies in lenses; very heterogeneous and stratified unit; thickness ranges from approximately 0 feet to 25 feet; thin to absent along the axes of former stream channels where it was eroded.
4. *Cretaceous Potomac-Raritan-Magothy (PRM) aquifer system upper clay unit:* reddish yellow, pale brown, brownish gray, and white clay/silt (commonly sandy and finely-laminated); generally less than 5 feet thick and not everywhere present beneath the PES Complex.
5. *Cretaceous PRM upper sand unit:* light gray to pale yellow, fine to medium-grained quartz sand with a trace-to-little silt but including thick lenses of micaceous very fine silty sand in places; ranges in thickness from a few feet to approximately 30 feet; not everywhere present beneath the PES Complex and generally thickens to the south and east.
6. *Cretaceous PRM middle clay unit:* medium to high plasticity red, white, and dark gray micaceous clay/silt with intercalating lenses of muddy sand; thickness ranges from greater than approximately 20 feet to less than 5 feet.
7. *Cretaceous PRM middle sand unit:* brown and reddish yellow, silty, occasionally gravelly and muddy sand; up to 10 feet thick where interpreted to be present; difficult to distinguish from the lower sand where those units appear to be vertically continuous.
8. *Cretaceous PRM lower clay unit:* dark gray, brown, and red clay/silt with sandy lenses; commonly only a few feet thick and not everywhere present beneath the PES Complex;
9. *Cretaceous PRM lower sand unit:* pale gray, pale yellow, and brown and white quartz sand coarsening with depth to white and varicolored sandy gravel and gravelly sand; common lenses of clayey sand and gravel; thickness ranges from approximately 25 feet to more than 50 feet.

Bedrock is present beneath the Coastal Plain deposits in AOI 8 and consists predominantly of variably-weathered mica schist. The bedrock surface is irregular and contains troughs. Beneath AOI 8, bedrock elevations are approximately -20 feet to -70 feet referenced to the North American Vertical Datum of 1988 (NAVD 88).

## 1.3 LOCAL HYDROGEOLOGY AND WATER BODIES

Stantec is currently preparing a RIR for AOI 8 that includes a detailed discussion of the site-specific hydrogeologic conditions that characterize groundwater occurrence and flow beneath the area. Based on that investigation, the geologic framework present beneath and in close proximity to AOI 8 is interpreted to support the following general hydrogeologic conditions:

- Two discrete water-bearing zones have been identified beneath AOI 8 at the PES Complex. In general, these are the water-table (unconfined) and a lower (semi-confined) aquifer. Their properties are as follows:

    1. *Unconfined aquifer:* primarily composed of saturated portions of Quaternary alluvium (including the "Trenton gravel" and younger stream deposits) and underlying PRM upper sand unit; includes the upper clay unit aquitard where present; may include deeper portions of Holocene alluvium, when saturated; on average, the saturated thickness of the unconfined aquifer ranges from a few feet to approximately 30 feet.
    2. *Lower aquifer:* semi-confined, artesian aquifer primarily composed of the lower sand unit but as mapped also includes the middle sand unit and lower clay unit aquitard, where present; the lower aquifer saturated thickness generally ranges from 20 feet to 35 feet.

- The water-table surface appears to subtly mirror natural surface topography in AOI 8, and is generally characterized by convergence towards a former stream that bisected the AOI, and flow towards the Schuylkill River.

- The middle clay unit aquitard appears to be laterally continuous beneath AOI 8 and create overall hydraulic separation between the unconfined and lower aquifers.

Two stormwater basins are located within AOI 8 and represent the identified surface water features. The Schuylkill River represents the western and southern border of the AOI. Private water wells are not present within the PES Complex and the complex is currently connected to a public water supply with sanitary wastewater from AOI 8 being discharged to a City of Philadelphia sewer.

## 1.4 ECOLOGICAL EVALUATION

The majority of AOI 8 is covered with soil, gravel, and impervious surfaces. The soil and gravel-covered portions of AOI 8 are not likely to serve as a breeding area, migratory stopover, or primary habitat for wildlife. On October 31, 2016, a survey of endangered, threatened, and special concern wildlife and habitat was conducted by submitting a search request through the Pennsylvania Natural Diversity Inventory (PNDI) Environmental Review Tool. The results of the PNDI search identified no known impacts by the Pennsylvania Game Commission and the U.S. Fish and Wildlife Service.

The PNDI search identified potential endangered species impacts that required further review by the Pennsylvania Department of Conservation and Natural Resources (PA DCNR) and the Pennsylvania Fish and Boat Commission (PA FBC). No effect letter requests were submitted to PA DCNR and PA FBC on October 31, 2016. A response was received from the PA DCNR on November 4, 2016, indicating that no impact is anticipated to the species of special concern. In a letter dated November 28, 2016, the PA FBC noted that certain areas of AOI 8 might serve as a potential habitat for the Eastern Redbelly Turtle (Pseudemys rubriventres), which is a threatened species. A wildlife salvage effort for the turtles was conducted in 2013 in the stormwater basin adjacent to the Schuylkill River. As the remediation investigation activities at tanks PB 552, PB 669, and PB 1937, do not include disturbance within 300 feet

of the potential habitat at the Schuylkill River, no immediate action is warranted with regard to the species of concern. This threatened species will be further evaluated as an ecological receptor for impacts related to Evergreen's environmental liability in the Act 2/ One Cleanup Program.

All ecological assessment documentation is included in **Appendix A**.

# 2.0 SUMMARY OF INVESTIGATIONS

A record of historic soil sampling was available for one open incident; however, additional soil sampling was conducted in 2016 to supplement the investigation of remaining open incidents in conjunction with the AOI 8 RI, and is summarized in **Table 1**. Available historical documentation is presented in **Appendix B**. Fieldwork conducted as part of this additional investigation followed the Quality Assurance/Quality Control Plan and Field Procedures Manual (**Appendix C**) and the Site Specific Health and Safety Plan (**Appendix D**). The following sections of this report summarize all characterization activities related to these incidents. The soil sample locations are shown on **Figures 3, 4, and 5.** Available soil boring logs for the sample locations are provided as **Appendix E**.

Soil samples collected during RI field activities were analyzed for the Evergreen Comprehensive List of COCs (**Appendix F**). **Table 2** presents soil analytical results compared to non-residential SHS and **Table 3** presents analytical results with comparison to NRDC MSCs. Laboratory analytical reports are included as **Appendix G**.

## 2.1 PB 552 (FORMER PADEP TANK 070A, INCIDENT 31920)

Tank PB 552, historically used to store gas oil, was permanently closed-in-place and removed per Closure Notification Form dated October 26,2000 and the Amended Tank Registration Form submitted on March 4, 2003. As part of tank closure activities, soil sampling was conducted by Aquaterra Technologies Inc. in June 2003. Eleven soil borings (AOI8-GP-1 through AOI8-GP-11; **Figure 3**) were completed along the perimeter of the tank using direct-push methodology. This tank was noted to be situated about 10% underground; as such, the soil sampling was conducted in accordance with a site assessment protocol specified by the PADEP Southeast Regional Office to roughly follow the Technical Guidance Document for Closure Requirements for Underground Storage Tanks (USTs). One soil sample was collected above the water table (8-14 feet below ground surface) from each soil boring and analyzed for benzene, toluene, ethylbenzene, total xylenes, isopropylbenzene, flourene, naphthalene, and phenanthrene. Four of the eleven soil samples exceeded the SHS for naphthalene, and therefore, a Notice of Reportable Release (NORR) was submitted to the PADEP on July 8, 2003. Soil samples did not exceed corresponding NRDC MSCs for any COCs.

## 2.2 PB 669 (FORMER PADEP TANK 090A, INCIDENT 5912)

On September 16, 2000, a leak from the steam coil lead to the release of approximately 200 gallons of gas oil within the tank containment area of PB 669. As part of interim remedial measures, the free product was recovered via vacuum trucks, and contaminated soils were proposed to be excavated. However, related disposal documentation was not found during an internal file review of archived Sunoco documents, conducted by Stantec in 2016. No evidence of characterization soil sampling is available; therefore, two soil borings (AOI8-BH-16-062 and AOI8-BH-16-073) were completed in the area of the former tank containment berm as part of the AOI 8 RI activities (**Figure 4**). Two soil samples were collected from each soil boring and analyzed for the Evergreen Comprehensive List of COCs. In addition, shallow and deep soil samples were collected, at monitoring well N-146 to the southwest of tank PB 669,

in 2013 and analyzed for the Evergreen Comprehensive List of COCs. One sample exceeded the SHS for lead; however, the concentration did not exceed the lead SSS. No other COCs exceeded the SHS.

## 2.3 PB 1937 (FORMER PADEP TANK 131A, INCIDENTS 5914 AND 45965)

According to internal and PADEP records, two open incidents are listed for tank PB 1937. No documentation or information is available for Incident No. 5914 (dated 8/5/1989); however, a record of phone notification to PADEP regarding a release of 840 gallons of gas oil was noted on 2/7/1995. No evidence of characterization soil sampling is available for either incident; therefore, four perimeter soil borings (AOI8-BH-16-074 through AOI8-BH-16-077) were completed within the tank containment area of former tank PB 1937 (**Figure 5**). Two soil samples were collected from each soil boring and analyzed for the Evergreen Comprehensive List of COCs. Samples did not exceed the SHS or NRDC MSCs for any COCs.

# 3.0 QUALITY ASSURANCE/ QUALITY CONTROL

Methods established by Evergreen to examine data quality are outlined in **Appendix C**, Quality Assurance/Quality Control Plan and Field Procedures Manual. All fieldwork conducted as part of the site characterization activities was performed in accordance with the procedures outlined in the Evergreen Field Procedures Manual, **Appendix C**. The following sections describe specific aspects of quality assurance/quality control procedures that pertain to the activities outlined in this report.

## 3.1 EQUIPMENT DECONTAMINATION

All sampling equipment was either dedicated or decontaminated in accordance with the field sampling procedures to prevent cross-contamination. Prior to sampling, the equipment was decontaminated with successive rinses of detergent, potable water, and distilled water.

## 3.2 EQUIPMENT CALIBRATION

Air quality monitors used for both air monitoring and soil screening were calibrated prior to use. Both a zero calibration and a span calibration using gases of known concentration as recommended by the manufacturer (i.e. 100 parts per million by volume ($ppm_v$) isobutylene for the photoionization sensor) were performed.

## 3.3 SAMPLE PRESERVATION

Samples were placed directly into chemically preserved and/or non-preserved glassware provided by the analytical laboratory, as appropriate. All samples were preserved and shipped at a temperature of approximately 4° Celsius (C) or less by application of ice prior to shipment to the analytical laboratory. This temperature was maintained during shipment by placing ice in zip-top bags above, around, and below the sample containers.

## 3.4 DOCUMENTATION

Chain-of-custody forms were maintained throughout the sampling program to document sample acquisition, possession, and analysis. Chain-of-custody documentation accompanied all samples from the field to the laboratory. Each sample was assigned a unique identifier that was recorded in the field notes as well as on the chain-of-custody document.

# 4.0 SELECTION OF REMEDIATION STANDARDS

All soil results were screened using a multi-step process as described in this section. Soil sample analytical results were first screened against the PADEP non-residential, used aquifer (Total Dissolved Solids [TDS] less than or equal to 2,500 milligrams per liter [mg/L]) SHS. The following process was used to select the soil SHS for each COC:

- The highest value of either 100 times the groundwater MSC or the generic value MSC was selected to represent the soil to groundwater numeric value.
- The selected used aquifer, non-residential soil to groundwater numeric value was then compared to the NRDC MSC (0-2 or 2-15 ft bgs, as applicable).
- The more stringent of the soil to groundwater numeric value and the NRDC MSC was selected as the SHS for initial comparison of soil sample results.

To further evaluate the potential risk posed by the concentrations of COCs which were detected above their respective SHS, the next step in the screening process is to compare all of the soil analytical results to the NRDC MSCs.

An exception to this soil screening process exists for lead. On February 24, 2015, Evergreen submitted a Human Health Risk Assessment (HHRA) Report (Langan, 2015) to PADEP which presented the development of a risk-based numeric SSS for lead in soil. In a letter dated May 6, 2015, PADEP approved the HHRA, and a NRDC SSS for lead of 2,240 milligrams per kilogram (mg/kg) was established. This SSS is used in place of the default 0-2 ft bgs NRDC MSC for lead and is referred to as the lead SSS.

Remediation standards for soil will be selected for each incident and will apply specifically to impacted soils. The non-residential SHS is selected as the remediation standard for constituents that meet or are below the SHS.

For concentrations of COCs exceeding the SHS, a SSS via pathway elimination will be chosen as the remediation standard. In order for a pathway to be considered complete, it must have a source, a transport medium, a receptor, and exposure route. If concentrations are below the applicable NRDC MSCs, the direct contact exposure pathway is incomplete. The soil-to-groundwater pathway for exceedences of the SHS will be presented in the AOI 8 RIR.

# 5.0 ATTAINMENT OF REMEDIATION STANDARDS

Attainment of remediation standards will be demonstrated separately for each incident as outlined below, and selected remediation standards will apply within the AST containment berm area.

## 5.1 PB 552: NON-RESIDENTIAL STATEWIDE HEALTH STANDARD AND SITE SPECIFIC STANDARD

For this incident, exceedences of the SHS exceedances were noted for naphthalene in four sample locations (AOI8-GP-2, AOI8-GP-5, AOI8-GP-6, and AOI8-GP-11). The highest concentration of naphthalene detected was 48 mg/kg. Concentrations of naphthalene did not exceed the applicable NRDC MSC; therefore, the direct contact exposure pathway is considered incomplete. The soil-to-groundwater pathway is being addressed in the AOI 8 RIR. A vapor intrusion pathway is considered incomplete due to the absence of occupied buildings in the area of PB 552. The selected remediation standards for soil have been attained; therefore, the remedial action for soils at tank PB 552 is complete.

## 5.2 PB 669: NON-RESIDENTIAL STATEWIDE HEALTH STANDARD AND SITE SPECIFIC STANDARD

A concentration of lead exceeded the SHS for the deep sample at AOI8-BH-16-073. This detection did not exceed the lead SSS. Therefore, a direct contact exposure pathway is considered incomplete. No other COCs were detected above the SHS. A vapor intrusion pathway is considered to be incomplete due to the absence of occupied buildings in the area of PB 669. The soil-to-groundwater pathway is being addressed in the AOI 8 RIR. Selected remediation standards are considered to be in attainment at PB 669.

## 5.3 PB 1937: NON-RESIDENTIAL STATEWIDE HEALTH STANDARD

Concentrations of COCs were not detected in any of the soil samples above the SHS; therefore, the SHS is attained. The soil-to-groundwater pathway is being addressed in the AOI 8 RIR. No occupied buildings are present in the vicinity of tank PB 1937; therefore, a vapor intrusion pathway is incomplete. The soil remediation standards for PB 1937 are considered to be in attainment, and remedial action at PB 1937 is considered complete.

# 6.0 Post Remedial Measures

No additional measures are required in order to maintain attainment of the selected remediation standards in soil associated with tanks PB 552, PB 669, and PB 1937.

Currently, the vapor intrusion pathway is incomplete because of the lack of receptors (occupied buildings) in the PB 552, PB 669, and PB 1937 tank containment areas. A vapor intrusion assessment will be conducted in a future submittal. If necessary, an institutional/engineering control will be established for any future occupied buildings planned in these tank areas in order to assure that this pathway remains incomplete.

The engineering/institutional control described herein will be formalized in an environmental covenant for the PES Complex.

# 7.0 CONCLUSIONS

Through site characterization performed as part of tank closure activities and through additional sampling conducted during the AOI 8 RI, characterization and delineation of four AOI 8 open incidents is considered complete. Additional information about the AOI, including a comprehensive conceptual site model, will be submitted in the AOI 8 RIR under the Act 2/One Cleanup Program.

Attainment of the SHS for all COCs has been demonstrated for two open incidents, No. 5914 and No. 45965 at Tank PB 1937. Attainment of the SHS has been demonstrated in soil for COCs at tanks PB 552 and PB 669, with the exception of naphthalene at PB 552 and lead at PB 669. Attainment of the SSS via pathway elimination has been demonstrated in soils for Incident No. 31920 and 5912, for naphthalene and lead, respectively.

Based on the soil results described in this report, the site characterization is complete for open tank incidents listed in this report. Within the tank containment dikes, concentrations of COCs in soils have been delineated to the selected remediation standards. Attainment of SHS has been demonstrated for all COCs that are below the SHS. Furthermore, the vapor intrusion pathway is incomplete due to an absence of occupied buildings in tank containment berm areas. Potential future vapor intrusion pathways will be evaluated in a future submittal and if necessary, formalized in an environmental covenant. Impacts to groundwater will be addressed through the One Cleanup Program process. Therefore, attainment of selected remediation standards is complete for these incidents.

No further action in association with these open incidents is warranted, and Evergreen requests approval of this SCR/RACR and the closure of the following open incidents: 31920, 5912, 5914, 45965.

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# TABLES

SITE CHARACTERIZATION REPORT / REMEDIAL ACTION COMPLETION REPORT FOR ABOVEGROUND STORAGE TANKS
PB 552, PB 669, AND PB 1937

Philadelphia Refining Complex, Point Breeze Refinery
3144 Passyunk Ave, Philadelphia, Pennsylvania

Stantec

**Table 1**
**2016 Soil Characterization Activities Summary**
**Area of Interest 8, Philadelphia Refining Complex**
**Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC**

| Location ID | General Descripton of Physical Location | Location Rationale | Product Type | Soil Sample Depths (feet below ground surface) | Analyte List |
|---|---|---|---|---|---|
| AOI8-BH-16-062 | Former Tank PB 669 | Characterize soil in area of open incident at PB 669 | Gas Oil | 0-2, 2-15[1] | Evergreen Comprehensive List |
| AOI8-BH-16-073 | Former Tank PB 669 | Characterize soil in area of open incident at PB 669 | Gas Oil | 0-2, 2-15[1] | Evergreen Comprehensive List |
| AOI8-BH-16-074 | Former Tank PB 1937 | Characterize soil in area of open incident at PB 1937 | Gas Oil | 0-2, 2-15[1] | Evergreen Comprehensive List |
| AOI8-BH-16-075 | Former Tank PB 1937 | Characterize soil in area of open incident at PB 1937 | Gas Oil | 0-2, 2-15[1] | Evergreen Comprehensive List |
| AOI8-BH-16-076 | Former Tank PB 1937 | Characterize soil in area of open incident at PB 1937 | Gas Oil | 0-2, 2-15[1] | Evergreen Comprehensive List |
| AOI8-BH-16-077 | Former Tank PB 1937 | Characterize soil in area of open incident at PB 1937 | Gas Oil | 0-2, 2-15[1] | Evergreen Comprehensive List |

Notes:
1. 2'-15' samples collected from the interval exhibiting the highest PID reading above the water table

**Table 2**
**Soil Analytical Results Summary - Non-Residential Statewide Health Standards**
**Area of Interest 8, Philadelphia Refining Complex**
**Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC**

| | | | PB 669 | | | | | | PB 552 | | | | | | | | | | | PB 1937 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sample Location** | | | AOI8-BH-16-062 | | AOI8-BH-16-073 | | N-146 | | AOI8-GP-1 | AOI8-GP-2 | AOI8-GP-3 | AOI8-GP-4 | AOI8-GP-5 | AOI8-GP-6 | AOI8-GP-7 | AOI8-GP-8 | AOI8-GP-9 | AOI8-GP-10 | AOI8-GP-11 | AOI8-BH-16-074 | | AOI8-BH-16-075 | | AOI8-BH-16-076 | | AOI8-BH-16-077 | |
| **Sample Date** | | | 13-Sep-16 | 13-Sep-16 | 13-Sep-16 | 13-Sep-16 | 6-Nov-13 | 7-Nov-13 | 3-Jun-03 | 3-Jun-03 | 3-Jun-03 | 3-Jun-03 | 4-Jun-03 | 4-Jun-03 | 4-Jun-03 | 4-Jun-03 | 4-Jun-03 | 4-Jun-03 | 4-Jun-03 | 25-Aug-16 | 25-Aug-16 | 25-Aug-16 | 25-Aug-16 | 25-Aug-16 | 25-Aug-16 | 25-Aug-16 | 25-Aug-16 |
| **Sample ID** | | | AOI8-BH-16-062-0-2-20160913 | AOI8-BH-16-062-12-14-20160913 | AOI8-BH-16-073-0-2-20160913 | AOI8-BH-16-073-12-14-20160913 | AOI-8-N-146-0-2 | AOI-8-N-146-17-18 | GP-1 12-14' | GP-2 10-12' | GP-3 8-10' | GP-4 10-12' | GP-5 10-12' | GP-6 10-12' | GP-7 10-12' | GP-8 10-12' | GP-9 10-12' | GP-10 10-12' | GP-11 10-12' | AOI8-BH-16-074-0-2-20160825 | AOI8-BH-16-074-6-8-20160825 | AOI8-BH-16-075-0-2-20160825 | AOI8-BH-16-075-4-6-20160825 | AOI8-BH-16-076-0-2-20160825 | AOI8-BH-16-076-4-6-20160825 | AOI8-BH-16-077-0-2-20160825 | AOI8-BH-16-077-4-6-20160825 |
| **Sample Depth** | | | 0 - 2 ft | 12 - 14 ft | 0 - 2 ft | 12 - 14 ft | 0 - 2 ft | 17 - 18 ft | 12 - 14 ft | 10 - 12 ft | 8 - 10 ft | 10 - 12 ft | 10 - 12 ft | 10 - 12 ft | 10 - 12 ft | 10 - 12 ft | 10 - 12 ft | 10 - 12 ft | 10 - 12 ft | 0 - 2 ft | 6 - 8 ft | 0 - 2 ft | 4 - 6 ft | 0 - 2 ft | 4 - 6 ft | 0 - 2 ft | 4 - 6 ft |
| **Sampling Company** | | | AQUATERRA | AQUATERRA | AQUATERRA | AQUATERRA | STANTEC | STANTEC | AQUATERRA | AQUATERRA | AQUATERRA | AQUATERRA | AQUATERRA | AQUATERRA | AQUATERRA | AQUATERRA | AQUATERRA | AQUATERRA | AQUATERRA | AQUATERRA | AQUATERRA | AQUATERRA | AQUATERRA | AQUATERRA | AQUATERRA | AQUATERRA | AQUATERRA |
| **Laboratory** | | | ESC | ESC | ESC | ESC | ACCUTEST | ACCUTEST | LL | LL | LL | LL | LL | LL | LL | LL | LL | LL | LL | ESC | ESC | ESC | ESC | ESC | ESC | ESC | ESC |
| **Laboratory Work Order** | | SHS-PA | L859570 | L859570 | L859570 | L859570 | JB52301 | JB52677 | 854405 | 854405 | 854405 | 854405 | 854608 | 854608 | 854608 | 854608 | 854608 | 854608 | 854608 | L856076 | L856076 | L856076 | L856076 | L856076 | L856076 | L856076 | L856076 |
| **Laboratory Sample ID** | **Units** | **A B** | L859570-09 | L859570-10 | L859570-11 | L859570-12 | JB52301-3 | JB52677-4 | 4056154 | 4056155 | 4056156 | 4056157 | 4057230 | 4057231 | 4057232 | 4057233 | 4057234 | 4057235 | 4057236 | L856076-23 | L856076-24 | L856076-25 | L856076-26 | L856076-27 | L856076-28 | L856076-29 | L856076-30 |
| **Volatile Organic Compounds** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BENZENE | mg/kg | 0.5[AB] | ND (0.00127) | ND (0.00124) | 0.116 | ND (0.362) | ND (0.00098) | ND (0.110) | ND (0.11) | ND (0.22) | ND (0.19) | ND (0.20) | ND (0.21) | *ND (0.59)* | ND (0.097) | ND (0.088) | ND (0.011) | ND (0.044) | ND (0.19) | ND (0.00183) | 0.00470 | ND (0.00122) | 0.00228 | 0.00149 | 0.0678 | 0.00188 | 0.00276 |
| CYCLOHEXANE | mg/kg | 6900[AB] | ND (0.00127) | ND (0.00124) | 0.683 | 6.53 | ND (0.0049) | 0.622 | - | - | - | - | - | - | - | - | - | - | - | ND (0.00183) | 0.00402 | ND (0.00122) | ND (0.00131) | ND (0.00108) | ND (0.00104) | ND (0.00140) | ND (0.00122) |
| 1,2-DIBROMOETHANE (EDB) | mg/kg | 0.005[AB] | ND (0.00127) | ND (0.00124) | *ND (0.0110)* | *ND (0.460)* | - | - | - | - | - | - | - | - | - | - | - | - | - | ND (0.00183) | ND (0.00140) | ND (0.00122) | ND (0.00131) | ND (0.00108) | ND (0.00104) | ND (0.00140) | ND (0.00122) |
| 1,2-DICHLOROETHANE (EDC) | mg/kg | 0.5[AB] | ND (0.00127) | ND (0.00124) | ND (0.0320) | ND (0.354) | ND (0.00098) | ND (0.110) | - | - | - | - | - | - | - | - | - | - | - | ND (0.00183) | ND (0.00140) | ND (0.00122) | ND (0.00131) | ND (0.00108) | ND (0.00104) | ND (0.00140) | ND (0.00122) |
| ETHYLBENZENE | mg/kg | 70[AB] | ND (0.00127) | ND (0.00124) | 0.0375 | ND (1.34) | ND (0.00098) | ND (0.110) | ND (0.34) | ND (0.77) | ND (0.54) | ND (0.55) | ND (0.21) | ND (1.8) | ND (0.097) | ND (0.088) | ND (0.022) | ND (0.044) | ND (0.67) | ND (0.00183) | ND (0.00140) | ND (0.00122) | ND (0.00131) | ND (0.00108) | ND (0.00104) | ND (0.00140) | ND (0.00122) |
| ISOPROPYLBENZENE (CUMENE) | mg/kg | 2500[AB] | ND (0.0127) | ND (0.0124) | ND (0.320) | 15.6 | ND (0.0049) | 0.562 J | 4.0 | 13 | 6.4 | 7.1 | 8.7 | 19 | 4.7 | 3.8 | ND (0.28) | 2.3 | 7.1 | ND (0.0183) | ND (0.0140) | ND (0.0122) | ND (0.0131) | ND (0.0108) | ND (0.0104) | ND (0.0140) | ND (0.0122) |
| METHYL TERTIARY BUTYL ETHER | mg/kg | 2[AB] | ND (0.00127) | ND (0.00124) | ND (0.0320) | ND (1.34) | ND (0.00098) | ND (0.110) | - | - | - | - | - | - | - | - | - | - | - | ND (0.00183) | ND (0.00140) | ND (0.00122) | ND (0.00131) | ND (0.00108) | ND (0.00104) | ND (0.00140) | ND (0.00122) |
| HEXANE | mg/kg | 5600[AB] | ND (0.0127) | ND (0.0124) | ND (0.320) OE I | ND (13.4) | ND (0.0049) | ND (0.570) | - | - | - | - | - | - | - | - | - | - | - | ND (0.0183) | ND (0.0140) | ND (0.0122) | ND (0.0131) | ND (0.0108) | ND (0.0104) | ND (0.0140) | ND (0.0122) |
| NAPHTHALENE | mg/kg | 25[AB] | - | - | - | - | - | - | 16 | **33 [B]** | 19 | 24 | **32 [B]** | **48 [B]** | 16 | 13 | 1.4 | 17 | **40 [B]** | - | - | - | - | - | - | - | - |
| BUTYLBENZENE, SEC- | mg/kg | 2800[AB] | ND (0.00127) | ND (0.00124) | 0.0821 | 1.73 | ND (0.0049) | 0.395 J | - | - | - | - | - | - | - | - | - | - | - | ND (0.00183) | ND (0.00140) | ND (0.00122) | ND (0.00131) | ND (0.00108) | ND (0.00104) | ND (0.00140) | ND (0.00122) |
| BUTYLBENZENE, TERT- | mg/kg | 2200[AB] | ND (0.00127) | ND (0.00124) | 0.150 | ND (1.34) | ND (0.0049) | 0.312 J | - | - | - | - | - | - | - | - | - | - | - | ND (0.00183) | 0.0246 | ND (0.00122) | ND (0.00131) | ND (0.00108) | ND (0.00104) | ND (0.00140) | ND (0.00122) |
| TOLUENE | mg/kg | 100[AB] | ND (0.00637) | ND (0.00622) | ND (0.160) | ND (6.70) | ND (0.00098) | ND (0.110) | ND (0.23) | ND (0.51) | ND (0.22) | ND (0.33) | ND (0.29) | ND (1.2) | ND (0.22) | ND (0.22) | ND (0.022) | ND (0.11) | ND (0.22) | ND (0.00914) | ND (0.00702) | ND (0.00612) | ND (0.00654) | ND (0.00540) | ND (0.00521) | ND (0.00700) | ND (0.00609) |
| 1,2,4-TRIMETHYLBENZENE | mg/kg | 35[AB] | ND (0.00127) | 0.00539 | 0.0713 | 11.4 | ND (0.0049) | 0.150 J | - | - | - | - | - | - | - | - | - | - | - | ND (0.00183) | ND (0.00140) | ND (0.00122) | ND (0.00131) | ND (0.00108) | ND (0.00104) | ND (0.00140) | ND (0.00122) |
| 1,3,5-TRIMETHYLBENZENE | mg/kg | 210[AB] | ND (0.00127) | 0.00186 | ND (0.0320) | 2.70 | ND (0.0049) | ND (0.570) | - | - | - | - | - | - | - | - | - | - | - | ND (0.00183) | ND (0.00140) | ND (0.00122) | ND (0.00131) | ND (0.00108) | ND (0.00104) | ND (0.00140) | ND (0.00122) |
| XYLENES, TOTAL (DIMETHYLBENZENE) | mg/kg | 1000[AB] | ND (0.00382) | ND (0.00373) | 0.125 | 8.86 | ND (0.00098) | ND (0.110) | ND (3.4) | ND (4.5) | ND (4.3) | ND (3.3) | ND (2.9) | ND (7.0) | ND (2.2) | ND (1.0) | 0.24 | ND (0.66) | ND (3.3) | ND (0.00548) | ND (0.00421) | ND (0.00367) | ND (0.00392) | ND (0.00324) | ND (0.00312) | ND (0.00420) | ND (0.00365) |
| **Volatile Organic Compounds (SW8011)** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1,2-DIBROMOETHANE (EDB) | mg/kg | 0.005[AB] | - | - | - | - | ND (0.0028) | ND (0.0030) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| **Semi-Volatile Organic Compounds** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ACENAPHTHENE | mg/kg | 4700[AB] | ND (0.0421) | ND (0.0411) | ND (0.430) | 8.39 | ND (0.037) | 0.294 | - | - | - | - | - | - | - | - | - | - | - | ND (0.102) | ND (0.232) | ND (0.202) | ND (0.431) | ND (3.46) | ND (0.0344) | ND (0.0462) | ND (0.402) |
| ANTHRACENE | mg/kg | 350[AB] | ND (0.0421) | ND (0.0411) | ND (0.430) | 4.10 | 0.0493 | 0.526 | - | - | - | - | - | - | - | - | - | - | - | ND (0.102) | ND (0.232) | ND (0.202) | ND (0.431) | ND (3.46) | ND (0.0344) | ND (0.0462) | ND (0.402) |
| BENZO(A)ANTHRACENE | mg/kg | 130[A] 430[B] | ND (0.0421) | 0.115 | ND (4.30) | ND (5.00) | 0.192 | 0.640 | - | - | - | - | - | - | - | - | - | - | - | ND (0.102) | ND (0.232) | ND (0.202) | 0.566 | ND (3.46) | 0.0498 | 0.0684 | 0.551 |
| BENZO(A)PYRENE | mg/kg | 12[A] 46[B] | ND (0.0421) | 0.112 | ND (4.30) | 3.58 | 0.286 | 0.487 | - | - | - | - | - | - | - | - | - | - | - | ND (0.102) | ND (0.232) | ND (0.202) | 0.702 | ND (3.46) | 0.0665 | 0.0826 | 0.683 |
| BENZO(B)FLUORANTHENE | mg/kg | 76[A] 170[B] | ND (0.0421) | 0.148 | ND (4.30) | 3.32 | 0.330 | 0.523 | - | - | - | - | - | - | - | - | - | - | - | ND (0.102) | ND (0.232) | ND (0.202) | 0.846 | 6.45 | 0.0867 | 0.103 | 0.803 |
| BENZO(G,H,I)PERYLENE | mg/kg | 180[AB] | ND (0.0421) | 0.0471 | ND (4.30) | ND (2.50) | 0.525 | 0.404 | - | - | - | - | - | - | - | - | - | - | - | ND (0.102) | ND (0.232) | ND (0.202) | ND (0.431) | ND (3.46) | 0.0382 | 0.0495 | ND (0.402) |
| BENZO(K)FLUORANTHENE | mg/kg | 76[A] 610[B] | ND (0.0421) | 0.0448 | ND (4.30) | ND (2.50) | 0.0987 | 0.108 | - | - | - | - | - | - | - | - | - | - | - | ND (0.102) | ND (0.232) | ND (0.202) | ND (0.431) | ND (3.46) | ND (0.0344) | ND (0.0462) | ND (0.402) |
| 1,1'-BIPHENYL | mg/kg | 190[AB] | ND (0.424) | ND (0.415) | ND (4.34) | ND (25.2) | ND (0.074) | ND (0.073) | - | - | - | - | - | - | - | - | - | - | - | ND (1.03) | ND (2.34) | ND (2.04) | ND (4.35) | ND (34.9) | ND (0.347) | ND (0.466) | ND (4.06) |
| BIS(2-ETHYLHEXYL)PHTHALATE | mg/kg | 130[AB] | ND (0.424) | ND (0.415) | ND (43.4) | ND (50.4) | ND (0.074) | ND (0.073) | - | - | - | - | - | - | - | - | - | - | - | ND (1.03) | ND (2.34) | ND (2.04) | ND (4.35) | ND (34.9) | ND (0.347) | ND (0.466) | ND (4.06) |
| DI-N-BUTYL PHTHALATE | mg/kg | 4900[AB] | ND (0.424) | ND (0.415) | ND (4.34) | ND (25.2) | ND (0.074) | ND (0.073) | - | - | - | - | - | - | - | - | - | - | - | ND (1.03) | ND (2.34) | ND (2.04) | ND (4.35) | ND (34.9) | ND (0.347) | ND (0.466) | ND (4.06) |
| CHRYSENE | mg/kg | 230[AB] | ND (0.0421) | 0.101 | ND (4.30) | 5.60 | 0.285 | 1.09 | - | - | - | - | - | - | - | - | - | - | - | ND (0.102) | ND (0.232) | ND (0.202) | 0.567 | 3.85 | 0.0528 | 0.0697 | 0.523 |
| DIBENZ(A,H)ANTHRACENE | mg/kg | 22[A] 270[B] | ND (0.0421) | ND (0.0411) | ND (4.30) | ND (2.50) | 0.0946 | 0.154 | - | - | - | - | - | - | - | - | - | - | - | ND (0.102) | ND (0.232) | ND (0.202) | ND (0.431) | ND (3.46) | ND (0.0344) | ND (0.0462) | ND (0.402) |
| DIETHYL PHTHALATE | mg/kg | 9300[AB] | ND (0.424) | ND (0.415) | ND (4.34) | ND (25.2) | ND (0.074) | ND (0.073) | - | - | - | - | - | - | - | - | - | - | - | ND (1.03) | ND (2.34) | ND (2.04) | ND (4.35) | ND (34.9) | ND (0.347) | ND (0.466) | ND (4.06) |
| 2,4-DIMETHYLPHENOL | mg/kg | 230[AB] | ND (0.424) | ND (0.415) | ND (4.34) | ND (25.2) | ND (0.180) | ND (0.180) | - | - | - | - | - | - | - | - | - | - | - | ND (1.03) | ND (2.34) | ND (2.04) | ND (4.35) | ND (34.9) | ND (0.347) | ND (0.466) | ND (4.06) |
| 2,4-DINITROPHENOL | mg/kg | 23[AB] | ND (0.424) | ND (0.415) | ND (4.34) | ND (7.42) | ND (0.740) | ND (0.730) | - | - | - | - | - | - | - | - | - | - | - | ND (1.03) | ND (2.34) | ND (2.04) | ND (4.35) | ND (10.3) | ND (0.347) | ND (0.466) | ND (4.06) |
| FLUORANTHENE | mg/kg | 3200[AB] | ND (0.0421) | 0.165 | ND (0.430) | 5.17 | 0.317 | 1.04 | - | - | - | - | - | - | - | - | - | - | - | ND (0.102) | ND (0.232) | ND (0.202) | 0.645 | ND (3.46) | 0.0452 | 0.0987 | 0.599 |
| FLUORENE | mg/kg | 3800[AB] | ND (0.0421) | ND (0.0411) | 0.517 | 10.6 | ND (0.037) | 1.05 | 4.4 | 1.6 | 4.3 | 6.2 | 6.2 | 7.4 | 2.4 | 2.5 | 4.4 | 5.2 | 6.5 | ND (0.102) | ND (0.232) | ND (0.202) | ND (0.431) | ND (3.46) | ND (0.0344) | ND (0.0462) | ND (0.402) |
| INDENO(1,2,3-C,D)PYRENE | mg/kg | 76[A] 22000[B] | ND (0.0421) | 0.0452 | ND (4.30) | ND (2.50) | 0.265 | 0.245 | - | - | - | - | - | - | - | - | - | - | - | ND (0.102) | ND (0.232) | ND (0.202) | ND (0.431) | ND (3.46) | 0.0350 | ND (0.0462) | ND (0.402) |
| 2-METHYLNAPHTHALENE | mg/kg | 1900[AB] | ND (0.0421) | ND (0.0411) | 1.56 | 145 | ND (0.074) | ND (0.073) | - | - | - | - | - | - | - | - | - | - | - | 0.122 | ND (0.232) | ND (0.202) | ND (0.431) | ND (3.46) | ND (0.0344) | ND (0.0462) | ND (0.402) |
| CRESOL, M,P- (3&4-METHYLPHENOL) | mg/kg | 58*[AB] | ND (0.424) | ND (0.415) | ND (4.34) | ND (25.2) | ND (0.074) | ND (0.073) | - | - | - | - | - | - | - | - | - | - | - | ND (1.03) | ND (2.34) | ND (2.04) | ND (4.35) | ND (34.9) | ND (0.347) | ND (0.466) | ND (4.06) |
| CRESOL, O- (2-METHYLPHENOL) | mg/kg | 580[AB] | ND (0.424) | ND (0.415) | ND (4.34) | ND (25.2) | ND (0.074) | ND (0.073) | - | - | - | - | - | - | - | - | - | - | - | ND (1.03) | ND (2.34) | ND (2.04) | ND (4.35) | ND (34.9) | ND (0.347) | ND (0.466) | ND (4.06) |
| NAPHTHALENE | mg/kg | 25[AB] | ND (0.0421) | ND (0.0411) | ND (0.430) | 10.4 | ND (0.037) | ND (0.036) | - | - | - | - | - | - | - | - | - | - | - | ND (0.102) | ND (0.232) | ND (0.202) | ND (0.431) | ND (3.46) | ND (0.0344) | ND (0.0462) | ND (0.402) |
| 4-NITROPHENOL | mg/kg | 6[AB] | ND (0.424) | ND (0.415) | ND (4.34) | ND (3.97) | ND (0.370) | ND (0.360) | - | - | - | - | - | - | - | - | - | - | - | ND (1.03) | ND (2.34) | ND (2.04) | ND (4.35) | ND (5.50) | ND (0.347) | ND (0.466) | ND (4.06) |
| PHENANTHRENE | mg/kg | 10000[AB] | ND (0.0421) | ND (0.0411) | 1.26 | 24.5 | 0.134 | 3.21 | 14 | 4.8 | 12 | 18 | 16 | 16 | 4.7 | 7.4 | 15 | 26 | 17 | ND (0.102) | ND (0.232) | ND (0.202) | ND (0.431) | ND (3.46) | ND (0.0344) | ND (0.0462) | ND (0.402) |
| PHENOL | mg/kg | 200[AB] | ND (0.424) | ND (0.415) | ND (4.34) | ND (25.2) | ND (0.074) | ND (0.073) | - | - | - | - | - | - | - | - | - | - | - | ND (1.03) | ND (2.34) | ND (2.04) | ND (4.35) | ND (34.9) | ND (0.347) | ND (0.466) | ND (4.06) |
| PYRENE | mg/kg | 2200[AB] | ND (0.0421) | 0.131 | ND (4.30) | 7.49 | 0.256 | 1.21 | - | - | - | - | - | - | - | - | - | - | - | ND (0.102) | ND (0.232) | ND (0.202) | 0.650 | ND (3.46) | 0.0462 | 0.0896 | 0.603 |
| PYRIDINE | mg/kg | 12[AB] | ND (0.424) | ND (0.415) | ND (4.34) | ND (4.75) | ND (0.074) | ND (0.073) | - | - | - | - | - | - | - | - | - | - | - | ND (1.03) | ND (2.34) | ND (2.04) | ND (4.35) | ND (6.58) | ND (0.347) | ND (0.466) | ND (4.06) |
| QUINOLINE | mg/kg | 0.37[AB] | ND (0.0731) | ND (0.0715) | *ND (0.749)* | *ND (4.35)* | ND (0.180) | ND (0.180) | - | - | - | - | - | - | - | - | - | - | - | ND (0.178) OE | *ND (0.403) OE* | ND (0.351) OE | *ND (0.751) OE* | *ND (6.02) OE* | ND (0.347) OE | ND (0.0804) OE | *ND (0.699) OE* |
| **Metals** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| COBALT | mg/kg | 160[AB] | 4.20 | 7.10 | 13.3 | 21.6 | 6.8 | 13.3 | - | - | - | - | - | - | - | - | - | - | - | ND (1.55) | 1.70 | 5.98 | 3.51 | 3.04 | 5.11 | 5.53 | 3.00 |
| LEAD | mg/kg | 450[AB] | 26.7 | 49.8 | 124 | **1660 [B]** | 125 | 31.9 | - | - | - | - | - | - | - | - | - | - | - | 24.9 | 13.6 | 68.6 | 75.3 | 76.9 | 186 | 20.3 | 70.8 |
| NICKEL | mg/kg | 650[AB] | 15.5 | 18.5 | 28.7 | 49.4 | 47.3 | 20.2 | - | - | - | - | - | - | - | - | - | - | - | 10.5 | 4.38 | 14.5 | 29.9 | 12.5 | 10.3 | 14.8 | 16.0 |
| VANADIUM | mg/kg | 220[A] 820[B] | 47.4 | 37.7 | 64.1 | 52.3 | 41.4 | 24.5 | - | - | - | - | - | - | - | - | - | - | - | 63.8 | 9.88 | 39.6 | 41.6 | 26.0 | 26.2 | 50.8 | 69.5 |
| ZINC | mg/kg | 12000[AB] | 53.5 | 63.4 | 149 | 549 | 190 | 75.0 | - | - | - | - | - | - | - | - | - | - | - | 44.8 | 20.6 | 65.5 | 123 | 68.6 | 134 | 64.3 | 119 |

See last page for notes.

**Table 2**
**Soil Analytical Results Summary - Non-Residential Statewide Health Standards**
**Area of Interest 8, Philadelphia Refining Complex**
**Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC**

**Notes:**

| | |
|---|---|
| SHS-PA | Pennsylvania Department of Environmental Protection - Statewide Health Standards |
| A | PADEP Non-Residential Statewide Health Standards (0-2 ft bgs) (Unsaturated Soil) |
| B | PADEP Non-Residential Statewide Health Standards (>2 ft bgs) (Unsaturated Soil) |
| **6.5** A | Concentration exceeds the indicated standard. |
| 15.2 | Measured concentration did not exceed the indicated standard. |
| *ND (0.50)* | Indicates the laboratory method detection limit (if available) was above the applicable standard. The reporting limit is shown if the laboratory method detection limit is not available. |
| ND (0.03) | Indicates concentration not detected above the laboratory reporting limit (in parentheses) except when the reporting limit is greater than the standard in which case the method detectio |
| - | Parameter not analyzed / not available |
| - | Cresol, m&p (3-Methylphenol & 4-Methylphenol) co-elute and are reported as the summation of the co-eluting compounds. Standards shown are the stricter of the two. |
| I | Matrix Interference |
| J | Indicates an estimated value |
| OE | The associated batch QC was outside the established quality control range for precision/accuracy. |
| mg/kg | milligrams per kilogram |
| LL | Eurofins Lancaster Laboratories Environmental |
| ESC | ESC Lab Sciences |
| ACCUTEST | Accutest Laboratories |

**Table 3**
**Soil Analytical Results Summary**
**Non-Residential Direct Contact Medium-Specific Concentrations**
**Area of Interest 8, Philadelphia Refining Complex**
**Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC**

| | | | PB 669 | | | | | | PB 552 | | | | | | | | | | | PB 1937 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sample Location** | | | **AOI8-BH-16-062** | | **AOI8-BH-16-073** | | **N-146** | | **AOI8-GP-1** | **AOI8-GP-2** | **AOI8-GP-3** | **AOI8-GP-4** | **AOI8-GP-5** | **AOI8-GP-6** | **AOI8-GP-7** | **AOI8-GP-8** | **AOI8-GP-9** | **AOI8-GP-10** | **AOI8-GP-11** | **AOI8-BH-16-074** | | **AOI8-BH-16-075** | | **AOI8-BH-16-076** | | **AOI8-BH-16-077** | |
| **Sample Date** | | | **13-Sep-16** | **13-Sep-16** | **13-Sep-16** | **13-Sep-16** | **6-Nov-13** | **7-Nov-13** | **3-Jun-03** | **3-Jun-03** | **3-Jun-03** | **3-Jun-03** | **4-Jun-03** | **4-Jun-03** | **4-Jun-03** | **4-Jun-03** | **4-Jun-03** | **4-Jun-03** | **4-Jun-03** | **25-Aug-16** | **25-Aug-16** | **25-Aug-16** | **25-Aug-16** | **25-Aug-16** | **25-Aug-16** | **25-Aug-16** | **25-Aug-16** |
| **Sample ID** | | | **AOI8-BH-16-062 0-2-20160913** | **AOI8-BH-16-062 12-14-20160913** | **AOI8-BH-16-073 0-2-20160913** | **AOI8-BH-16-073 12-14-20160913** | **AOI-8-N-146-0-2** | **AOI-8-N-146-17 18** | **GP-1 12-14'** | **GP-2 10-12'** | **GP-3 8-10'** | **GP-4 10-12'** | **GP-5 10-12'** | **GP-6 10-12'** | **GP-7 10-12'** | **GP-8 10-12'** | **GP-9 10-12'** | **GP-10 10-12'** | **GP-11 10-12'** | **AOI8-BH-16-074 0-2-20160825** | **AOI8-BH-16-074 6-8-20160825** | **AOI8-BH-16-075 0-2-20160825** | **AOI8-BH-16-075 4-6-20160825** | **AOI8-BH-16-076 0-2-20160825** | **AOI8-BH-16-076 4-6-20160825** | **AOI8-BH-16-077 0-2-20160825** | **AOI8-BH-16-077 4-6-20160825** |
| **Sample Depth** | | | **0 - 2 ft** | **12 - 14 ft** | **0 - 2 ft** | **12 - 14 ft** | **0 - 2 ft** | **17 - 18 ft** | **12 - 14 ft** | **10 - 12 ft** | **8 - 10 ft** | **10 - 12 ft** | **10 - 12 ft** | **10 - 12 ft** | **10 - 12 ft** | **10 - 12 ft** | **10 - 12 ft** | **10 - 12 ft** | **10 - 12 ft** | **0 - 2 ft** | **6 - 8 ft** | **0 - 2 ft** | **4 - 6 ft** | **0 - 2 ft** | **4 - 6 ft** | **0 - 2 ft** | **4 - 6 ft** |
| **Sampling Company** | | | **AQUATERRA** | **AQUATERRA** | **AQUATERRA** | **AQUATERRA** | **STANTEC** | **STANTEC** | **AQUATERRA** | **AQUATERRA** | **AQUATERRA** | **AQUATERRA** | **AQUATERRA** | **AQUATERRA** | **AQUATERRA** | **AQUATERRA** | **AQUATERRA** | **AQUATERRA** | **AQUATERRA** | **AQUATERRA** | **AQUATERRA** | **AQUATERRA** | **AQUATERRA** | **AQUATERRA** | **AQUATERRA** | **AQUATERRA** | **AQUATERRA** |
| **Laboratory** | | | **ESC** | **ESC** | **ESC** | **ESC** | **ACCUTEST** | **ACCUTEST** | **LL** | **LL** | **LL** | **LL** | **LL** | **LL** | **LL** | **LL** | **LL** | **LL** | **LL** | **ESC** | **ESC** | **ESC** | **ESC** | **ESC** | **ESC** | **ESC** | **ESC** |
| **Laboratory Work Order** | | **MSC-PA** | **L859570** | **L859570** | **L859570** | **L859570** | **JB52301** | **JB52677** | **854405** | **854405** | **854405** | **854405** | **854608** | **854608** | **854608** | **854608** | **854608** | **854608** | **854608** | **L856076** | **L856076** | **L856076** | **L856076** | **L856076** | **L856076** | **L856076** | **L856076** |
| **Laboratory Sample ID** | **Units** | **A B** | **L859570-09** | **L859570-10** | **L859570-11** | **L859570-12** | **JB52301-3** | **JB52677-4** | **4056154** | **4056155** | **4056156** | **4056157** | **4057230** | **4057231** | **4057232** | **4057233** | **4057234** | **4057235** | **4057236** | **L856076-23** | **L856076-24** | **L856076-25** | **L856076-26** | **L856076-27** | **L856076-28** | **L856076-29** | **L856076-30** |
| **Volatile Organic Compounds** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BENZENE | mg/kg | 290^ 330[B] | ND (0.00127) | ND (0.00124) | 0.116 | ND (1.34) | ND (0.00098) | ND (0.110) | ND (0.11) | ND (0.22) | ND (0.19) | ND (0.20) | ND (0.21) | ND (0.59) | ND (0.097) | ND (0.088) | ND (0.011) | ND (0.044) | ND (0.19) | ND (0.00183) | 0.00470 | ND (0.00122) | 0.00228 | 0.00149 | 0.0678 | 0.00188 | 0.00276 |
| CYCLOHEXANE | mg/kg | 10000[AB] | ND (0.00127) | ND (0.00124) | 0.683 | 6.53 | ND (0.0049) | 0.622 | - | - | - | - | - | - | - | - | - | - | - | ND (0.00183) | 0.00402 | ND (0.00122) | ND (0.00131) | ND (0.00108) | ND (0.00104) | ND (0.00140) | ND (0.00122) |
| 1,2-DIBROMOETHANE (EDB) | mg/kg | 3.7^ 4.3[B] | ND (0.00127) | ND (0.00124) | ND (0.0320) | ND (1.34) | - | - | - | - | - | - | - | - | - | - | - | - | - | ND (0.00183) | ND (0.00140) | ND (0.00122) | ND (0.00131) | ND (0.00108) | ND (0.00104) | ND (0.00140) | ND (0.00122) |
| 1,2-DICHLOROETHANE (EDC) | mg/kg | 86^ 98[B] | ND (0.00127) | ND (0.00124) | ND (0.0320) | ND (1.34) | ND (0.00098) | ND (0.110) | - | - | - | - | - | - | - | - | - | - | - | ND (0.00183) | ND (0.00140) | ND (0.00122) | ND (0.00131) | ND (0.00108) | ND (0.00104) | ND (0.00140) | ND (0.00122) |
| ETHYLBENZENE | mg/kg | 890^ 1000[B] | ND (0.00127) | ND (0.00124) | 0.0375 | ND (1.34) | ND (0.00098) | ND (0.110) | ND (0.34) | ND (0.77) | ND (0.54) | ND (0.55) | ND (0.21) | ND (1.8) | ND (0.097) | ND (0.088) | ND (0.022) | ND (0.044) | ND (0.67) | ND (0.00183) | ND (0.00140) | ND (0.00122) | ND (0.00131) | ND (0.00108) | ND (0.00104) | ND (0.00140) | ND (0.00122) |
| ISOPROPYLBENZENE (CUMENE) | mg/kg | 10000[AB] | ND (0.0127) | ND (0.0124) | ND (0.320) | 15.6 | ND (0.0049) | 0.562 J | 4.0 | 13 | 6.4 | 7.1 | 8.7 | 19 | 4.7 | 3.8 | ND (0.28) | 2.3 | 7.1 | ND (0.0183) | ND (0.0140) | ND (0.0122) | ND (0.0131) | ND (0.0108) | ND (0.0104) | ND (0.0140) | ND (0.0122) |
| METHYL TERTIARY BUTYL ETHER | mg/kg | 8600^ 9900[B] | ND (0.00127) | ND (0.00124) | ND (0.0320) | ND (1.34) | ND (0.00098) | ND (0.110) | - | - | - | - | - | - | - | - | - | - | - | ND (0.00183) | ND (0.00140) | ND (0.00122) | ND (0.00131) | ND (0.00108) | ND (0.00104) | ND (0.00140) | ND (0.00122) |
| HEXANE | mg/kg | 10000[AB] | ND (0.0127) | ND (0.0124) | ND (0.320) OE1 | ND (13.4) | ND (0.0049) | ND (0.570) | - | - | - | - | - | - | - | - | - | - | - | ND (0.0183) | ND (0.0140) | ND (0.0122) | ND (0.0131) | ND (0.0108) | ND (0.0104) | ND (0.0140) | ND (0.0122) |
| NAPHTHALENE | mg/kg | 760^ 190000[B] | - | - | - | - | - | - | 16 | 33 | 19 | 24 | 32 | 48 | 16 | 13 | 1.4 | 17 | 40 | - | - | - | - | - | - | - | - |
| BUTYLBENZENE, SEC- | mg/kg | 10000[AB] | ND (0.00127) | ND (0.00124) | 0.0821 | 1.73 | ND (0.0049) | 0.395 J | - | - | - | - | - | - | - | - | - | - | - | ND (0.00183) | ND (0.00140) | ND (0.00122) | ND (0.00131) | ND (0.00108) | ND (0.00104) | ND (0.00140) | ND (0.00122) |
| BUTYLBENZENE, TERT- | mg/kg | 10000[AB] | ND (0.00127) | ND (0.00124) | 0.150 | ND (1.34) | ND (0.0049) | 0.312 J | - | - | - | - | - | - | - | - | - | - | - | ND (0.00183) | 0.0246 | ND (0.00122) | ND (0.00131) | ND (0.00108) | ND (0.00104) | ND (0.00140) | ND (0.00122) |
| TOLUENE | mg/kg | 10000[AB] | ND (0.00637) | ND (0.00622) | ND (0.160) | ND (6.70) | ND (0.00098) | ND (0.110) | ND (0.23) | ND (0.51) | ND (0.22) | ND (0.33) | ND (0.29) | ND (1.2) | ND (0.22) | ND (0.22) | ND (0.022) | ND (0.11) | ND (0.22) | ND (0.00914) | ND (0.00702) | ND (0.00612) | ND (0.00654) | ND (0.00540) | ND (0.00521) | ND (0.00700) | ND (0.00609) |
| 1,2,4-TRIMETHYLBENZENE | mg/kg | 560^ 640[B] | ND (0.00127) | 0.00539 | 0.0713 | 11.4 | ND (0.0049) | 0.150 J | - | - | - | - | - | - | - | - | - | - | - | ND (0.00183) | ND (0.00140) | ND (0.00122) | ND (0.00131) | ND (0.00108) | ND (0.00104) | ND (0.00140) | ND (0.00122) |
| 1,3,5-TRIMETHYLBENZENE | mg/kg | 10000[AB] | ND (0.00127) | 0.00186 | ND (0.0320) | 2.70 | ND (0.0049) | ND (0.570) | - | - | - | - | - | - | - | - | - | - | - | ND (0.00183) | ND (0.00140) | ND (0.00122) | ND (0.00131) | ND (0.00108) | ND (0.00104) | ND (0.00140) | ND (0.00122) |
| XYLENES, TOTAL (DIMETHYLBENZENE) | mg/kg | 8000^ 9100[B] | ND (0.00382) | ND (0.00373) | 0.125 | 8.86 | ND (0.00098) | ND (0.110) | ND (3.4) | ND (4.5) | ND (4.3) | ND (3.3) | ND (2.9) | ND (7.0) | ND (2.2) | ND (1.0) | 0.24 | ND (0.66) | ND (3.3) | ND (0.00548) | ND (0.00421) | ND (0.00367) | ND (0.00392) | ND (0.00324) | ND (0.00312) | ND (0.00420) | ND (0.00365) |
| **Volatile Organic Compounds (SW8011)** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1,2-DIBROMOETHANE (EDB) | mg/kg | 3.7^ 4.3[B] | - | - | - | - | ND (0.0028) | ND (0.0030) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| **Semi-Volatile Organic Compounds** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ACENAPHTHENE | mg/kg | 190000[AB] | ND (0.0421) | ND (0.0411) | ND (0.430) | 8.39 | ND (0.037) | 0.294 | - | - | - | - | - | - | - | - | - | - | - | ND (0.102) | ND (0.232) | ND (0.202) | ND (0.431) | ND (3.46) | ND (0.0344) | ND (0.0462) | ND (0.402) |
| ANTHRACENE | mg/kg | 190000[AB] | ND (0.0421) | ND (0.0411) | ND (0.430) | 4.10 | 0.0493 | 0.526 | - | - | - | - | - | - | - | - | - | - | - | ND (0.102) | ND (0.232) | ND (0.202) | ND (0.431) | ND (3.46) | ND (0.0344) | ND (0.0462) | ND (0.402) |
| BENZO(A)ANTHRACENE | mg/kg | 130^ 190000[B] | ND (0.0421) | 0.115 | ND (4.30) | ND (5.00) | 0.192 | 0.640 | - | - | - | - | - | - | - | - | - | - | - | ND (0.102) | ND (0.232) | ND (0.202) | 0.566 | ND (3.46) | 0.0498 | 0.0684 | 0.551 |
| BENZO(A)PYRENE | mg/kg | 12^ 190000[B] | ND (0.0421) | 0.112 | ND (4.30) | 3.58 | 0.286 | 0.487 | - | - | - | - | - | - | - | - | - | - | - | ND (0.102) | ND (0.232) | ND (0.202) | 0.702 | ND (3.46) | 0.0665 | 0.0826 | 0.683 |
| BENZO(B)FLUORANTHENE | mg/kg | 76^ 190000[B] | ND (0.0421) | 0.148 | ND (4.30) | 3.32 | 0.330 | 0.523 | - | - | - | - | - | - | - | - | - | - | - | ND (0.102) | ND (0.232) | ND (0.202) | 0.846 | 6.45 | 0.0867 | 0.103 | 0.803 |
| BENZO(G,H,I)PERYLENE | mg/kg | 190000[AB] | ND (0.0421) | 0.0471 | ND (4.30) | ND (2.50) | 0.525 | 0.404 | - | - | - | - | - | - | - | - | - | - | - | ND (0.102) | ND (0.232) | ND (0.202) | ND (0.431) | ND (3.46) | 0.0382 | 0.0495 | ND (0.402) |
| BENZO(K)FLUORANTHENE | mg/kg | 76^ 190000[B] | ND (0.0421) | 0.0448 | ND (4.30) | ND (2.50) | 0.0987 | 0.108 | - | - | - | - | - | - | - | - | - | - | - | ND (0.102) | ND (0.232) | ND (0.202) | ND (0.431) | ND (3.46) | ND (0.0344) | ND (0.0462) | ND (0.402) |
| 1,1'-BIPHENYL | mg/kg | 11000^ 190000[B] | ND (0.424) | ND (0.415) | ND (4.34) | ND (25.2) | ND (0.074) | ND (0.073) | - | - | - | - | - | - | - | - | - | - | - | ND (1.03) | ND (2.34) | ND (2.04) | ND (4.35) | ND (34.9) | ND (0.347) | ND (0.466) | ND (4.06) |
| BIS(2-ETHYLHEXYL)PHTHALATE | mg/kg | 6500^ 10000[B] | ND (0.424) | ND (0.415) | ND (43.4) | ND (50.4) | ND (0.074) | ND (0.073) | - | - | - | - | - | - | - | - | - | - | - | ND (1.03) | ND (2.34) | ND (2.04) | ND (4.35) | ND (34.9) | ND (0.347) | ND (0.466) | ND (4.06) |
| DI-N-BUTYL PHTHALATE | mg/kg | 10000[AB] | ND (0.424) | ND (0.415) | ND (4.34) | ND (25.2) | ND (0.074) | ND (0.073) | - | - | - | - | - | - | - | - | - | - | - | ND (1.03) | ND (2.34) | ND (2.04) | ND (4.35) | ND (34.9) | ND (0.347) | ND (0.466) | ND (4.06) |
| CHRYSENE | mg/kg | 760^ 190000[B] | ND (0.0421) | 0.101 | ND (4.30) | 5.60 | 0.285 | 1.09 | - | - | - | - | - | - | - | - | - | - | - | ND (0.102) | ND (0.232) | ND (0.202) | 0.567 | 3.85 | 0.0528 | 0.0697 | 0.523 |
| DIBENZ(A,H)ANTHRACENE | mg/kg | 22^ 190000[B] | ND (0.0421) | ND (0.0411) | ND (4.30) | ND (2.50) | 0.0946 | 0.154 | - | - | - | - | - | - | - | - | - | - | - | ND (0.102) | ND (0.232) | ND (0.202) | ND (0.431) | ND (3.46) | ND (0.0344) | ND (0.0462) | ND (0.402) |
| DIETHYL PHTHALATE | mg/kg | 10000[AB] | ND (0.424) | ND (0.415) | ND (4.34) | ND (25.2) | ND (0.074) | ND (0.073) | - | - | - | - | - | - | - | - | - | - | - | ND (1.03) | ND (2.34) | ND (2.04) | ND (4.35) | ND (34.9) | ND (0.347) | ND (0.466) | ND (4.06) |
| 2,4-DIMETHYLPHENOL | mg/kg | 10000[AB] | ND (0.424) | ND (0.415) | ND (4.34) | ND (25.2) | ND (0.180) | ND (0.180) | - | - | - | - | - | - | - | - | - | - | - | ND (1.03) | ND (2.34) | ND (2.04) | ND (4.35) | ND (34.9) | ND (0.347) | ND (0.466) | ND (4.06) |
| 2,4-DINITROPHENOL | mg/kg | 6400^ 190000[B] | ND (0.424) | ND (0.415) | ND (4.34) | ND (25.2) | ND (0.740) | ND (0.730) | - | - | - | - | - | - | - | - | - | - | - | ND (1.03) | ND (2.34) | ND (2.04) | ND (4.35) | ND (34.9) | ND (0.347) | ND (0.466) | ND (4.06) |
| FLUORANTHENE | mg/kg | 130000^ 190000[B] | ND (0.0421) | 0.165 | ND (0.430) | 5.17 | 0.317 | 1.04 | - | - | - | - | - | - | - | - | - | - | - | ND (0.102) | ND (0.232) | ND (0.202) | 0.645 | ND (3.46) | 0.0452 | 0.0987 | 0.599 |
| FLUORENE | mg/kg | 130000^ 190000[B] | ND (0.0421) | ND (0.0411) | 0.517 | 10.6 | ND (0.037) | 1.05 | 4.4 | 1.6 | 4.3 | 6.2 | 6.2 | 7.4 | 2.4 | 2.5 | 4.4 | 5.2 | 6.5 | ND (0.102) | ND (0.232) | ND (0.202) | ND (0.431) | ND (3.46) | ND (0.0344) | ND (0.0462) | ND (0.402) |
| INDENO(1,2,3-C,D)PYRENE | mg/kg | 76^ 190000[B] | ND (0.0421) | 0.0452 | ND (4.30) | ND (2.50) | 0.265 | 0.245 | - | - | - | - | - | - | - | - | - | - | - | ND (0.102) | ND (0.232) | ND (0.202) | ND (0.431) | ND (3.46) | 0.0350 | ND (0.0462) | ND (0.402) |
| 2-METHYLNAPHTHALENE | mg/kg | 13000^ 190000[B] | ND (0.0421) | ND (0.0411) | 1.56 | 145 | ND (0.074) | ND (0.073) | - | - | - | - | - | - | - | - | - | - | - | 0.122 | ND (0.232) | ND (0.202) | ND (0.431) | ND (3.46) | ND (0.0344) | ND (0.0462) | ND (0.402) |
| CRESOL, M,P- (3&4-METHYLPHENOL) | mg/kg | 10000^[AB] | ND (0.424) | ND (0.415) | ND (4.34) | ND (25.2) | ND (0.074) | ND (0.073) | - | - | - | - | - | - | - | - | - | - | - | ND (1.03) | ND (2.34) | ND (2.04) | ND (4.35) | ND (34.9) | ND (0.347) | ND (0.466) | ND (4.06) |
| CRESOL, O- (2-METHYLPHENOL) | mg/kg | 160000^ 190000[B] | ND (0.424) | ND (0.415) | ND (4.34) | ND (25.2) | ND (0.074) | ND (0.073) | - | - | - | - | - | - | - | - | - | - | - | ND (1.03) | ND (2.34) | ND (2.04) | ND (4.35) | ND (34.9) | ND (0.347) | ND (0.466) | ND (4.06) |
| NAPHTHALENE | mg/kg | 760^ 190000[B] | ND (0.0421) | ND (0.0411) | ND (0.430) | 10.4 | ND (0.037) | ND (0.036) | - | - | - | - | - | - | - | - | - | - | - | ND (0.102) | ND (0.232) | ND (0.202) | ND (0.431) | ND (3.46) | ND (0.0344) | ND (0.0462) | ND (0.402) |
| 4-NITROPHENOL | mg/kg | 26000^ 190000[B] | ND (0.424) | ND (0.415) | ND (4.34) | ND (25.2) | ND (0.370) | ND (0.360) | - | - | - | - | - | - | - | - | - | - | - | ND (1.03) | ND (2.34) | ND (2.04) | ND (4.35) | ND (34.9) | ND (0.347) | ND (0.466) | ND (4.06) |
| PHENANTHRENE | mg/kg | 190000[AB] | ND (0.0421) | ND (0.0411) | 1.26 | 24.5 | 0.134 | 3.21 | 14 | 4.8 | 12 | 18 | 16 | 16 | 4.7 | 7.4 | 15 | 26 | 17 | ND (0.102) | ND (0.232) | ND (0.202) | ND (0.431) | ND (3.46) | ND (0.0344) | ND (0.0462) | ND (0.402) |
| PHENOL | mg/kg | 16000^ 18000[B] | ND (0.424) | ND (0.415) | ND (4.34) | ND (25.2) | ND (0.074) | ND (0.073) | - | - | - | - | - | - | - | - | - | - | - | ND (1.03) | ND (2.34) | ND (2.04) | ND (4.35) | ND (34.9) | ND (0.347) | ND (0.466) | ND (4.06) |
| PYRENE | mg/kg | 96000^ 190000[B] | ND (0.0421) | 0.131 | ND (4.30) | 7.49 | 0.256 | 1.21 | - | - | - | - | - | - | - | - | - | - | - | ND (0.102) | ND (0.232) | ND (0.202) | 0.650 | ND (3.46) | 0.0462 | 0.0896 | 0.603 |
| PYRIDINE | mg/kg | 3200^ 10000[B] | ND (0.424) | ND (0.415) | ND (4.34) | ND (25.2) | ND (0.074) | ND (0.073) | - | - | - | - | - | - | - | - | - | - | - | ND (1.03) | ND (2.34) | ND (2.04) | ND (4.35) | ND (34.9) | ND (0.347) | ND (0.466) | ND (4.06) |
| QUINOLINE | mg/kg | 30^ 10000[B] | ND (0.424) | ND (0.415) | ND (4.34) | ND (25.2) | ND (0.180) | ND (0.180) | - | - | - | - | - | - | - | - | - | - | - | ND (1.03) OE | ND (2.34) OE | ND (2.04) OE | ND (4.35) OE | ND (6.02) OE | ND (0.347) OE | ND (0.466) OE | ND (4.06) OE |
| **Metals** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| COBALT | mg/kg | 960^ 190000[B] | 4.20 | 7.10 | 13.3 | 21.6 | 6.8 | 13.3 | - | - | - | - | - | - | - | - | - | - | - | ND (1.55) | 1.70 | 5.98 | 3.51 | 3.04 | 5.11 | 5.53 | 3.00 |
| LEAD | mg/kg | 2240^ 190000[B] | 26.7 | 49.8 | 124 | 1660 | 125 | 31.9 | - | - | - | - | - | - | - | - | - | - | - | 24.9 | 13.6 | 68.6 | 75.3 | 76.9 | 186 | 20.3 | 70.8 |
| NICKEL | mg/kg | 64000^ 190000[B] | 15.5 | 18.5 | 28.7 | 49.4 | 47.3 | 20.2 | - | - | - | - | - | - | - | - | - | - | - | 10.5 | 4.38 | 14.5 | 29.9 | 12.5 | 10.3 | 14.8 | 16.0 |
| VANADIUM | mg/kg | 220^ 190000[B] | 47.4 | 37.7 | 64.1 | 52.3 | 41.4 | 24.5 | - | - | - | - | - | - | - | - | - | - | - | 63.8 | 9.88 | 39.6 | 41.6 | 26.0 | 26.2 | 50.8 | 69.5 |
| ZINC | mg/kg | 190000[AB] | 53.5 | 63.4 | 149 | 549 | 190 | 75.0 | - | - | - | - | - | - | - | - | - | - | - | 44.8 | 20.6 | 65.5 | 123 | 68.6 | 134 | 64.3 | 119 |

See notes on last page.

**Table 3**
**Soil Analytical Results Summary**
**Non-Residential Direct Contact Medium-Specific Concentrations**
**Area of Interest 8, Philadelphia Refining Complex**
**Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC**

**Notes:**

| | |
|---|---|
| MSC-PA | Pennsylvania Department of Environmental Protection Medium-Specific Concentrations (MSCs) |
| A | Medium-Specific Concentrations (MSCs) for Organic/Inorganic Regulated Substances in Soil - Direct Contact - Non-Residential Surface Soil (0-2 ft). Lead value is the site-specific standard. |
| B | Medium-Specific Concentrations (MSCs) for Organic/Inorganic Regulated Substances in Soil - Direct Contact - Non-Residential Subsurface Soil (2-15 ft) |
| 15.2 | Measured concentration did not exceed the indicated standard. |
| *ND (0.50)* | Indicates the laboratory method detection limit (if available) was above the applicable standard. The reporting limit is shown if the laboratory method detection limit is not available. |
| ND (0.03) | Indicates concentration not detected above the laboratory reporting limit (in parentheses) except when the reporting limit is greater than the standard in which case the method detection limit is listed in parentheses. |
| - | Parameter not analyzed / not available |
| * | Cresol, m&p (3-Methylphenol & 4-Methylphenol) co-elute and are reported as the summation of the co-eluting compounds. Standards shown are the stricter of the two. |
| I | Matrix Interference |
| J | Indicates an estimated value |
| OE | The associated batch QC was outside the established quality control range for precision/accuracy. |
| mg/kg | milligrams per kilogram |
| LL | Eurofins Lancaster Laboratories Environmental |
| ESC | ESC Lab Sciences |
| ACCUTEST | Accutest Laboratories |

**FIGURES**
SITE CHARACTERIZATION REPORT / REMEDIAL ACTION COMPLETION REPORT FOR ABOVEGROUND STORAGE TANKS
PB 552, PB 669, AND PB 1937

Philadelphia Refining Complex, Point Breeze Refinery
3144 Passyunk Ave, Philadelphia, Pennsylvania

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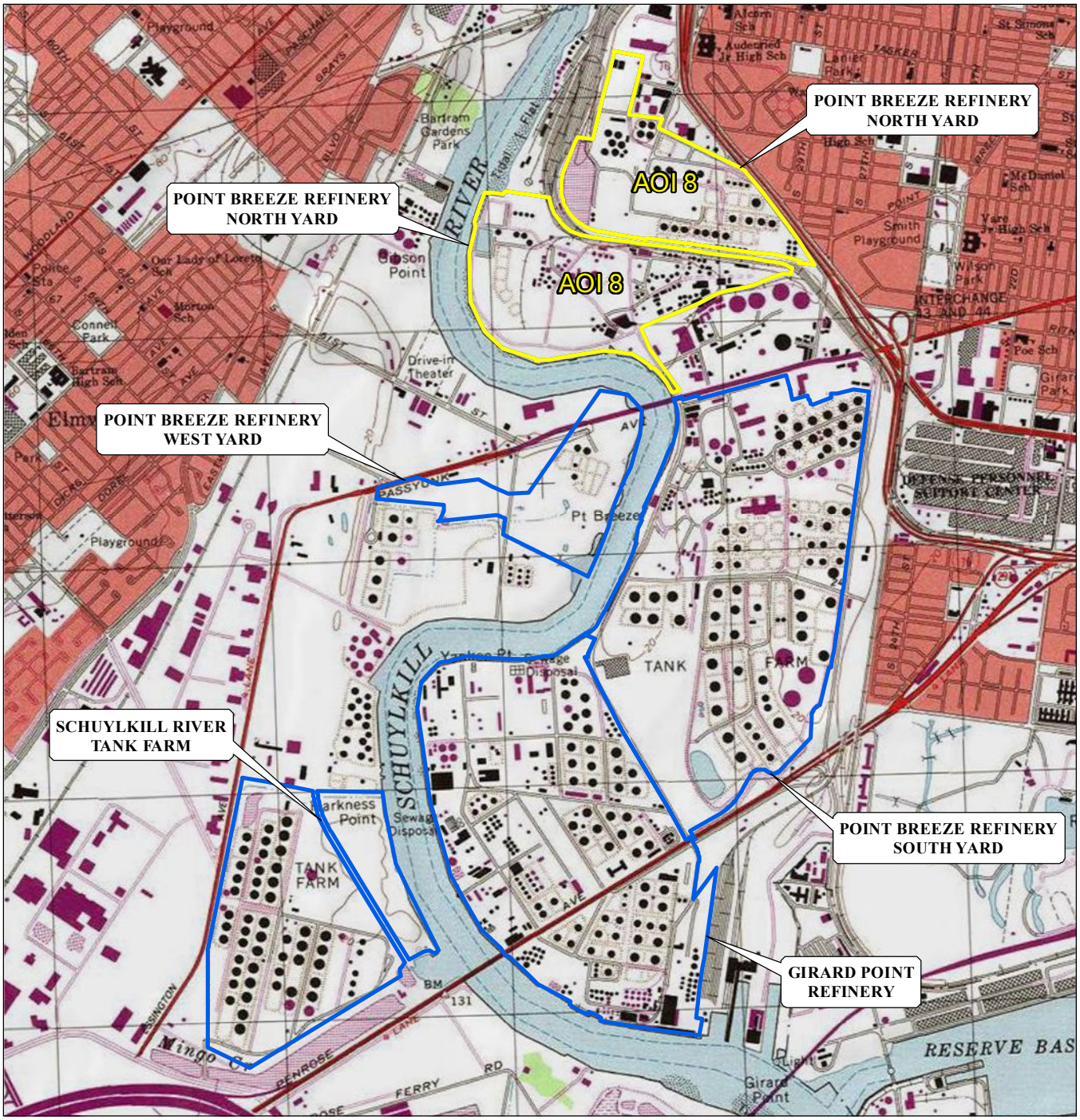


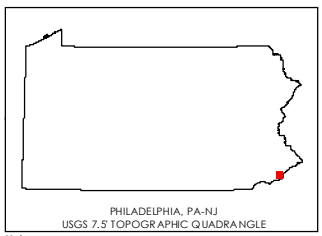


**Legend**

- AOI 8
- PHILADELPHIA REFINING COMPLEX

0 1,100 2,200 Feet

1:26,400 (at original document size of 8.5x11)

N

Stantec

EVERGREEN

Project Location
City of Philadelphia, Pennsylvania

21340243S
Prepared by GWC on 3/31/2017
Technical Review by JKD on 4/4/2017
Independent Review by JLM on 4/8/2017

Client/Project
PHILADELPHIA REFINERY OPERATIONS, A SERIES OF EVERGREEN RESOURCES GROUP, LLC
PHILADELPHIA REFINING COMPLEX
3144 PASSYUNK AVENUE
PHILADELPHIA, PA 19145

Figure No.
1

Title
**AOI 8 SITE LOCATION MAP**

**Notes**
1. Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet
2. Source: Stantec
3. Service Layer Credits: Copyright© 2013 National Geographic Society, i-cubed

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## Legend

- MONITORING/RECOVERY WELL
- DAMAGED MONITORING WELL
- DESTROYED MONITORING WELL
- UNABLE TO LOCATE WELL
- APPROXIMATE LOCATION OF PHILADELPHIA WATER DEPARTMENT SEWER
- TANK WITH OPEN STORAGE TANK INCIDENT
- AREA OF INTEREST (AOI)
- AOI 8
- BELMONT TERMINAL

0 250 500 Feet

1:3,000 (At original document size of 22x34)

N

Figure No.

**2**

Title

# AOI 8 SITE PLAN

Client/Project

PHILADELPHIA REFINERY OPERATIONS, A SERIES OF
EVERGREEN RESOURCES GROUP, LLC
PHILADELPHIA REFINING COMPLEX
3144 PASSYUNK AVENUE
PHILADELPHIA, PA 19145

Project Location

City of Philadelphia,
Pennsylvania

213402435

Prepared by GWC on 3/31/2017
Technical Review by JKD on 4/4/2017
Independent Review by JLM on 4/8/2017

**Notes**

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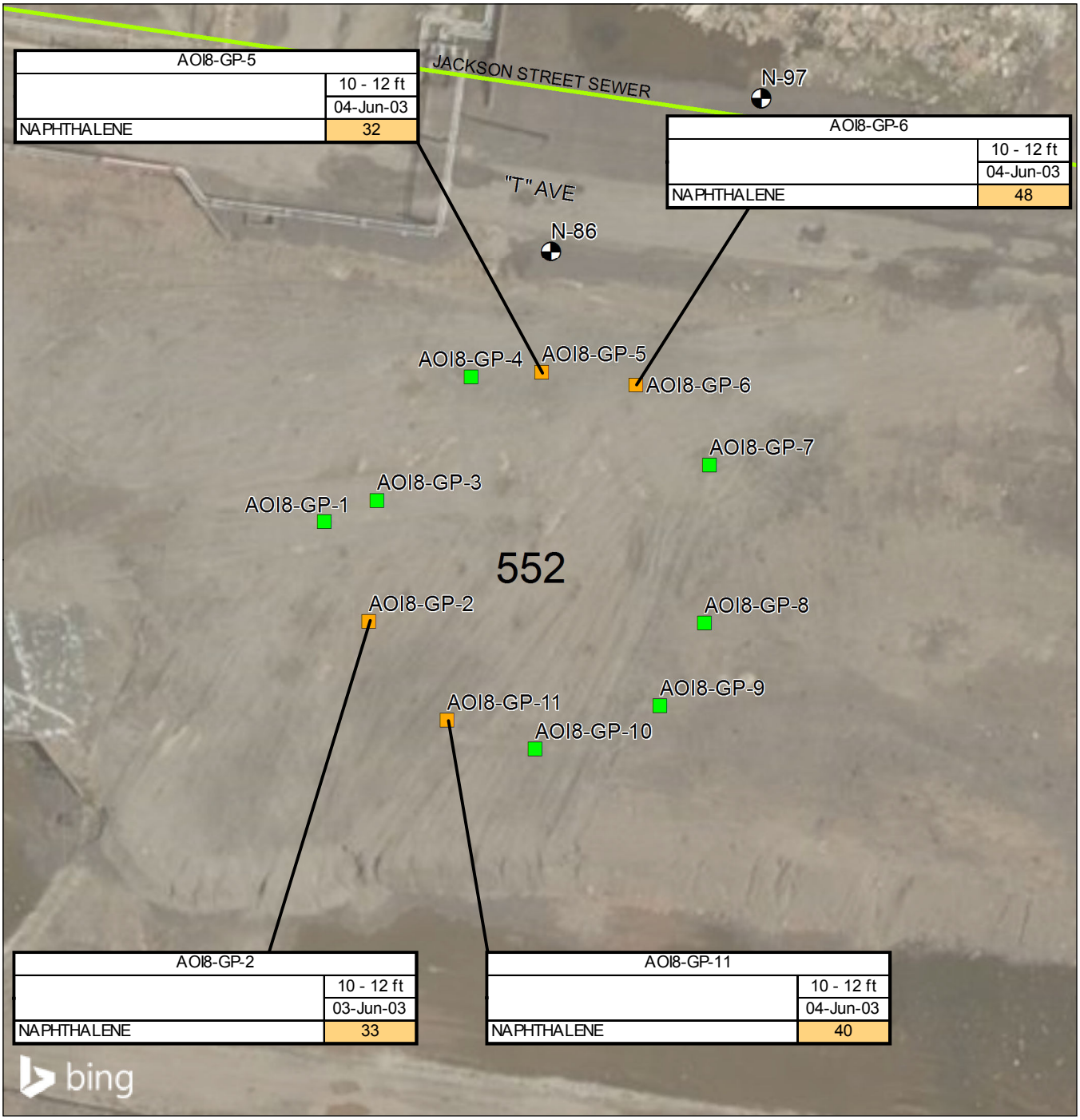


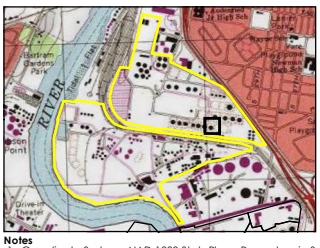

**Legend**

- DEEP SOIL EXCEEDANCE OF THE PADEP NON-RESIDENTIAL, UNSATURATED STATEWIDE HEALTH STANDARD GREATER THAN 2'
- NO DEEP SOIL EXCEEDANCE OF THE PADEP NON-RESIDENTIAL, UNSATURATED STATEWIDE HEALTH STANDARD GREATER THAN 2'
- MONITORING/RECOVERY WELL
- APPROXIMATE LOCATION OF PHILADELPHIA WATER DEPARTMENT SEWER
- 33 CONCENTRATION EXCEEDS THE NON-RESIDENTIAL STATEWIDE HEALTH STANDARD

0 10 20 30 40 50 Feet

1:600 (at original document size of 8.5x11)

N

Stantec

EVERGREEN

**Notes**

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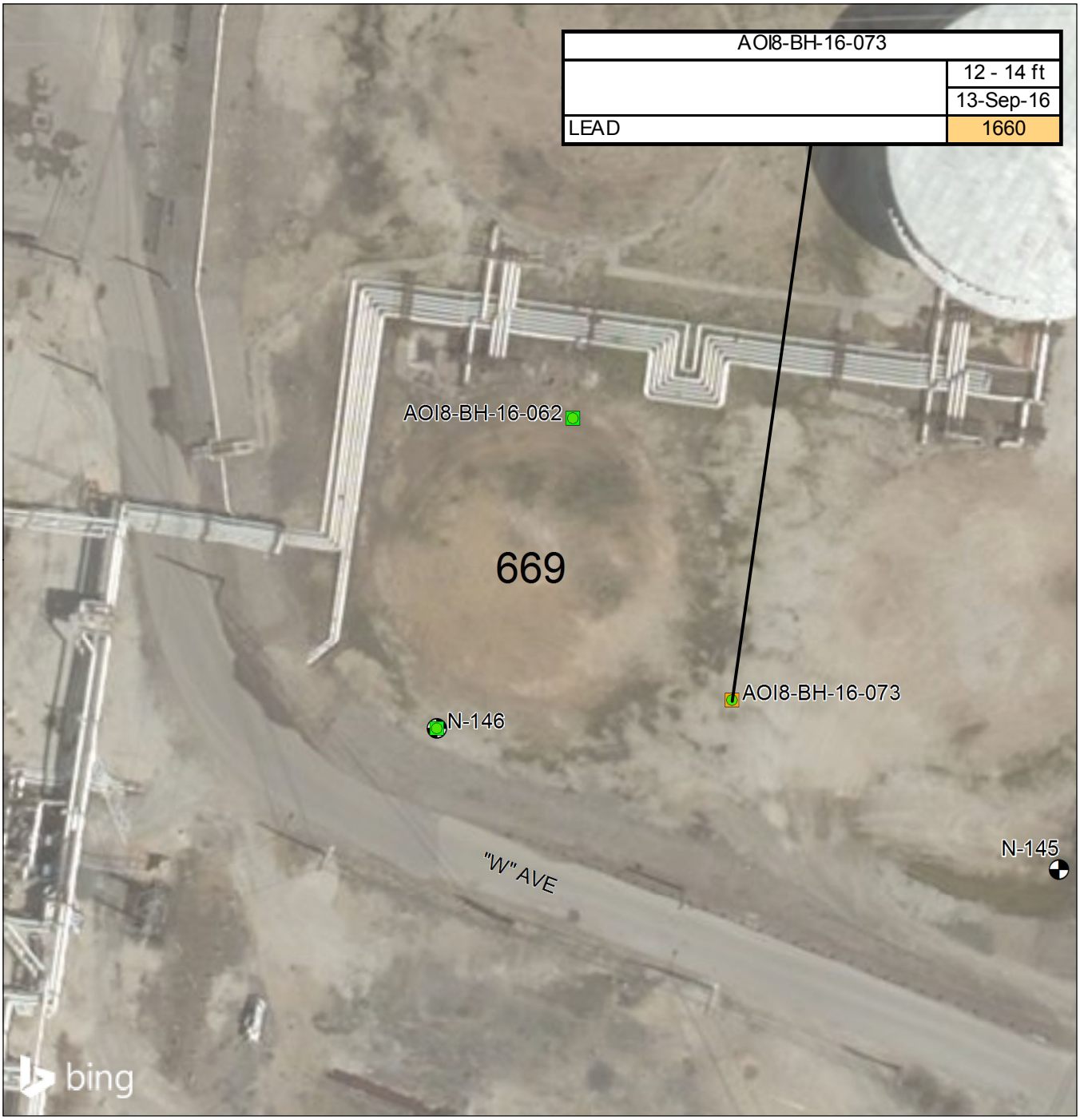
Project Location
City of Philadelphia, Pennsylvania

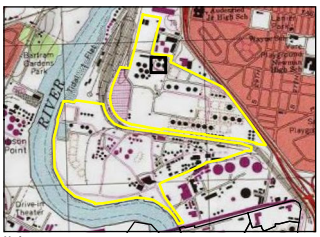
213402435
Prepared by GWC on 4/3/2017
Technical Review by JKD on 4/4/2017
Independent Review by JLM on 4/8/2017

Client/Project
PHILADELPHIA REFINERY OPERATIONS, A SERIES OF EVERGREEN RESOURCES GROUP, LLC
PHILADELPHIA REFINING COMPLEX
3144 PASSYUNK AVENUE
PHILADELPHIA, PA 19145

Figure No.
**3**

Title
**SOIL SAMPLE LOCATIONS AND RESULTS TANK 552**



**Legend**

- NO SHALLOW SOIL EXCEEDANCE OF THE PADEP NON-RESIDENTIAL, UNSATURATED STATEWIDE HEALTH STANDARD 0-2'
- DEEP SOIL EXCEEDANCE OF THE PADEP NON-RESIDENTIAL, UNSATURATED STATEWIDE HEALTH STANDARD GREATER THAN 2'
- NO DEEP SOIL EXCEEDANCE OF THE PADEP NON-RESIDENTIAL, UNSATURATED STATEWIDE HEALTH STANDARD GREATER THAN 2'
- MONITORING/RECOVERY WELL
- 1660 CONCENTRATION EXCEEDS THE NON-RESIDENTIAL STATEWIDE HEALTH STANDARD

0 10 20 30 40 50 Feet

1:600 (at original document size of 8.5x11)

N

Stantec

EVERGREEN

**Notes**

1. Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet North American Vertical Datum of 1988 (NAVD 88)
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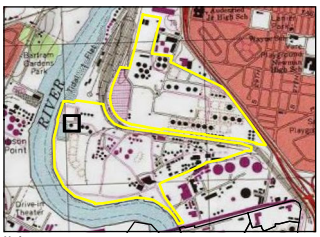
Project Location
City of Philadelphia, Pennsylvania

213402435
Prepared by GWC on 4/3/2017
Technical Review by JKD on 4/4/2017
Independent Review by JLM on 4/8/2017

Client/Project
PHILADELPHIA REFINERY OPERATIONS, A SERIES OF EVERGREEN RESOURCES GROUP, LLC
PHILADELPHIA REFINING COMPLEX
3144 PASSYUNK AVENUE
PHILADELPHIA, PA 19145

Figure No.
**4**

Title
**SOIL SAMPLE LOCATIONS AND RESULTS TANK 669**



**Legend**

- NO SHALLOW SOIL EXCEEDANCE OF THE PADEP NON-RESIDENTIAL, UNSATURATED STATEWIDE HEALTH STANDARD 0-2'
- NO DEEP SOIL EXCEEDANCE OF THE PADEP NON-RESIDENTIAL, UNSATURATED STATEWIDE HEALTH STANDARD GREATER THAN 2'

0 10 20 30 40 50 Feet

1:600 (at original document size of 8.5x11)

N

Stantec

EVERGREEN

**Notes**

1. Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet North American Vertical Datum of 1988 (NAVD 88)
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Project Location
City of Philadelphia, Pennsylvania

213402435
Prepared by GWC on 4/3/2017
Technical Review by JKD on 4/4/2017
Independent Review by JLM on 4/8/2017

Client/Project
PHILADELPHIA REFINERY OPERATIONS, A SERIES OF EVERGREEN RESOURCES GROUP, LLC
PHILADELPHIA REFINING COMPLEX
3144 PASSYUNK AVENUE
PHILADELPHIA, PA 19145

Figure No.
**5**

Title
**SOIL SAMPLE LOCATIONS AND RESULTS TANK 1937**

# APPENDIX A
# Ecological Assessment Documentation

SITE CHARACTERIZATION REPORT / REMEDIAL ACTION COMPLETION REPORT FOR ABOVEGROUND STORAGE TANKS PB 552, PB 669, AND PB 1937

Philadelphia Refining Complex, Point Breeze Refinery
3144 Passyunk Ave, Philadelphia, Pennsylvania

Stantec

**APPENDIX B**
**Historical Tank Documentation**

**(electronic only)**

SITE CHARACTERIZATION REPORT / REMEDIAL ACTION COMPLETION REPORT FOR ABOVEGROUND STORAGE TANKS
PB 552, PB 669, AND PB 1937

Philadelphia Refining Complex, Point Breeze Refinery
3144 Passyunk Ave, Philadelphia, Pennsylvania

Stantec

**APPENDIX C**
**Quality Assurance/ Quality Control Plan and Field Procedures Manual**

**(electronic only)**

SITE CHARACTERIZATION REPORT / REMEDIAL ACTION COMPLETION REPORT FOR ABOVEGROUND STORAGE TANKS
PB 552, PB 669, AND PB 1937

Philadelphia Refining Complex, Point Breeze Refinery
3144 Passyunk Ave, Philadelphia, Pennsylvania

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**APPENDIX D**
**Site Specific Health and Safety Plan**

**(electronic only)**

SITE CHARACTERIZATION REPORT / REMEDIAL ACTION COMPLETION REPORT FOR ABOVEGROUND STORAGE TANKS
PB 552, PB 669, AND PB 1937

Philadelphia Refining Complex, Point Breeze Refinery
3144 Passyunk Ave, Philadelphia, Pennsylvania

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# APPENDIX E
# Soil Boring Logs

SITE CHARACTERIZATION REPORT / REMEDIAL ACTION COMPLETION REPORT FOR ABOVEGROUND STORAGE TANKS
PB 552, PB 669, AND PB 1937

Philadelphia Refining Complex, Point Breeze Refinery
3144 Passyunk Ave, Philadelphia, Pennsylvania

Stantec

# APPENDIX F
# List of Constituents of Concern

SITE CHARACTERIZATION REPORT / REMEDIAL ACTION COMPLETION REPORT FOR ABOVEGROUND STORAGE TANKS
PB 552, PB 669, AND PB 1937

Philadelphia Refining Complex, Point Breeze Refinery
3144 Passyunk Ave, Philadelphia, Pennsylvania

Stantec

**APPENDIX G**
**Soil Laboratory Analytical Reports**

**(electronic only)**

SITE CHARACTERIZATION REPORT / REMEDIAL ACTION COMPLETION REPORT FOR ABOVEGROUND STORAGE TANKS
PB 552, PB 669, AND PB 1937

Philadelphia Refining Complex, Point Breeze Refinery
3144 Passyunk Ave, Philadelphia, Pennsylvania

Stantec

# 1. PROJECT INFORMATION

Project Name: **PHRO- AOI 8**
Date of Review: **10/31/2016 11:29:06 AM**
Project Category: **Hazardous Waste Clean-up, Site Remediation, and Reclamation, Spill (e.g., oil, chemical)**
Project Area: **246.51 acres**
County(s): **Philadelphia**
Township/Municipality(s): **PHILADELPHIA**
ZIP Code: **19145**
Quadrangle Name(s): **PHILADELPHIA**
Watersheds HUC 8: **Schuylkill**
Watersheds HUC 12: **City of Philadelphia-Schuylkill River**
Decimal Degrees: **39.926139, -75.203624**
Degrees Minutes Seconds: **39° 55' 34.1014" N, 75° 12' 13.456" W**

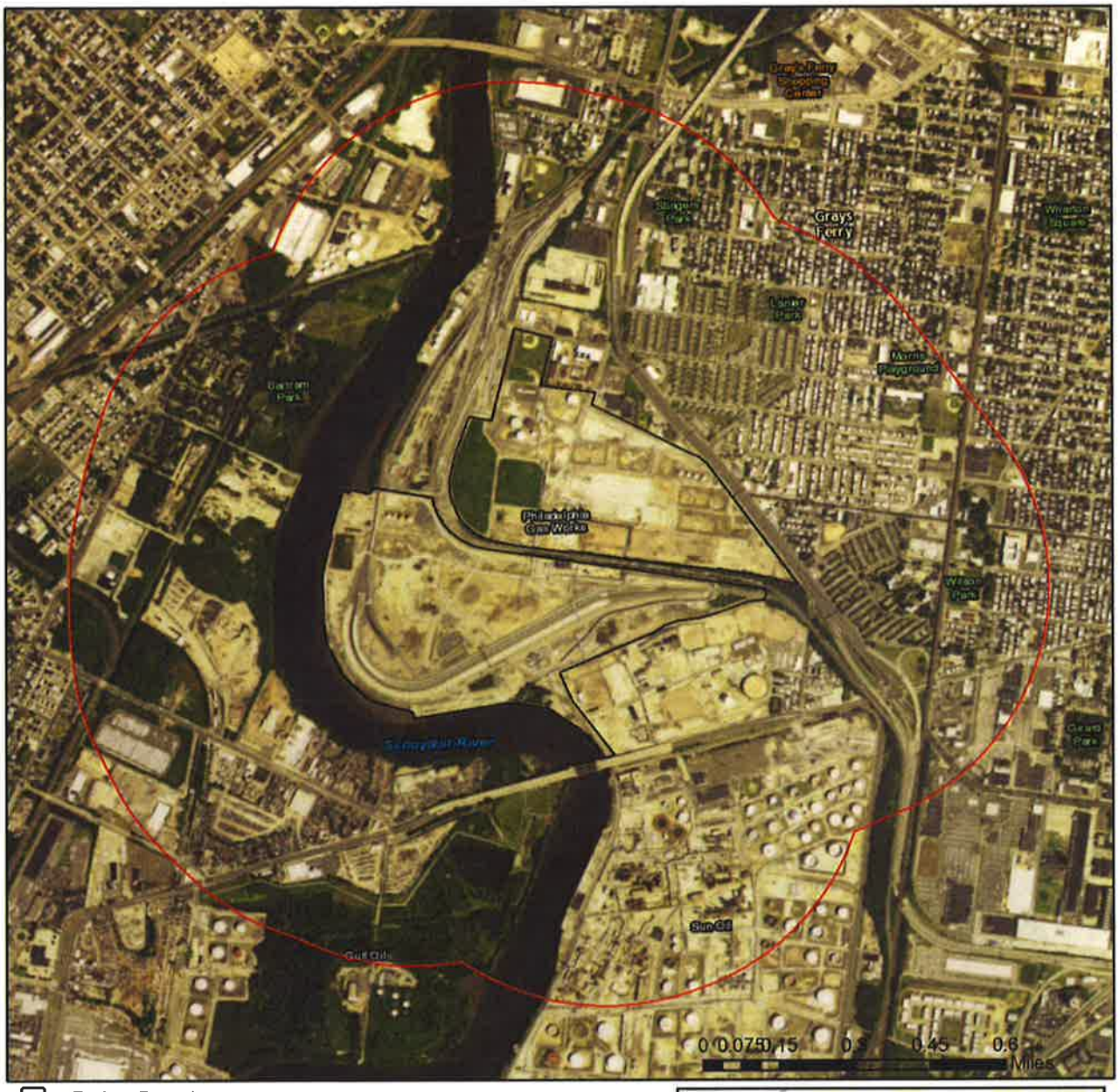
# 2. SEARCH RESULTS

| Agency | Results | Response |
|---|---|---|
| PA Game Commission | No Known Impact | No Further Review Required |
| PA Department of Conservation and Natural Resources | **Potential Impact** | **FURTHER REVIEW IS REQUIRED, See Agency Response** |
| PA Fish and Boat Commission | **Potential Impact** | **FURTHER REVIEW IS REQUIRED, See Agency Response** |
| U.S. Fish and Wildlife Service | No Known Impact | No Further Review Required |

As summarized above, Pennsylvania Natural Diversity Inventory (PNDI) records indicate there may be potential impacts to threatened and endangered and/or special concern species and resources within the project area. If the response above indicates "No Further Review Required" no additional communication with the respective agency is required. If the response is "Further Review Required" or "See Agency Response," refer to the appropriate agency comments below. Please see the DEP Information Section of this receipt if a PA Department of Environmental Protection Permit is required.

Note that regardless of PNDI search results, projects requiring a Chapter 105 DEP individual permit or GP 5, 6, 7, 8, 9 or 11 in certain counties (Adams, Berks, Bucks, Carbon, Chester, Cumberland, Delaware, Lancaster, Lebanon, Lehigh, Monroe, Montgomery, Northampton, Schuylkill and York) must comply with the bog turtle habitat screening requirements of the PASPGP.

# PHRO- AOI 8

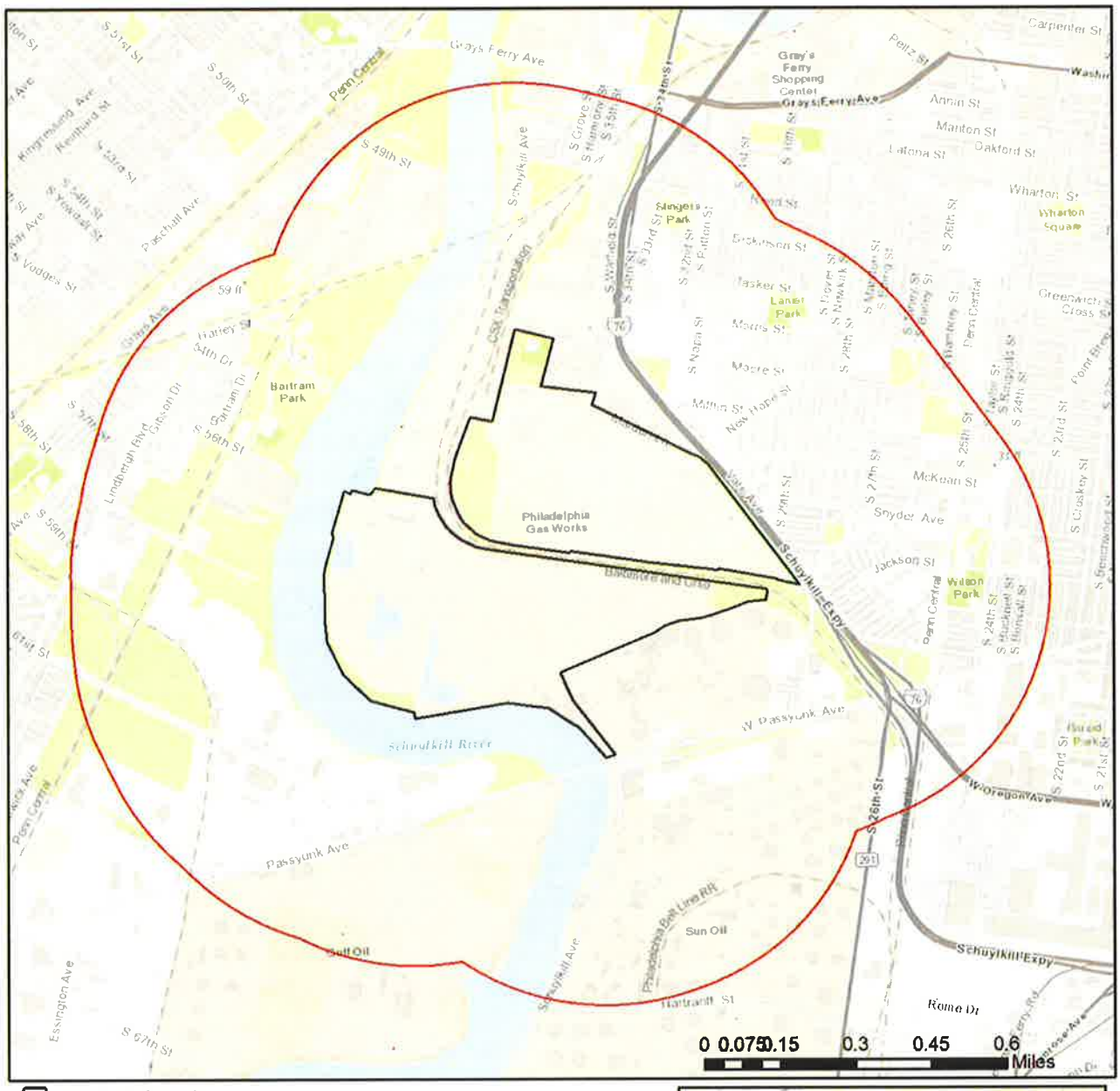



Project Boundary

Buffered Project Boundary

Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user

# PHRO- AOI 8




Project Boundary

Buffered Project Boundary

Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

## RESPONSE TO QUESTION(S) ASKED

**Q1:** Accurately describe what is known about wetland presence in the project area or on the land parcel by selecting ONE of the following. "Project" includes all features of the project (including buildings, roads, utility lines, outfall and intake structures, wells, stormwater retention/detention basins, parking lots, driveways, lawns, etc.), as well as all associated impacts (e.g., temporary staging areas, work areas, temporary road crossings, areas subject to grading or clearing, etc.). Include all areas that will be permanently or temporarily affected -- either directly or indirectly -- by any type of disturbance (e.g., land clearing, grading, tree removal, flooding, etc.). Land parcel = the lot(s) on which some type of project(s) or activity(s) are proposed to occur.
**Your answer is:** The project area (or land parcel) has not been investigated by someone qualified to identify and delineate wetlands, or it is currently unknown if the project or project activities will affect wetlands.

**Q2:** Aquatic habitat (stream, river, lake, pond, etc.) is located on or adjacent to the subject property and project activities (including discharge) may occur within 300 feet of these habitats?
**Your answer is:** Unknown

# 3. AGENCY COMMENTS

Regardless of whether a DEP permit is necessary for this proposed project, any potential impacts to threatened and endangered species and/or special concern species and resources must be resolved with the appropriate jurisdictional agency. In some cases, a permit or authorization from the jurisdictional agency may be needed if adverse impacts to these species and habitats cannot be avoided.

These agency determinations and responses are **valid for two years** (from the date of the review), and are based on the project information that was provided, including the exact project location; the project type, description, and features; and any responses to questions that were generated during this search. If any of the following change: 1) project location, 2) project size or configuration, 3) project type, or 4) responses to the questions that were asked during the online review, the results of this review are not valid, and the review must be searched again via the PNDI Environmental Review Tool and resubmitted to the jurisdictional agencies. The PNDI tool is a primary screening tool, and a desktop review may reveal more or fewer impacts than what is listed on this PNDI receipt. The jursidictional agencies **strongly advise against** conducting surveys for the species listed on the receipt prior to consultation with the agencies.

## PA Game Commission
## RESPONSE:

No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

## PA Department of Conservation and Natural Resources
## RESPONSE:

Further review of this project is necessary to resolve the potential impact(s). Please send project information to this agency for review (see WHAT TO SEND).

**DCNR Species:** (Note: The Pennsylvania Conservation Explorer tool is a primary screening tool, and a desktop review may reveal more or fewer species than what is listed below. After desktop review, if a botanical survey is required by DCNR, we recommend the DCNR Botanical Survey Protocols, available here: http://www.gis.dcnr.state.pa.us/hgis-er/PNDI_DCNR.aspx.)

| Scientific Name | Common Name | Current Status | Proposed Status | Survey Window |
|---|---|---|---|---|
| Amaranthus cannabinus | Waterhemp Ragweed | Special Concern Species* | Special Concern Species* | fl. July - Sept. |
| Schoenoplectus fluviatilis | River Bulrush | Special Concern Species* | Special Concern Species* | fruits June - August |

### PA Fish and Boat Commission

### RESPONSE:

Further review of this project is necessary to resolve the potential impact(s). Please send project information to this agency for review (see WHAT TO SEND).

**PFBC Species:** (Note: The Pennsylvania Conservation Explorer tool is a primary screening tool, and a desktop review may reveal more or fewer species than what is listed below.)

| Scientific Name | Common Name | Current Status |
|---|---|---|
| Sensitive Species** | | Endangered |
| Sensitive Species** | | Threatened |

### U.S. Fish and Wildlife Service

### RESPONSE:

No impacts to **federally** listed or proposed species are anticipated. Therefore, no further consultation/coordination under the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq. is required. Because no take of federally listed species is anticipated, none is authorized. This response does not reflect potential Fish and Wildlife Service concerns under the Fish and Wildlife Coordination Act or other authorities.

* Special Concern Species or Resource - Plant or animal species classified as rare, tentatively undetermined or candidate as well as other taxa of conservation concern, significant natural communities, special concern populations (plants or animals) and unique geologic features.
** Sensitive Species - Species identified by the jurisdictional agency as collectible, having economic value, or being susceptible to decline as a result of visitation.

## WHAT TO SEND TO JURISDICTIONAL AGENCIES

**If project information was requested by one or more of the agencies above**, upload* or email* the following information to the agency(s). Instructions for uploading project materials can be found here. This option provides the applicant with the convenience of sending project materials to a single location accessible to all three state agencies. Alternatively, applicants may email or mail their project materials (see AGENCY CONTACT INFORMATION).
***Note:** U.S.Fish and Wildlife Service requires applicants to mail project materials to the USFWS PA field office (see AGENCY CONTACT INFORMATION). USFWS will not accept project materials submitted electronically (by upload or email).

**Check-list of Minimum Materials to be submitted:**
____Project narrative with a description of the overall project, the work to be performed, current physical characteristics of the site and acreage to be impacted.
____A map with the project boundary and/or a basic site plan(particularly showing the relationship of the project to the physical features such as wetlands, streams, ponds, rock outcrops, etc.)
**In addition to the materials listed above, USFWS REQUIRES the following**
____**SIGNED** copy of a Final Project Environmental Review Receipt

**The inclusion of the following information may expedite the review process.**
____Color photos keyed to the basic site plan (i.e. showing on the site plan where and in what direction each photo was taken and the date of the photos)
____Information about the presence and location of wetlands in the project area, and how this was determined (e.g., by a qualified wetlands biologist), if wetlands are present in the project area, provide project plans showing the location of all project features, as well as wetlands and streams.

# 4. DEP INFORMATION

The Pa Department of Environmental Protection (DEP) requires that a signed copy of this receipt, along with any required documentation from jurisdictional agencies concerning resolution of potential impacts, be submitted with applications for permits requiring PNDI review. Two review options are available to permit applicants for handling PNDI coordination in conjunction with DEP's permit review process involving either T&E Species or species of special concern. Under sequential review, the permit applicant performs a PNDI screening and completes all coordination with the appropriate jurisdictional agencies prior to submitting the permit application. The applicant will include with its application, both a PNDI receipt and/or a clearance letter from the jurisdictional agency if the PNDI Receipt shows a Potential Impact to a species or the applicant chooses to obtain letters directly from the jurisdictional agencies. Under concurrent review, DEP, where feasible, will allow technical review of the permit to occur concurrently with the T&E species consultation with the jurisdictional agency. The applicant must still supply a copy of the PNDI Receipt with its permit application. The PNDI Receipt should also be submitted to the appropriate agency according to directions on the PNDI Receipt. The applicant and the jurisdictional agency will work together to resolve the potential impact(s). See the DEP PNDI policy at https://conservationexplorer.dcnr.pa.gov/content/resources.

## 5. ADDITIONAL INFORMATION

The PNDI environmental review website is a preliminary screening tool. There are often delays in updating species status classifications. Because the proposed status represents the best available information regarding the conservation status of the species, state jurisdictional agency staff give the proposed statuses at least the same consideration as the current legal status. If surveys or further information reveal that a threatened and endangered and/or special concern species and resources exist in your project area, contact the appropriate jurisdictional agency/agencies immediately to identify and resolve any impacts.

For a list of species known to occur in the county where your project is located, please see the species lists by county found on the PA Natural Heritage Program (PNHP) home page (www.naturalheritage.state.pa.us). Also note that the PNDI Environmental Review Tool only contains information about species occurrences that have actually been reported to the PNHP.

## 6. AGENCY CONTACT INFORMATION

**PA Department of Conservation and Natural Resources**
Bureau of Forestry, Ecological Services Section
400 Market Street, PO Box 8552
Harrisburg, PA 17105-8552
Email: RA-HeritageReview@pa.gov
Fax:(717) 772-0271

**PA Fish and Boat Commission**
Division of Environmental Services
450 Robinson Lane, Bellefonte, PA 16823
Email: RA-FBPACENOTIFY@pa.gov

**U.S. Fish and Wildlife Service**
Pennsylvania Field Office
Endangered Species Section
110 Radnor Rd; Suite 101
State College, PA 16801
NO Faxes Please

**PA Game Commission**
Bureau of Wildlife Habitat Management
Division of Environmental Planning and Habitat Protection
2001 Elmerton Avenue, Harrisburg, PA 17110-9797
Email: RA-PGC_PNDI@pa.gov
NO Faxes Please

## 7. PROJECT CONTACT INFORMATION

Name: Andrew Klingbeil
Company/Business Name: Stantec Consulting Services
Address: 1060 Andrew drive, Suite 140
City, State, Zip: West Chester PA 19380
Phone:(610) 840-2525 Fax:( )
Email: andrew.klingbeil@stantec.com

## 8. CERTIFICATION

I certify that ALL of the project information contained in this receipt (including project location, project size/configuration, project type, answers to questions) is true, accurate and complete. In addition, if the project type, location, size or configuration changes, or if the answers to any questions that were asked during this online review change, I agree to re-do the online environmental review.

applicant/project proponent signature

10-31-16
date

Stantec

October 31, 2016

PA Department of Conservation and Natural Resources
Bureau of Forestry, Ecological Services Section
400 Market Street
P.O. Box 8552
Harrisburg, PA, 17105-8552

**Reference: Potential PNDI Conflict**
**Philadelphia Refinery Complex – AOI 8**
**PNDI Search ID: PNDI 612649**
**City of Philadelphia, Philadelphia County, Pennsylvania**

Dear Sir/Madam,

Stantec Consulting Services, Inc. (Stantec) is currently preparing Site Characterization Reports (SCRs) on behalf of Philadelphia Energy Solutions Refining and Marketing LLC (PES) and Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC (Evergreen) for select aboveground storage tanks located in the PES Philadelphia Refinery Complex (facility), located at 3144 Passyunk Avenue in the City of Philadelphia, Philadelphia County, Pennsylvania (**Figure 1**) in response to tank-related incidents. Additionally, the facility is part of the One Cleanup Program which provides a mechanism for properties participating in the Pennsylvania Land Recycling Program to also satisfy the requirements of the Environmental Protection Agency (EPA) Corrective Measures Program. As a part of this program, Stantec is currently preparing combined Site Characterization Reports/Remedial Investigation Reports (SCR/RIRs) to establish the current conditions of the site and investigate environmental impacts resulting from historical refining operations.

The storage tank Corrective Action Process (CAP) regulations in 25 PA Code Chapter 245, Subchapter D, specifically §245.310(a) (28) and §245.310(b) (4), and the Land Recycling Program regulations in 25 PA Code Chapter 250, specifically §250.311 and §250.402, require an evaluation of ecological receptors at the facility. According to the Pennsylvania Natural Diversity Inventory (PNDI) Environmental Review Tool search (PNDI Search ID: 612649), potential impacts may exist within the facility under the jurisdiction of the State of Pennsylvania Department of Conservation and Natural Resources (PADCNR). The search identified Waterhemp Ragweed (Amaranthus cannabinus) and River Bulrush (Schoenoplectus fluviatilis) as special species of concern within the general project area. A copy of the PNDI Project Environmental Review Receipt is attached.

The facility is located on industrial property with access restricted by fencing and security measures. AOI 8 is bordered by Vare Avenue to the north and east, Philadelphia Gas Works (PGW) to the south, and by the Schuylkill River to the west. AOI 8 encompasses approximately 247 acres and is bisected by CSX railroad property. AOI 8 presently contains a railyard, propane

**Reference: Potential PNDI Conflict**
**Philadelphia Refinery Complex – AOI 8**
**PNDI Search ID: PNDI 612649**
**City of Philadelphia, Philadelphia County, Pennsylvania**

terminal, aboveground storage tanks (AST), and open space. An aerial photograph depicting site features is included as **Figure 2**. The current and intended future uses of AOI 8 are non-residential.

We request a determination from the PADCNR as to whether or not projects at this facility could affect Waterhemp Ragweed (Amaranthus cannabinus) and River Bulrush (Schoenoplectus fluviatilis), identified by the PNDI Environmental Project Review to be special species of concern in the area under PADCNR jurisdiction. If you have questions on the enclosed material or require any additional information to make your determination, please feel free to contact me at (610) 840-2525.

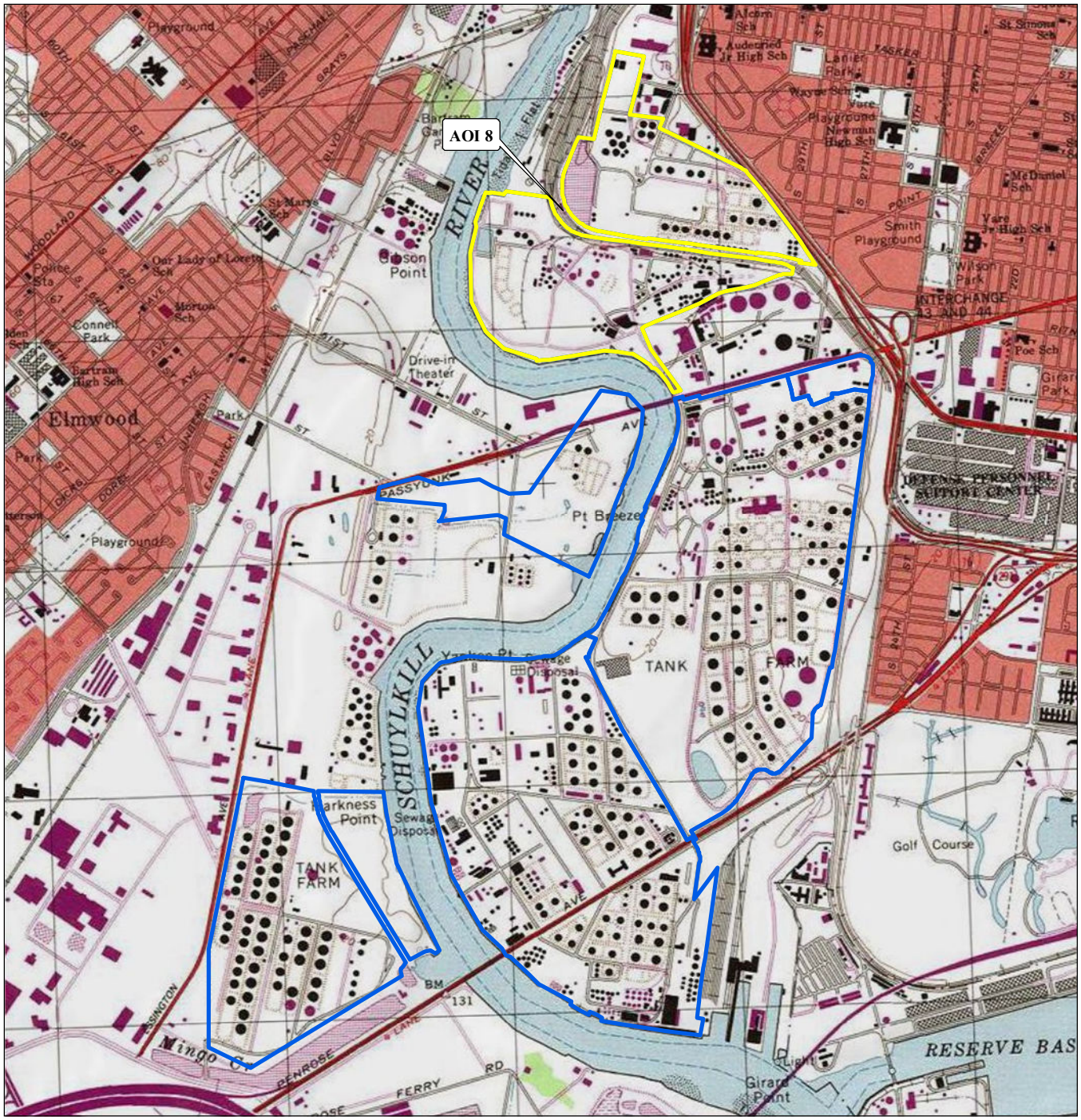
Regards,

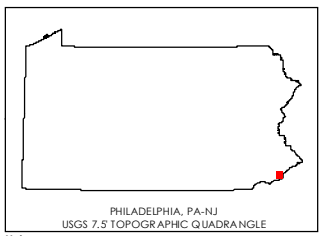
**Stantec Consulting Services, Inc.**

Andrew D. Klingbeil, P.G.
Geologic Project Specialist
Phone: 610-840-2525
Fax: 610-840-2501
andrew.klingbeil@stantec.com

Attachment: PNDI Project Environmental Review Receipt
Figure 1 – Site Location Map
Figure 2 – Site Plan

c. Stantec Project File
Evergreen Project File




**Notes**
1. Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet
2. Source: Stantec, Evergreen Resources Management
3. Service Layer Credits: Copyright:© 2013 National Geographic Society, i-cubed

**LEGEND**

AOI 8

PHILADELPHIA REFINERY COMPLEX

0 550 1,100 2,200 Feet

1:26,400 (at original document size of 8.5x11)

N

Stantec

Project Location
City of Philadelphia, Pennsylvania

213402435
Prepared by GWC on 9/12/2016
Technical Review by ADK on 10/24/2016
Independent Review by MN on 10/24/2016

Client/Project
EVERGREEN RESOURCES MANAGEMENT OPERATIONS LLC
PHILADELPHIA REFINERY
3144 PASSYUNK AVENUE
PHILADELPHIA, PA 19145

Figure No.
1

Title
**AOI 8 - SITE LOCATION MAP**

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

**LEGEND**

- AOI 8
- PHILADELPHIA REFINERY COMPLEX

0 200 400 600 800 Feet

1:9,600 (at original document size of 8.5x11)

N

Stantec

**Notes**

1. Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet
2. Source: Stantec, Evergreen Resources Management
3. Service Layer Credits: Image courtesy of USGS Earthstar Geographics SIO © 2016 Microsoft Corporation Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors

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Project Location
City of Philadelphia, Pennsylvania

213402435
Prepared by GWC on 9/12/2016
Technical Review by ADK on 10/24/2016
Independent Review by MN on 10/24/2016

Client/Project
EVERGREEN RESOURCES MANAGEMENT OPERATIONS LLC
PHILADELPHIA REFINERY
3144 PASSYUNK AVENUE
PHILADELPHIA, PA 19145

Figure No.
**2**

Title
**AOI 8 - SITE PLAN**

Stantec

October 31, 2016

PA Fish and Boat Commission
Division of Environmental Services
450 Robinson Lane
Bellefonte, PA 16823

**Reference: Potential PNDI Conflict**
**Philadelphia Refinery Complex – AOI 8**
**PNDI Search ID: PNDI 612649**
**City of Philadelphia, Philadelphia County, Pennsylvania**

Dear Sir/Madam,

Stantec Consulting Services, Inc. (Stantec) is currently preparing Site Characterization Reports (SCRs) on behalf of Philadelphia Energy Solutions Refining and Marketing LLC (PES) and Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC (Evergreen) for select aboveground storage tanks located in the PES Philadelphia Refinery Complex (facility), located at 3144 Passyunk Avenue in the City of Philadelphia, Philadelphia County, Pennsylvania (**Figure 1**) in response to tank-related incidents. Additionally, the facility is part of the One Cleanup Program which provides a mechanism for properties participating in the Pennsylvania Land Recycling Program to also satisfy the requirements of the Environmental Protection Agency (EPA) Corrective Measures program. As a part of this program, Stantec is currently preparing combined Site Characterization Reports/Remedial Investigation Reports (SCR/RIRs) to establish the current conditions of the site and investigate environmental impacts resulting from historical refining operations.

The storage tank Corrective Action Process (CAP) regulations in 25 PA Code Chapter 245, Subchapter D, specifically §245.310(a)(28) and §245.310(b)(4), and the Land Recycling Program regulations in 25 PA Code Chapter 250, specifically §250.311 and §250.402, require an evaluation of ecological receptors at the facility. According to the Pennsylvania Natural Diversity Inventory (PNDI) Environmental Review Tool search (PNDI Search ID: 612649), potential impacts may exist within the facility under the jurisdiction of the State of Pennsylvania Fish and Boat Commission (PA FBC). The search identified two undisclosed sensitive species as endangered and/or threatened within the general project area. A copy of the PNDI Project Environmental Review Receipt is attached.

The facility is located on industrial property with access restricted by fencing and security measures. AOI 8 is bordered by Vare Avenue to the north and east, Philadelphia Gas Works (PGW) to the south, and by the Schuylkill River to the west. AOI 8 encompasses approximately 247 acres and is bisected by CSX railroad property. AOI 8 presently contains a railyard, propane

**Reference: Potential PNDI Conflict**
**Philadelphia Refinery Complex – AOI 8**
**PNDI Search ID: PNDI 612649**
**City of Philadelphia, Philadelphia County, Pennsylvania**

terminal, aboveground storage tanks (AST), and open space. An aerial photograph depicting site features is included as **Figure 2**. The current and intended future uses of AOI 8 are non-residential.

We request a determination from the PA FBC as to whether or not projects at this facility could affect the sensitive species identified by the PNDI Environmental Project Review to be endangered and/or threatened in the area under PA FBC jurisdiction. If you have questions on the enclosed material or require any additional information to make your determination, please feel free to contact me at (610) 840-2525.

Regards,

**Stantec Consulting Services, Inc.**

Andrew D. Klingbeil, P.G.
Geologic Project Specialist
Phone: 610-840-2525
Fax: 610-840-2501
andrew.klingbeil@stantec.com

Attachment: PNDI Project Environmental Review Receipt
Figure 1 – Site Location Map
Figure 2 – Site Plan

c. Stantec Project File
Evergreen Project File

pennsylvania
DEPARTMENT OF CONSERVATION
AND NATURAL RESOURCES

BUREAU OF FORESTRY

November 4, 2016 **PNDI Number: 612649**

**Avani Patel**
**Stantec Consulting**
1060 Andrew Drive
Suite 140
West Chester, PA 19380
Email: avani.patel@stantec.com (hard copy will not follow)

**Re: PHRO – AOI 8**
**Philadelphia, Philadelphia County, PA**

Dear Avani Patel,

Thank you for the submission of the Pennsylvania Natural Diversity Inventory (PNDI) Environmental Review Receipt Number **612649** for review. PA Department of Conservation and Natural Resources screened this project for potential impacts to species and resources under DCNR's responsibility, which includes plants, terrestrial invertebrates, natural communities, and geologic features only.

**No Impact Anticipated**

PNDI records indicate species or resources under DCNR's jurisdiction are located in the vicinity of the project. However, based on the information you submitted concerning the nature of the project, the immediate location, and our detailed resource information, DCNR has determined that no impact is likely. No further coordination with our agency is needed for this project.

This response represents the most up-to-date review of the PNDI data files and is valid for two (2) years only. If project plans change or more information on listed or proposed species becomes available, our determination may be reconsidered. Should the proposed work continue beyond the period covered by this letter, please resubmit the project to this agency as an "Update" (including an updated PNDI receipt, project narrative and accurate map). As a reminder, this finding applies to potential impacts under DCNR's jurisdiction only. Visit the PNHP website for directions on contacting the Commonwealth's other resource agencies for environmental review.

**Should you have any questions or concerns, please contact Jaci Braund, Ecological Information Specialist, by phone (717-214-3813) or via email (c-jbraund@pa.gov).**

Sincerely

Greg Podniesinski, Section Chief
Natural Heritage Section

Pennsylvania Fish & Boat Commission
established 1866

**Division of Environmental Services**
Natural Diversity Section
450 Robinson Lane
Bellefonte, PA 16823
814-359-5237

November 28, 2016

**IN REPLY REFER TO**
SIR# 46874

Stantec Consulting
Avani Patel
1060 Andrew Drive
West Chester, Pennsylvania 19380

**RE: Species Impact Review (SIR) – Rare, Candidate, Threatened and Endangered Species**
**PNDI Search No. 612649_1**
**PHRO - AOI 8**
**PHILADELPHIA County: Philadelphia City**

Dear Avani Patel:

This responds to your inquiry about a Pennsylvania Natural Diversity Inventory (PNDI) Internet Database search "potential conflict" or a threatened and endangered species impact review. These projects are screened for potential conflicts with rare, candidate, threatened or endangered species under Pennsylvania Fish & Boat Commission jurisdiction (fish, reptiles, amphibians, aquatic invertebrates only) using the Pennsylvania Natural Diversity Inventory (PNDI) database and our own files. These species of special concern are listed under the Endangered Species Act of 1973, the Wild Resource Conservation Act, and the Pennsylvania Fish & Boat Code (Chapter 75), or the Wildlife Code.

**Eastern Redbelly Turtle (*Pseudemys rubriventris*, Threatened)**

The project area was evaluated for potential habitat for Eastern Redbelly Turtles in 2013. The turtles were found in the stormwater basin adjacent to the river, and some accessible potential nesting habitat was located along the river shoreline. Turtles were salvaged from the stormwater basin prior to its maintenance in 2013, and we had recommended that fencing be installed to prevent their return. Additionally, nesting habitat was to have been created or enhanced as part of that project. Therefore, these areas identified as potentially occupied by Eastern Redbelly Turtles would need to be avoided by any future development plans at the site.

**If wetlands, open water areas, streams, rivers, or ponds or the area within 300ft of these water features are to be disturbed from the project activity**, we will need to conduct a more thorough evaluation of the potential adverse impacts to the species of concern. Items **such as:** basic project plans, project narrative, general habitat descriptions, and color photographs keyed to a site map or diagram of the project area, wetlands identification and delineation, stream characterization (flow velocity, width, depth, substrate type, pools and riffles, identification of basking areas, logs, woody debris, presence of

aquatic vegetation) would expedite our review process. Pending the review of information, a habitat assessment or survey targeting the presence of the species of concern may be warranted.

**However, if wetlands, vernal pools, or water bodies or the area within 300ft of these water features are not to be disturbed in any way by the proposed activity**, and provided that best management practices are employed and strict erosion and sedimentation measures are maintained, I do not foresee any adverse impacts to the Eastern Redbelly Turtle (*Pseudemys rubriventris*) from the proposed project.

This response represents the most up-to-date summary of the PNDI data and our files and is valid for two (2) years from the date of this letter. An absence of recorded species information does not necessarily imply species absence. Our data files and the PNDI system are continuously being updated with species occurrence information. Should project plans change or additional information on listed or proposed species become available, this determination may be reconsidered, and consultation shall be re-initiated.

**If you have any questions regarding this review, please contact Kathy Gipe at 814-359-5186 and refer to the SIR # 46874.** Thank you for your cooperation and attention to this important matter of species conservation and habitat protection.

Sincerely,

Christopher A. Urban, Chief
Natural Diversity Section

CAU/KDG/dn

CONESTOGA-ROVERS
& ASSOCIATES

410 Eagleview Boulevard, Suite 110
Exton, Pennsylvania 19341
Telephone: (610) 321-1800 Fax: (610) 321-2763
www.CRAworld.com

September 10, 2013 Reference No. 080309.02

Ms. Kathy Gipe
Natural Diversity Section
Pennsylvania Fish and Boat Commission
450 Robinson Lane
Bellefonte, PA 16823

Dear Ms. Gipe:

Re: **SIR# 40240**
Wildlife Salvage Summary Report
PES North Yard
City of Philadelphia, Philadelphia County, Pennsylvania

Conestoga-Rovers & Associates, Inc. (CRA) was retained by Philadelphia Energy Solutions Refining and Marketing LLC (PES) to conduct a wildlife salvage in the stormwater basin on the North Yard site (Site) located along the Schuylkill River in the City of Philadelphia. The wildlife salvage was conducted in accordance with the Wildlife Salvage Plan submitted to the Pennsylvania Fish & Boat Commission (PFBC) on March 1, 2013 as a result of the findings of CRA's Habitat Assessment Report (CRA Report January 30, 2013) and PFBC's Species Impact Review (SIR) #40240 dated February 26, 2013. This Summary Report presents the methods and results of the wildlife salvage.

## 1.0 SITE LOCATION & PROJECT DESCRIPTION

As shown on the USGS topographic map (Figure 1), the Site is approximately 137 acres and is generally located along the east bank of the Schuylkill River, north of Passyunk Avenue in the City of Philadelphia. As shown on the aerial photograph (Figure 2), the Site is industrial in nature and generally barren. The stormwater basin is located in the northwest portion of the Site and is approximately 60 feet from the Schuylkill River. The basin has two compartments, earthen sides and bottom, is approximately 5 feet deep, and is surrounded by a sandy berm. Water enters the basin from the north through an in-ground concrete oil-water separator.

## 2.0 WILDLIFE SALVAGE METHODOLOGY

Prior to the active season, PES installed a silt fence barrier along the non-bulkheaded sections of shoreline of the Schuylkill River and also around the stormwater basin to prevent turtles from accessing the active work zones on the Site and the basin. A CRA biologist met onsite with the project team on March 28, 2013 to mark out the location of the barrier fence along the River and

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ISO 9001
ENGINEERING DESIGN

around the basin. The barrier fence installation was completed by April 5, 2013.

As a first step in the wildlife salvage effort, PES temporarily partially dewatered the basin down to approximately 12 inches of water. CRA accessed the basin via boat and conducted a limited salvage with nets and by hand. CRA's team of biologists conducted oversight of dewatering and hand captures on June 18, 2013 (7.75 hours) and June 19, 2013 (6.5 hours). After two days of limited salvage using hand nets, CRA set traps to complete the salvage as approved in the Wildlife Salvage Plan.

CRA's Salvage Plan proposed the use of both basking traps and hoop net traps to complete the salvage. However; after observing conditions in the basin and the large fluctuations in water depth, we determined that fixed hoop nets might result in drowning mortality of trapped turtles and we restricted trapping to basking traps only.

On June 20, 2013, CRA deployed 9 basking traps in each compartment of the basin for a total of 18 basking traps. Daily trap checking commenced on June 21, 2013 and was continued until no redbelly turtles were captured for fifteen (15) consecutive trap days, as approved by PFBC in an e-mail communication on July 11, 2013. The traps were removed on July 22, 2013 after seventeen (17) consecutive trap days without a redbelly capture.

All oversight, salvage, and relocation efforts were conducted under the direction of Mr. Scott Bush, a PFBC-recognized biologist (SCP 63 Type 3). CRA assistants included Ms. Christine Miller and Ms. Melissa Kalb.

## 3.0 RESULTS OF WILDLIFE SALVAGE

During the initial two days of dewatering and limited hand capture salvage, CRA captured three (3) red-eared sliders (RES; *Trachemys scripta elegans*) and one (1) common snapping turtle (CST; *Chelydra serpentine*) in the basin. During the 31 days of trapping, CRA captured 4 eastern redbelly turtles (RBT; *Pseudemys rubriventris*), 38 RES, and 1 eastern painted turtle (EPT; *Chrysemys picta picta*) in the basking traps, and 3 turtles (2 RES and 1 CST) by hand or dip net. The percent capture by species was RES 86%, RBT 8%, CST 4%, and EPT 2%.

All captured turtles were documented in accordance with PFBC protocols (species identification, sex, carapace measurements, weight, condition, photographs, etc.). All eastern painted turtles, common snapping turtles, and 1 redbelly turtle were relocated to the Schuylkill

River. Three (3) of the captured redbelly turtles were retained for a radio telemetry study to be sponsored by PES in lieu of nesting habitat mitigation. Non-native species were not relocated in accordance with our Scientific Collection Permit and the conditions of PFBC's SIR #40240.

Table 1 below provides a summary of the redbelly turtles captured during CRA's wildlife salvage at the PES North Yard Site. A summary of CRA's daily trapping efforts is provided in Table 2.

**TABLE 1**
**EASTERN REDBELLY TURTLE CAPTURE SUMMARY**

| DATE CAPTURED | SEX | MEASUREMENTS* (cm) | WEIGHT (grams) | RELOCATION |
|---|---|---|---|---|
| June 23, 2013 | F | CL = 18.42<br>CW = 15.24<br>H = 6.35 | 907 | Retained for telemetry study; released to Schuylkill River on July 29, 2013 |
| June 27, 2013 | F | CL = 30.48<br>CW = 21.27<br>H = 12.38 | 3,968 | Retained for telemetry study; released to Schuylkill River on July 29, 2013 |
| July 3, 2013 | J** | CL = 6.67<br>CW = 6.35<br>H = 3.65 | 70 | Retained for telemetry study; released to Schuylkill River on July 29, 2013 |
| July 5, 2013 | J** | CL = 6.35<br>CW = 6.35<br>H = 2.86 | 70 | Immediately released to Schuylkill River adjacent to Site |

*Carapace length (CL), Carapace width (CW), Height (H)
**Juvenile; Sex not apparent

**TABLE 2**
**SUMMARY OF WILDLIFE SALVAGE EFFORT**
**PES - NORTH YARD**
**CITY OF PHILADELPHIA, PHILADELPHIA COUNTY, PA**
**June 18 - July 22, 2013**

| LOCATION | TRAP ID | DATE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | TOTAL TRAP DAYS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 6/18/2013 | 6/19/2013 | 6/21/2013 | 6/22/2013 | 6/23/2013 | 6/24/2013 | 6/25/2013 | 6/26/2013 | 6/27/2013 | 6/28/2013 | 6/29/2013 | 6/30/2013 | 7/1/2013 | 7/2/2013 | 7/3/2013 | 7/4/2013 | 7/5/2013 | 7/6/2013 | 7/7/2013 | 7/8/2013 | 7/9/2013 | 7/10/2013 | 7/11/2013 | 7/12/2013 | 7/13/2013 | 7/14/2013 | 7/15/2013 | 7/16/2013 | 7/17/2013 | 7/18/2013 | 7/19/2013 | 7/20/2013 | 7/21/2013 | 7/22/2013 | |
| West Side Basin | B-2 | Dewatering & Attempted Salvage | | Trap Set | -- | -- | -- | -- | 1 RES | 1 RES | 1 RES | -- | -- | -- | 1 RES | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1 RES | -- | Trap Removed | 31 |
| | B-7 | | | Trap Set | -- | 3 RES | -- | 1 RES | -- | 1 RES | -- | -- | -- | 1 RES | -- | 1 RBT | -- | -- | -- | -- | -- | 1 RES | -- | -- | 1 RES | -- | -- | -- | -- | -- | -- | -- | -- | -- | Trap Removed | 31 |
| | B-8 | | | Trap Set | -- | 1 EPT | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | Trap Removed | 31 |
| | B-9 | | | Trap Set | -- | 1 RBT | -- | -- | -- | -- | -- | -- | 2 RES | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | Trap Removed | 31 |
| | B-10 | | | Trap Set | -- | -- | -- | -- | 1 RES | 1 RBT | -- | -- | -- | 2 RES | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | Trap Removed | 31 |
| | B-11 | | | Trap Set | -- | 1 RES | -- | -- | -- | -- | 1 RES | -- | -- | -- | 1 RES | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | Trap Removed | 31 |
| | B-16 | | | Trap Set | 1 RES hatchling | -- | -- | -- | -- | 1 RES | -- | -- | -- | -- | -- | 1 RES | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | Trap Removed | 31 |
| | B-17 | | | Trap Set | -- | -- | -- | 1 RES | 1 RES | -- | -- | 1 RES | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1 RES | -- | -- | -- | -- | Trap Removed | 31 |
| | B-20 | | | Trap Set | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | Trap Removed | 31 |
| East Side Basin | B-1 | | | Trap Set | -- | -- | -- | -- | -- | 1 RES | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | Trap Removed | 31 |
| | B-3 | | | Trap Set | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1 RES | -- | -- | 1 RES | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | Trap Removed | 31 |
| | B-4 | | | Trap Set | 1 RES hatchling | -- | -- | -- | -- | -- | -- | -- | -- | 1 RES | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | Trap Removed | 31 |
| | B-12 | | | Trap Set | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | Trap Removed | 31 |
| | B-13 | | | Trap Set | -- | -- | 1 RES | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1 RBT | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1 RES | Trap Removed | 31 |
| | B-14 | | | Trap Set | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1 RES / Trap Removed | 31 |
| | B-15 | | | Trap Set | -- | -- | -- | -- | 1 RES | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | Trap Removed | 31 |
| | B-18 | | | Trap Set | -- | -- | -- | -- | -- | -- | 1 RES | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | Trap Removed | 31 |
| | B-19 | | | Trap Set | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | Trap Removed | 31 |
| Hand / Net Capture | | 1 CST, 3 RES | -- | -- | -- | -- | -- | 1 CST | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1 RES | -- | -- | -- | -- | 1 RES | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 33 |

NOTES:
B-1: Basking Trap
CST: Common snapping turtle
EPT: Eastern painted turtle
RBT: Redbelly turtle
RES: Red-eared slider

-- Trap empty

## 4.0 SUMMARY & CONCLUSIONS

During the combined wildlife salvage efforts in the stormwater basin on the PES North Yard Site, CRA captured 50 turtles (4 RBT, 1 EPT, 2 CST, and 43 RES). Three (3) of the redbelly turtles were retained by CRA for use in a PFBC-approved telemetry study. CRA attached transmitters and released the RBTs to the Schuylkill River on July 29, 2013. CRA began tracking the turtles via radio telemetry on July 30, 2013 and has continued the tracking in accordance with the schedule provided in the Telemetry Work Plan (dated July 3, 2013) as approved by PFBC. As discussed in the Telemetry Work Plan, the results of CRA's telemetry study will be submitted in a separate report at the conclusion of the study.

If you have any questions or require additional information, please do not hesitate to contact me at (610) 321-1800 ext. 12 or cmiller@craworld.com.

Yours truly,

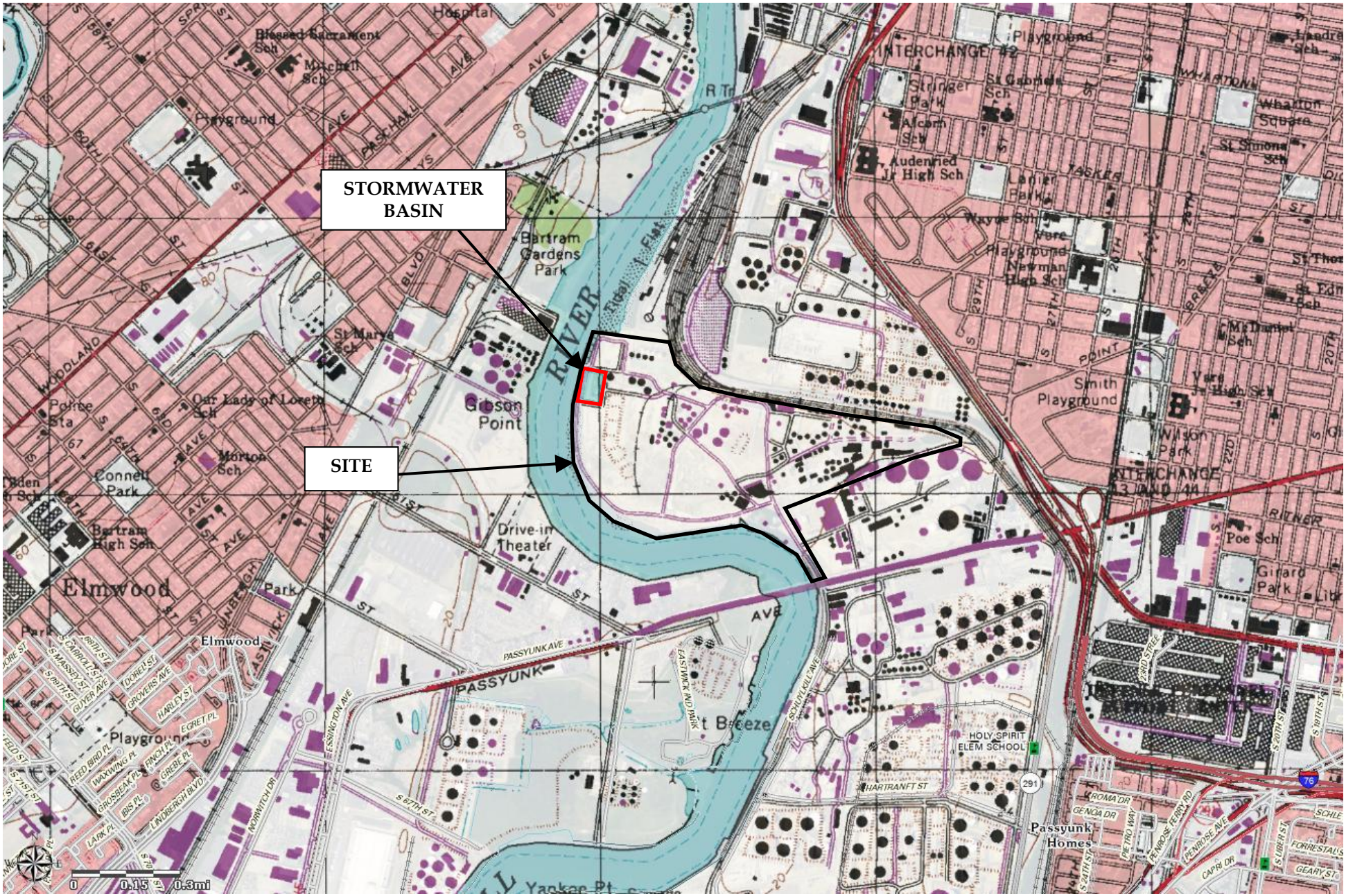
CONESTOGA-ROVERS & ASSOCIATES

Christine J. Miller
Ecologist

CJM/smk/2
Encl.

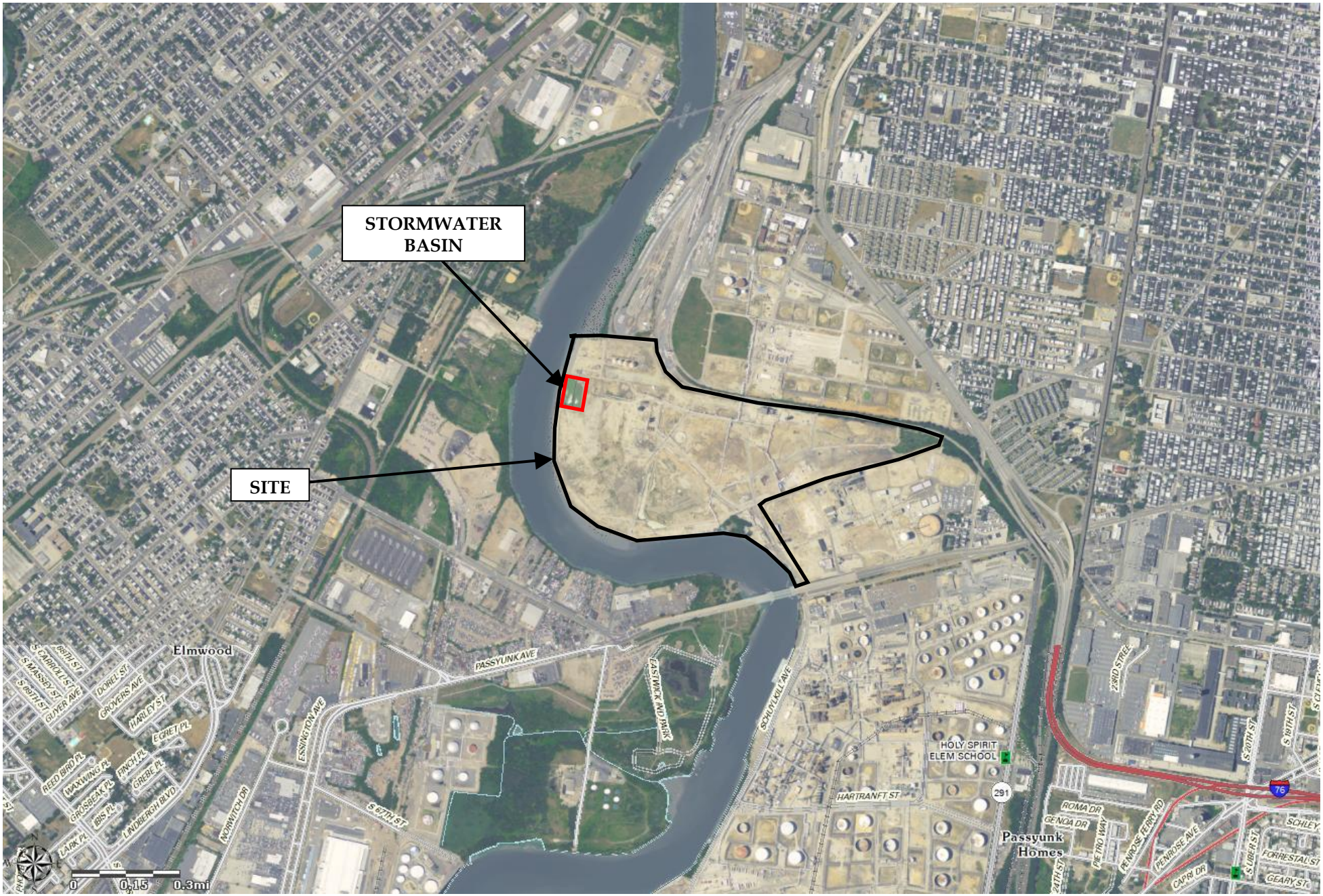
cc: Joe Musil - Urban
Scott Bush - CRA

FIGURES




Source: U.S. Geological Survey, National Geospatial Program.

**FIGURE 1**
**SITE LOCATION MAP**




Source: U.S. Geological Survey, National Geospatial Program.

**FIGURE 2**
**AERIAL PHOTOGRAPH**

ATTACHMENT A

COLOR PHOTOGRAPHS

Photo 1. Looking northeast at the stormwater basin on the PES site.

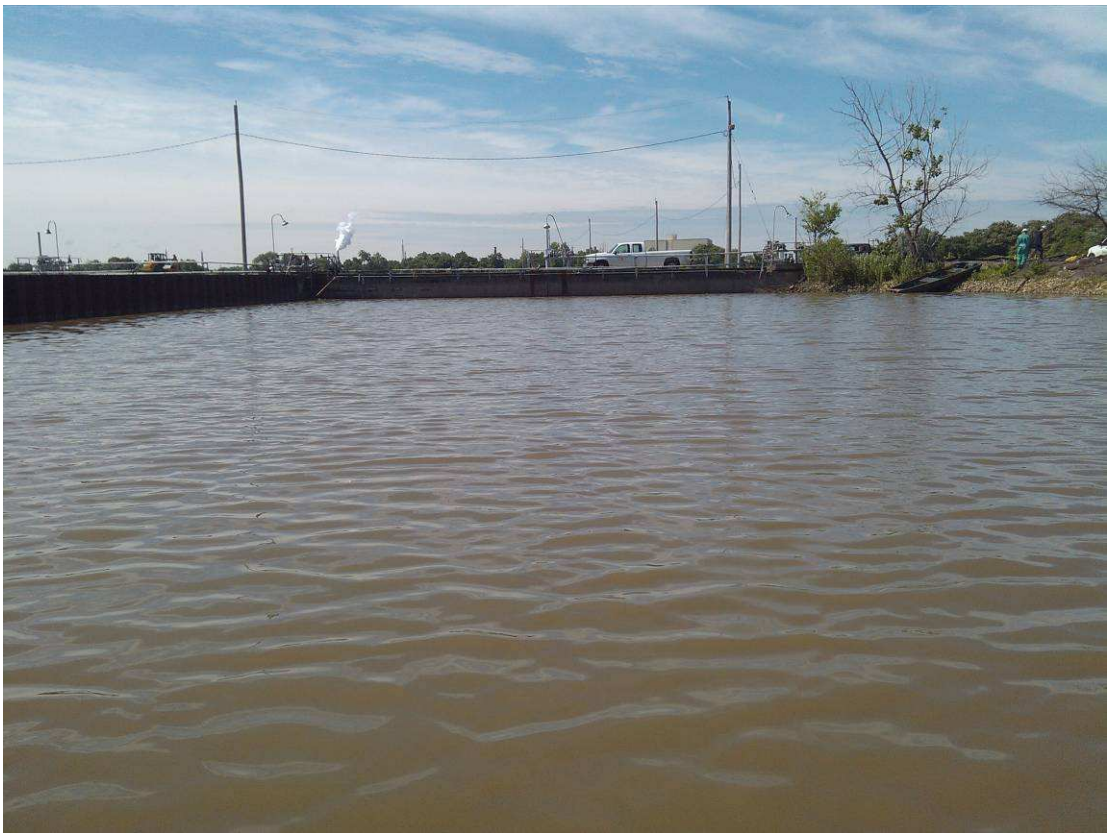


Photo 2. Looking south at the stormwater basin on the PES site.

Photo 3. Looking north at basking traps in the west side of the stormwater basin.

Photo 4. Looking north at basking traps in the east side of the stormwater basin.

Photo 5. Common snapping turtle captured by hand during the attempted basin salvage on June 18, 2013; released to Schuylkill River adjacent to Site.

Photo 6. Female redbelly turtle captured during trapping on June 23, 2013; retained for telemetry study.

Photo 7. Looking at several red-eared sliders captured during trapping; not released.

Photo 8. Female redbelly turtle captured during trapping on June 27, 2013; retained for telemetry study.

Photo 9. Juvenile redbelly turtle captured during trapping on July 3, 2013; retained for telemetry study.

Photo 10. Juvenile redbelly turtle captured during trapping on July 5, 2013; released to Schuylkill River adjacent to Site.

Photos 11 and 12. Examples of juvenile red-eared sliders trapped during the salvage, not released.

Photos 13 and 14. Examples of adult red-eared sliders trapped during the salvage, not released.

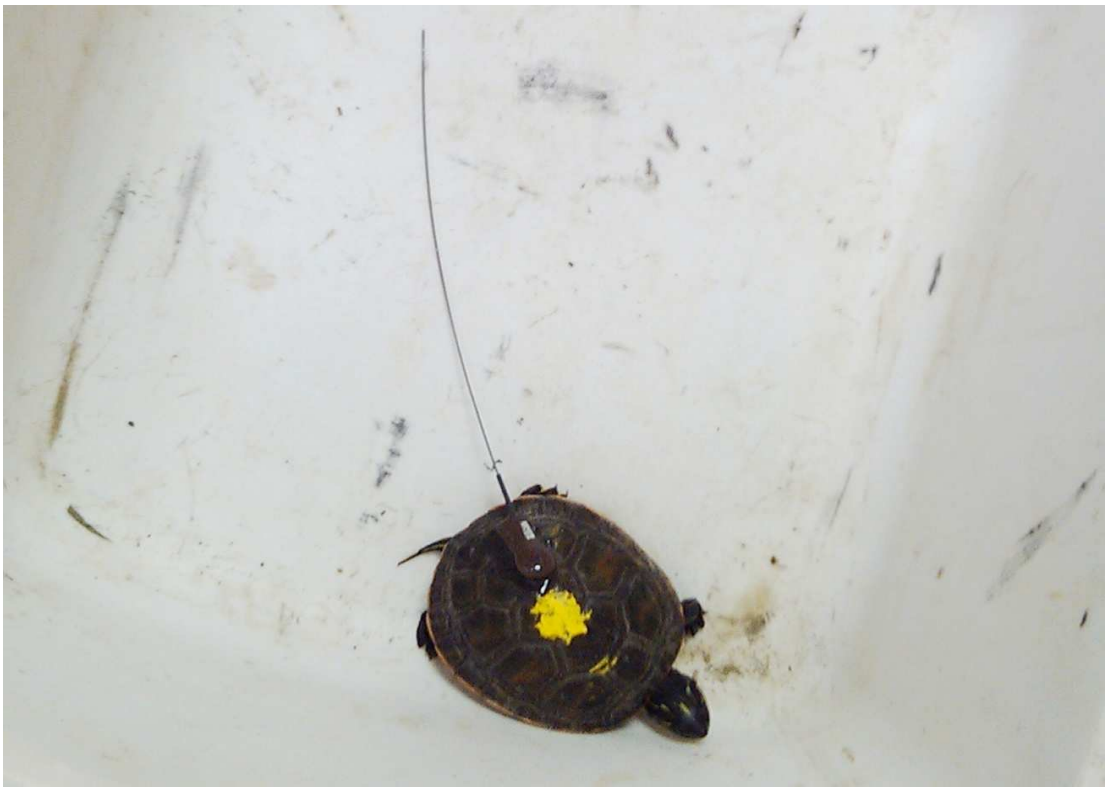


Photo 15. Juvenile redbelly turtle affixed with radio transmitter prior to release.

Photo 16. Adult female redbelly turtles affixed with radio transmitters prior to release.

Pennsylvania Fish & Boat Commission
established 1866

**Division of Environmental Services**
Natural Diversity Section
450 Robinson Lane
Bellefonte, PA 16823

September 23, 2013

**IN REPLY REFER TO**
SIR# 40240

CONESTOGA-ROVERS & ASSOCIATES
CHRISTINE MILLER
410 EAGLEVIEW BOULEVARD, SUITE 110
EXTON, Pennsylvania 19341

**RE: Species Impact Review (SIR) – Rare, Candidate, Threatened and Endangered Species**
**PNDI Search No. 20121217383356**
**PES NORTH YARD**
**PHILADELPHIA County: Philadelphia City**

Dear CHRISTINE MILLER:

This letter is to acknowledge our receipt of your report of salvage activities for the eastern redbelly turtle (*Pseudemys rubriventris*, PA threatened) prior to construction at the project site. The PFBC uses these reports to help guide our conservation and management efforts for the redbelly turtle. Please be sure to report any captures made under your scientific collector's permit for this project in our online collector's permit system.

Thank you for your cooperation and dedication to the protection of reptiles and amphibians of the Commonwealth. **If you have any questions regarding this review, please contact Kathy Gipe at 814-359-5186 and refer to the SIR # 40240.** Thank you for your cooperation and attention to this important matter of species conservation and habitat protection.

Sincerely,

Christopher A. Urban, Chief
Natural Diversity Section

CAU/KDG/dn

**Sunoco, Inc.**
3144 Passyunk Avenue
Philadelphia PA 19145-5299
215 339 2000

October 26, 2000

Mr. Stephan Brown
Pa Department of Environmental Protection
Lee Park – Suite 6010
555 North Lane
Conshohocken, PA 19428

RE: Facility ID #51- 19781
Sunoco, Inc. (R&M)
Point Breeze Processing Area

Dear Mr. Brown:

Sunoco is planning to permanently close and remove aboveground storage tanks 068A, 070A, and 072A. The associated Sunoco tank numbers are ~~549~~, 552 and 554.

I have enclosed the required thirty (30) day closure notification form for your file and review. If you should have any questions please contact me at 215-339-2120.

Sincerely,

Jim Tucker

Jim Tucker
Environmental Specialist

2530-FM-LRWM0127 4/96

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF LAND RECYCLING AND WASTE MANAGEMENT

DATE RECEIVED: _____

ATTACHMENT 3

# ABOVEGROUND STORAGE TANK SYSTEM CLOSURE NOTIFICATION FORM

NOTE: Notification of permanent closure must be received by the appropriate regional office of the Department at least 30 days prior to initiation of the closure activities.

| | | | | |
|---|---|---|---|---|
| **I.** | **Owner of Tank System** | | | |
| | Owner Name<br>Sunoco, Inc. (R&M) | | | |
| | Street Address<br>3144 Passyunk Ave. | | Phone Number<br>215-339-2000 | |
| | City<br>Philadelphia | State<br>PA | Zip Code<br>19145 | |
| **II.** | **Location of Tank System** | | | |
| | Facility Name<br>Sunoco, Inc. (R&M) - Point Breeze Processing Area | | Facility Identification Number<br>51-19781 | |
| | Street Address<br>3144 Passyunk Avenue | City<br>Philadelphia | State<br>PA | Zip Code<br>19145 |
| | Municipality<br>Philadelphia | County<br>Philadelphia | | |
| | Contact Person<br>Jim Tucker | | Phone Number<br>215-339-2120 | |
| **III.** | **Month/Day/Year of Proposed Closure** 12/31/00 | | | |
| **IV.** | **Certified Installer/Company Performing Tank Handling Activities** | | | |
| | Certified Installer Name<br>David Wiechecki | | Installer Certification Number<br>3951 | |
| | Street Address<br>3415 West 2nd Street | | Phone Number<br>610-494-3171 | |
| | City<br>Trainer | State<br>PA | Zip Code<br>19061 | |
| | Certified Company Name<br>International Scrap Iron and Metal Co. | | Company Certification Number<br>860 | |
| **V.** | **Contractor/Individual Performing Site Assessment Activities** | | | |
| | Name of Contractor or Individual<br>International Scrap Iron and Metal Co. | | | |
| | Street Address<br>3415 West 2nd Street | | Phone Number<br>610-494-3171 | |
| | City<br>Trainer | State<br>PA | Zip Code<br>19061 | |
| **VI.** | **Description of Aboveground Storage Tank Systems (See reverse side of form)** | | | |
| **VII.** | **Will this closure involve replacement of at least one old tank with a new tank?**<br>Yes _____ No X _____ | | | |
| **VIII.** | **Signature of Tank System Owner** | | **Date**<br>10/25/00 | |

| VI. Description of Underground Storage Tank System (Complete for each tank undergoing closure) | | | | | |
|---|---|---|---|---|---|
| Tank Registration Number | | 068A | 070A | 072A | |
| Estimated Total Capacity (Gallons) | | 2,032,800 | 2,818,200 | 2,352,000 | |
| Substance(s) Stored Throughout Operating Life of Tank (Check All That Apply) | a. Petroleum | | | | |
| | Unleaded Gasoline | ☐ | ☐ | ☐ | ☐ |
| | Leaded Gasoline | ☐ | ☐ | ☐ | ☐ |
| | Aviation Gasoline | ☐ | ☐ | ☐ | ☐ |
| | Kerosene | ☐ | ☐ | ☐ | ☐ |
| | Jet Fuel | ☐ | ☐ | ☐ | ☐ |
| | Diesel Fuel | ☐ | ☐ | ☐ | ☐ |
| | Fuel Oil No. 1 | ☐ | ☐ | ☐ | ☐ |
| | Fuel Oil No. 2 | ☐ | ☐ | ☐ | ☐ |
| | Fuel Oil No. 3 | ☐ | ☐ | ☐ | ☐ |
| | Fuel Oil No. 4 | ☐ | ☐ | ☐ | ☐ |
| | Fuel Oil No. 5 | ☐ | ☐ | ☐ | ☐ |
| | Fuel Oil No. 6 | ☐ | ☐ | ☐ | ☐ |
| | New Motor Oil | ☐ | ☐ | ☐ | ☐ |
| | Used Motor Oil | ☐ | ☐ | ☐ | ☐ |
| | Other, Please Specify | GAS OIL | GAS OIL | GAS OIL | |
| | b. Hazardous Substance Name of Principal CERCLA Substance AND Chemical Abstract Service (CAS) No. | ☐ | ☐ | ☐ | ☐ |
| | c. Unknown | ☐ | ☐ | ☐ | ☐ |
| Proposed Closure Method (Check Only One) | a. Removal | ☒ | ☒ | ☒ | ☐ |
| | b. Closure-In-Place | ☐ | ☐ | ☐ | ☐ |
| | c. Change-In-Service | ☐ | ☐ | ☐ | ☐ |
| Partial System Closure (Yes or No) NO | | | | | |
| Tank Registration Number | | | | | |
| Estimated Total Capacity (Gallons) | | | | | |
| Substance(s) Stored Throughout Operating Life of Tank (Check All That Apply) | a. Petroleum | | | | |
| | Unleaded Gasoline | ☐ | ☐ | ☐ | ☐ |
| | Leaded Gasoline | ☐ | ☐ | ☐ | ☐ |
| | Aviation Gasoline | ☐ | ☐ | ☐ | ☐ |
| | Kerosene | ☐ | ☐ | ☐ | ☐ |
| | Jet Fuel | ☐ | ☐ | ☐ | ☐ |
| | Diesel Fuel | ☐ | ☐ | ☐ | ☐ |
| | Fuel Oil No. 1 | ☐ | ☐ | ☐ | ☐ |
| | Fuel Oil No. 2 | ☐ | ☐ | ☐ | ☐ |
| | Fuel Oil No. 3 | ☐ | ☐ | ☐ | ☐ |
| | Fuel Oil No. 4 | ☐ | ☐ | ☐ | ☐ |
| | Fuel Oil No. 5 | ☐ | ☐ | ☐ | ☐ |
| | Fuel Oil No. 6 | ☐ | ☐ | ☐ | ☐ |
| | New Motor Oil | ☐ | ☐ | ☐ | ☐ |
| | Used Motor Oil | ☐ | ☐ | ☐ | ☐ |
| | Other, Please Specify | | | | |
| | b. Hazardous Substance Name of Principal CERCLA Substance AND Chemical Abstract Service (CAS) No. | ☐ | ☐ | ☐ | ☐ |
| | c. Unknown | ☐ | ☐ | ☐ | ☐ |
| Proposed Closure Method (Check Only One) | a. Removal | ☐ | ☐ | ☐ | ☐ |
| | b. Closure-In-Place | ☐ | ☐ | ☐ | ☐ |
| | c. Change-In-Service | ☐ | ☐ | ☐ | ☐ |
| Partial System Closure (Yes or No) | | | | | |

**Sunoco, Inc.**
3144 Passyunk Avenue
Philadelphia PA 19145-5299
215 339 2000

March 4, 2003

FILE COPY

Pa Department of Environmental Protection
P.O. Box 8762
Harrisburg, PA 17105-8762

Attention: Storage Tank Division

**Sunoco, Inc. (R&M)**
**Point Breeze Processing Area**
**Facility ID# 51-19781**

Enclosed is one (1) Registration/Permitting of Storage Tanks form # 3930-PM-WC0014. This form has been completed for the removal of (2) registered tanks **070A** and **082A**. The associated Sunoco tank numbers are 552 and 652. These tanks have been demolished and removed from the site.

If you have any questions please call 215-339-2120.

Sincerely,

Jim Tucker

Jim Tucker
Sr. Environmental Engineering Specialist

Bcc: George Keegan
Carlos Ochoa – G.P./MO Box 250
Harry Buchmann – 14 SB - Box 180

552 & 652 Tanks - Demolition

BUREAU OF WATERSHED CONSERVATION

# REGISTRATION / PERMITTING OF STORAGE TANKS

**I. PURPOSE OF SUBMITTAL** *(Check All Those That Apply)*

**INITIAL**
- ☐ Initial
- ☐ Registration for Removal of Unregistered Tank(s)
- ☐ Registration for Un-Registered Tank(s) Closed in Place

**AMENDED**
- ☐ Changed Previous Info
- ☐ Added Tank(s)
- ☐ Tank(s) Temporarily Out of Use
- ☑ Removed / Closed Tank(s)
- ☐ Exempted Tank(s)
- ☐ Changed from Regulated to Unregulated Substance or Use
- ☐ Relocated Tank(s)

**CHANGE OF OWNERSHIP**
- ☐ Sold ☐ Purchased
- ☐ All Tanks (Will Remain at Same Facility)
- ☐ Some Tanks (Will Remain at Same Facility)
- ☐ Some Tanks (Relocated to Another Regulated Facility)
- ☐ Some Tanks (Relocated to a New Facility and the Tanks are to be Registered)

STATE USE ONLY

**II.A. TANK OWNER / APPLICANT INFORMATION** *(Type or Print Legibly in Ink)*

Storage Tank Client I.D. No. (State Use Only) | DEP Client ID No.

Organization Name or Registered Fictitious Name: SUNOCO, INC. (R&M) | Employer ID No. (EIN): 231743283

Individual Last Name | First Name | MI | Suffix | SSN

Mailing Address Line 1: 3144 PASSYUNK Ave | Mailing Address Line 2

Address Last Line – City: PHILADELPHIA | State: PA | ZIP+4: 19145-5299 | Country: USA | Phone No.: 215-339-2120

**TYPE OF OWNER/BUSINESS** *(Check Only One)*

- ☐ Vol. Fire Co./EMS Org.
- ☐ Federal Government
- ☐ State Government

***Local Government***
- ☐ County
- ☐ Municipality
- ☐ School District
- ☐ Authority

***Corporate***
- ☑ Corporation/PA
- ☐ Corporation/Non-PA
- ☐ Assn./Organization

***Private***
- ☐ Partnership/General
- ☐ Partnership/Limited
- ☐ Sole Proprietorship
- ☐ Individual(s)
- ☐ Assn./Organization

**II.B. CHANGE OF OWNERSHIP** *(The new owner is to complete all sections of this form including this section if some or all tanks have been purchased/transferred.)*

Previous Owner Name: | Date of Purchase/Transfer

Mailing Address Line 1 | Mailing Address Line 2

ress Last Line – City | State | ZIP+4 | Country | Phone No.

Previous Facility ID No. | Previous Tank Nos.

**III. FACILITY/SITE INFORMATION** *(Type or Print Legibly in Ink)*

A. Storage Tank Facility ID No: 51-19781 | Facility/Site Name: POINT BREEZE PROCESSING AREA | DEP Site ID #

Site Location Line 1: 3144 PASSYUNK AVE | Site Location Line 2

Site Location Last Line – City: PHILADELPHIA | State: PA | ZIP+4: 19145-5299 | EPA ID#: PAD002289700

County Name: PHILADELPHIA | Municipality | Check One: City ☑ Boro ☐ Twp ☐ | Phone No.

**Type of Facility** *(Check Only One)*

- ☐ 00 Unknown
- ☐ 01 Gas Station
- ☐ 02 Petroleum Distributor
- ☐ 03 Air Taxi
- ☐ 04 Aircraft Owner
- ☐ 05 Auto Dealership
- ☐ 06 Railroad
- ☐ 07 Local Government
- ☐ 08 State Government
- ☐ 09 Federal, Non-Military
- ☐ 10 Federal, Military
- ☐ 11 Commercial
- ☑ 12 Industrial
- ☐ 13 Residential
- ☐ 14 Contractor
- ☐ 15 Trucking/Transport
- ☐ 16 Utility
- ☐ 17 Farm
- ☐ 18 Convenience Store
- ☐ 99 Other _____

**B. Fire Safety Permit No. (if applicable)**

**C. Contact (check only one)**
- ☐ Send all mail to owner/applicant address
- ☐ Send all mail to facility/site location
- ☑ Send all mail to contact address listed below

Contact Last Name: TUCKER | First Name: JAMES | MI: R | Suffix:

Mailing Address Line 1: 3144 PASSYUNK Ave | Mailing Address Line 2

Address Last Line – City: PHILADELPHIA | State: PA | ZIP+4: 19145-5299 | Country: USA | Phone No.: 215-339-2120

FACILITY ID NO. — 51-19781 Facility Name POINT BREEZE PROCESS AREA

## IV. DESCRIPTION OF STORAGE TANKS (Type or print legibly each regulated storage tank at this facility under your ownership

A. ABOVEGROUND TANKS List all tanks. If amending information, identify the Amended Tank(s) with an asterisk (*) to the left of the tank number.

| Tank Number | STATUS | TYPE | Install Date (Mo-Day-Yr) | Change of Status Date (Mo-Day-Yr) | Capacity (Gallons) | Substance Code (Currently or Last Stored) | CERCLA Name (If Hazardous Substance) Substance Name (If Other Petroleum Substance or Petroleum-Based Mixture) | CAS No. (If Hazardous Substance) | Exer Refer Cod (See Instru |
|---|---|---|---|---|---|---|---|---|---|
| 070A | R | F | 01/01/1914 | 2/06/2003 | 2,818,200 | J | GAS OIL | | |
| 082A | R | M | 01/01/1978 | 2/06/2003 | 29,400 | J | FATTY ACID | | |
| A | | | | | | | | | |
| A | | | | | | | | | |
| A | | | | | | | | | |
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Status Codes: C - Currently in Use T - Temporarily Out of Use E - Exempt R - Removed P - Closed in Place
Type Codes: M - Manufactured F - Field Constructed

B. UNDERGROUND TANKS List all tanks. If amending information, identify the Amended Tank(s) with an asterisk (*) to the left of the tank number.

| Tank Number | STATUS | TYPE | Install Date (Mo-Day-Yr) | Change of Status Date (Mo-Day-Yr) | Capacity (Gallons) | Substance Code (Currently or Last Stored) | CERCLA Name (If Hazardous Substance) Substance Name (If Other Petroleum Substance or Petroleum-Based Mixture) | CAS No. (If Hazardous Substance) | Exempt Referenc Code (See Instructio |
|---|---|---|---|---|---|---|---|---|---|
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Status Codes: C - Currently in Use T - Temporarily Out of Use E - Exempt R - Removed P - Closed in Place
Type Codes: M - Manufactured F - Field Constructed

*Detach this entire form and return with all appropriate signatures to the Division of Storage Tanks*

FACILITY ID NO. — 51-19781 Facility Name POINT BREEZE PROCESS AREA

## V. INFORMATION FOR ABOVEGROUND AND UNDERGROUND NEW TANK INSTALLATIONS

(Write the Tank Number(s) and place a check (√) in the appropriate box for each component that was installed.)

| | Tank Number | Tank Number | Tank Number | Tank Number | Tank Number | Tank Number | Tank Number | Tank Number | Tank Number | Tank Number | T Nu |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **TANK CONSTRUCTION AND CORROSION PROTECTION (1)** | | | | | | | | | | | |
| (A) SINGLE WALL UNPROTECTED STEEL | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | |
| (B) CATHODICALLY PROTECTED STEEL (GALVANIC) | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | |
| (C) CATHODICALLY PROTECTED STEEL (IMPRESSED CURRENT) | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | |
| (D) DOUBLE WALL UNPROTECTED STEEL | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | |
| (E) SINGLE WALL FIBERGLASS | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | |
| (F) DOUBLE WALL FIBERGLASS | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | |
| (G) JACKETED STEEL OR DOUBLE WALL ACT-100 | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | |
| (H) STEEL WITH FRP COATING | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | |
| (I) STEEL WITH LINED INTERIOR | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | |
| (J) CONCRETE | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | |
| (O) CATHODICALLY PROTECTED DOUBLE WALL STEEL (GALVANIC) | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | |
| (p) CATHODICALLY PROTECTED STEEL WITH LINER | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | |
| (Q) DOUBLE BOTTOM (AST's ONLY) | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | |
| (R) MOLDED PLASTIC FORM (AST's ONLY) | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | |
| (99) OTHER (SPECIFY) | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | |
| **UNDERGROUND PIPING CONSTRUCTION AND CORROSION PROTECTION (2)** | | | | | | | | | | | |
| (A) BARE STEEL | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | |
| (B) CATHODICALLY PROTECTED STEEL | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | |
| (C) COPPER | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | |
| (D) FIBERGLASS | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | |
| (E) FLEXIBLE (NON-METALLIC) | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | |
| (G) NONE | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | |
| (H) DOUBLE WALL METALLIC PRIMARY | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | |
| (J) DOUBLE WALL RIGID (FRP) PRIMARY | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | |
| (K) DOUBLE WALL FLEXIBLE PRIMARY | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | |
| (L) TRENCH LINER | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | |
| (M) JACKETED | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | |
| (99) OTHER (SPECIFY) | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | |
| **ABOVEGROUND PIPING CONSTRUCTION AND CORROSION PROTECTION (3)** | | | | | | | | | | | |
| (A) BARE STEEL | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | |
| (B) CATHODICALLY PROTECTED STEEL | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | |
| (C) COPPER | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | |
| (D) FIBERGLASS | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | |
| (E) FLEXIBLE (NON-METALLIC) | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | |
| (G) NONE | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | |
| (99) OTHER (SPECIFY) | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | |
| **PRODUCT DELIVERY (PIPING) SYSTEM (4)** | | | | | | | | | | | |
| (A) SUCTION: CHECK VALVE AT PUMP | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | |
| (B) SUCTION: CHECK VALVE AT TANK | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | |
| (C) PRESSURE | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | |
| (D) GRAVITY FED | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | |
| (E) NONE | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | |

*Detach instructions and return this entire form with all appropriate signatures to the Division of Storage Tanks*

FACILITY ID NO. — 51-19781 Facility Name POINT BREEZE PROCESS AI

## V. INFORMATION FOR ABOVEGROUND AND UNDERGROUND NEW TANK INSTALLATIONS (cont.)

(Write the Tank Number(s) and place a check (√) in the appropriate box for each component that was installed.)

| | Tank Number | Tank Number | Tank Number | Tank Number | Tank Number | Tank Number | Tank Number | Tank Number | Tank Number | Tank Number | Nu |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SPILL PREVENTION (6) USTs ONLY | | | | | | | | | | | |
| (Y) YES | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | |
| (N) NO | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | |
| (E) FILL IN LESS THAN 25 GALLONS | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | |
| OVERFILL PREVENTION PRESENT (7) | | | | | | | | | | | |
| (Y) YES | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| (N) NO | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| (E) FILL IN LESS THAN 25 GALLONS | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| VAPOR RECOVERY PRESENT (11) | | | | | | | | | | | |
| (A) STAGE I INSTALLED | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| (B) STAGE II INSTALLED | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| (C) STAGE I AND II INSTALLED | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| (D) NONE | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| EMERGENCY CONTAINMENT (16) ASTs ONLY | | | | | | | | | | | |
| (Y) YES | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| (N) NO | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| SECONDARY CONTAINMENT (17) ASTs ONLY | | | | | | | | | | | |
| (Y) YES | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| (N) NO | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

## VI. ABOVEGROUND AND UNDERGROUND TANK INFORMATION FOR REMOVAL FROM SERVICE

(Write the Tank Number(s) and place a check (√) in the appropriate box for each tank that was removed or closed in place.)

| | Tank Number | Tank Number | Tank Number | Tank Number | Tank Number | Tank Number | Tank Number | Tank Number | Tank Number | Tank Number | Tank Numbe |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 070A | 082A | | | | | | | | | |
| TANK REMOVED | ☑ | ☑ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| TANK CLOSED IN PLACE | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| CONTAMINATION SUSPECTED OR OBSERVED AND NOTIFICATION OF CONTAMINATION FORM WAS SUBMITTED | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| CLOSURE DOCUMENT SUBMITTED TO THE APPROPRIATE DEP REGIONAL OFFICE | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| CLOSURE DOCUMENT KEPT ON FILE BY OWNER | ☑ | ☑ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

070A - TANK WAS REGISTERED AS AN ABOVEGROUND TANK BUT HAS BEEN OUT OF SERVICE FOR SEVERAL YEARS. WHILE SUNOCO WAS PREPARING FOR DEMOLITION SUNOCO RECOGNIZED THAT THE TANK WAS 10% UNDERGROUND. THE SITE ASSESSMENT WILL BE CONDUCTED MEETING THE REQUIREMENTS FOR AN UNDERGROUND TANK. A CERTIFIED ABOVEGROUND TANK HANDLER REMOVED THE TANK. THIS WAS AGREED UPON BY STEPHAN BROWN OF THE PADEP AND MYSELF. Jim Tucker

*Detach this entire form and return with all appropriate signatures to the Division of Storage Tanks*

FACILITY ID NO. — 51-19781 Facility Name Point Breeze Process Area

## VII. OWNER CERTIFICATION (Read and sign after completing all applicable sections.)

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that I *on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate* complete. This registration is conditioned upon compliance with provisions of the Storage Tank and Spill Prevention Act of 1989, all applicable regula nd with the requirements for obtaining and maintaining a permit required under this Act. I certify my responsibility for assuring the following p requirements:

- Storage Tank systems are in compliance with applicable administrative, technical and operational requirements as specified in Subchapter E underground tanks or Subchapter F or G for aboveground tanks.
- Tank handling and inspection activities are performed by an individual possessing DEP certification in the appropriate category as require Subchapters A and B.
- Underground storage tanks meet the applicable financial responsibility requirements of Subchapter H (relating to financial responsibility requirements).
- A Spill Prevention Response (SPR) Plan must be submitted to the appropriate DEP regional office for facilities that have aboveground storage tanks wh the total capacity of all aboveground tanks is greater than 21,000 gallons.

My signature represents to the Department that I own the storage tank(s) and am aware of the responsibilities and potential liabilities as an "owner" aris under the Storage Tank and Spill Prevention Act of 1989 and all applicable regulations. I am also advised that this registration is made subject to the penalt of 18 PA. C.S. Section 4904 relating to unsworn falsification to authorities.

| Name and Title of Owner | Signature | Date |
|---|---|---|
| Jim Tucker<br>Environmental Engineering Spec. | Jim Tucker | 3/4/03 |

## VIII. INSTALLER/REMOVER CERTIFICATION

**This section must be completed by the certified tank handler(s) who is responsible fo the installation or removal from service of the aboveground and underground storage tank systems listed in Sections V and VI. Do NO *enter the company certification number. Tank modification must be submitted on a "Tank Handling Activities Report" form.* (Type or Prin legibly)**

As the certified tank handler responsible for the tank handling activities in the category or categories listed, I certify that all tank handling activities were conducted in compliance with the design, installation and operation standards of the Storage Tank and Spill Prevention Act of 1989 and all applicable regulations. I also certify, under penalty of law as provided in 18 PA C.S.A. 4904 (relating to unsworn falsification to authorities), that the information provided therein is true, accurate and complete to the best of my knowledge and belief.

| Tank Number | *Installer/Remover Name* | Construction Standard | Individual Certification No. | Certification Category | *Installer/Remover Signature* | Date |
|---|---|---|---|---|---|---|
| 076A | David Wiecheckі | AR | 3951 | AFR | | 3/4/03 |
| 082A | David Wiecheckі | AR | 3951 | AMR | | 3/4/03 |
| | | | | | | |
| | | | | | | |
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## IX. INSPECTOR CERTIFICATION

**This section must be completed by the certified tank inspector(s) who is responsible for verifying the installation standards for all field constructed tanks and all aboveground tanks greater than 21,000 gallons listed in Section V. (Type or Print legibly)**

As the certified tank inspector responsible for verifying tank handling activities and construction standards, I certify that the tank(s) listed below are constructed to appropriate industry standards and, if applicable, to manufacturer's specifications; that the tank(s) have been tested as required by industry standards; and that the tank(s) meet or exceed applicable design and operating standards; and are in compliance with the requirements of the Storage Tank and Spill Prevention Act of 1989, and all applicable regulations. I also certify under penalty of law as provided in 18 PA C.S. A. 4904 (relating to unsworn falsification to authorities), that the information provided herein is true, accurate and complete to the best of my knowledge and belief.

| Tank Number | Inspector Name | Construction Standard | Individual Certification No. | Certification Category | Inspector Signature | Date |
|---|---|---|---|---|---|---|
| | | | | | | |
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## X. SITE SPECIFIC PERMIT NUMBER

**(If a site specific permit was required for new tank installation, write the tank number(s) and permit number(s) in the appropriate box.)**

| Site Specific Permit No. | Tank Number | Tank Number | Tank Number | Tank Number | Tank Number | Tank Number | Tank Number | Tank Number | Tank Number | Tank Number |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

Bcc: George Keegan – PB/MO
Harry Buchmann – PB/14SB – Box 180
Jim Oppenheim – PB/MO
Barry Allison – GP/MO – Box 290
Patrick Chabeda – PB/MO

**Sunoco, Inc.**
3144 Passyunk Avenue
Philadelphia PA 19145-5299
215 339 2000

FILE COPY

July 18, 2003

Mr. Stephan Brown
PaDEP – SE Regional Office
Lee Park, Suite 6010
555 North Lane
Conshohocken, PA 19428

**Re: Sunoco Storage Tank #552**
**PA Registration #070A**
**Sunoco Philadelphia Refinery – Point Breeze Processing Area**
**Facility ID# 51-19781**

Dear Mr. Brown:

Sunoco tank #552 was permanently closed and removed from site on March 3, 2003. A site assessment was performed to measure for the presence of any release from the storage tank system.

Soil samples were collected and analyzed for Benzene, Toluene, Ethylbenzene, Total Xylenes, Isopropylbenzene, Naphthalene, Fluorene, and Phenanthrene. Analytical results indicate Naphthalene exceeded the PaDEP Act 2 MSC, (Medium Specific Concentrations), standard for saturated soils in 10 of 11 samples. Analytical results indicate that all other tested parameters were below applicable PaDEP Act 2 MSC's.

As outlined in Pennsylvania Code Title 25 Chapter 245.309 Subchapter D Sunoco will perform a site characterization to determine the required remedial action. The site characterization report will be submitted on or before January 4, 2004.

If you have any questions or need additional information please contact me at 215-339-2120.

Sincerely,

Jim Tucker
Sr. Environmental Specialist

CC: Philadelphia Local Emergency Planning Committee
240 Spring Garden Street
Philadelphia, Pa 19123

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

2530-FM-LRWM0082 Rev. 11/2001
BUREAU OF LAND RECYCLING AND WASTE MANAGEMENT

# NOTIFICATION OF REPORTABLE RELEASE *(Owners and Operators)*

☑ Initial
☐ Follow-Up

# NOTIFICATION OF CONTAMINATION *(Certified Installers and Inspectors)*

## NOTIFICATION OF REPORTABLE RELEASE *(Owners and Operators)*

The Storage Tank Program's Corrective Action Process (CAP) regulations establish release reporting requirements for owners and operators of storage tanks and storage tank facilities.

***Subsection 245.305(a) of the regulations requires owners or operators to notify the appropriate regional office of the Department as soon as practicable, but no later than 24 hours, after the confirmation of a reportable release.***

Subsection 245.305(d) requires owners or operators to provide an initial written notification to the Department, each municipality in which the reportable release occurred, and each municipality where that release has impacted environmental media or water supplies, buildings, or sewer or other utility lines, within 15 days of the notice required by Subsection 245.305(a).

Subsection 245.305(e) requires owners or operators to provide follow-up written notification to the Department and to each impacted municipality of new impacts to environmental media or water supplies, buildings, or sewer or other utility lines discovered after the initial written notification required by subsection 245.305(d). Written notification is to be made within 15 days of the discovery of the new impact.

This form may be used to comply with Subsection 245.305(d) and (e).

**OWNERS AND OPERATORS (O/O)**
**INDICATE IF THIS IS AN INITIAL OR FOLLOW-UP NOTIFICATION BY MARKING THE APPROPRIATE BOX FOUND IN THE TOP RIGHT-HAND CORNER OF THIS FORM. PLEASE COMPLETE ALL INFORMATION IN SECTIONS I, II, IIIA, IIIB, IV, V, VII and VIII.**

## NOTIFICATION OF CONTAMINATION *(Certified Installers and Inspectors)*

***The Storage Tank Program's Certification regulations establish standards of performance for certified installers and inspectors of storage tanks and storage tank facilities.***

Subsection 245.132(a)(4) of the regulations requires certified installers and inspectors to report to the Department a release of a regulated substance or confirmed or suspected contamination of soil, surface or groundwater from regulated substances observed while performing services as a certified installer or inspector.

This form may be used to comply with Subsection 245.132(a)(4). Subsection 245.132(a)(4) requires submission of the form within 48 hours of observing suspected or confirmed contamination. Where there is a reportable release, the form may be submitted jointly by the owner, operator, certified installer and certified inspector. In this instance, the form must be received by the appropriate regional office within 15 days of the notice required by Subsection 245.305(a).

**CERTIFIED INSTALLERS AND INSPECTORS (I/I)**
**PLEASE COMPLETE ALL INFORMATION IN SECTIONS I, II, IIIA, IIIC, VI, VII and VIII.**

## INSTRUCTIONS

I. **FACILITY INFORMATION** - Record the name, I.D. number and physical location (not P.O. Box) of the facility at which a reportable release has been confirmed or at which suspected or confirmed contamination has been observed. Include the name and phone number of a person to contact at the facility.

II. **OWNER/OPERATOR INFORMATION** - Record the name, business address and phone number of the owner of the facility identified in Section I. Also, record the name and phone number of the operator of the facility.

III. **REGULATED SUBSTANCE INFORMATION** - Indicate to the best of your knowledge: A) the type of product or products involved; B) the quantity of product or products released; and C) whether the contamination is suspected or confirmed.

IV. **REPORTABLE RELEASE INFORMATION** - Record the date of confirmation of the reportable release, e.g., "9/18/01"; the date and regional office notified; and the date the local municipality(ies) [provide name of municipality(ies)] was/were sent a copy of this form. Indicate to the best of your knowledge the source/cause of the release, how the release was discovered and the environmental media affected and impacts.

V. **INTERIM REMEDIALACTIONS** - Indicate the interim remedial actions planned, initiated or completed.

VI. **SUSPECTED/CONFIRMED CONTAMINATION INFORMATION** - Record the date of observation of the suspected or confirmed contamination, e.g., "11/24/01". Indicate to the best of your knowledge the indications of a suspected release or extent of confirmed contamination resulting from the release of the regulated substance.

VII. **ADDITIONAL INFORMATION** - Provide any additional, relevant, available information concerning the reportable release or suspected or confirmed contamination. Include in this section specific details or problems about the release. For example, if the piping was the source of the release and the cause was corrosion of a metal connector or flexible connector, it is important to include that information here. Use additional 8½" x 11" sheets of paper, if necessary.

VIII. **CERTIFICATION** - Please print your name, and provide your signature and date of signature. If a certified installer/inspector, provide certification number and company certification number.

IX. **ATTACHMENT** - If a certified installer/inspector, provide a copy of failed valid tightness test(s), if applicable.

**PLEASE SEND COMPLETED ORIGINAL FORM TO:**
PA Department of Environmental Protection
Environmental Cleanup Program
Storage Tank Section
(and the appropriate address below, depending on where the FACILITY is located)

**IF A REPORTABLE RELEASE, ALSO SEND A COPY OF THE FORM TO:**
PA Department of Environmental Protection
Land Recycling and Cleanup Program
Attn: Storage Tank Corrective Action
P.O. Box 8471
Harrisburg, PA 17105-8471 FAX: 717-787-0884

| Southeast Region | Northeast Region | Southcentral Region | Northcentral Region | Southwest Region | Northwest Region |
|---|---|---|---|---|---|
| Lee Park, Suite 6010<br>555 North Lane<br>Conshohocken, PA 19428<br>PHONE: 610-832-5950/6000<br>FAX: 610-832-6143 | 2 Public Square<br>Wilkes-Barre, PA 18711-0790<br>PHONE: 570-826-2511<br>FAX: 570-820-4907 | 909 Elmerton Avenue<br>Harrisburg, PA 17110<br>PHONE: 877-333-1904<br>FAX: 717-705-4830 | 208 W. Third Street, Suite 101<br>Williamsport, PA 17701<br>PHONE: 570-321-6525/327-3696<br>FAX: 570-327-3420 | 400 Waterfront Drive<br>Pittsburgh, PA 15222<br>PHONE: 412-442-4091/4000<br>FAX: 412-442-4328 | 230 Chestnut Street<br>Meadville, PA 16335-3481<br>PHONE: 814-332-6945<br>800-373-3398<br>FAX: 814-332-6121 |
| **Counties**<br>Bucks, Chester, Delaware, Montgomery, Philadelphia | **Counties**<br>Carbon, Lackawanna, Lehigh, Luzerne, Monroe, Northampton, Pike, Schuylkill, Susquehanna, Wayne, Wyoming | **Counties**<br>Adams, Bedford, Berks, Blair, Cumberland, Dauphin, Franklin, Fulton, Huntingdon, Juniata, Lancaster, Lebanon, Mifflin, Perry, York | **Counties**<br>Bradford, Cameron, Centre, Clinton, Clearfield, Columbia, Lycoming, Montour, Northumberland, Potter, Snyder, Sullivan, Tioga, Union | **Counties**<br>Allegheny, Armstrong, Beaver, Cambria, Fayette, Greene, Indiana, Somerset, Washington, Westmoreland | **Counties**<br>Butler, Clarion, Crawford, Elk, Erie, Forest, Jefferson, Lawrence, McKean, Mercer, Venango, Warren |

2530-FM-LRWM0082 Rev. 11/2001

FACILITY I.D. NUMBER 51-19781

## I. FACILITY INFORMATION (Both O/O and I/I)

Facility Name: SUNOCO INC - POINT BREEZE
Facility I.D. Number: 51-19781
Street Address (P.O. Box not acceptable): 3144 PASSYUNK AVE
City: PHILADELPHIA
State: PA
Zip Code: 19145-5299
County: PHILADELPHIA
Municipality: PHILADELPHIA
Contact Person: Jim Tucker
Phone Number: (215)339-2120

## II. OWNER/OPERATOR INFORMATION (Both O/O and I/I)

Owner Name: SAME
Address:
City:
State:
Zip Code:
Phone Number: ( ) -
Operator Name:
Phone Number: ( ) -

## III. REGULATED SUBSTANCE INFORMATION

| A. Type of Product(s) Involved (Mark All That Apply ☒): Both O/O and I/I | | B. Quantity (Gallons) of Product(s) Released: O/O Only | C. Contamination Suspected [S] or Confirmed [C] (Mark All That Apply ☒): I/I Only | |
|---|---|---|---|---|
| Leaded Gasoline | ☐ | | [S] | [C] |
| Unleaded Gasoline | ☐ | | [S] | [C] |
| Aviation Gasoline | ☐ | | [S] | [C] |
| Kerosene | ☐ | | [S] | [C] |
| Jet Fuel | ☐ | | [S] | [C] |
| Diesel Fuel | ☐ | | [S] | [C] |
| New Motor Oil | ☐ | | [S] | [C] |
| Used Motor Oil | ☐ | | [S] | [C] |
| Fuel Oil No. 1 | ☐ | | [S] | [C] |
| Fuel Oil No. 2 | ☐ | | [S] | [C] |
| Fuel Oil No. 4 | ☐ | | [S] | [C] |
| Fuel Oil No. 5 | ☐ | | [S] | [C] |
| Fuel Oil No. 6 | ☐ | | [S] | [C] |
| Other (Specify) GAS OIL | ☑ | | [S] | X [C] |
| Unknown | ☐ | | [S] | [C] |

FILE

## IV. REPORTABLE RELEASE INFORMATION (O/O Only)

Date Reportable Release was Confirmed: 07 / 08 / 03 (m / d / y)

Date Owner/Operator Verbally Notified Appropriate Regional Office of Reportable Release and Office Notified:
Date: 07 / 08 / 03 (m / d / y) Office: SOUTHEAST REGION

Date Owner/Operator Sent Copy of this Written Notification to Local Municipality(ies) and Name of Municipality(ies) Notified:
Date: 07 / 17 / 03 (m / d / y) Municipality: PHILADELPHIA
Date: ___ / ___ / ___ (m / d / y) Municipality:

| Source/Cause (Mark All That Apply ☒): | | How Discovered (Mark All That Apply ☒): | | Environmental Media Affected and Impacts (Mark All That Apply ☒): | |
|---|---|---|---|---|---|
| Tank (DEP Assigned Nos. 070A) | ☒ | During Closure | ☒ | Soil | ☒ |
| Piping System (Aboveground Regulated) | ☐ | Lining Installation | ☐ | Sediment | ☐ |
| Piping System (Underground Regulated) | ☐ | Routine Leak Detection | ☐ | Surface Water | ☐ |
| Piping System (Non-Regulated) | ☐ | Third Party Inspection | ☐ | Ground Water | ☐ |
| Dispenser/Dispensing Equipment | ☐ | Tightness Testing Activities | ☐ | Bedrock | ☐ |
| Spill Catchment Basin | ☐ | Visible Product or Odor Reports | ☐ | Water Supplies | ☐ |
| Accident/Act of God | ☐ | Water in Tank | ☐ | Vapors/Product in Buildings | ☐ |
| Containment/Sump Failure | ☐ | Construction | ☐ | Vapors/Product in Sewer/Utility Lines | ☐ |
| Faulty Installation | ☐ | Upgrade/Repair | ☐ | Ecological Receptors | ☐ |
| Corrosion | ☐ | Supply Well Sample Results | ☐ | | |
| Mechanical Failure | ☐ | Monitoring Well Sample Results | ☐ | | |
| Spill During Delivery | ☐ | Property Transfer | ☐ | | |
| Overfill at Delivery | ☐ | Other (Specify) | ☐ | | |
| Vehicle Gas Tank Overfill | ☐ | Unknown | ☐ | | |
| Product Delivery Hose Rupture | ☐ | | | | |
| Other (Specify) | ☐ | | | | |
| Unknown | ☒ | | | | |

## V. INTERIM REMEDIAL ACTIONS (O/O Only)

(Mark All That Apply ☒):

| | Planned | Initiated | Completed | Not Applicable |
|---|---|---|---|---|
| Regulated Substance Removed from Storage Tanks | ☐ | ☐ | ☒ | ☐ |
| Fire, Explosion and Safety Hazards Mitigated | ☐ | ☐ | ☐ | ☒ |
| Contaminated Soil Excavated | ☒ | ☐ | ☐ | ☐ |
| Free Product Recovered | ☐ | ☐ | ☐ | ☒ |
| Water Supplies Identified and Sampled | ☐ | ☐ | ☐ | ☒ |
| Temporary Water Supplies Provided | ☐ | ☐ | ☐ | ☒ |
| Other (Specify) | ☐ | ☐ | ☐ | ☐ |

## VI. SUSPECTED / CONFIRMED CONTAMINATION INFORMATION (I/I Only)

**Date of Observation of Suspected/Confirmed Contamination:** 07 (m) / 08 (d) / 03 (y)

**Indication of Suspected Contamination (Mark All That Apply ☒):**

- Unusual Level of Vapors ☐
- Erratic Behavior of Product Dispensing Equipment ☐
- Release Detection Results Indicate a Release ☐
- Discovery of Holes in the Storage Tank ☐
- Other (Specify) Soil SAMPLING DURING CLOSURE ☒

**Extent of Confirmed Contamination (Mark All That Apply ☒):**

- Product Stained or Product Saturated Soil or Backfill ☒
- Ponded Product ☐
- Free Product or Sheen on Ponded Water ☐
- Free Product or Sheen on the Ground Water Surface ☐
- Free Product or Sheen on Surface Water ☐
- Other (Specify) _____ ☐

## VII. ADDITIONAL INFORMATION (Both O/O and I/I)

Provide any additional, relevant, available information concerning the reportable release or suspected or confirmed contamination. Include specific details or problems about the release. For example, if the piping was the source of the release and the cause was corrosion of a metal connector or flexible connector, it is important to include that information here. Provide DEP assigned and owner/operator assigned tank number(s), where applicable. Use additional 8½" x 11" sheets of paper, if necessary.

SUNOCO TANK # 552
PADEP # 070A

SEE ATTACHED LETTER

FILE COPY

FACILITY I.D. NUMBER 51-19781

## VIII. CERTIFICATION (Both O/O and I/I)

I, Jim Tucker, hereby certify, under penalty of law as provided in 18 Pa.
(Print Name)

C.S.A. §4904 (relating to unsworn falsification to authorities) that I am the owner or operator of the above referenced storage tank facility and that the information provided by me in this notification is true, accurate and complete to the best of my knowledge and belief.

Jim Tucker
Signature of Owner or Operator

07/16/03
Date

I, _____, hereby certify, under penalty of law as provided in 18 Pa.
(Print Name)

C.S.A. §4904 (relating to unsworn falsification to authorities) that I am the certified installer who performed tank handling activities at the above referenced storage tank facility and that the information provided by me in this notification is true, accurate and complete to the best of my knowledge and belief.

Signature of Certified Installer

/ /
Date

Installer Certification Number

Company Certification Number

I, _____, hereby certify, under penalty of law as provided in 18 Pa.
(Print Name)

C.S.A. §4904 (relating to unsworn falsification to authorities) that I am the certified inspector who performed inspection activities at the above referenced storage tank facility and that the information provided by me in this notification is true, accurate and complete to the best of my knowledge and belief.

Signature of Certified Inspector

/ /
Date

Inspector Certification Number

Company Certification Number

Aquaterra
Technologies, Inc.

8 July 2003

Mr. Jim Tucker
Sunoco, Inc (R&M)
3144 Passyunk Avenue,
Philadelphia, PA 19145

RE: Point Breeze Refinery
Tank 552 Closure Report
Facility ID: 51-19781

Dear Mr. Tucker:

Enclosed please find the Above Ground Storage Tank System Closure Report Form prepared by Aquaterra Technologies, Inc. for the referenced facility.

In accordance with site assessment protocol specified by the PADEP Southeast Regional Office, Aquaterra completed eleven soil borings around the perimeter of the former Tank 552 excavation. Borings were advanced to the top of the water table utilizing direct-push sampling services provided by B.L. Myers, of Glenmoore, Pennsylvania. Soil samples retrieved from the borings were field screened with a Photo Ionization Detector (PID) to evaluate the relative presence or absence of Volatile Organic Compounds (VOCs). Soil samples were then collected and sent to Lancaster Laboratories, Inc. for analysis of Benzene, Toluene, Ethylbenzene, Xylenes (Total), Isopropylbenzene, and Naphthalene via EPA method 8021 and Fluorene and Phenanthrene via EPA method 8310.

Soil samples were collected at the top of the water table, which ranged from 8'-10' below ground surface. Analytical results from the soil samples collected indicate Naphthalene exceeded the PADEP Act 2 MSC standard, (10,000 µg/kg), for saturated soils in 10 of 11 samples. Analytical results indicate that Benzene, Toluene, Ethylbenzene, Xylenes (Total), Isopropylbenzene, Fluorene, and Phenanthrene were below applicable PADEP Act 2 MSC's.

The enclosed report includes a figure showing sampling locations, a table summarizing soil sample analytical results, soil boring logs, an MSDS sheet for GasOil, and the laboratory analytical reports. Please note that the following information is required to complete the enclosed report form:

- Section I, Items 15 and 16 pertaining to reporting and waste disposition;
- Tank Owner's signature;
- Section II completed and signed by the Certified Tank Installer.

P.O. Box 744 • West Chester, PA 19381 • Phone 610.431.5733 • Fax 610.431.5734

As we discussed, Sunoco has the option of submitting this form to PADEP immediately, or submitting it with a subsequent Site Characterization Report, which is due 180 days from the verbal notification to PADEP.

Should you have any questions or comments regarding this report, please contact me at (610) 431-5733.

Respectfully Submitted,
AQUATERRA TECHNOLOGIES, INC.

Kevin W. Martin
Project Coordinator

Enclosure

Cc: Jim Oppenheim - Sunoco
Aquaterra Project File

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF LAND RECYCLING AND WASTE MANAGEMENT

# ABOVEGROUND STORAGE TANK SYSTEM CLOSURE REPORT FORM

Sunoco, Inc., Philadelphia Refinery
Facility I.D.

Philadelphia — Municipality
Philadelphia — County

Date Prepared

James Tucker
Name of Person Submitting Report
(Please Print)

Sunoco, Inc.
Company Name
(If Applicable)

Title

Closure Method (Check all that apply):

- ☒ AST Removal
- ☐ AST Closure-In-Place
- ☐ AST Change-In-Service

Site Assessment Results (Check all that apply):

- ☐ No Obvious Contamination - Sample Results Meet Standards/Levels
- ☒ No Obvious Contamination - Sample Results Do Not Meet Standards/Levels
- ☐ Obvious, Localized Contamination - Sample Results Meet Standards/Levels
- ☐ Obvious, Localized Contamination - Sample Results Do Not Meet Standards/Levels
- ☐ Obvious, Extensive Contamination

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF LAND RECYCLING AND WASTE MANAGEMENT

DATE RECEIVED: _____

# ABOVEGROUND STORAGE TANK SYSTEM CLOSURE REPORT FORM

Owners who are permanently closing aboveground storage tanks may use this form to demonstrate that a storage tank closure was performed in accordance with the "Closure Requirements for Aboveground Storage Tank Systems" document.
PLEASE PRINT OR TYPE. COMPLETE ALL QUESTIONS.

## SECTION I. Owner/Facility/Tank/Waste Management and Disposal Information

1. Facility ID Number 51-19781
2. Facility Name Philadelphia Refinery - Point Breeze
3. Facility County Philadelphia
4. Facility Municipality Philadelphia
5. Facility Address 3144 Passyunk Avenue
6. Facility Contact Person James Tucker
7. Facility Telephone Number ( 215 ) 339-2120
8. Owner Name Sunoco, Inc. (R & M)
9. Owner Mailing Address 3144 Passyunk Avenue, Philadelphia, PA 19145-5299
10. Description of Aboveground Storage Tanks (Complete for each tank closed)

| | | | | | |
|---|---|---|---|---|---|
| **DATE OF TANK CLOSURE** (Month/Day/Year) | | 2/6/2003 | | | |
| Tank Registration Number | | 070A | | | |
| Estimated Total Capacity (Gallons) | | 2,818,200 | | | |
| Substance(s) Stored Throughout Operating Life of Tank (Check All That Apply) | **a. Petroleum** | | | | |
| | Unleaded Gasoline | ☐ | ☐ | ☐ | ☐ |
| | Leaded Gasoline | ☐ | ☐ | ☐ | ☐ |
| | Aviation Gasoline | ☐ | ☐ | ☐ | ☐ |
| | Kerosene | ☐ | ☐ | ☐ | ☐ |
| | Jet Fuel | ☐ | ☐ | ☐ | ☐ |
| | Diesel Fuel | ☐ | ☐ | ☐ | ☐ |
| | Fuel Oil No. 1 | ☐ | ☐ | ☐ | ☐ |
| | Fuel Oil No. 2 | ☐ | ☐ | ☐ | ☐ |
| | Fuel Oil No. 4 | ☐ | ☐ | ☐ | ☐ |
| | Fuel Oil No. 5 | ☐ | ☐ | ☐ | ☐ |
| | Fuel Oil No. 6 | ☐ | ☐ | ☐ | ☐ |
| | New Motor Oil | ☐ | ☐ | ☐ | ☐ |
| | Used Motor Oil | ☐ | ☐ | ☐ | ☐ |
| | Other, Please Specify | GasOil | | | |
| NOTE: If Hazardous Substance Block is Checked, Attach Material Safety Data Sheets (MSDS) | **b. Hazardous Substance** | ☐ | ☐ | ☐ | ☐ |
| | Name of Principal CERCLA Substance | | | | |
| | AND | | | | |
| | Chemical Abstract Service (CAS) No. | | | | |
| | **c. Unknown** | ☐ | ☐ | ☐ | ☐ |
| Closure Method (Check Only One) | **a. Removal** | ☒ | ☐ | ☐ | ☐ |
| | **b. Closure-in-Place** | ☐ | ☐ | ☐ | ☐ |
| | **c. Change-In-Service** | ☐ | ☐ | ☐ | ☐ |
| Partial System Closure (Yes or No) | | No | | | |

| | | | | | |
|---|---|---|---|---|---|
| **DATE OF TANK CLOSURE** (Month/Day/Year) | | | | | |
| Tank Registration Number | | | | | |
| Estimated Total Capacity (Gallons) | | | | | |
| Substance(s) Stored Throughout Operating Life of Tank (Check All That Apply) | **a. Petroleum** | | | | |
| | Unleaded Gasoline | ☐ | ☐ | ☐ | ☐ |
| | Leaded Gasoline | ☐ | ☐ | ☐ | ☐ |
| | Aviation Gasoline | ☐ | ☐ | ☐ | ☐ |
| | Kerosene | ☐ | ☐ | ☐ | ☐ |
| | Jet Fuel | ☐ | ☐ | ☐ | ☐ |
| | Diesel Fuel | ☐ | ☐ | ☐ | ☐ |
| | Fuel Oil No. 1 | ☐ | ☐ | ☐ | ☐ |
| | Fuel Oil No. 2 | ☐ | ☐ | ☐ | ☐ |
| | Fuel Oil No. 4 | ☐ | ☐ | ☐ | ☐ |
| | Fuel Oil No. 5 | ☐ | ☐ | ☐ | ☐ |
| | Fuel Oil No. 6 | ☐ | ☐ | ☐ | ☐ |
| | New Motor Oil | ☐ | ☐ | ☐ | ☐ |
| | Used Motor Oil | ☐ | ☐ | ☐ | ☐ |
| | Other, Please Specify | | | | |
| NOTE: If Hazardous Substance Block is Checked, Attach Material Safety Data Sheets (MSDS) | **b. Hazardous Substance** | ☐ | ☐ | ☐ | ☐ |
| | Name of Principal CERCLA Substance | | | | |
| | AND | | | | |
| | Chemical Abstract Service (CAS) No. | | | | |
| | **c. Unknown** | ☐ | ☐ | ☐ | ☐ |
| Closure Method (Check Only One) | **a. Removal** | ☐ | ☐ | ☐ | ☐ |
| | **b. Closure-in-Place** | ☐ | ☐ | ☐ | ☐ |
| | **c. Change-In-Service** | ☐ | ☐ | ☐ | ☐ |
| Partial System Closure (Yes or No) | | | | | |

**Yes** **N/A**

☒ ☐ 11. Briefly describe the storage tank facility and the nature of the operations which were conducted at the facility (both historical and present) **including use of tanks:**

The facility is part of the Sunoco Philadelphia Refinery. Operations of the faciltiy are processing bulk crude oil to make petroleum products. The tank was used for the storage of GasOil. See attached MSDS for further information on substance stored

☒ ☐ 12. A site location and sampling map of the site, drawn to scale, is attached. See page 11 of 11.

☐ ☒ 13. Original, color photographs of the closure process involving any excavation are attached (i.e., inside of excavation/piping runs, pit water, containment structure and foundation showing condition).

☒ ☐ 14. An amended "Registration/Permitting of Storage Tanks" form was submitted to the DEP, Bureau of Land Recycling and Waste Management, Division of Storage Tanks, P.O. Box 8762, Harrisburg, PA 17105-8762.

Date: 3/4/2003

☒ ☐ 15. If a reportable release was confirmed, the appropriate regional office of DEP was notified by the owner or operator.

Date: 7/8/2003 Office: Southeast Regional Office

Yes N/A

☒ ☐ 16. If tanks were cleaned on-site:

a. Briefly describe the disposition of usable product: OIL + WATER PROCESSED ON SITE

b. Briefly describe the disposal of unusable product, sludges, sediments, and wastewater generated during cleaning. Provide the name and permit number of the processing, treatment, storage or disposal facility. (Attach documentation of proper disposal):
WASTEWATER PROCESSED THROUGH ON SITE TREATMENT PLANT
OIL PROCESSED IN ON SITE RECOVERABLE HYDROCARBON TANKS

c. If tank contents were determined/deemed to be hazardous waste, provide:

(1) Generator ID Number: _____

(2) Licensed Hazardous Waste Transporter Name and ID Number: _____

☐ ☒ 17. If tanks were removed from the site for cleaning:

a. Provide the name and permit number of the processing, treatment, storage or disposal facility performing the tank cleaning: _____

b. If tank contents were determined/deemed to be hazardous waste, provide:

(1) Generator ID Number: _____

(2) Licensed Hazardous Waste Transporter Name and ID Number: _____

18. Briefly describe the disposition of tanks/piping (Attach documentation of proper disposal):

☐ ☒ 19. If contaminated soil is excavated:

a. Briefly describe the disposition and amount _____ (tons) of contaminated soil. Provide the name and permit number of the processing, treatment, storage or disposal facility. (Attach documentation of proper disposal):

b. If contaminated soil is determined/deemed to be hazardous waste, provide:

(1) Generator ID Number: _____

(2) Licensed Hazardous Waste Transporter Name and ID Number: _____

Yes N/A

☐ ☒ 20. Briefly describe the disposition of and amount _____ (tons) of uncontaminated soil and debris (attach analyses):

_____

_____

_____

☐ ☒ 21. If the tanks were "Closed-in-Place" provide information below:

a. Briefly describe the tank cleaning process: _____

_____

_____

b. If subcontracted, name and address of company that performed the tank cleaning:

_____

_____

c. How were tanks marked/labeled with permanent closure date: _____

_____

_____

I, James Tucker, hereby certify, under penalty of law as provided in 18 Pa. C.S. §4904 (relating
(Print Name)
to unsworn falsification to authorities) that I am the owner of the above referenced storage tank(s) and that the information provided by me in this closure report (Section I) is true, accurate and complete to the best of my knowledge and belief.

James Tucker
Signature of Tank Owner

7/9/2003
Date



Printed on Recycled Paper

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF LAND RECYCLING AND WASTE MANAGEMENT

# ABOVEGROUND STORAGE TANK SYSTEM CLOSURE REPORT FORM

## SECTION II. Tank Handling Information

Facility ID Number 51-19781
PA reg # 070A (552 Tk)

Yes N/A

1. Briefly describe the excavation and initial on-site staging of uncontaminated/contaminated soil:
   n/a AST

2. Briefly describe the method of piping system closure and the closure of the piping systems including the quantity and condition of the piping:
   4", 10" + 12" piping, isolated, divorced with remaining equipment blasted off. - good condition.

3. Briefly describe the condition of the tanks and any problems encountered during tank removal:
   Tank clean. No problem with removal.

4. Briefly describe the method used to purge the tanks of and monitor for explosive vapors:
   Manways openned, puctured and discharge openned. Daily gas Testing by company.

☑ ☐ 5. If tanks were cleaned on-site:
   a. Briefly describe the tank cleaning process: Product removed and tank cleaned by others prior to removal.
   b. If subcontracted, name and address of company that performed the tank cleaning:

☐ ☑ 6. If tanks were closed-in-place, briefly describe the tank fill material:

☐ ☑ 7. If contamination was suspected or observed, the "Notification of Contamination" form was submitted.

SECTION II. (continued)

I, David Wiechak, hereby certify, under penalty of law as provided in 18 Pa. C.S. §4904 (relating to unsworn falsification to authorities) that I am the owner of the above referenced storage tank(s) and that the information provided by me in this closure report (Section I) is true, accurate and complete to the best of my knowledge and belief.

(Print Name)

Signature of Certified Installer

3/3/03
Date

3951
Installer Certification Number

860
Company Certification Number

Intl Scrap Iron & Metal Co. Inc
Company Name

3415 West Second St.
Street

Trainer PA 19061
City/Town, State, Zip

610-494-3171
Phone

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF LAND RECYCLING AND WASTE MANAGEMENT

# ABOVEGROUND STORAGE TANK SYSTEM CLOSURE REPORT FORM

## SECTION III. Site Assessment Information

**Tank Registration # 070A (complete one sheet for EACH tank system and attach ALL laboratory sheets pertaining to that system)**

**Facility ID Number 51-19781**

**A.** Provide depth of *BEDROCK* and *WATER* IF encountered during excavation or soil boring (write "N/A: if NOT encountered).

Bedrock N/A feet below land surface Water 8-10 feet below land surface

**B.** Provide Length of *PIPING* IF piping was closed-in-place (write "N/A" if NOT closed-in-place).

Length of piping N/A feet

**C. TANK SYSTEM REMOVED FROM THE GROUND/SITE**

1). Was obvious contamination observed while excavating, sampling or removing the tank system?

☒ NO ----------→ Conduct confirmatory sampling ----------→ See end of this section for options on submission and maintenance of closure records ----------→ Do not complete item C.2. below.

☐ YES----------→ Report release to DEP within 24 hours ----------→ Describe contamination observed and likely source(s) tank, piping, dispenser, spills, overfills): _____

_____

_____

_____ ----------→ Complete item C.2. below.

2). Was contamination localized (within three feet of the tank system in every direction with no obvious water contamination)?

☐ YES --------→ Remove or remediate contaminated soil --------→ Conduct confirmatory sampling-------→ See end of this section for options on submission and maintenance of closure records.

**D. TANK SYSTEM CLOSED-IN-PLACE OR CHANGED-IN-SERVICE**

Was obvious contamination observed during sampling, boring or assessing water depths?

☐ NO ----------→ Conduct confirmatory sampling ----------→ See end of this section for options on submission and maintenance of closure records.

☐ YES----------→ Report release to DEP within 24 hours ----------→ Describe contamination observed and likely source(s) tank, piping, dispenser, spills, overfills): _____

_____

_____

_____

Continue with corrective action --------→ See end of this section for options on submission and maintenance of closure records. ----------→

**E.** If the answer to C.1. is "no", the answer to C.2. if "yes" or the answer to D. is "no", confirmatory samples are required. Use the sample/analysis information sheet on page 10 of 11 to provide the information on confirmatory sampling and complete the diagram on Page 11 of 11.

**Options for Submission and Maintenance of Closure Site Assessment Records**

Records of the site assessment must be maintained for at least three years after completion of permanent closure or change-in-service in one of the following ways:

(a) By the owners and operators who took the tank system out of service;
(b) By the current owners and operators of the tank system site; or
(c) By mailing these records to the DEP regional office responsible for the county in which the tank is located if they cannot be maintained at the closed facility.

Where the results of the site assessment indicate that obvious, localized soil contamination was encountered and the analytical results of the confirmatory sampling show levels below the statewide standard/action levels, this closure report form (Sections I, II, and III) or some other acceptable site characterization report must be received by the Department within 180 days of verbally reporting the release.

Where the results of the site assessment indicate that no obvious contamination or obvious, localized contamination was encountered, but the analytical results of the confirmatory sampling show levels above the statewide standard/action levels, or where there is obvious, extensive contamination, Section 245.310(a)(8) of the Corrective Action Process (CAP) regulation requires that details of removal from service be included in the site characterization report. A copy of the completed closure report form should be submitted as part of the site characterization report to satisfy the requirements of Section 245.310(a)(8) of the CAP regulations.

I, M. Brad Spancake (Print Name), hereby certify, under penalty of law as provided in 18 Pa. C.S. §4904 (relating to unsworn falsification to authorities) that I am the person who performed the site assessment activities associated with the closure of the above referenced storage tank(s) and that the information provided by me in this closure report (Section III) is true, accurate and complete to the best of my knowledge and belief.

| | |
|---|---|
| Signature of Person Performing Site Assessment | Date |
| Staff Scientist<br>Title of Person Performing Site Assessment | Aquaterra Technologies, Inc.<br>Name of Company Performing Site Assessment |

# ABOVEGROUND STORAGE TANK SYSTEM
# CLOSURE REPORT FORM

## Sample/Analysis Information
## (Attachment for Section III.)
## Facility ID Number 51-19781

| Sample I.D. (See diagram) | Parameter | Analytical Method[1] | | Media | Result (units) | Detection Limit (units) | Date Sample Taken | Date Sample Analyzed |
|---|---|---|---|---|---|---|---|---|
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[1] Where EPA Method 5035 is used, indicate sample collection option in the right hand box of this column using the following codes:

P - Samples placed in a soil sample vial with a preservative present.
E - Samples collected and stored in a soil collection device which is airtight and affords little to no headspace.
N - Samples placed in soil sample vial without a preservative present.

**Site Location and Sampling Map** - Use this page or suitable facsimile to provide a large scale map of the site where tanks were closed. Scales between 1" = 10 and 1" = 100 feet frequently work out well. Include the following information as each applies to the site: facility name and I.D., county, township or borough, property boundaries or area of interest, buildings, roads and streets with names or route numbers, utilities, location and ID number of storage tanks removed including piping and dispensers, soil stockpile locations, excavations or other locations of product recovery, north arrow, approximate map scale and legend. Also show depth and location of samples with sample ID numbers cross-referenced to the same ID numbers shown on Page 10 of 11.

**Facility Name and ID: 51 - 19781**

**County: PHILADELPHIA**

**Township/Borough: PHILADELPHIA**

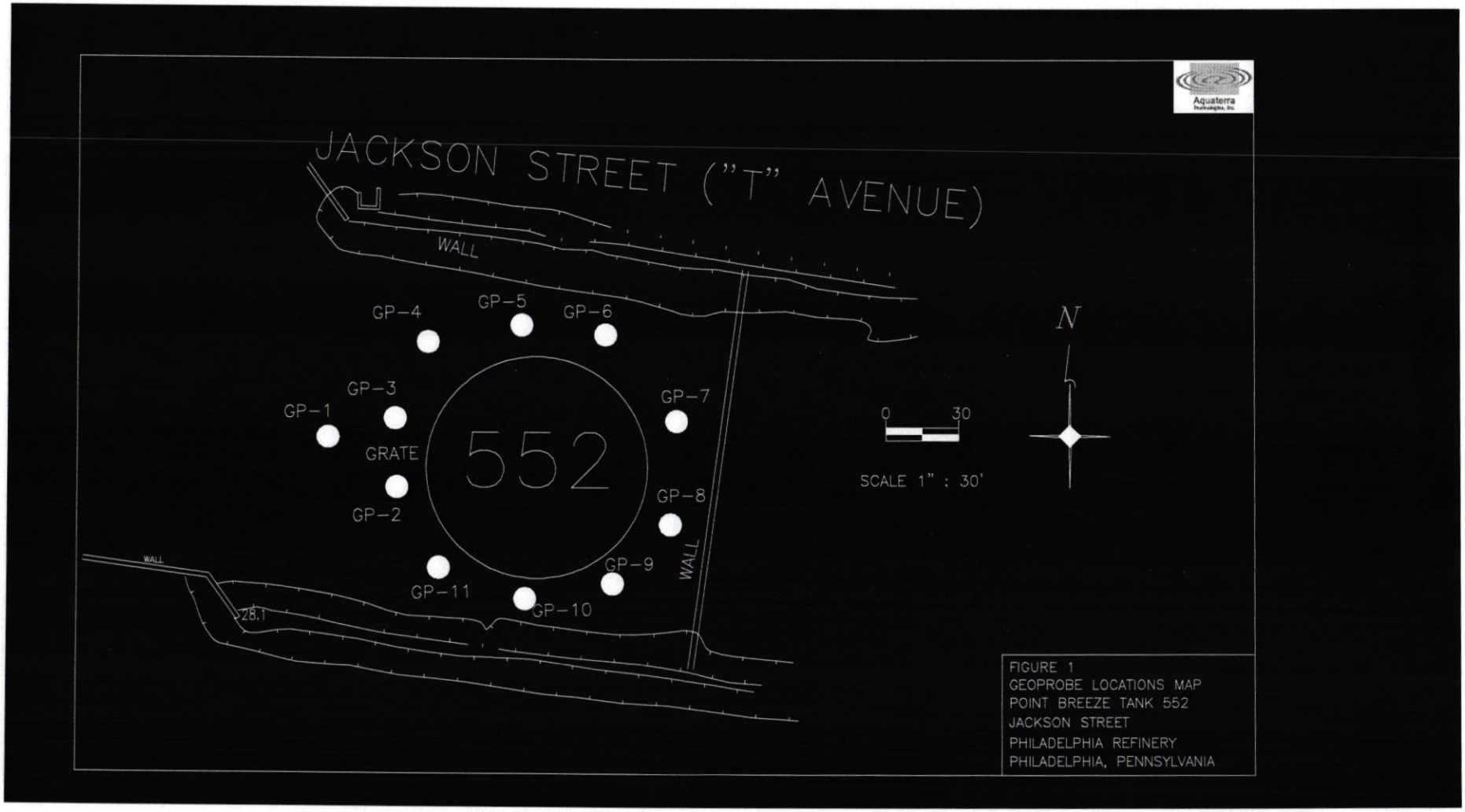


FIGURE 1
GEOPROBE LOCATIONS MAP
POINT BREEZE TANK 552
JACKSON STREET
PHILADELPHIA REFINERY
PHILADELPHIA, PENNSYLVANIA

**TABLE 1. SOIL QUALITY SUMMARY**
**SUNOCO POINT BREEZE TANK 552**
**PHILADELPHIA REFINERY**
**PHILADELPHIA , PENNSYLVANIA**

| Sample ID | Date | Benzene (µg/kg) | Toluene (µg/kg) | Ethylbenzene (µg/kg) | Xylenes (Total) (µg/kg) | Isopropylbenzene (µg/kg) | Naphthalene (µg/kg) | Fluorene (µg/kg) | Phenanthrene (µg/kg) |
|---|---|---|---|---|---|---|---|---|---|
| GP-1 12'-14' | ######## | < 110. | < 230. | < 340. | < 3,400. | 4,000. | **16,000.** | 4,400. | 14,000. |
| GP-2 10'-12' | ######## | <220 | <510 | <770 | <4,500 | 13,000 | **33,000** | 1,600 | 4,800 |
| GP-3 8'-10' | ######## | <190 | <220 | <540 | <4,300 | 6,400 | **19,000** | 4,300 | 12,000 |
| GP-4 10'-12' | ######## | <200 | <330 | <550 | <3,300 | 7,100 | **24,000** | 6,200 | 18,000 |
| GP-5 10'-12' | ######## | <210 | <290 | <210 | <2,900 | 8,700 | **32,000** | 6,200 | 16,000 |
| GP-6 10'-12' | ######## | <590 | <1,200 | <1,800 | <7,000 | 19,000 | **48,000** | 7,400 | 16,000 |
| GP-7 10'-12' | ######## | <97 | <220 | <97 | <2,200 | 4,700 | **16,000** | 2,400 | 4,700 |
| GP-8 10'-12' | ######## | <88 | <220 | <88 | <1,000 | 3,800 | **13,000** | 2,500 | 7,400 |
| GP-9 10'-12' | ######## | <11 | <22 | <22 | 240 | <280 | 1,400 | 4,400 | 15,000 |
| GP-10 10'-12' | ######## | <44 | <110 | <44 | <660 | 2,300 | **17,000** | 5,200 | 26,000 |
| GP-11 10'-12' | ######## | <190 | <220 | <670 | <3,300 | 7,100 | **40,000** | 6,500 | 17,000 |
| **PADEP ACT 2 MSC's** | | 500 | 100,000 | 70,000 | 1,000,000 | 230,000 | 10,000 | 380,000 | 1,000,000 |

PADEP ACT 2 MSCs = Medium Specific Concentrations (MSCs) for Organic Regulated Substances in Soil as found in Table 3 of Appendix A of the Pennsylvania Land Recycling Program (Pennsylvania Code, Title 25, Chapter 250)

Bolded values indicate an exceedance of the PADEP Act 2 MSC

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF LAND RECYCLING AND WASTE MANAGEMENT

# ABOVEGROUND STORAGE TANK SYSTEM CLOSURE REPORT FORM

## SECTION III. Site Assessment Information

**Tank Registration # 070A (complete one sheet for EACH tank system and attach ALL laboratory sheets pertaining to that system)**

**Facility ID Number 51-19781**

**A.** Provide depth of *BEDROCK* and *WATER* IF encountered during excavation or soil boring (write "N/A: if NOT encountered).

Bedrock N/A feet below land surface Water 8-10 feet below land surface

**B.** Provide Length of *PIPING* IF piping was closed-in-place (write "N/A" if NOT closed-in-place).

Length of piping N/A feet

**C. TANK SYSTEM REMOVED FROM THE GROUND/SITE**

1). Was obvious contamination observed while excavating, sampling or removing the tank system?

☒ NO ----------→ Conduct confirmatory sampling ----------→ See end of this section for options on submission and maintenance of closure records ----------→ Do not complete item C.2. below.

☐ YES----------→ Report release to DEP within 24 hours ----------→ Describe contamination observed and likely source(s) tank, piping, dispenser, spills, overfills): _____

_____

_____

_____ ----------→ Complete item C.2. below.

2). Was contamination localized (within three feet of the tank system in every direction with no obvious water contamination)?

☐ YES --------→ Remove or remediate contaminated soil --------→ Conduct confirmatory sampling-------→ See end of this section for options on submission and maintenance of closure records.

**D. TANK SYSTEM CLOSED-IN-PLACE OR CHANGED-IN-SERVICE**

Was obvious contamination observed during sampling, boring or assessing water depths?

☐ NO ----------→ Conduct confirmatory sampling ----------→ See end of this section for options on submission and maintenance of closure records.

☐ YES----------→ Report release to DEP within 24 hours ----------→ Describe contamination observed and likely source(s) tank, piping, dispenser, spills, overfills): _____

_____

_____

_____

Continue with corrective action --------→ See end of this section for options on submission and maintenance of closure records. ----------→

**E.** If the answer to C.1. is "no", the answer to C.2. if "yes" or the answer to D. is "no", confirmatory samples are required. Use the sample/analysis information sheet on page 10 of 11 to provide the information on confirmatory sampling and complete the diagram on Page 11 of 11.

**Options for Submission and Maintenance of Closure Site Assessment Records**

Records of the site assessment must be maintained for at least three years after completion of permanent closure or change-in-service in one of the following ways:

(a) By the owners and operators who took the tank system out of service;
(b) By the current owners and operators of the tank system site; or
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Where the results of the site assessment indicate that obvious, localized soil contamination was encountered and the analytical results of the confirmatory sampling show levels below the statewide standard/action levels, this closure report form (Sections I, II, and III) or some other acceptable site characterization report must be received by the Department within 180 days of verbally reporting the release.

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I, M. Brad Spancake (Print Name), hereby certify, under penalty of law as provided in 18 Pa. C.S. §4904 (relating to unsworn falsification to authorities) that I am the person who performed the site assessment activities associated with the closure of the above referenced storage tank(s) and that the information provided by me in this closure report (Section III) is true, accurate and complete to the best of my knowledge and belief.

Signature of Person Performing Site Assessment

7/8/03
Date

Staff Scientist
Title of Person Performing Site Assessment

Aquaterra Technologies, Inc.
Name of Company Performing Site Assessment

**TABLE 1. SOIL QUALITY SUMMARY**
**SUNOCO POINT BREEZE TANK 552**
**PHILADELPHIA REFINERY**
**PHILADELPHIA , PENNSYLVANIA**

| Sample ID | Date | Benzene (µg/kg) | Toluene (µg/kg) | Ethylbenzene (µg/kg) | Xylenes (Total) (µg/kg) | Isopropylbenzene (µg/kg) | Naphthalene (µg/kg) | Fluorene (µg/kg) | Phenanthrene (µg/kg) |
|---|---|---|---|---|---|---|---|---|---|
| GP-1 12'-14' | 6/3/2003 | < 110. | < 230. | < 340. | < 3,400. | 4,000. | 16,000. | 4,400. | 14,000. |
| GP-2 10'-12' | 6/3/2003 | <220 | <510 | <770 | <4,500 | 13,000 | 33,000 | 1,600 | 4,800 |
| GP-3 8'-10' | 6/3/2003 | <190 | <220 | <540 | <4,300 | 6,400 | 19,000 | 4,300 | 12,000 |
| GP-4 10'-12' | 6/3/2003 | <200 | <330 | <550 | <3,300 | 7,100 | 24,000 | 6,200 | 18,000 |
| GP-5 10'-12' | 6/4/2003 | <210 | <290 | <210 | <2,900 | 8,700 | 32,000 | 6,200 | 16,000 |
| GP-6 10'-12' | 6/4/2003 | <590 | <1,200 | <1,800 | <7,000 | 19,000 | 48,000 | 7,400 | 16,000 |
| GP-7 10'-12' | 6/4/2003 | <97 | <220 | <97 | <2,200 | 4,700 | 16,000 | 2,400 | 4,700 |
| GP-8 10'-12' | 6/4/2003 | <88 | <220 | <88 | <1,000 | 3,800 | 13,000 | 2,500 | 7,400 |
| GP-9 10'-12' | 6/4/2003 | <11 | <22 | <22 | 240 | <280 | 1,400 | 4,400 | 15,000 |
| GP-10 10'-12' | 6/4/2003 | <44 | <110 | <44 | <660 | 2,300 | 17,000 | 5,200 | 26,000 |
| GP-11 10'-12' | 6/4/2003 | <190 | <220 | <670 | <3,300 | 7,100 | 40,000 | 6,500 | 17,000 |
| **PADEP ACT 2 MSC's** | | 500 | 100,000 | 70,000 | 1,000,000 | 230,000 | 10,000 | 380,000 | 1,000,000 |

PADEP ACT 2 MSCs = Medium Specific Concentrations (MSCs) for Organic Regulated Substances in Soil as found in Table 3 of Appendix A of the Pennsylvania Land Recycling Program (Pennsylvania Code, Title 25, Chapter 250)

# Aquaterra Technologies, Inc.
# Subsurface Log: GP-1

**Project Name:** Tank 552
**Location:** Point Breeze Refinery
**Boring Number:** GP-1
**Casing Elevation:** N/A
**Screen Diameter:** N/A **Length:** N/A
**Casing Diameter:** N/A **Length:** N/A
**Drilling Method:** Geoprobe

**Owner:** Sunoco, Inc. (R&M)
**Permit No.:** N/A
**Log By:** M. Brad Spancake
**Driller:** BL Myers
**Slot Size:** N/A
**Type:** N/A
**Sample Method:** Acetate Sleeve

**Date:** 6/3/03
**Borehole Dia:** N/A
**Water Level (Init):** 12
**Rig Type:**

**Total Boring Depth:** 16'
**Screen Interval:** N/A
**Sand Pack Interval:** N/A
**Completion Details:** N/A

**Construction Details**
**Bentonite Interval:** N/A
**Cement/Grout Interval:** N/A
**Sand Pack Type:** N/A

= Backfill
= Cement/Grout
= Bentonite
= Sand

| Depth (ft) | Sample Depth (ft) | PID (ppm) | Recovery (ft) | Lithology |
|---|---|---|---|---|
| 0 | 0-2 | 26 | 2 | Backfill material, light brown silt, medium grain sand and gravel. Dry |
| 2 | 2-4 | 37 | 2 | Slightly moist medium brown silt. Coarse sand and gravel |
| 4 | 4-6 | 0 | 2 | Medium brown clay and silt, slightly moist. Some gravel |
| 6 | 6-8 | 103 | 2 | Same as above |
| 8 | 8-10 | 141 | 2 | Medium brown silt and clay, some gravel and fine sand. Slightly moist |
| 10 | 10-12 | 399 | 2 | Gravel and coarse sand in a medium brown silt matrix. Becoming wet. |
| 12 | **12-14** | 372 | 2 | Wet sand and gravel in a medium brown silt and rock matrix. |
| 14 | 14-16 | 223 | 2 | Same as above |
| 16 | | | | End boring at 16' BGS |

NOTE: Shaded sample submitted for laboratory analysis

# Aquaterra Technologies, Inc.
# Subsurface Log: GP-2

**Project Name:** Tank 552
**Location:** Point Breeze Refinery
**Boring Number:** GP-2
**Casing Elevation:** N/A
**Screen Diameter:** N/A **Length:** N/A
**Casing Diameter:** N/A **Length:** N/A
**Drilling Method:** Geoprobe

**Owner:** Sunoco, Inc. (R&M)
**Permit No.:** N/A
**Log By:** M. Brad Spancake
**Driller:** BL Myers
**Slot Size:** N/A
**Type:** N/A
**Sample Method:** Acetate Sleeve

**Date:** 6/3/03
**Borehole Dia:** N/A
**Water Level (Init):** 10'
**Rig Type:**

**Total Boring Depth:** 12'
**Screen Interval:** N/A
**Sand Pack Interval:** N/A
**Completion Details:** N/A

**Construction Details**
**Bentonite Interval:** N/A
**Cement/Grout Interval:** N/A
**Sand Pack Type:** N/A

= Backfill
= Cement/Grout
= Bentonite
= Sand

| Depth (ft) | Sample Depth (ft) | PID (ppm) | Recovery (ft) | Lithology |
|---|---|---|---|---|
| 0 | 0-2 | 0 | 2 | Backfill material, medium brown silt and gravel, stones. Dry |
| 2 | 2-4 | 13 | 1 | Slightly moist, same as above. |
| 4 | 4-6 | 200 | 2 | Wet backfill material, stained brown silt and clay matrix |
| 6 | 6-8 | 163 | 1 | Slightly moist brown clay and silt matrix. Thin layer of fine sand |
| 8 | 8-10 | 379 | 2 | Moist to wet coarse sand and gravel in medium brown silt matrix |
| 10 | **10-12** | 343 | 2 | Same as above |
| 12 | | | | End boring at 12' BGS |

NOTE: Shaded sample submitted for laboratory analysis

# Aquaterra Technologies, Inc.
# Subsurface Log: GP-3

**Project Name:** Tank 552
**Location:** Point Breeze Refinery
**Boring Number:** GP-3
**Casing Elevation:** N/A
**Screen Diameter:** N/A **Length:** N/A
**Casing Diameter:** N/A **Length:** N/A
**Drilling Method:** Geoprobe

**Owner:** Sunoco, Inc. (R&M)
**Permit No.:** N/A
**Log By:** M. Brad Spancake
**Driller:** BL Myers
**Slot Size:** N/A
**Type:** N/A
**Sample Method:** Acetate Sleeve

**Date: 6/3/03**
**Borehole Dia: N/A**
**Water Level (Init): 10'**

**Rig Type:**

**Total Boring Depth:** 12'
**Screen Interval:** N/A
**Sand Pack Interval:** N/A
**Completion Details:** N/A

**Construction Details**
**Bentonite Interval:** N/A
**Cement/Grout Interval:** N/A
**Sand Pack Type:** N/A

= Backfill
= Cement/Grout
= Bentonite
= Sand

| Depth (ft) | Sample Depth (ft) | PID (ppm) | Recovery (ft) | Lithology |
|---|---|---|---|---|
| 0 | 0-2 | 32 | 2 | Backfill material, medium brown silt matrix with some gravel. Staining at bottom. Rock in bottom of sleeve |
| 2 | 2-4' | NA | 0 | N/A |
| 4 | 4-6' | 127 | 2 | Medium brown silt and clay. Stained at the top. Slightly moist, some gravel and sand |
| 6 | 6-8' | 293 | 2 | Moist fine sand in a dark brown silt and clay matrix. Some gravel towards bottom |
| 8 | **8-10'** | 574 | 2 | Moist to wet coarse sand in brown silt and clay matrix. Gravel and small rocks. |
| 10 | 10-12' | 405 | 1 | Wet, same as above |
| 12 | | | | End boring at 12' BGS |

NOTE: Shaded sample submitted for laboratory analysis

# Aquaterra Technologies, Inc.
# Subsurface Log: GP-4

**Project Name:** Tank 552
**Location:** Point Breeze Refinery
**Boring Number:** GP-4
**Casing Elevation:** N/A
**Screen Diameter:** N/A **Length:** N/A
**Casing Diameter:** N/A **Length:** N/A
**Drilling Method:** Geoprobe

**Owner:** Sunoco, Inc. (R&M)
**Permit No.:** N/A
**Log By:** M. Brad Spancake
**Driller:** BL Myers
**Slot Size:** N/A
**Type:** N/A
**Sample Method:** Acetate Sleeve

**Date:** 6/3/03
**Borehole Dia:** N/A
**Water Level (Init):** 10'
**Rig Type:**

**Total Boring Depth:** 12'
**Screen Interval:** N/A
**Sand Pack Interval:** N/A
**Completion Details:** N/A

**Construction Details**
**Bentonite Interval:** N/A
**Cement/Grout Interval:** N/A
**Sand Pack Type:** N/A

= Backfill
= Cement/Grout
= Bentonite
= Sand

| Depth (ft) | Sample Depth (ft) | PID (ppm) | Recovery (ft) | Lithology |
|---|---|---|---|---|
| 0 | 0-2 | 0 | 2 | Gravel and subangular base stone |
| 2 | 2-4 | 2 | 1 | Medium brown silt and clay |
| 4 | 4-6 | 0 | 2 | Same as above |
| 6 | 6-8 | 22 | 1 | Coarse sand in a brown silt matrix with small gravel. Slightly moist |
| 8 | 8-10 | 165 | 2 | Same as above |
| 10 | **10-12** | 492 | 2 | Wet, same as above |
| 12 | | | | End boring at 12' BGS |

NOTE: Shaded sample submitted for laboratory analysis

# Aquaterra Technologies, Inc.
# Subsurface Log: GP-5

**Project Name:** Tank 552
**Location:** Point Breeze Refinery
**Boring Number:** GP-5
**Casing Elevation:** N/A
**Screen Diameter:** N/A **Length:** N/A
**Casing Diameter:** N/A **Length:** N/A
**Drilling Method:** Geoprobe

**Owner:** Sunoco, Inc. (R&M)
**Permit No.:** N/A
**Log By:** M. Brad Spancake
**Driller:** BL Myers
**Slot Size:** N/A
**Type:** N/A
**Sample Method:** Acetate Sleeve

**Date:** 6/4/03
**Borehole Dia:** N/A
**Water Level (Init):** 10'

**Rig Type:**

**Total Boring Depth:** 12'
**Screen Interval:** N/A
**Sand Pack Interval:** N/A
**Completion Details:** N/A

**Construction Details**
**Bentonite Interval:** N/A
**Cement/Grout Interval:** N/A
**Sand Pack Type:** N/A

= Backfill
= Cement/Grout
= Bentonite
= Sand

| Depth (ft) | Sample Depth (ft) | PID (ppm) | Recovery (ft) | Lithology |
|---|---|---|---|---|
| 0 | 0-2 | 0 | 2 | Backfill material, medium brown/orange silty clay with some sand |
| 2 | 2-4 | 0 | 2 | Dark brown clay and silt matrix, slightly moist with some fine sand |
| 4 | 4-6 | 3.5 | 2 | Fine sand in a brown silt matrix |
| 6 | 6-8 | 23 | 2 | Medium and coarse sand and gravel in a dark brown silt matrix. |
| 8 | 8-10 | 546 | 2 | Coarse sand, gravel, and rock in brown silt matrix, slightly moist |
| 10 | **10-12** | 411 | 2 | Wet fine and medium sand in brown silt matrix |
| 12 | | | | End boring at 12' BGS |

NOTE: Shaded sample submitted for laboratory analysis

# Aquaterra Technologies, Inc.
# Subsurface Log: GP-6

**Project Name:** Tank 552
**Location:** Point Breeze Refinery
**Boring Number:** GP-6
**Casing Elevation:** N/A
**Screen Diameter:** N/A **Length:** N/A
**Casing Diameter:** N/A **Length:** N/A
**Drilling Method:** Geoprobe

**Owner:** Sunoco, Inc. (R&M)
**Permit No.:** N/A
**Log By:** M. Brad Spancake
**Driller:** BL Myers
**Slot Size:** N/A
**Type:** N/A
**Sample Method:** Acetate Sleeve

**Date: 6/4/03**
**Borehole Dia: N/A**
**Water Level (Init): 10'**

**Rig Type:**

**Total Boring Depth:** 12'
**Screen Interval:** N/A
**Sand Pack Interval:** N/A
**Completion Details:** N/A

**Construction Details**
**Bentonite Interval:** N/A
**Cement/Grout Interval:** N/A
**Sand Pack Type:** N/A

= Backfill
= Cement/Grout
= Bentonite
= Sand

| Depth (ft) | Sample Depth (ft) | PID (ppm) | Recovery (ft) | Lithology |
|---|---|---|---|---|
| 0 | 0-2 | 4.5 | 2 | Backfill material, brown silt and clay matrix, rocks and some gravel |
| 2 | 2-4 | 2.3 | 1 | Slightly moist brown silt and clay matrix, some fine sand |
| 4 | 4-6 | 13 | 2 | Same as above, coarse sand and gravel in bottom, some rock fragments |
| 6 | 6-8 | 7 | 1.5 | Coarse sand and gravel in brown silt matrix with gravel and rock fragments |
| 8 | 8-10 | 583 | 2 | Moist brown silt matrix with coarse sand and gravel, small rock fragments. |
| 10 | **10-12** | 616 | 2 | Wet dark brown silt, some small pebble and fine sand. Clay in bottom. |
| 12 | | | | |

NOTE: Shaded sample submitted for laboratory analysis

# Aquaterra Technologies, Inc.
# Subsurface Log: GP-7

**Project Name:** Tank 552
**Location:** Point Breeze Refinery
**Boring Number:** GP-7
**Casing Elevation:** N/A
**Screen Diameter:** N/A **Length:** N/A
**Casing Diameter:** N/A **Length:** N/A
**Drilling Method:** Geoprobe

**Owner:** Sunoco, Inc. (R&M)
**Permit No.:** N/A
**Log By:** M. Brad Spancake
**Driller:** BL Myers
**Slot Size:** N/A
**Type:** N/A
**Sample Method:** Acetate Sleeve

**Date: 6/4/03**
**Borehole Dia: N/A**
**Water Level (Init): 10'**
**Rig Type:**

**Total Boring Depth:** 12'
**Screen Interval:** N/A
**Sand Pack Interval:** N/A
**Completion Details:** N/A

**Construction Details**
**Bentonite Interval:** N/A
**Cement/Grout Interval:** N/A
**Sand Pack Type:** N/A

= Backfill
= Cement/Grout
= Bentonite
= Sand

| Depth (ft) | Sample Depth (ft) | PID (ppm) | Recovery (ft) | Lithology |
|---|---|---|---|---|
| 0 | 0-2 | 13 | 2 | Backfill material to brown/orange compact clay |
| 2 | 2-4 | 2 | 1.5 | Same as above |
| 4 | 4-6 | 4.5 | 2 | Fine sand in brown silt matrix, slightly moist |
| 6 | 6-8 | 3.2 | 1.5 | Brown silt matrix with fine and coarse sand, gravel, and small rock. Slightly moist |
| 8 | 8-10 | 133 | 2 | Brown silt matrix with coarse sand and gravel, small rocks. Moist to wet |
| 10 | **10-12** | 231 | 2 | Wet. Same as above. Bottom 1' was brown/orange compact clay |
| 12 | | | | End boring at 12' BGS |

NOTE: Shaded sample submitted for laboratory analysis

# Aquaterra Technologies, Inc.
# Subsurface Log: GP-8

**Project Name:** Tank 552
**Location:** Point Breeze Refinery
**Boring Number:** GP-8
**Casing Elevation:** N/A
**Screen Diameter:** N/A **Length:** N/A
**Casing Diameter:** N/A **Length:** N/A
**Drilling Method:** Geoprobe

**Owner:** Sunoco, Inc. (R&M)
**Permit No.:** N/A
**Log By:** M. Brad Spancake
**Driller:** BL Myers
**Slot Size:** N/A
**Type:** N/A
**Sample Method:** Acetate Sleeve

**Date: 6/4/03**
**Borehole Dia: N/A**
**Water Level (Init): 10'**
**Rig Type:**

**Total Boring Depth:** 12'
**Screen Interval:** N/A
**Sand Pack Interval:** N/A
**Completion Details:** N/A

**Construction Details**
**Bentonite Interval:** N/A
**Cement/Grout Interval:** N/A
**Sand Pack Type:** N/A

= Backfill
= Cement/Grout
= Bentonite
= Sand

| Depth (ft) | Sample Depth (ft) | PID (ppm) | Recovery (ft) | Lithology |
|---|---|---|---|---|
| 0 | 0-2 | 6 | 2 | Backfill material, clay and brown silt matrix |
| 2 | 2-4 | 3 | 1 | Same as above |
| 4 | 4-6 | 6 | 2 | Same as above |
| 6 | 6-8 | 2 | 2 | Gray clay and brown silt matrix, sand and gravel in bottom 2" |
| 8 | 8-10 | N/A | 0 | Sleeve stuck, No recovery |
| 10 | **10-12** | 114 | 1.5 | Wet coarse sand and gravel in dark brown and gray silt and clay. Orange/gray clay in bottom |
| 12 | | | | End boring at 12' BGS |

NOTE: Shaded sample submitted for laboratory analysis

# Aquaterra Technologies, Inc.
# Subsurface Log: GP-9

**Project Name:** Tank 552
**Location:** Point Breeze Refinery
**Boring Number:** GP-9
**Casing Elevation:** N/A
**Screen Diameter:** N/A **Length:** N/A
**Casing Diameter:** N/A **Length:** N/A
**Drilling Method:** Geoprobe

**Owner:** Sunoco, Inc. (R&M)
**Permit No.:** N/A
**Log By:** M. Brad Spancake
**Driller:** BL Myers
**Slot Size:** N/A
**Type:** N/A
**Sample Method:** Acetate Sleeve

**Date:** 6/4/03
**Borehole Dia:** N/A
**Water Level (Init):** 10'
**Rig Type:**

**Total Boring Depth:** 12'
**Screen Interval:** N/A
**Sand Pack Interval:** N/A
**Completion Details:** N/A

**Construction Details**
**Bentonite Interval:** N/A
**Cement/Grout Interval:** N/A
**Sand Pack Type:** N/A

= Backfill
= Cement/Grout
= Bentonite
= Sand

| Depth (ft) | Sample Depth (ft) | PID (ppm) | Recovery (ft) | Lithology |
|---|---|---|---|---|
| 0 | 0-2 | 74 | 2 | Backfill material to brown/gray clay |
| 2 | 2-4 | 17 | 2 | Same as above, slight moisture and gravel towards bottom |
| 4 | 4-6 | 23 | 2 | Brown clay and silt matrix, some fine sand. Slightly moist |
| 6 | 6-8 | 17 | 2 | Fine to medium tan sand, rock fragments in a brown silt matrix. Coarse sand and gravel at the bottom, becoming moist |
| 8 | 8-10 | 54 | 2 | Moist sand and gravel in a brown/gray silt, becoming wet |
| 10 | **10-12** | 132 | 2 | Same as above, grey sand at bottom, wet |
| 12 | | | | End boring at 12' BGS |

NOTE: Shaded sample submitted for laboratory analysis

# Aquaterra Technologies, Inc.
# Subsurface Log: GP-10

**Project Name:** Tank 552
**Location:** Point Breeze Refinery
**Boring Number:** GP-10
**Casing Elevation:** N/A
**Screen Diameter:** N/A **Length:** N/A
**Casing Diameter:** N/A **Length:** N/A
**Drilling Method:** Geoprobe

**Owner:** Sunoco, Inc. (R&M)
**Permit No.:** N/A
**Log By:** M. Brad Spancake
**Driller:** BL Myers
**Slot Size:** N/A
**Type:** N/A
**Sample Method:** Acetate Sleeve

**Date:** 6/4/03
**Borehole Dia:** N/A
**Water Level (Init):** 10'
**Rig Type:**

**Total Boring Depth:** 12'
**Screen Interval:** N/A
**Sand Pack Interval:** N/A
**Completion Details:** N/A

**Construction Details**
**Bentonite Interval:** N/A
**Cement/Grout Interval:** N/A
**Sand Pack Type:** N/A

= Backfill
= Cement/Grout
= Bentonite
= Sand

| Depth (ft) | Sample Depth (ft) | PID (ppm) | Recovery (ft) | Lithology |
|---|---|---|---|---|
| 0 | 0-2 | 1 | 2 | Backfill to gray/brown clay and silt matrix |
| 2 | 2-4 | 0 | 1 | Same as above |
| 4 | 4-6 | 4 | 2 | Same as above |
| 6 | 6-8 | 1 | 2 | Medium sand in brown silt matrix. Some gravel and rock. Slightly moist |
| 8 | 8-10 | 13 | 2 | Coarse sand and gravel in brown silt matrix, becoming wet |
| 10 | **10-12** | 65 | 2 | Wet, same as above. Gray clay in bottom of sample |
| 12 | | | | End boring at 12' BGSA |

NOTE: Shaded sample submitted for laboratory analysis

# Aquaterra Technologies, Inc.
# Subsurface Log: GP-11

**Project Name:** Tank 552
**Location:** Point Breeze Refinery
**Boring Number:** GP-11
**Casing Elevation:** N/A
**Screen Diameter:** N/A **Length:** N/A
**Casing Diameter:** N/A **Length:** N/A
**Drilling Method:** Geoprobe

**Owner:** Sunoco, Inc. (R&M)
**Permit No.:** N/A
**Log By:** M. Brad Spancake
**Driller:** BL Myers
**Slot Size:** N/A
**Type:** N/A
**Sample Method:** Acetate Sleeve

**Date: 6/4/03**
**Borehole Dia: N/A**
**Water Level (Init): 10'**
**Rig Type:**

**Total Boring Depth:** 12'
**Screen Interval:** N/A
**Sand Pack Interval:** N/A
**Completion Details:** N/A

**Construction Details**
**Bentonite Interval:** N/A
**Cement/Grout Interval:** N/A
**Sand Pack Type:** N/A

= Backfill
= Cement/Grout
= Bentonite
= Sand

| Depth (ft) | Sample Depth (ft) | PID (ppm) | Recovery (ft) | Lithology |
|---|---|---|---|---|
| 0 | 0-2 | 1 | 2 | Backfill material to brown silt and clay matrix, some gravel |
| 2 | 2-4 | 1 | 1 | Brown silt and clay, slight moisture |
| 4 | 4-6 | 19 | 2 | Same as above. Becoming medium sand and gravel, slight moisture |
| 6 | 6-8 | 118 | 2 | Coarse sand and gravel in brown silt matrix, some rock fragments. Becoming moist |
| 8 | 8-10 | 135 | 2 | Moist coarse sand, gravel and rock fragments in brown silt matrix. Becoming wet at bottom |
| 10 | **10-12** | 227 | 2 | Same as above, wet. Clay in bottom of sample |
| 12 | | | | |

NOTE: Shaded sample submitted for laboratory analysis

SEKOVIN, S.A. -- MARINE GASOIL

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MSDS Safety Information

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FSC: 9140
NIIN: 01-313-7776
MSDS Date: 03/01/1993
MSDS Num: BRHDL
Product ID: MARINE GASOIL
MFN: 01
Responsible Party
Cage: NO412
Name: SEKOVIN, S.A.
Address: 53-55 AKTI MIAOULI STREET
City: PIREAUS 18536, GREECE NK 00000
Review Ind: Y
Published: Y

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Contractor Summary

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Cage: 0LRZ6
Name: SEKAVIN S.A.
Address: 53-55 AKTI MIAOULI STREET
City: 185 36 PIRAEUS, GREECE NK 00000
Phone: UNKNOWN
Cage: NO412
Name: SEKOVIN, S.A.
Address: 53-55 AKTI MIAOULI STREET
City: PIREAUS 18536, GREECE NK 00000
Phone: UNKNOWN

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Item Description Information

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Item Name: FUEL OIL,NAVAL
Specification Number: MGO-C-16232
Type/Grade/Class: GRADE DFM
Unit of Issue: GL
UI Container Qty: X

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Ingredients

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Name: MIDDLE DISTILLATE HYDROCARBONS IN C10-C28 RANGE OF PARAFFINIC, NAPHTHENIC OR AROMATIC TYPES.
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED

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Name: ADDITIVES, IGNITION IMPROVERS.
Other REC Limits: NONE RECOMMENDED
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED

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Health Hazards Data

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LD50 LC50 Mixture: LD50 ORAL RAT IS UNKNOWN
Route Of Entry Inds - Inhalation: YES
Skin: YES
Ingestion: NO
Carcinogenicity Inds - NTP: NO
IARC: NO
OSHA: NO

Effects of Exposure: ACUTE-INGESTION:MAY BE TOXIC. MAY CAUSE GI TRACT IRRITATION. INHALATION:INHALATION OF MIST/VAPORS/FUMES MAY CAUSE RESPIRATORY TRACT IRRITATION. SMALL AMOUNT ASPIRATED INTO LUNGS MAY CAUSE CHEMICAL PNE UMONITIS. EYE:IRRITATION. SKIN:REPEATEDCONTACT MAY CAUSE IRRITATION. CHRONIC:DERMATITIS.

Explanation Of Carcinogenicity: MAY CONTAIN UNKNOWN CARCINOGENS SUCH AS POLYCYCLIC AROMATIC HYDROCARBONS.

Signs And Symptions Of Overexposure: EYES/SKIN: IRRITATION. INHALATION: HEADACHE, NAUSEA, WEAKNESS, SEDATION, AND UNCONSCIOUSNESS. INGESTION:NAUSEA, DIARRHEA.

Medical Cond Aggravated By Exposure: SKIN DISEASE.

First Aid: EYES:FLUSH WITH PLENTY OF WATER FOR 15 MINUTES. SEE DOCTOR. SKIN:REMOVE CONTAMINATED CLOTHING AND SHOES. WASH WITH SOAP AND WATER.SEE DOCTOR. INHALATION:REMOVE TO FRESH AIR. GIVE OXYGEN/CPR IF NEEDED. SEE DOCTOR. INGESTION: DO NOT INDUCE VOMITING. SEE DOCTOR IMMEDIATELY.

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Handling and Disposal

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Spill Release Procedures: ELIMINATE IGNITION SOURCES. VENTILATE AREA. USE NON-SPARKING TOOLS. WEAR PROPER PROTECTIVE EQUIPMENT. STOP LEAK AND CONTAIN SPILL. ABSORB IN INERT ABSORBENT AND PLACE INTO APPROPIATE DISPOSAL CONTAINE R AND SEAL. WASH AREA WITH DETERGENT.

Waste Disposal Methods: DISPOSE OF IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL ENVIRONMENTAL REGULATIONS.

Handling And Storage Precautions: STORE IN COOL,DRY,WELL VENTILATED PLACE,AWAY FROM HEAT,IGNITION SOURCES AND INCOMPATIBLE MATERIALS.KEEP CONTAINERS CLOSED WHEN NOT IN USE.

Other Precautions: EMPTY CONTAINERS RETAIN RESIDUE. DO NOT PRESSURIZE, CUT, WELD OR EXPOSE TO HEAT, FLAME, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY.

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Fire and Explosion Hazard Information

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Flash Point Method: CC

Flash Point Text: 140F,60C

Extinguishing Media: USE CARBON DIOXIDE, FOAM, HALON, WATER SPRAY OR ANY APPROVED EXTINGUSHING AGENT FOR CLASS B FIRES.

Fire Fighting Procedures: WEAR FIRE FIGHTING PROTECTIVE EQUIPMENT AND A FULL FACED SELF CONTAINED BREATHING APPARATUS. COOL FIRE EXPOSED CONTAINERS WITH WATER SPRAY.

Unusual Fire/Explosion Hazard: COMBUSTIBLE LIQUID. CONTAINER MAY EXPLODE IN HEAT OF FIRE. SMOKE MAY BE TOXIC.

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Control Measures

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Respiratory Protection: NONE NORMALLY REQUIRED WITH ADEQUATE VENTILATION. NIOSH RESPIRATOR WITH ORGANIC VAPOR CARTRIDGE APPROPIATE FOR EXPOSURE OF CONCERN OR SCBA IF TLV IS EXCEEDED.

Ventilation: SUFFICIENT MECHANICAL (GENERAL) AND/OR LOCAL EXHAUST VENTILATION.

Protective Gloves: NEOPRENE.

Eye Protection: GOGGLES.

Other Protective Equipment: FULL BODY LONG-SLEEVED GARMENTS TO PREVENT REPEATED OR PROLONGED SKIN CONTACT. EYE WASH STATION AND SAFETY SHOWER.

Work Hygienic Practices: AVOID CONTACT WITH EYES AND SKIN. DO NOT BREATHE VAPORS. WASH THOROUGHLY AFTER HANDLING. LAUNDER CONTAMINATED CLOTHING.

Supplemental Safety and Health: AVOID CONTACT.

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Physical/Chemical Properties

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HCC: V4

B.P. Text: 374F,190C
Decomp Text: UNKNOWN
Vapor Pres: NIL
Spec Gravity: 0.825-0.87
Viscosity: 1.0 CST @104F
Evaporation Rate & Reference: NEGLIGIBLE
Solubility in Water: NEGLIGIBLE
Appearance and Odor: STRAW COLORED LIQUID, PETROLEUM OIL ODOR.
Corrosion Rate: UNKNOWN

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Reactivity Data

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Stability Indicator: YES
Stability Condition To Avoid: HIGH HEAT, OPEN FLAMES AND OTHER SOURCES OF IGNITION
Materials To Avoid: STRONG OXIDIZING AGENTS, COMBINATION OF SULFURIC AND NITRIC ACIDS.
Hazardous Decomposition Products: CARBON OXIDES AND VARIOUS HYDROCARBONS WHEN BURNED.
Hazardous Polymerization Indicator: NO

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Toxicological Information

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Ecological Information

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MSDS Transport Information

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Regulatory Information

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Other Information

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Transportation Information

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Responsible Party Cage: NO412
Trans ID NO: 124508
Product ID: MARINE GASOIL
MSDS Prepared Date: 03/01/1993
Review Date: 08/05/1993
MFN: 1
Tech Entry NOS Shipping Nm: PETROLEUM MIDDLE DISTILLATES
Multiple KIT Number: 0
Review IND: Y
Unit Of Issue: GL
Container QTY: X

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Detail DOT Information

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DOT PSN Code: GJL
Symbols: G
DOT Proper Shipping Name: FLAMMABLE LIQUIDS, N.O.S.
Hazard Class: 3
UN ID Num: UN1993
DOT Packaging Group: III
Label: FLAMMABLE LIQUID
Special Provision: B1,B52,T7,T30

Packaging Exception: 150
Non Bulk Pack: 203
Bulk Pack: 242
Max Qty Pass: 60 L
Max Qty Cargo: 220 L
Vessel Stow Req: A

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Detail IMO Information

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IMO PSN Code: HIA
IMO Proper Shipping Name: FLAMMABLE LIQUID, N.O.S. o
IMDG Page Number: 3345
UN Number: 1993
UN Hazard Class: 3.3
IMO Packaging Group: III
Subsidiary Risk Label: -
EMS Number: 3-07
MED First Aid Guide NUM: T

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Detail IATA Information

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IATA PSN CA
IATA UN ID Num: 1993
IATA Proper Shipping Name: FLAMMABLE LIQUID, N.O.S. *
IATA UN Class: 3
IATA Label: FLAMMABLE LIQUID
UN Packing Group: III
Packing Note Passenger: 309
Max Quant Pass: 60L
Max Quant Cargo: 220L
Packaging Note Cargo: 310

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Detail AFI Information

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AFI PSN CA
AFI Symbols: *
AFI Proper Shipping Name: FLAMMABLE LIQUIDS, N.O.S.
AFI Hazard Class: 3
AFI UN ID NUM: UN1993
AFI Packing Group: III
Special Provisions: P5
Back Pack Reference: A7.3

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HAZCOM Label

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Product ID: MARINE GASOIL
Cage: NO412
Assigned IND: Y
Company Name: SEKOVIN, S.A.
Street: 53-55 AKTI MIAOULI STREET
City: PIREAUS 18536, GREECE NK
Zipcode: 00000
Label Required IND: Y
Date Of Label Review: 08/05/1993
Status Code: C
Label Date: 08/05/1993
Year Procured: 1993
Origination Code: F
Chronic Hazard IND: Y
Eye Protection IND: YES

Skin Protection IND: YES
Signal Word: WARNING
Health Hazard: Moderate
Contact Hazard: Slight
Fire Hazard: Slight
Reactivity Hazard: None
Hazard And Precautions: WARNIG! COMBUSTIBLE LIQUID. ACUTE-INGESTION:LOW TOXICITY. INHALATION:INHALATION OF MIST/VAPORS/FUMES MAY CAUSE RESPIRATORY TRACT IRRITATION. SMALL AMOUNT ASPIRATED INTO LUNGS MAY CAUSE CHEMICAL PNEUMO NITIS. EYE:IRRITATION. SKIN:REPEATED CONTACT MAY CAUSE IRRITATION. CHRONIC:DERMATITIS. STORE IN COOL, WELL VENTILATED PLACE, AWAY FROM IGNITION SOURCES. FIRST AID: EYES:FLUSH WITH PLENTY OF WATER FOR 15 MINUTES. SEE DOCTOR. SKIN:REMOVE CONTAMINATED CLOTHING AND SHOES. WASH WITH SOAP AND WATER.SEE DOCTOR. INHALATION:REMOVE TO FRESH AIR. GIVE OXYGEN/CPR IF NEEDED.SEE DOCTOR. INGESTION: DO NOT INDUCE VOMITING. SEE DOCTOR IMMEDIATELY.

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Disclaimer (provided with this information by the compiling agencies): This information is formulated for use by elements of the Department of Defense. The United States of America in no manner whatsoever expressly or implied warrants, states, or intends said information to have any application, use or viability by or to any person or persons outside the Department of Defense nor any person or persons contracting with any instrumentality of the United States of America and disclaims all liability for such use. Any person utilizing this instruction who is not a military or civilian employee of the United States of America should seek competent professional advice to verify and assume responsibility for the suitability of this information to their particular situation regardless of similarity to a corresponding Department of Defense or other government situation.

Lancaster Laboratories

ANALYTICAL RESULTS

Prepared for:

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381
610-431-5733

Prepared by:

Lancaster Laboratories
2425 New Holland Pike
Lancaster, PA 17605-2425

SAMPLE GROUP

The sample group for this submittal is 854405. Samples arrived at the laboratory on Wednesday, June 04, 2003. The PO# for this group is TANK 552.

| Client Description | Lancaster Labs Number |
|---|---|
| GP-1 12-14' Grab Soil Sample | 4056154 |
| GP-2 10-12' Grab Soil Sample | 4056155 |
| GP-3 8-10' Grab Soil Sample | 4056156 |
| GP-4 10-12' Grab Soil Sample | 4056157 |

1 COPY TO SUN: Aquaterra Tech. Attn: Mr. Kevin Martin

Questions? Contact your Client Services Representative
Sandra L Patton at (717) 656-2300.

Respectfully Submitted,

Victoria M. Martell
Chemist

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4056154**

Collected:06/03/2003 09:05 by MBS

Account Number: 10132

Submitted: 06/04/2003 18:30
Reported: 06/18/2003 at 16:49
Discard: 06/26/2003
GP-1 12-14' Grab Soil Sample

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

SUN: Point Breeze - Tank 552 Closure

GP112

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | n.a. | 12.3 | 0.50 | % | 1 |
| | "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. | | | | | |
| 08179 | BTEX/MTBE/Cumene/Napht.(8021) | | | | | |
| 08183 | Benzene | 71-43-2 | < 110. | 110. | ug/kg | 386 |
| 08184 | Toluene | 108-88-3 | < 230. | 230. | ug/kg | 386 |
| 08185 | Ethylbenzene | 100-41-4 | < 340. | 340. | ug/kg | 386 |
| 08186 | Total Xylenes | 1330-20-7 | < 3,400. | 3,400. | ug/kg | 386 |
| 08188 | Isopropylbenzene | 98-82-8 | 4,000. | 180. | ug/kg | 386 |
| 08189 | Naphthalene | 91-20-3 | 16,000. | 8,800. | ug/kg | 386 |
| | The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately. | | | | | |

Sufficient sample volume was not available to perform a MS/MSD for this analysis. Therefore, a LCS/LCSD was performed to demonstrate precision and accuracy at a batch level.

Due to the presence of interferents near their retention time, normal reporting limits were not attained for the compounds listed below. The presence or concentration of these compounds cannot be determined below the reporting limits due to the presence of these interferents.
benzene, toluene, ethylbenzene, and total xylenes

The concentration reported for naphthalene is the maximum amount that could be in the soil. There are compounds coeluting with naphthalene that may be adding additional mass to its peak. Therefore, the actual concentration of naphthalene may be less than what is being reported.

Poor surrogate recoveries were observed for this sample due to the dilution needed to perform the analysis.

00941 PAH's in Solids by HPLC

MEMBER ACIL
Lancaster Laboratories, Inc.
2425 New Holland Pike
PO Box 12425
Lancaster, PA 17605-2425
717-656-2300 Fax: 717-656-2681

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4056154**

Collected:06/03/2003 09:05 by MBS

Account Number: 10132

Submitted: 06/04/2003 18:30
Reported: 06/18/2003 at 16:49
Discard: 06/26/2003
GP-1 12-14' Grab Soil Sample

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

SUN: Point Breeze - Tank 552 Closure

GP112

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|
| 00974 | Fluorene | 86-73-7 | 4,400. | 310. | ug/kg | 10 |
| 01007 | Phenanthrene | 85-01-8 | 14,000. | 760. | ug/kg | 50 |

The surrogate data is outside the QC limits due to unresolvable matrix problems evident in the sample extraction.

Due to the sample matrix an initial dilution was necessary to perform the analysis. Therefore, the reporting limits for the PAH by HPLC compounds were raised.

Commonwealth of Pennsylvania Lab Certification No. 36-037

## Laboratory Chronicle

| CAT No. | Analysis Name | Method | Trial# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | EPA 160.3 modified | 1 | 06/05/2003 16:53 | Scott W Freisher | 1 |
| 08179 | BTEX/MTBE/Cumene/Napht.(8021) | SW-846 8021B | 1 | 06/06/2003 12:16 | Deborah S Garrison | 386 |
| 00941 | PAH's in Solids by HPLC | SW-846 8310 | 1 | 06/14/2003 07:17 | Timothy J Trees | 10 |
| 00941 | PAH's in Solids by HPLC | SW-846 8310 | 1 | 06/16/2003 03:01 | Timothy J Trees | 50 |
| 03338 | PAH Solid Extraction | SW-846 3550B | 1 | 06/05/2003 10:00 | Olivia Arosemena | 1 |
| 08390 | High Level Volatile Soil Prep | SW-846 5035 | 1 | 06/04/2003 21:10 | Medina A Long | n.a. |

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4056155**

Collected:06/03/2003 09:40 by MBS

Account Number: 10132

Submitted: 06/04/2003 18:30
Reported: 06/18/2003 at 16:49
Discard: 06/26/2003
GP-2 10-12' Grab Soil Sample

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

SUN: Point Breeze - Tank 552 Closure

GP210

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | n.a. | 22.2 | 0.50 | % | 1 |

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.

| | | | | | | |
|---|---|---|---|---|---|---|
| 08179 | BTEX/MTBE/Cumene/Napht.(8021) | | | | | |
| 08183 | Benzene | 71-43-2 | < 220. | 220. | ug/kg | 850 |
| 08184 | Toluene | 108-88-3 | < 510. | 510. | ug/kg | 850 |
| 08185 | Ethylbenzene | 100-41-4 | < 770. | 770. | ug/kg | 850 |
| 08186 | Total Xylenes | 1330-20-7 | < 4,500. | 4,500. | ug/kg | 850 |
| 08188 | Isopropylbenzene | 98-82-8 | 13,000. | 440. | ug/kg | 850 |
| 08189 | Naphthalene | 91-20-3 | 33,000. | 870. | ug/kg | 850 |

The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.

Sufficient sample volume was not available to perform a MS/MSD for this analysis. Therefore, a LCS/LCSD was performed to demonstrate precision and accuracy at a batch level.

Due to the presence of interferents near their retention time, normal reporting limits were not attained for the compounds listed below. The presence or concentration of these compounds cannot be determined below the reporting limits due to the presence of these interferents.
benzene, toluene, ethylbenzene, and total xylenes

The concentration reported for naphthalene is the maximum amount that could be in the soil. There are compounds coeluting with naphthalene that may be adding additional mass to its peak. Therefore, the actual concentration of naphthalene may be less than what is being reported.

Poor surrogate recoveries were observed for this sample due to the dilution needed to perform the analysis.

00941 PAH's in Solids by HPLC

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4056155**

Collected:06/03/2003 09:40 by MBS

Account Number: 10132

Submitted: 06/04/2003 18:30
Reported: 06/18/2003 at 16:49
Discard: 06/26/2003
GP-2 10-12' Grab Soil Sample

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

SUN: Point Breeze - Tank 552 Closure

GP210

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|
| 00974 | Fluorene | 86-73-7 | 1,600. | 350. | ug/kg | 10 |
| 01007 | Phenanthrene | 85-01-8 | 4,800. | 170. | ug/kg | 10 |

The surrogate data is outside the QC limits due to unresolvable matrix problems evident in the sample extraction.

The quantitation limits for the HPLC PAH compounds were raised because sample dilution was necessary to bring target compounds into the calibration range of the system.

Commonwealth of Pennsylvania Lab Certification No. 36-037

## Laboratory Chronicle

| CAT No. | Analysis Name | Method | Trial# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | EPA 160.3 modified | 1 | 06/05/2003 16:53 | Scott W Freisher | 1 |
| 08179 | BTEX/MTBE/Cumene/Napht.(8021) | SW-846 8021B | 1 | 06/06/2003 16:51 | Deborah S Garrison | 850 |
| 00941 | PAH's in Solids by HPLC | SW-846 8310 | 1 | 06/14/2003 15:17 | Timothy J Trees | 10 |
| 03338 | PAH Solid Extraction | SW-846 3550B | 1 | 06/05/2003 10:00 | Olivia Arosemena | 1 |
| 08390 | High Level Volatile Soil Prep | SW-846 5035 | 1 | 06/04/2003 21:11 | Medina A Long | n.a. |

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4056156**

Collected:06/03/2003 10:30 by MBS

Account Number: 10132

Submitted: 06/04/2003 18:30
Reported: 06/18/2003 at 16:49
Discard: 06/26/2003
GP-3 8-10' Grab Soil Sample

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

SUN: Point Breeze - Tank 552 Closure

GP3-8

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | n.a. | 7.3 | 0.50 | % | 1 |
| | "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. | | | | | |
| 08179 | BTEX/MTBE/Cumene/Napht.(8021) | | | | | |
| 08183 | Benzene | 71-43-2 | < 190. | 190. | ug/kg | 890 |
| 08184 | Toluene | 108-88-3 | < 220. | 220. | ug/kg | 890 |
| 08185 | Ethylbenzene | 100-41-4 | < 540. | 540. | ug/kg | 890 |
| 08186 | Total Xylenes | 1330-20-7 | < 4,300. | 4,300. | ug/kg | 890 |
| 08188 | Isopropylbenzene | 98-82-8 | 6,400. | 380. | ug/kg | 890 |
| 08189 | Naphthalene | 91-20-3 | 19,000. | 770. | ug/kg | 890 |

The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.

Sufficient sample volume was not available to perform a MS/MSD for this analysis. Therefore, a LCS/LCSD was performed to demonstrate precision and accuracy at a batch level.

Due to the presence of interferents near their retention time, normal reporting limits were not attained for the compounds listed below. The presence or concentration of these compounds cannot be determined below the reporting limits due to the presence of these interferents.
benzene, toluene, ethylbenzene, and total xylenes

The concentration reported for naphthalene is the maximum amount that could be in the soil. There are compounds coeluting with naphthalene that may be adding additional mass to its peak. Therefore, the actual concentration of naphthalene may be less than what is being reported.

Poor surrogate recoveries were observed for this sample due to the dilution needed to perform the analysis.

00941 PAH's in Solids by HPLC

MEMBER ACIL
Lancaster Laboratories, Inc.
2425 New Holland Pike
PO Box 12425
Lancaster, PA 17605-2425
717-656-2300 Fax: 717-656-2681

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4056156**

Collected:06/03/2003 10:30 by MBS

Account Number: 10132

Submitted: 06/04/2003 18:30
Reported: 06/18/2003 at 16:49
Discard: 06/26/2003
GP-3 8-10' Grab Soil Sample

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

SUN: Point Breeze - Tank 552 Closure

GP3-8

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|
| 00974 | Fluorene | 86-73-7 | 4,300. | 290. | ug/kg | 10 |
| 01007 | Phenanthrene | 85-01-8 | 12,000. | 720. | ug/kg | 50 |

The surrogate data is outside the QC limits due to unresolvable matrix problems evident in the sample extraction.

The quantitation limits for the HPLC PAH compounds were raised because sample dilution was necessary to bring target compounds into the calibration range of the system.

Commonwealth of Pennsylvania Lab Certification No. 36-037

## Laboratory Chronicle

| CAT No. | Analysis Name | Method | Trial# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | EPA 160.3 modified | 1 | 06/05/2003 16:53 | Scott W Freisher | 1 |
| 08179 | BTEX/MTBE/Cumene/Napht.(8021) | SW-846 8021B | 1 | 06/06/2003 17:28 | Deborah S Garrison | 890 |
| 00941 | PAH's in Solids by HPLC | SW-846 8310 | 1 | 06/14/2003 15:59 | Timothy J Trees | 10 |
| 00941 | PAH's in Solids by HPLC | SW-846 8310 | 1 | 06/16/2003 03:43 | Timothy J Trees | 50 |
| 03338 | PAH Solid Extraction | SW-846 3550B | 1 | 06/05/2003 10:00 | Olivia Arosemena | 1 |
| 08390 | High Level Volatile Soil Prep | SW-846 5035 | 1 | 06/04/2003 21:12 | Medina A Long | n.a. |

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4056157**

Collected:06/03/2003 11:00 by MBS

Account Number: 10132

Submitted: 06/04/2003 18:30
Reported: 06/18/2003 at 16:49
Discard: 06/26/2003
GP-4 10-12' Grab Soil Sample

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

SUN: Point Breeze - Tank 552 Closure

GP410

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | n.a. | 9.8 | 0.50 | % | 1 |

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.

08179 BTEX/MTBE/Cumene/Napht.(8021)

| | | | | | | |
|---|---|---|---|---|---|---|
| 08183 | Benzene | 71-43-2 | < 200. | 200. | ug/kg | 920 |
| 08184 | Toluene | 108-88-3 | < 330. | 330. | ug/kg | 920 |
| 08185 | Ethylbenzene | 100-41-4 | < 550. | 550. | ug/kg | 920 |
| 08186 | Total Xylenes | 1330-20-7 | < 3,300. | 3,300. | ug/kg | 920 |
| 08188 | Isopropylbenzene | 98-82-8 | 7,100. | 410. | ug/kg | 920 |
| 08189 | Naphthalene | 91-20-3 | 24,000. | 820. | ug/kg | 920 |

The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.

Sufficient sample volume was not available to perform a MS/MSD for this analysis. Therefore, a LCS/LCSD was performed to demonstrate precision and accuracy at a batch level.

Due to the presence of interferents near their retention time, normal reporting limits were not attained for the compounds listed below. The presence or concentration of these compounds cannot be determined below the reporting limits due to the presence of these interferents.
benzene, toluene, ethylbenzene, and total xylenes

The concentration reported for naphthalene is the maximum amount that could be in the soil. There are compounds coeluting with naphthalene that may be adding additional mass to its peak. Therefore, the actual concentration of naphthalene may be less than what is being reported.

Poor surrogate recoveries were observed for this sample due to the dilution needed to perform the analysis.

00941 PAH's in Solids by HPLC

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4056157**

Collected:06/03/2003 11:00 by MBS

Submitted: 06/04/2003 18:30
Reported: 06/18/2003 at 16:49
Discard: 06/26/2003
GP-4 10-12' Grab Soil Sample

SUN: Point Breeze - Tank 552 Closure

Account Number: 10132

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

GP410

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|
| 00974 | Fluorene | 86-73-7 | 6,200. | 300. | ug/kg | 10 |
| 01007 | Phenanthrene | 85-01-8 | 18,000. | 740. | ug/kg | 50 |

The surrogate data is outside the QC limits due to unresolvable matrix problems evident in the sample extraction.

The quantitation limits for the HPLC PAH compounds were raised because sample dilution was necessary to bring target compounds into the calibration range of the system.

Commonwealth of Pennsylvania Lab Certification No. 36-037

## Laboratory Chronicle

| CAT No. | Analysis Name | Method | Trial# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | EPA 160.3 modified | 1 | 06/05/2003 16:53 | Scott W Freisher | 1 |
| 08179 | BTEX/MTBE/Cumene/Napht.(8021) | SW-846 8021B | 1 | 06/06/2003 18:05 | Deborah S Garrison | 920 |
| 00941 | PAH's in Solids by HPLC | SW-846 8310 | 1 | 06/14/2003 16:41 | Timothy J Trees | 10 |
| 00941 | PAH's in Solids by HPLC | SW-846 8310 | 1 | 06/16/2003 04:26 | Timothy J Trees | 50 |
| 03338 | PAH Solid Extraction | SW-846 3550B | 1 | 06/05/2003 10:00 | Olivia Arosemena | 1 |
| 08390 | High Level Volatile Soil Prep | SW-846 5035 | 1 | 06/04/2003 21:13 | Medina A Long | n.a. |

MEMBER ACIL
Lancaster Laboratories, Inc.
2425 New Holland Pike
PO Box 12425
Lancaster, PA 17605-2425
717-656-2300 Fax: 717-656-2681

# Analysis Request / Environmental Services Chain of Custody

Lancaster Laboratories
*Where quality is a science.*

For Lancaster Laboratories use only
Acct. # 10132 Group# 854405 Sample # 4056154-57

**COC #** 0023556

Please print. Instructions on reverse side correspond with circled numbers.

(1)
Client: Sun · Aquaterra Acct. #:
Project Name/#: Tank 552 PWSID #:
Project Manager: Kevin Martin P.O.#:
Sampler: M Brad Spancake Quote #:
Name of state where samples were collected: PA

For Lab Use Only
FSC:
SCR #: 178383

| (2) Sample Identification | Date Collected | Time Collected | (3) Grab | Composite | Matrix: Soil | Water (Potable / NPDES) | Other | (4) Total # of Containers | (5) Analyses Requested: 8021 BTEX, Cumene, Naphthalene / 8310 Phenanthrene / 8310 Fluorene / % Moist | Remarks | (6) Temperature of samples upon receipt (if requested) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| GP-1 12'-14' | 6/3/03 | 0905 | X | | X | | | 2 | | temp 4°C | |
| GP-2 10'-12' | 6/3/03 | 0940 | X | | X | | | 2 | | TB 6/4/03 | |
| GP-3 8'-10' | 6/3/03 | 1030 | X | | X | | | 2 | | | |
| GP-4 10'-12' | 6/3/03 | 1100 | X | | X | | | 2 | | | |
| | | | X | | X | | | 2 | MBS | | |
| | | | X | | X | | | 1 | MBS | | |

(7) **Turnaround Time Requested** (TAT) (please circle): Normal Rush
(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)
Date results are needed:
Rush results requested by (please circle): Phone Fax E-mail
Phone #: Fax #:
E-mail address:

(8) **Data Package Options** (please circle if required)
QC Summary, Type I (Tier I), Type II (Tier II), Type III (NJ Red. Del.), Type IV (CLP), Type VI (Raw Data), GLP, Other
SDG Complete? Yes No
Site-specific QC required? Yes No
(If yes, indicate QC sample and submit triplicate volume.)
Internal Chain of Custody required? Yes No

(9)

| Relinquished by: | Date | Time | Received by: | Date | Time |
|---|---|---|---|---|---|
| K. Martin | 5.22.03 | 1530 | M. Brad Spancake | 5/22/03 | 1530 |
| M. Brad Spancake | 6/4/03 | 0800 | Maureen McCullough | 6/4/03 | 11:05 |
| Maureen McCullough | 6/4/03 | 18:30 | | | |
| | | | | | |
| | | | C. Carter | 6-4-03 | 1830 |

# Analysis Report

Lancaster Laboratories

ANALYTICAL RESULTS

Prepared for:

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381
610-431-5733

Prepared by:

Lancaster Laboratories
2425 New Holland Pike
Lancaster, PA 17605-2425

SAMPLE GROUP

The sample group for this submittal is 854608. Samples arrived at the laboratory on Thursday, June 05, 2003. The PO# for this group is TANK 552.

| Client Description | Lancaster Labs Number |
|---|---|
| GP-5 10-12' Grab Soil Sample | 4057230 |
| GP-6 10-12' Grab Soil Sample | 4057231 |
| GP-7 10-12' Grab Soil Sample | 4057232 |
| GP-8 10-12' Grab Soil Sample | 4057233 |
| GP-9 10-12' Grab Soil Sample | 4057234 |
| GP-10 10-12' Grab Soil Sample | 4057235 |
| GP-11 10-12' Grab Soil Sample | 4057236 |

1 COPY TO SUN: Aquaterra Tech. Attn: Mr. Kevin Martin

Questions? Contact your Client Services Representative
Sandra L Patton at (717) 656-2300.

Respectfully Submitted,
Erik J. Frederiksen
Group Leader

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4057230**

Collected:06/04/2003 08:50 by MBS

Account Number: 10132

Submitted: 06/05/2003 18:40
Reported: 06/18/2003 at 22:28
Discard: 06/26/2003
GP-5 10-12' Grab Soil Sample

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

SUN: Point Breeze - Tank 552 Closure

G510-

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | n.a. | 13.4 | 0.50 | % | 1 |

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.

| | | | | | | |
|---|---|---|---|---|---|---|
| 08179 | BTEX/MTBE/Cumene/Napht.(8021) | | | | | |
| 08183 | Benzene | 71-43-2 | < 210. | 210. | ug/kg | 930 |
| 08184 | Toluene | 108-88-3 | < 290. | 290. | ug/kg | 930 |
| 08185 | Ethylbenzene | 100-41-4 | < 210. | 210. | ug/kg | 930 |
| 08186 | Total Xylenes | 1330-20-7 | < 2,900. | 2,900. | ug/kg | 930 |
| 08188 | Isopropylbenzene | 98-82-8 | 8,700. | 430. | ug/kg | 930 |
| 08189 | Naphthalene | 91-20-3 | 32,000. | 860. | ug/kg | 930 |

The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.

Sufficient sample volume was not available to perform a MS/MSD for this analysis. Therefore, a LCS/LCSD was performed to demonstrate precision and accuracy at a batch level.

Due to the presence of interferents near their retention time, normal reporting limits were not attained for the compounds listed below. The presence or concentration of these compounds cannot be determined below the reporting limits due to the presence of these interferents.
toluene and total xylenes

The concentration reported for naphthalene is the maximum amount that could be in the soil. There are compounds coeluting with naphthalene that may be adding additional mass to its peak. Therefore, the actual concentration of naphthalene may be less than what is being reported.

Poor surrogate recoveries were observed for this sample due to the dilution needed to perform the analysis.

Due to the nature of the sample matrix, normal reporting limits were not attained.

MEMBER ACIL
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PO Box 12425
Lancaster, PA 17605-2425
717-656-2300 Fax: 717-656-2681

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4057230**

Collected:06/04/2003 08:50 by MBS

Account Number: 10132

Submitted: 06/05/2003 18:40
Reported: 06/18/2003 at 22:28
Discard: 06/26/2003
GP-5 10-12' Grab Soil Sample

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

SUN: Point Breeze - Tank 552 Closure

G510-

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|
| 00941 | PAH's in Solids by HPLC | | | | | |
| 00974 | Fluorene | 86-73-7 | 6,200. | 150. | ug/kg | 5 |
| 01007 | Phenanthrene | 85-01-8 | 16,000. | 770. | ug/kg | 50 |

The surrogate data is outside the QC limits due to unresolvable matrix problems evident in the sample extraction.

Due to the sample matrix an initial dilution was necessary to perform the analysis. Therefore, the reporting limits for the PAH by HPLC compounds were raised.

Commonwealth of Pennsylvania Lab Certification No. 36-037

## Laboratory Chronicle

| CAT No. | Analysis Name | Method | Trial# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | EPA 160.3 modified | 1 | 06/06/2003 19:57 | Scott W Freisher | 1 |
| 08179 | BTEX/MTBE/Cumene/Napht.(8021) | SW-846 8021B | 1 | 06/09/2003 11:27 | Stephanie A Selis | 930 |
| 00941 | PAH's in Solids by HPLC | SW-846 8310 | 1 | 06/13/2003 21:07 | Timothy J Trees | 5 |
| 00941 | PAH's in Solids by HPLC | SW-846 8310 | 1 | 06/14/2003 18:01 | Timothy J Trees | 50 |
| 03338 | PAH Solid Extraction | SW-846 3550B | 1 | 06/06/2003 22:00 | Sally L Appleyard | 1 |
| 08390 | High Level Volatile Soil Prep | SW-846 5035 | 1 | 06/05/2003 20:54 | Medina A Long | n.a. |

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4057231**

Collected:06/04/2003 09:10 by MBS

Account Number: 10132

Submitted: 06/05/2003 18:40
Reported: 06/18/2003 at 22:29
Discard: 06/26/2003
GP-6 10-12' Grab Soil Sample

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

SUN: Point Breeze - Tank 552 Closure

G610-

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | n.a. | 14.7 | 0.50 | % | 1 |
| | "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. | | | | | |
| 08179 | BTEX/MTBE/Cumene/Napht.(8021) | | | | | |
| 08183 | Benzene | 71-43-2 | < 590. | 590. | ug/kg | 2306 |
| 08184 | Toluene | 108-88-3 | < 1,200. | 1,200. | ug/kg | 2306 |
| 08185 | Ethylbenzene | 100-41-4 | < 1,800. | 1,800. | ug/kg | 2306 |
| 08186 | Total Xylenes | 1330-20-7 | < 7,000. | 7,000. | ug/kg | 2306 |
| 08188 | Isopropylbenzene | 98-82-8 | 19,000. | 1,100. | ug/kg | 2306 |
| 08189 | Naphthalene | 91-20-3 | 48,000. | 2,200. | ug/kg | 2306 |

The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.

Sufficient sample volume was not available to perform a MS/MSD for this analysis. Therefore, a LCS/LCSD was performed to demonstrate precision and accuracy at a batch level.

Due to the presence of interferents near their retention time, normal reporting limits were not attained for the compounds listed below. The presence or concentration of these compounds cannot be determined below the reporting limits due to the presence of these interferents.
benzene, toluene, ethylbenzene, and total xylenes

The concentration reported for naphthalene is the maximum amount that could be in the soil. There are compounds coeluting with naphthalene that may be adding additional mass to its peak. Therefore, the actual concentration of naphthalene may be less than what is being reported.

Poor surrogate recoveries were observed for this sample due to the dilution needed to perform the analysis.

00941 PAH's in Solids by HPLC

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4057231**

Collected:06/04/2003 09:10 by MBS

Account Number: 10132

Submitted: 06/05/2003 18:40
Reported: 06/18/2003 at 22:29
Discard: 06/26/2003
GP-6 10-12' Grab Soil Sample

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

SUN: Point Breeze - Tank 552 Closure

G610-

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|
| 00974 | Fluorene | 86-73-7 | 7,400. | 150. | ug/kg | 5 |
| 01007 | Phenanthrene | 85-01-8 | 16,000. | 790. | ug/kg | 50 |

The surrogate data is outside the QC limits due to unresolvable matrix problems evident in the sample extraction.

Due to the sample matrix an initial dilution was necessary to perform the analysis. Therefore, the reporting limits for the PAH by HPLC compounds were raised.

Commonwealth of Pennsylvania Lab Certification No. 36-037

## Laboratory Chronicle

| CAT No. | Analysis Name | Method | Trial# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | EPA 160.3 modified | 1 | 06/06/2003 19:57 | Scott W Freisher | 1 |
| 08179 | BTEX/MTBE/Cumene/Napht.(8021) | SW-846 8021B | 1 | 06/09/2003 07:11 | Stephanie A Selis | 2306 |
| 00941 | PAH's in Solids by HPLC | SW-846 8310 | 1 | 06/13/2003 23:13 | Timothy J Trees | 5 |
| 00941 | PAH's in Solids by HPLC | SW-846 8310 | 1 | 06/14/2003 18:44 | Timothy J Trees | 50 |
| 03338 | PAH Solid Extraction | SW-846 3550B | 1 | 06/06/2003 22:00 | Sally L Appleyard | 1 |
| 08390 | High Level Volatile Soil Prep | SW-846 5035 | 1 | 06/05/2003 20:55 | Medina A Long | n.a. |

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4057232**

Collected:06/04/2003 09:30 by MBS

Account Number: 10132

Submitted: 06/05/2003 18:40
Reported: 06/18/2003 at 22:29
Discard: 06/26/2003
GP-7 10-12' Grab Soil Sample

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

SUN: Point Breeze - Tank 552 Closure

G710-

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | n.a. | 9.7 | 0.50 | % | 1 |
| | "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. | | | | | |
| 08179 | BTEX/MTBE/Cumene/Napht.(8021) | | | | | |
| 08183 | Benzene | 71-43-2 | < 97. | 97. | ug/kg | 437 |
| 08184 | Toluene | 108-88-3 | < 220. | 220. | ug/kg | 437 |
| 08185 | Ethylbenzene | 100-41-4 | < 97. | 97. | ug/kg | 437 |
| 08186 | Total Xylenes | 1330-20-7 | < 2,200. | 2,200. | ug/kg | 437 |
| 08188 | Isopropylbenzene | 98-82-8 | 4,700. | 190. | ug/kg | 437 |
| 08189 | Naphthalene | 91-20-3 | 16,000. | 390. | ug/kg | 437 |
| | The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately. | | | | | |

Sufficient sample volume was not available to perform a MS/MSD for this analysis. Therefore, a LCS/LCSD was performed to demonstrate precision and accuracy at a batch level.

Due to the presence of interferents near their retention time, normal reporting limits were not attained for the compounds listed below. The presence or concentration of these compounds cannot be determined below the reporting limits due to the presence of these interferents.
benzene, toluene, ethylbenzene, and total xylenes

The concentration reported for naphthalene and isopropylbenzene is the maximum amount that could be in the soil. There are compounds coeluting with naphthalene and isopropylbenzene that may be adding additional mass to their peaks. Therefore, the actual concentrations of naphthalene and isopropylbenzene may be less than what is being reported.

Poor surrogate recoveries were observed for this sample due to the dilution needed to perform the analysis.

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4057232**

Collected:06/04/2003 09:30 by MBS

Account Number: 10132

Submitted: 06/05/2003 18:40
Reported: 06/18/2003 at 22:29
Discard: 06/26/2003
GP-7 10-12' Grab Soil Sample

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

SUN: Point Breeze - Tank 552 Closure

G710-

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|
| 00941 | PAH's in Solids by HPLC | | | | | |
| 00974 | Fluorene | 86-73-7 | 2,400. | 140. | ug/kg | 5 |
| 01007 | Phenanthrene | 85-01-8 | 4,700. | 140. | ug/kg | 10 |

The surrogate data is outside the QC limits due to unresolvable matrix problems evident in the sample extraction.

Due to the sample matrix an initial dilution was necessary to perform the analysis. Therefore, the reporting limits for the PAH by HPLC compounds were raised.

Commonwealth of Pennsylvania Lab Certification No. 36-037

## Laboratory Chronicle

| CAT No. | Analysis Name | Method | Trial# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | EPA 160.3 modified | 1 | 06/06/2003 19:57 | Scott W Freisher | 1 |
| 08179 | BTEX/MTBE/Cumene/Napht.(8021) | SW-846 8021B | 1 | 06/09/2003 07:48 | Stephanie A Selis | 437 |
| 00941 | PAH's in Solids by HPLC | SW-846 8310 | 1 | 06/13/2003 23:55 | Timothy J Trees | 5 |
| 00941 | PAH's in Solids by HPLC | SW-846 8310 | 1 | 06/14/2003 19:26 | Timothy J Trees | 10 |
| 03338 | PAH Solid Extraction | SW-846 3550B | 1 | 06/06/2003 22:00 | Sally L Appleyard | 1 |
| 08390 | High Level Volatile Soil Prep | SW-846 5035 | 1 | 06/05/2003 20:56 | Medina A Long | n.a. |

MEMBER ACIL
Lancaster Laboratories, Inc.
2425 New Holland Pike
PO Box 12425
Lancaster, PA 17605-2425
717-656-2300 Fax: 717-656-2681

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4057233**

Collected:06/04/2003 10:00 by MBS

Account Number: 10132

Submitted: 06/05/2003 18:40
Reported: 06/18/2003 at 22:29
Discard: 06/26/2003
GP-8 10-12' Grab Soil Sample

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

SUN: Point Breeze - Tank 552 Closure

G810-

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | n.a. | 10. | 0.50 | % | 1 |
| | "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. | | | | | |
| 08179 | BTEX/MTBE/Cumene/Napht.(8021) | | | | | |
| 08183 | Benzene | 71-43-2 | < 88. | 88. | ug/kg | 394 |
| 08184 | Toluene | 108-88-3 | < 220. | 220. | ug/kg | 394 |
| 08185 | Ethylbenzene | 100-41-4 | < 88. | 88. | ug/kg | 394 |
| 08186 | Total Xylenes | 1330-20-7 | < 1,000. | 1,000. | ug/kg | 394 |
| 08188 | Isopropylbenzene | 98-82-8 | 3,800. | 180. | ug/kg | 394 |
| 08189 | Naphthalene | 91-20-3 | 13,000. | 350. | ug/kg | 394 |

The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.

Sufficient sample volume was not available to perform a MS/MSD for this analysis. Therefore, a LCS/LCSD was performed to demonstrate precision and accuracy at a batch level.

Due to the presence of interferents near their retention time, normal reporting limits were not attained for the compounds listed below. The presence or concentration of these compounds cannot be determined below the reporting limits due to the presence of these interferents.
toluene and total xylenes

The concentration reported for naphthalene is the maximum amount that could be in the soil. There are compounds coeluting with naphthalene that may be adding additional mass to its peak. Therefore, the actual concentration of naphthalene may be less than what is being reported.

Poor surrogate recoveries were observed for this sample due to the dilution needed to perform the analysis.

Due to the nature of the sample matrix, normal reporting limits were not attained.

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4057233**

Collected:06/04/2003 10:00 by MBS

Account Number: 10132

Submitted: 06/05/2003 18:40
Reported: 06/18/2003 at 22:29
Discard: 06/26/2003
GP-8 10-12' Grab Soil Sample

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

SUN: Point Breeze - Tank 552 Closure

G810-

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|
| 00941 | PAH's in Solids by HPLC | | | | | |
| 00974 | Fluorene | 86-73-7 | 2,500. | 140. | ug/kg | 5 |
| 01007 | Phenanthrene | 85-01-8 | 7,400. | 300. | ug/kg | 20 |

The surrogate data is outside the QC limits due to unresolvable matrix problems evident in the sample extraction.

Due to the sample matrix an initial dilution was necessary to perform the analysis. Therefore, the reporting limits for the PAH by HPLC compounds were raised.

Commonwealth of Pennsylvania Lab Certification No. 36-037

## Laboratory Chronicle

| CAT No. | Analysis Name | Method | Trial# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | EPA 160.3 modified | 1 | 06/06/2003 19:57 | Scott W Freisher | 1 |
| 08179 | BTEX/MTBE/Cumene/Napht.(8021) | SW-846 8021B | 1 | 06/09/2003 08:24 | Stephanie A Selis | 394 |
| 00941 | PAH's in Solids by HPLC | SW-846 8310 | 1 | 06/14/2003 00:37 | Timothy J Trees | 5 |
| 00941 | PAH's in Solids by HPLC | SW-846 8310 | 1 | 06/14/2003 20:08 | Timothy J Trees | 20 |
| 03338 | PAH Solid Extraction | SW-846 3550B | 1 | 06/06/2003 22:00 | Sally L Appleyard | 1 |
| 08390 | High Level Volatile Soil Prep | SW-846 5035 | 1 | 06/05/2003 20:57 | Medina A Long | n.a. |

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4057234**

Collected:06/04/2003 10:30 by MBS

Account Number: 10132

Submitted: 06/05/2003 18:40
Reported: 06/18/2003 at 22:29
Discard: 06/26/2003
GP-9 10-12' Grab Soil Sample

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

SUN: Point Breeze - Tank 552 Closure

G910-

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | n.a. | 10.3 | 0.50 | % | 1 |

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.

08179 BTEX/MTBE/Cumene/Napht.(8021)

| | | | | | | |
|---|---|---|---|---|---|---|
| 08183 | Benzene | 71-43-2 | < 11. | 11. | ug/kg | 42.5 |
| 08184 | Toluene | 108-88-3 | < 22. | 22. | ug/kg | 42.5 |
| 08185 | Ethylbenzene | 100-41-4 | < 22. | 22. | ug/kg | 42.5 |
| 08186 | Total Xylenes | 1330-20-7 | 240. | 19. | ug/kg | 42.5 |
| 08188 | Isopropylbenzene | 98-82-8 | < 280. | 280. | ug/kg | 42.5 |
| 08189 | Naphthalene | 91-20-3 | 1,400. | 38. | ug/kg | 42.5 |

The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.

Sufficient sample volume was not available to perform a MS/MSD for this analysis. Therefore, a LCS/LCSD was performed to demonstrate precision and accuracy at a batch level.

Due to the presence of interferents near their retention time, normal reporting limits were not attained for the compounds listed below. The presence or concentration of these compounds cannot be determined below the reporting limits due to the presence of these interferents.
benzene, toluene, ethylbenzene, and total xylenes

The concentration reported for naphthalene is the maximum amount that could be in the soil. There are compounds coeluting with naphthalene that may be adding additional mass to its peak. Therefore, the actual concentration of naphthalene may be less than what is being reported.

Poor surrogate recoveries were observed for this sample due to the dilution needed to perform the analysis.

00941 PAH's in Solids by HPLC

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4057234**

Collected:06/04/2003 10:30 by MBS

Account Number: 10132

Submitted: 06/05/2003 18:40
Reported: 06/18/2003 at 22:29
Discard: 06/26/2003
GP-9 10-12' Grab Soil Sample

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

SUN: Point Breeze - Tank 552 Closure

G910-

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|
| 00974 | Fluorene | 86-73-7 | 4,400. | 300. | ug/kg | 10 |
| 01007 | Phenanthrene | 85-01-8 | 15,000. | 750. | ug/kg | 50 |

The surrogate data is outside the QC limits due to unresolvable matrix problems evident in the sample extraction.

Due to the sample matrix an initial dilution was necessary to perform the analysis. Therefore, the reporting limits for the PAH by HPLC compounds were raised.

Commonwealth of Pennsylvania Lab Certification No. 36-037

## Laboratory Chronicle

| CAT No. | Analysis Name | Method | Trial# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | EPA 160.3 modified | 1 | 06/06/2003 19:57 | Scott W Freisher | 1 |
| 08179 | BTEX/MTBE/Cumene/Napht.(8021) | SW-846 8021B | 1 | 06/09/2003 18:38 | Stephanie A Selis | 42.5 |
| 00941 | PAH's in Solids by HPLC | SW-846 8310 | 1 | 06/14/2003 01:58 | Timothy J Trees | 10 |
| 00941 | PAH's in Solids by HPLC | SW-846 8310 | 1 | 06/14/2003 20:50 | Timothy J Trees | 50 |
| 03338 | PAH Solid Extraction | SW-846 3550B | 1 | 06/06/2003 22:00 | Sally L Appleyard | 1 |
| 08390 | High Level Volatile Soil Prep | SW-846 5035 | 1 | 06/05/2003 20:58 | Medina A Long | n.a. |

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4057235**

Collected:06/04/2003 10:50 by MBS

Account Number: 10132

Submitted: 06/05/2003 18:40
Reported: 06/18/2003 at 22:29
Discard: 06/26/2003
GP-10 10-12' Grab Soil Sample

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

SUN: Point Breeze - Tank 552 Closure

G1010

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | n.a. | 8.7 | 0.50 | % | 1 |

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.

08179 BTEX/MTBE/Cumene/Napht.(8021)

| | | | | | | |
|---|---|---|---|---|---|---|
| 08183 | Benzene | 71-43-2 | < 44. | 44. | ug/kg | 203 |
| 08184 | Toluene | 108-88-3 | < 110. | 110. | ug/kg | 203 |
| 08185 | Ethylbenzene | 100-41-4 | < 44. | 44. | ug/kg | 203 |
| 08186 | Total Xylenes | 1330-20-7 | < 660. | 660. | ug/kg | 203 |
| 08188 | Isopropylbenzene | 98-82-8 | 2,300. | 89. | ug/kg | 203 |
| 08189 | Naphthalene | 91-20-3 | 17,000. | 4,400. | ug/kg | 203 |

The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.

Sufficient sample volume was not available to perform a MS/MSD for this analysis. Therefore, a LCS/LCSD was performed to demonstrate precision and accuracy at a batch level.

Due to the presence of interferents near their retention time, normal reporting limits were not attained for the compounds listed below. The presence or concentration of these compounds cannot be determined below the reporting limits due to the presence of these interferents.
toluene and total xylenes

The concentration reported for naphthalene is the maximum amount that could be in the soil. There are compounds coeluting with naphthalene that may be adding additional mass to its peak. Therefore, the actual concentration of naphthalene may be less than what is being reported.

Poor surrogate recoveries were observed for this sample due to the dilution needed to perform the analysis.

Due to the nature of the sample matrix, normal reporting limits were not attained.

00941 PAH's in Solids by HPLC

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4057235**

Collected:06/04/2003 10:50 by MBS

Account Number: 10132

Submitted: 06/05/2003 18:40
Reported: 06/18/2003 at 22:29
Discard: 06/26/2003
GP-10 10-12' Grab Soil Sample

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

SUN: Point Breeze - Tank 552 Closure

G1010

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|
| 00974 | Fluorene | 86-73-7 | 5,200. | 300. | ug/kg | 10 |
| 01007 | Phenanthrene | 85-01-8 | 26,000. | 730. | ug/kg | 50 |

The surrogate data is outside the QC limits due to unresolvable matrix problems evident in the sample extraction.

Due to the sample matrix an initial dilution was necessary to perform the analysis. Therefore, the reporting limits for the PAH by HPLC compounds were raised.

Commonwealth of Pennsylvania Lab Certification No. 36-037

## Laboratory Chronicle

| CAT No. | Analysis Name | Method | Trial# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | EPA 160.3 modified | 1 | 06/06/2003 19:57 | Scott W Freisher | 1 |
| 08179 | BTEX/MTBE/Cumene/Napht.(8021) | SW-846 8021B | 1 | 06/09/2003 09:37 | Stephanie A Selis | 203 |
| 00941 | PAH's in Solids by HPLC | SW-846 8310 | 1 | 06/14/2003 02:40 | Timothy J Trees | 10 |
| 00941 | PAH's in Solids by HPLC | SW-846 8310 | 1 | 06/14/2003 21:32 | Timothy J Trees | 50 |
| 03338 | PAH Solid Extraction | SW-846 3550B | 1 | 06/06/2003 22:00 | Sally L Appleyard | 1 |
| 08390 | High Level Volatile Soil Prep | SW-846 5035 | 1 | 06/05/2003 20:59 | Medina A Long | n.a. |

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4057236**

Collected:06/04/2003 11:15 by MBS

Account Number: 10132

Submitted: 06/05/2003 18:40
Reported: 06/18/2003 at 22:29
Discard: 06/26/2003
GP-11 10-12' Grab Soil Sample

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

SUN: Point Breeze - Tank 552 Closure

G1110

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | n.a. | 10.2 | 0.50 | % | 1 |

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.

| | | | | | | |
|---|---|---|---|---|---|---|
| 08179 | BTEX/MTBE/Cumene/Napht.(8021) | | | | | |
| 08183 | Benzene | 71-43-2 | < 190. | 190. | ug/kg | 850 |
| 08184 | Toluene | 108-88-3 | < 220. | 220. | ug/kg | 850 |
| 08185 | Ethylbenzene | 100-41-4 | < 670. | 670. | ug/kg | 850 |
| 08186 | Total Xylenes | 1330-20-7 | < 3,300. | 3,300. | ug/kg | 850 |
| 08188 | Isopropylbenzene | 98-82-8 | 7,100. | 380. | ug/kg | 850 |
| 08189 | Naphthalene | 91-20-3 | 40,000. | 760. | ug/kg | 850 |

The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.

Due to the presence of interferents near their retention time, normal reporting limits were not attained for the compounds listed below. The presence or concentration of these compounds cannot be determined below the reporting limits due to the presence of these interferents.
toluene, ethylbenzene and total xylenes

The concentration reported for naphthalene is the maximum amount that could be in the soil. There are compounds coeluting with naphthalene that may be adding additional mass to its peak. Therefore, the actual concentration of naphthalene may be less than what is being reported.

Poor surrogate recoveries were observed for this sample due to the dilution needed to perform the analysis.

Due to the nature of the sample matrix, normal reporting limits were not attained.

| | | | | | | |
|---|---|---|---|---|---|---|
| 00941 | PAH's in Solids by HPLC | | | | | |
| 00974 | Fluorene | 86-73-7 | 6,500. | 300. | ug/kg | 10 |
| 01007 | Phenanthrene | 85-01-8 | 17,000. | 750. | ug/kg | 50 |

The surrogate data is outside the QC limits due to unresolvable matrix

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4057236**

Collected:06/04/2003 11:15 by MBS

Account Number: 10132

Submitted: 06/05/2003 18:40
Reported: 06/18/2003 at 22:29
Discard: 06/26/2003
GP-11 10-12' Grab Soil Sample

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

SUN: Point Breeze - Tank 552 Closure

G1110

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|

problems evident in the sample extraction.

Due to the sample matrix an initial dilution was necessary to perform the analysis. Therefore, the reporting limits for the PAH by HPLC compounds were raised.

Commonwealth of Pennsylvania Lab Certification No. 36-037

## Laboratory Chronicle

| CAT No. | Analysis Name | Method | Trial# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | EPA 160.3 modified | 1 | 06/06/2003 19:57 | Scott W Freisher | 1 |
| 08179 | BTEX/MTBE/Cumene/Napht.(8021) | SW-846 8021B | 1 | 06/11/2003 19:29 | Stephanie A Selis | 850 |
| 00941 | PAH's in Solids by HPLC | SW-846 8310 | 1 | 06/14/2003 03:22 | Timothy J Trees | 10 |
| 00941 | PAH's in Solids by HPLC | SW-846 8310 | 1 | 06/14/2003 22:15 | Timothy J Trees | 50 |
| 03338 | PAH Solid Extraction | SW-846 3550B | 1 | 06/06/2003 22:00 | Sally L Appleyard | 1 |
| 08390 | High Level Volatile Soil Prep | SW-846 5035 | 1 | 06/05/2003 21:00 | Medina A Long | n.a. |

# Analysis Request / Environmental Services Chain of Custody

Lancaster Laboratories
*Where quality is a science.*

For Lancaster Laboratories use only
Acct. # 10137 Group# 854608 Sample # 4057230-36

**COC #** 0012318

Please print. Instructions on reverse side correspond with circled numbers.

(1) Client: Sun-Aquaterra Acct. #:
Project Name/#: Tank 552 PWSID #:
Project Manager: Kevin Martin P.O.#:
Sampler: M. Brad Spancake Quote #:
Name of state where samples were collected: PA

For Lab Use Only
FSC:
SCR #:

| (2) Sample Identification | Date Collected | Time Collected | (3) Grab | Composite | (4) Matrix: Soil | Water | Other | Potable / NPDES (Check if Applicable) | Total # of Containers | (5) Analyses Requested: 8021 BTEX, Cumene, Naphthalene | 8310 Phenanthrene | 8310 Fluorene | % Moist | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GP-5 10'-12' | 6/4/03 | 0850 | X | | X | | | | 2 | | | | | |
| GP-6 10'-12' | 6/4/03 | 0910 | X | | X | | | | 2 | | | | | |
| GP-7 10'-12' | 6/4/03 | 0930 | X | | X | | | | 2 | | | | | |
| GP-8 10'-12' | 6/4/03 | 1000 | X | | X | | | | 2 | | | | | |
| GP-9 10'-12' | 6/4/03 | 1030 | X | | X | | | | 2 | | | | | |
| GP-10 10'-12' | 6/4/03 | 1050 | X | | X | | | | 2 | | | | | |
| GP-11 10'-12' | 6/4/03 | 1115 | X | | X | | | | 2 | | | | | |

(6) Temperature of samples upon receipt (if requested)

(7) **Turnaround Time Requested** (TAT) (please circle): Normal Rush
(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)
Date results are needed:
Rush results requested by (please circle): Phone Fax E-mail
Phone #: Fax #:
E-mail address:

(8) **Data Package Options** (please circle if required)
QC Summary Type VI (Raw Data)
Type I (Tier I) GLP
Type II (Tier II) Other
Type III (NJ Red. Del.)
Type IV (CLP)

SDG Complete? Yes No

Site-specific QC required? Yes No
(If yes, indicate QC sample and submit triplicate volume.)
Internal Chain of Custody required? Yes No

(9)

| Relinquished by: | Date | Time | Received by: | Date | Time |
|---|---|---|---|---|---|
| M. Brad Spancake | 6/5/03 | 11:10 | Marvin McCallister | 6/5/03 | 11:10 |
| Marvin McCallister | 6/5/03 | 18:40 | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | 6.5.03 | | 1840 |

Lancaster Laboratories, Inc., 2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 (717) 656-2300

2102 Rev. 10/27/02

Copies: White and yellow should accompany samples to Lancaster Laboratories. The pink copy should be retained by the client.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

2530-FM-LRW0087 Rev. 5/96
BUREAU OF LAND RECYCLING AND WASTE MANAGEMENT

RECEIVED
DEP SERO
HAZARDOUS WASTE MGMT
2000 SEP 27 PM 2:56

# NOTIFICATION OF REPORTABLE RELEASE *(Owners and Operators)*
# NOTIFICATION OF CONTAMINATION *(Certified Installers and Inspectors)*

**NOTIFICATION OF REPORTABLE RELEASE *(Owners and Operators)***

On August 21, 1993, the Storage Tank Cleanup Program's Corrective Action Process (CAP) regulations became effective. These regulations establish release reporting requirements for owners and operators of storage tanks and storage tank facilities.

Subsection 245.305(a) of the regulations requires owners or operators to notify the appropriate regional office of the Department as soon as practicable, but no later than 2 hours, after the confirmation of a reportable release.

Subsection 245.305(d) requires owners or operators to provide written notification to the appropriate regional office and to the local municipality, within 15 days of the notice required by Subsection 245.305(a). This form may be used to comply with Subsection 245.305(d).

**OWNERS AND OPERATORS (O/O)**
**PLEASE COMPLETE SECTIONS I, II, IIIA, IIIB, IV, V, VII and VIII.**

**NOTIFICATION OF CONTAMINATION *(Certified Installers and Inspectors)***

On September 21, 1991, the Storage Tank Program's Certification regulations became effective. These regulations establish standards of performance for certified installers and inspectors of storage tanks and storage tank facilities.

Subsection 245.132(a)(4) of the regulations requires certified installers and inspectors to report to the Department a release of a regulated substance or confirmed or suspected contamination of soil, surface or groundwater from regulated substances observed while performing services as a certified installer or inspector.

This form may be used to comply with Subsection 245.132(a)(4). The Department expects submission of the form within 48 hours of observing suspected or confirmed contamination. Where there is a reportable release, the form may be submitted jointly by the owner, operator, certified installer and certified inspector. In this instance, the form must be received by the appropriate regional office within 15 days of the notice required by Subsection 245.305(a).

**CERTIFIED INSTALLERS AND INSPECTORS (I/I)**
**PLEASE COMPLETE SECTIONS I, II, IIIA, IIIC, VI, VII and VIII.**

## INSTRUCTIONS

I. **FACILITY INFORMATION** - Record the name, I.D. number and physical location (not P.O. Box) of the facility at which a reportable release has been confirmed or at which suspected or confirmed contamination has been observed. Include the name and phone number of a person to contact at the facility.

II. **OWNER INFORMATION** - Record the name, business address and phone number of the owner of the facility identified in Section I.

III. **REGULATED SUBSTANCE INFORMATION** - Indicate to the best of your knowledge: A) the type of product or products involved; B) the quantity of product or products released; and C) whether the contamination is suspected or confirmed.

IV. **REPORTABLE RELEASE INFORMATION** - Record the date of confirmation of the reportable release, e.g., "08/21/93"; the date and regional office notified; and the date the local municipality (provide name of municipality) was sent a copy of this form. Indicate to the best of your knowledge the extent of contamination resulting from the release of the regulated substance.

V. **INTERIM REMEDIAL ACTIONS** - Indicate the interim remedial actions planned, initiated or completed.

VI. **SUSPECTED/CONFIRMED CONTAMINATION INFORMATION** - Record the date of observation of the suspected or confirmed contamination, e.g., "01/01/94". Indicate to the best of your knowledge the indications of a suspected release or extent of confirmed contamination resulting from the release of the regulated substance.

VII. **ADDITIONAL INFORMATION** - Provide any additional, relevant, available information concerning the reportable release or suspected or confirmed contamination. Include in this section a brief description of the activity that was being conducted when the reportable release was confirmed by the owner or operator or when the suspected/confirmed contamination was observed by the certified installer or inspector, e.g., during a(n) installation, repair or upgrade, removal from service or routine inspection.

VIII. **CERTIFICATION** - Please print your name, and provide your signature and date of signature. If a certified installer/inspector, provide certification number and company certification number.

**PLEASE SEND COMPLETED ORIGINAL FORM TO:**

PA Department of Environmental Protection
Environmental Cleanup Program
Storage Tank Section
(and the appropriate address below, depending on where the FACILITY is located)

| Southeast Region | Northeast Region | Southcentral Region | Northcentral Region | Southwest Region | Northwest Region |
|---|---|---|---|---|---|
| Lee Park, Suite 6010<br>555 North Lane<br>Conshohocken, PA 19428<br>FAX: 610-832-6143 | 2 Public Square<br>Wilkes-Barre, PA 18711-0790<br>FAX: 717-820-4907 | One Ararat Boulevard<br>Harrisburg, PA 17110<br>FAX: 717-540-7492 | 208 W. Third Street, Suite 101<br>Williamsport, PA 17701<br>FAX: 717-327-3565 | 400 Waterfront Drive<br>Pittsburgh, PA 15222<br>FAX: 412-442-4194 | 230 Chestnut Street<br>Meadville, PA 16335<br>FAX: 814-332-6121 |
| **Counties**<br>Bucks, Chester, Delaware, Montgomery, Philadelphia | **Counties**<br>Carbon, Lackawanna, Lehigh, Luzerne, Monroe, Northampton, Pike, Schuylkill, Susquehanna, Wayne, Wyoming | **Counties**<br>Adams, Bedford, Berks, Blair, Cumberland, Dauphin, Franklin, Fulton, Huntingdon, Juniata, Lancaster, Lebanon, Mifflin, Perry, York | **Counties**<br>Bradford, Cameron, Centre, Clinton, Clearfield, Columbia, Lycoming, Montour, Northumberland, Potter, Snyder, Sullivan, Tioga, Union | **Counties**<br>Allegheny, Armstrong, Beaver, Cambria, Fayette, Greene, Indiana, Somerset, Washington, Westmoreland | **Counties**<br>Butler, Clarion, Crawford, Elk, Erie, Forest, Jefferson, Lawrence, McKean, Mercer, Venango, Warren |

## I. FACILITY INFORMATION (Both O/O and I/I)

Facility Name: SUNOCO, INC (R&M) PT. BREEZE
Facility I.D. Number: 51-19781
Street Address (P.O. Box not acceptable): 3144 PASSYUNK AVE
City: PHILADELPHIA
State: PA
Zip Code: 19145
County: PHILADELPHIA
Municipality:
Contact Person: Jim Tucker
Phone Number: (215) 339-2120

## II. OWNER INFORMATION (Both O/O and I/I)

Owner Name: SUNOCO, INC (R&M)
Address: 3144 PASSYUNK AVE
City: PHILADELPHIA
Zip Code: 19145
State: PA
Phone Number: (215) 339-2000

## III. REGULATED SUBSTANCE INFORMATION

| A. Type of Product(s) Involved (Mark All That Apply ☒): Both O/O and I/I | | B. Quantity (Gallons) of Product(s) Released: O/O Only | C. Contamination Suspected [S] or Confirmed [C]: I/I Only | |
|---|---|---|---|---|
| Leaded Gasoline | ☐ | | [S] | [C] |
| Unleaded Gasoline | ☐ | | [S] | [C] |
| Aviation Gasoline | ☐ | | [S] | [C] |
| Kerosene | ☐ | | [S] | [C] |
| Jet Fuel | ☐ | | [S] | [C] |
| Diesel Fuel | ☐ | | [S] | [C] |
| New Motor Oil | ☐ | | [S] | [C] |
| Used Motor Oil | ☐ | | [S] | [C] |
| Fuel Oil No. 1 | ☐ | | [S] | [C] |
| Fuel Oil No. 2 | ☐ | | [S] | [C] |
| Fuel Oil No. 4 | ☐ | | [S] | [C] |
| Fuel Oil No. 5 | ☐ | | [S] | [C] |
| Fuel Oil No. 6 | ☐ | | [S] | [C] |
| Other (Specify) GAS oiL | ☑ | 200 | [S] | [C] |
| Unknown | ☐ | | [S] | [C] |

## IV. REPORTABLE RELEASE INFORMATION (O/O Only)

Date Reportable Release was Confirmed: 9 / 16 / 00 (m / d / y)

Date Owner/Operator Verbally Notified Appropriate Regional Office of Reportable Release and Office Notified:

Date 9 / 16 / 00 (m / d / y) Office SOUTHEAST REGION

Date Owner/Operator Sent Copy of this Written Notification to Local Municipality and Name of Municipality Notified:

Date 9 / 25 / 00 (m / d / y) Municipality PHILADELPHIA LOCAL EMERGENCY PLANNING COMMITTEE

Environmental Impacts (Mark All That Apply ☒):

| | |
|---|---|
| Soil | X |
| Sediment | ☐ |
| Surface Water | ☐ |
| Ground Water | ☐ |
| Water Supplies | ☐ |

## V. INTERIM REMEDIAL ACTIONS (O/O Only)

(Mark All That Apply ☒):

| | Planned | Initiated | Completed | Not Applicable |
|---|---|---|---|---|
| Regulated Substance Removed from Storage Tanks | ☐ | ☐ | ☐ | X |
| Fire, Explosion and Safety Hazards Mitigated | ☐ | ☐ | ☐ | X |
| Contaminated Soil Excavated | X | ☐ | ☐ | ☐ |
| Free Product Recovered | ☐ | ☐ | X | ☐ |
| Temporary Water Supplies Provided | ☐ | ☐ | ☐ | X |
| Other (Specify) _____ | ☐ | ☐ | ☐ | ☐ |

## VI. SUSPECTED / CONFIRMED CONTAMINATION INFORMATION (I/I Only)

Date of Observation of Suspected/Confirmed Contamination: ___ / ___ / ___ (m / d / y)

Indication of Suspected Contamination (Mark All That Apply ☒):

| | |
|---|---|
| Unusual Level of Vapors | ☐ |
| Erratic Behavior of Product Dispensing Equipment | ☐ |
| Release Detection Results Indicate a Release | ☐ |
| Discovery of Holes in the Storage Tank | ☐ |
| Other (Specify) _____ | ☐ |

Extent of Confirmed Contamination (Mark All That Apply ☒):

| | |
|---|---|
| Product Stained or Product Saturated Soil or Backfill | ☐ |
| Ponded Product | ☐ |
| Free Product or Sheen on Ponded Water | ☐ |
| Free Product or Sheen on the Ground Water Surface | ☐ |
| Free Product or Sheen on Surface Water | ☐ |
| Other (Specify) _____ | ☐ |

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## VII. ADDITIONAL INFORMATION (Both O/O and I/I)

include a brief description of the activity that was being conducted when the reportable release was confirmed by the owner or operator or when the suspected/confirmed contamination was observed by the certified installer or inspector, e.g., during a(n) installation, repair or upgrade, removal from service or routine inspection.

ON SATURDAY, SEPTEMBER 16, 2000 OPERATORS NOTICED A RELEASE WITHIN THE TANK DIKE OF STORAGE TANK 669 (PA# 090A). APPROXIMATELY 200 GALLONS OF GAS OIL WERE RELEASED TO THE SOIL. THE RELEASE WAS DUE TO A LEAK IN A STEAM COIL.

ALL FREE LIQUIDS WERE RECOVERED BY VACUUM TRUCKS. CONTAMINATED SOIL WILL BE EXCAVATED AND MANAGED AS RESIDUAL WASTE.

## VIII. CERTIFICATION (Both O/O and I/I)

I, JAMES TUCKER (Print Name), hereby certify, under penalty of law as provided in 18 Pa. C.S.A. §4904(relating to unsworn falsification to authorities) that I am the owner or operator of the above referenced storage tank facility and that the information provided by me in this notification is true, accurate and complete to the best of my knowledge and belief.

James Tucker
Signature of Owner or Operator

9/25/00
Date

I, _____ (Print Name), hereby certify, under penalty of law as provided in 18 Pa. C.S.A. §4904 (relating to unsworn falsification to authorities) that I am the certified installer who performed tank handling activities at the above referenced storage tank facility and that the information provided by me in this notification is true, accurate and complete to the best of my knowledge and belief.

_____
Signature of Certified Installer

_____
Date

_____
Installer Certification Number

_____
Company Certification Number

I, _____ (Print Name), hereby certify, under penalty of law as provided in 18 Pa. C.S.A. §4904 (relating to unsworn falsification to authorities) that I am the certified inspector who performed inspection activities at the above referenced storage tank facility and that the information provided by me in this notification is true, accurate and complete to the best of my knowledge and belief.

_____
Signature of Certified Inspector

_____
Date

_____
Inspector Certification Number

_____
Company Certification Number

RAM

SOUTHEAST REGION
INCIDENT NOTIFICATION
REPORT

SB.
#1
2hr150f

Submitted By: Gemmill
Date of Report: 95-02-07
Time of Report: 23:40
[ ] Work Hours [✓] After Hours

CALLER INFORMATION

Caller's Name/Organization: Robert Geisheimer / Sun - Phila
Sun Company Philadelphia Refinery 51-45659

Telephone Number: 215 / 339 - 2276

INCIDENT INFORMATION

Brief Description of Incident
#1937 Tank overflow. Gauge froze. Material stayed within containment
AST

Material(s) Involved: Gas oil

Est. Amount Released: 20 barrels

Responsible Party Information:

Name: Sun Company Philadelphia Refinery

Address: 3144 Passyunk Ave Phila

Telephone #: above

Incident Date/Time:

Date of Incident: 95/02/07

Time of Incident: 22:00

Incident Location:

County: Phila.

Munic.: Phila

Directions:

Environmental Impact:

Environ. Related Evac./Casualties? NA

Est. # Evacuated:

Est. # Injured:

Est. # Killed:

Medium Contaminated: [ ] None or N/A [ ] Air ~~[ ] Land~~
[ ] Surface Water [ ] Ground Water [✓] W/in Facility Only

Waterway(s) Affected/Threatened: Schuylkill

First Responders On Scene: (Fire Dept., Haz-Mat Team, Responsible Party, Other Agencies)

Response Action Taken: (Source Control, Containment/Countermeasures Clean-up):

DER EVALUATION/RESPONSE

| | | | |
|---|---|---|---|
| [ ] Air Contamination | [ ] Fix. Mus. Fac. Incid. | [ ] Land Contam./Waste | [ ] Search & Rescue Ops. |
| [ ] Building Collapse | [ ] Flooding | [ ] Mining Incidents | [ ] Sinkholes/Landslides |
| [ ] Dam Failure | [ ] Food/Water Borne Ill. | [ ] Oil & Gas Well Incid. | [ ] UST Leaks |
| [ ] Energy Shortage | [ ] Forest/Wild Fires | [ ] Pub. Water Sup. Contam. | [ ] Water Contamination |
| [ ] Explosives | [ ] Ice Jams | [ ] Radioact. Mat. Incid. | [ ] Water Short./Drought |
| | | | [✓] Other/Non-DER Incid. |

Material Involved: [ ] None or N/A [✓] Oil/Fuel [ ] Haz-Substance [ ] Other [ ] Unknown

Referred For: [✓] Prog. Follow-Up [ ] Prog. Resp. [ ] Emerg. Resp. [ ] Non-Reg. EP. Prog.

| Lead Program: | Program: | Staff Person Referred To: | Date: |
|---|---|---|---|
| Initial Response Action | | | / / |
| Follow-up Action/Info. | WQ | Bob Bauer | 95/02/08 |
| | ECP | S. Sinding | 95 02 8 |

INCIDENT NOTIFICATION REPORT - CONTINUED

NOTES AND CALL LOG

call w/ Gerheimer @ 23:40

Gemmill relayed to Mr. Berning/USCG@ 23:55

ADDITIONAL STATISTICAL DATA FIELDS

| | | | |
|---|---|---|---|
| Release: | [ ] None or N/A | [ ] Spill/Discharge | [ ] Disposal/Dumping |
| | [ ] Fire Related | [ ] Other | [ ] Unknown |
| Source: | [ ] None or N/A | [ ] Fixed Facility | [ ] Highway : Fuel |
| | [ ] Highway : Cargo | [ ] Railway | [ ] Vessel |
| | [ ] Pipeline | [ ] Other | [ ] Unknown |

DER Emergency Contracting? [ ] Yes [ ] No

(4-1)INR/.3

# Quality Assurance/ Quality Control Plan and Field Procedures Manual

Sunoco Partners Marcus Hook Industrial Complex and Philadelphia Energy Solutions (PES) Philadelphia Refinery Complex

Evergreen Resources Management Operations
May 20, 2016

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Appendix

A Evergreen Field Procedures Manual

# 1.0 INTRODUCTION

This Quality Assurance/Quality Control Plan and Field Procedures Manual (QA/QC Plan) outlines the procedures developed to ensure the collection and analysis of quality data for investigations completed under the United States Environmental Protection Agency (USEPA) Resource Conservation and Recovery Act (RCRA), Pennsylvania Department of Environmental Protection (PADEP) Act 2, and Pennsylvania and Delaware's Tank programs at the Sunoco Partners Marketing and Terminals, LP (Sunoco Partners) Marcus Hook Industrial Complex (MHIC) and the Philadelphia Energy Solutions Refining and Marketing, LLC (PES) Philadelphia Refinery Complex (PRC) on behalf of Evergreen Resources Management Operations (Evergreen). This document shall be used in conjunction with the site-specific work plans developed for each site and Standard Operating Procedures (SOPs) for field work as incorporated as Appendix A of this QA/QC Plan.

The QA/QC Plan is a planning document that provides a "blueprint" for obtaining the type and quality of data needed to support environmental decision making. The QA/QC Plan integrates relevant technical and quality aspects of a project and documents quality assurance and quality control.

The selection criteria and evaluation specified in this document will be used for validating the data in accordance with the USEPA Guidance on Environmental Data Verification and Data Validation (USEPA 240-R-02-004), dated November 2002 (EPA QA/G-8), USEPA Contract Laboratory Program National Functional Guidelines (NFGs) for Superfund Organic Methods Data Review (USEPA 540-R-08-01), dated June 2008 (SOM02.2) and USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (USEPA 540-R-10-011), dated January 2010 (ISM02.2). Qualifiers assigned to the data will be consistent with the data qualifiers specified in the NFGs and the USEPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (USEPA 540-R-08-01), collectively referred to herein as validation guidance.

# 2.0 QUALITY CONTROL REQUIREMENTS

The field and laboratory QC requirements for the characterization and remediation activities are discussed in the following subsections. Specific QC checks and acceptance criteria are provided in the referenced analytical methods.

## 2.1 Field Sampling Quality Control

The field QC requirements include analyzing reference standards for field instrument calibration and for routine calibration verifications. All initial and continuing calibration procedures will be implemented by trained personnel following the manufacturer's instructions to ensure the equipment is functioning within the specified tolerances. The calibration and maintenance history of the project-specific field instrumentation will be maintained in an active field logbook.

Field QC samples for this project include field duplicate samples to assess the overall precision of the sampling and analysis event, equipment rinse blanks to ensure proper cleaning of non-dedicated equipment is conducted between samples to avoid potential cross contamination (also generally referred to as field blanks), and trip blank samples to monitor cross contamination of water samples by volatile organic compounds (VOCs) during sample transport.

The frequency of collection of equipment rinse blanks will be one per sampling event. Field duplicate samples will only be prepared for groundwater samples, not for soil sampling events, at a collection frequency of 1 in 20 samples. One trip blank will be included for every shipment of samples to an analytical laboratory, at a minimum frequency of one trip blank per sample shipment which contains samples for VOCs analyses.

## 2.2 Analytical Quality Control

The laboratory QC requirements for the analyses may include evaluating chemical/thermal preservation, holding times, handling requirements, method blanks, instrument performance checks, initial calibration standards, calibration verification standards, internal standards, surrogate compound spikes, interference check samples, serial dilution samples, matrix spike/matrix spike duplicate (MS/MSD) samples, and laboratory control samples (LCS). The

acceptance criteria for the above identified requirements will be generated by the laboratory and included in the laboratory reports, along with the other laboratory QC requirements.

# 3.0 DATA VERIFICATION, VALIDATION, AND USABILITY

All field and laboratory data will be reviewed, verified, and/or validated. These terms are defined as follows:

- Data review is the in-house examination to ensure that the data have been recorded, transmitted, and processed correctly.
- Data verification is the process for evaluating the completeness, correctness, and conformance/compliance of a specific data set against the method, procedural, and/or contractual requirements.
- Data validation is an analyte-specific and sample-specific process that extends the evaluation of data beyond method, procedure, or contractual compliance (i.e., data verification) to determine the quality of a specific data set relative to the end use.

Field data and logbooks will be reviewed to ensure that the requirements of the sampling program, including the number of samples and locations, sampling, and sample handling procedures, were fulfilled.

Data verification, validation, and usability assessments performed on a percentage of lab packages to ensure that the data are scientifically defensible, properly documented, of known quality, and meet the project objectives, are described in the following sections. Data determined to be unusable may require corrective action be taken. Data use limitations will be identified in the data validation and usability assessment (VUA) report, which will be generated as required for characterization or final reporting to the agencies.

## 3.1 Data Review, Verification, and Validation Requirements

Data review, verification, and validation of the analytical data will be performed by each consultant completing the field activities. The exception to this scenario will be Aquaterra Technologies, Inc. (Aquaterra), in which case Aquaterra will review/verify the data and the consultant company working with Aquaterra will subsequently validate the samples.

Field information will be reviewed to ensure that all field measurements were conducted in accordance with the requirements of the site-specific work plan and this QA/QC Plan including applicable SOPs. Field measurements obtained using procedures inconsistent with the

requirements of these documents will be evaluated and may require that additional samples are collected or the use of the data be restricted.

*Stage 1 Verification and Validation Checks*

One hundred percent of the sample results will go through a Stage 1 verification and validation. As part of the data management process, each consultant will complete verification and validation based on the validation guidance. Data verification and validation will consist of the following items based on the guidance stated.

Stage 1 verification and validation of the laboratory analytical data package consists of checks for the compliance of sample receipt conditions, sample characteristics (e.g., percent moisture), and analytical results (with associated information). It is recommended that the following minimum baseline checks (as relevant) be performed on the laboratory analytical data package received for a Stage 1 validation label:

1. Documentation identifies the laboratory receiving and conducting analyses, and includes documentation for all samples submitted by the project or requester for analyses.
2. Requested analytical methods were performed and the analysis dates are present.
3. Requested target analyte results are reported along with the original laboratory data qualifiers and data qualifier definitions for each reported result.
4. Requested target analyte result units are reported.
5. Requested reporting limits for all samples are present and results at and below the requested (required) reporting limits are clearly identified (including sample detection limits if required).
6. Sampling dates (including times if needed), date and time of laboratory receipt of samples, and sample conditions upon receipt at the laboratory (including preservation, pH and temperature) are documented.
7. Sample results are evaluated by comparing sample conditions upon receipt at the laboratory (e.g., preservation checks) and sample characteristics (e.g., percent moisture) to the validation guidance.

*Stage 2 Verification and Validation Checks*

A minimum of 10 percent of the samples will be flagged for VUA. When a laboratory work order is selected, the entire work order will undergo Stage 2 validation. Laboratory work orders or sample delivery groups (SDGs) that are selected for VUA will undergo validation based on the NFGs.

The selection of samples that will undergo VUA process is designed to meet the needs of the site investigation, characterization, remediation, and closure programs, such as tank closures. Sampling that falls outside these programs will not undergo the VUA process. This includes samples that are collected for permit compliance, such as RCRA and effluent wastewater, as well as product samples, onsite soil reuse samples, and waste characterization samples.

Ten percent of samples will be selected based on the following additional conditions:

1. Sample package selected will contain a field duplicate sample.
2. Sample package selected will contain an equipment rinse blank.
3. Sample package selected will be representative of the contracted analytical laboratories, sample media, parameters, time, and project goals.

QC samples that are collected in the field will provide the best information for completing the VUA reports. The conditions for selection of samples are designed to provide the most useful information regarding sample analysis. Therefore, field duplicate samples have been identified as a priority condition. However, field duplicate samples will only be prepared for groundwater samples, not for soil sampling events. This is due to the known, inherent heterogeneity of soil at the sites. For program efficiency, entire SDGs will be selected for submission in the VUA process. Individual samples should not be selected and processed unless there is an overriding reason to do so, such as a point of compliance sample result that when compared to the historic data set appears to be anomalous.

Stage 2 data validation includes a review of the following QC data deliverables:

1. Technical holding times
2. Method blanks
3. Surrogate spikes
4. MS/MSD results
5. LCS results
6. Field duplicates

7. Trip and equipment rinse blank samples

*Stage 2B Verification and Validation Checks*

Stage 2B verification and validation will be completed on inorganic analytical data and will contain the following (in addition to Stage 1 verification):

1. Requested methods (handling, preparation, cleanup, and analytical) are performed.
2. Method dates (including dates, times and duration of analysis for radiation counting measurements and other methods, if needed) for handling (e.g., Toxicity Characteristic Leaching Procedure), preparation, cleanup and analysis are present, as appropriate.
3. Sample-related QC data and QC acceptance criteria (e.g., method blanks, surrogate recoveries, deuterated monitoring compounds (DMC) recoveries, laboratory control sample (LCS) recoveries, duplicate analyses, matrix spike and matrix spike duplicate recoveries, serial dilutions, post digestion spikes, standard reference materials) are provided and linked to the reported field samples (including the field quality control samples such as trip and equipment blanks).
4. Requested spike analytes or compounds (e.g., surrogate, DMCs, LCS spikes, post digestion spikes) have been added, as appropriate.
5. Sample holding times (from sampling date to preparation and preparation to analysis) are evaluated.
6. Frequency of QC samples is checked for appropriateness (e.g., one LCS per twenty samples in a preparation batch).
7. Sample results are evaluated by comparing holding times and sample-related QC data to the requirements in the data validation guidance.
8. Initial calibration data (e.g., initial calibration standards, initial calibration verification [ICV] standards, initial calibration blanks [ICBs]) are provided for all requested analytes and linked to field samples reported. For each initial calibration, the calibration type used is present along with the initial calibration equation used including any weighting factor(s) applied and the associated correlation coefficients, as appropriate. Recalculations of the standard concentrations using the initial calibration curve are present, along with their associated percent recoveries, as appropriate (e.g., if required by the project, method, or contract). For the ICV standard, the associated percent recovery (or percent difference, as appropriate) is present.
9. Appropriate number and concentration of initial calibration standards are present.

10. Continuing calibration data (e.g., continuing calibration verification [CCV] standards and continuing calibration blanks [CCBs]) are provided for all requested analytes and linked to field samples reported, as appropriate. For the CCV standard(s), the associated percent recoveries (or percent differences, as appropriate) are present.
11. Reported samples are bracketed by CCV standards and CCBs standards as appropriate.
12. Method specific instrument performance checks are present as appropriate (e.g., tunes for mass spectrometry methods, DDT/Endrin breakdown checks for pesticides and aroclors, instrument blanks and interference checks for ICP methods).
13. Frequency of instrument QC samples is checked for appropriateness (e.g., gas chromatography-mass spectroscopy [GC-MS] tunes have been run every 12 hours).
14. Sample results are evaluated by comparing instrument-related QC data to the requirements in the data validation guidance.

*Stage 3 Verification and Validation Checks*

Stage 3 verification and validation will be completed on organic analytical data and will contain the following (in addition to Stage 2B):

1. Instrument response data (e.g., GC peak areas, ICP corrected intensities) are reported for requested analytes, surrogates, internal standards, and DMCs for all requested field samples, matrix spikes, matrix spike duplicates, LCS, and method blanks as well as calibration data and instrument QC checks (e.g., tunes, DDT/Endrin breakdowns, interelement correction factors, and Florisil cartridge checks).
2. Reported target analyte instrument responses are associated with appropriate internal standard analyte(s) for each (or selected) analyte(s) (for methods using internal standard for calibration).
3. Fit and appropriateness of the initial calibration curve used or required (e.g., mean calibration factor, regression analysis [linear or non-linear, with or without weighting factors, with or without forcing]) is checked with recalculation of the initial calibration curve for each (or selected) analyte(s) from the instrument response.
4. Comparison of instrument response to the minimum response requirements for each (or selected) analyte(s).
5. Recalculation of each (or selected) opening and closing CCV (and CCB) response from the peak data reported for each (or selected) analyte(s) from the instrument response, as appropriate.

6. Compliance check of recalculated opening and/or closing CCV (and CCB) response to recalculated initial calibration response for each (or selected) analyte(s).
7. Recalculation of percent ratios for each (or selected) tune from the instrument response, as appropriate.
8. Compliance check of recalculated percent ratio for each (or selected) tune from the instrument response.
9. Recalculation of each (or selected) instrument performance check (e.g., DDT/Endrin breakdown for pesticide analysis, instrument blanks, interference checks) from the instrument response.
10. Recalculation and compliance check of retention time windows (for chromatographic methods) for each (or selected) analyte(s) from the laboratory reported retention times.
11. Recalculation of reported results for each reported (or selected) target analyte(s) from the instrument response.
12. Recalculation of each (or selected) reported spike recovery (surrogate recoveries, DMC recoveries, LCS recoveries, duplicate analyses, matrix spike and matrix spike duplicate recoveries, serial dilutions, post digestion spikes, standard reference materials etc.) from the instrument response.
13. Each (or selected) sample result(s) and spike recovery(ies) are evaluated by comparing the recalculated numbers to the laboratory reported numbers according to the requirements in the data validation guidance.

*Stage 4 Verification and Validation Checks*

Additional data validation may be completed for selected sites and/or sampling events, up to EPA Level 4 data review, which will require a laboratory data package inclusive of raw data. Stage 4 verification and validation includes all of the elements of the previous stages of validation and the following:

1. Evaluation of instrument performance checks (GC/MS)
2. Initial and continuing calibration checks (organic and inorganic analyses)
3. Review of internal standards (GC/MS)
4. Instrument blanks (inorganics)
5. Interference check samples (metals)
6. Recalculations of sample results and reporting limits

## 3.2 Validation Codes

Consultant specific validation codes will be added to the database. This will allow quick identification of the consultant that has performed the verification and/or VUA. Stantec may append additional codes for data management purposes to the codes provided in dt_result table approval_code field. Valid codes are as follows:

Langan:

- LAN1 – Historical data collected by Langan Level 1 Validation (Verification)
- LAN-VER – Langan performed verification
- LAN-USB – Langan performed usability

GHD:

- GHD-VER – GHD performed verification
- GHD-USB – GHD performed usability

Stantec:

- STN-VER – Stantec performed verification
- STN-USB – Stantec performed usability

This methodology creates a means for consultants to perform verification and usability on data collected by another consultant.

### 3.3 Data Updates in the Electronic Data Deliverables

All consultants will request EQuIS 4 file format Electronic Data Deliverables (EDDs) for data management from the analytical laboratories. In order to facilitate the data updates in the database, the following methodology will be used.

1. The consultant chemist / chemist team will open the .RES file for the EDD that has been selected to be validated for usability. The file can be opened using Excel, Access, Notepad, or similar tool. Although, it is a best practice to open the file in a way to preserve the textual nature of the EDD, it is not necessary.
2. The chemist will use the result_comment field in the .RES file to enter the qualifiers associated with the record and add a semicolon as a delimiter (;) followed by the reason code for the qualification.

3. The .RES file is to be saved with a .USB extension at the end of the file. This file is to be separate from the original .RES file provided and should not be used to over write the original .RES file that was sent with the EDD. This will result in the laboratory work order undergoing VUA having five files instead of four for the EDD. For example:
    - 1234.SMP
    - 1234.TST
    - 1234.BCH
    - 1234.RES
    - 1234.RES.USB
4. Stantec will use the fifth file to update the database with the appropriate qualifiers and codes in validator_qualifiers and approval_a through approval_d fields in dt_result table in the database.
5. Stantec will also change the validated y/n field in dt_result table in the database for the particular EDD.

## 3.4 Validation Qualifiers

The following qualifiers should be used during the validation/usability process. These are based on the NFGs, validation guidance, and commonly used qualifiers.

*Data Qualifiers and Definitions*

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

J The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

J+ The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample, potentially biased high.

J- The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample, potentially biased low.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

NJ The analyte has been "tentatively identified" or "presumptively identified" as present and the associated numerical value is the estimated concentration in the sample.

R The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.

B The analyte was detected in the method, field, and/or trip blank. This qualifier is not pursuant to the NFGs.

If additional qualifiers are required, please forward the suggestions to the Stantec Data Management Team and they will be added to the list of approved codes.

*Submitting Data and Validation Codes for Inclusion in the Database*

EDDs will be submitted to the database using the SharePoint portal intake forms. The appropriate qualifiers and codes that have been added to the result_comment field in the .RES.USB file will be included in the submission.

*Reason Codes*

Following is a list of reason codes available for validation. If additional codes are required, please forward the suggestions to the Stantec Data Management Team and they will be added to the list of approved codes.

| Reason Code | Reason Description |
|---|---|
| **General Use** | |
| EC | Result exceeds the calibration range. |
| HT | Holding time requirement was not met |
| MB | Method blank or preparation blank contamination |
| LCS | Laboratory control sample evaluation criteria not met |
| FB | Field blank contamination |
| RB | Rinsate blank contamination |
| SQL | The analysis meets all qualitative identification criteria, but the measured concentration is less than the reporting limit. |
| FD | Field duplicate evaluation criteria not met |
| TvP | Total to Partial criteria not met |
| RL | Reporting limit exceeds decision criteria (for non-detects) |
| **Inorganic Methods** | |
| ICV | Initial calibration verification evaluation criteria not met |
| CCV | Continuing calibration verification evaluation criteria not met |
| CCB | Continuing calibration blank contamination |
| PB | Preparation Blank |
| ICS | Interference check sample evaluation criteria not met |
| D | Laboratory duplicate or spike duplicate precision evaluation criteria not met |
| MS | Matrix spike recovery outside acceptance range |
| PDS | Post-digestion spike recovery outside acceptance range |
| MSA | Method of standard additions correction coefficient _0.995 |
| DL | Serial dilution results did not meet evaluation criteria |
| **Organic Methods** | |
| TUNE | Instrument performance (tuning) criteria not met |
| ICAL | Initial calibration evaluation criteria not met |
| CCAL | Continuing calibration evaluation criteria not met |
| SUR | Surrogate recovery outside acceptance range |
| MS/SD | Matrix spike/matrix spike duplicate precision criteria not met |
| MS | Matrix spike recovery outside acceptance range |
| IS | Internal standard evaluation criteria not met |
| LM | The PFK lock mass SICPs indicate that ion suppression evident |
| ID | Target compound identification criteria not met |
| **Results Reported for Analytes Analyzed Multiple Times** | |
| NSR | Not selected for reporting because the result was qualified as unusable |
| NSDL | Not selected for reporting because diluted resulted was selected for reporting |
| NSQ | Not selected for reporting because result was lesser quality based on data validation |
| NSO | Not selected for reporting because of other reason |
| **Bias Codes** | |
| H | Bias in sample result likely to be high |
| L | Bias in sample result likely to be low |
| I | Bias in sample result is indeterminate |

## 3.4 Verification and Validation Summary

Verification of sample collection procedures will consist of reviewing sample collection documentation for compliance with the requirements of the site-specific work plan and this QA/QC Plan. If alternate sampling procedures were used, the acceptability of the procedure will be evaluated to determine the effect on the usability of the data. Data usability will not be affected if the procedure used is determined to be an acceptable alternative that fulfills the measurement performance criteria in this QA/QC Plan.

The results of the data verification and validation procedure will identify data that do not meet the measurement performance criteria of this QA/QC Plan. Data verification and validation will determine whether the data are acceptable, of limited usability (qualified as estimated), or rejected. Data qualified as estimated will be reviewed and a discussion of the usability of estimated data will be included in the VUA report.

Data determined to be unusable may require corrective action to be taken. Potential types of corrective action may include resampling by the field team or reanalysis of samples by the laboratory. The corrective actions taken are dependent upon the ability to mobilize the field team and whether or not the data are critical for project data quality objectives to be achieved. Data use limitations will be identified in VUA report, which will be generated as required for characterization or final reporting to the agencies. Each consultant will be responsible for their own VUA reports.

*Revision History*

| Revision | Description | Prepared By | Date |
|---|---|---|---|
| 1.0 | Initial creation of document as SOP for VUA | Stantec (Gus Sukkurwala/Jennifer Menges/Andrew Bradley) | 5/31/2015 |
| 2.0 | Incorporation into QA/QC Plan | GHD (Colleen Costello) | 3/21/2016 |
| 3.0 | Inclusion of Field Procedures. Edits from Langan (Emily Strake & Kevin McKeever) | Stantec (Jennifer Menges) | 5/13/2016 |
| | | | |

# APPENDIX A
# EVERGREEN FIELD PROCEDURES MANUAL

# Evergreen
# Field Procedures Manual

## Sunoco Partners Marcus Hook Industrial Complex and Philadelphia Energy Solutions (PES) Philadelphia Refinery Complex

**Evergreen Resources Management Operations**

**May 20, 2016**

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# 1.0 INTRODUCTION

This Field Procedures Manual outlines the standard operating procedures developed to ensure the collection and analysis of quality data for investigations completed under the United States Environmental Protection Agency (USEPA) Resource Conservation and Recovery Act (RCRA) program, Pennsylvania Department of Environmental Protection (PADEP) Act 2 program and Pennsylvania and Delaware's Tank programs at the Sunoco Partners Marketing and Terminals, LP (Sunoco Partners) Marcus Hook Industrial Complex (MHIC) and the Philadelphia Energy Solutions Refining and Marketing, LLC (PES) Philadelphia Refinery Complex (PRC) on behalf of Evergreen Resources Management Operations (Evergreen). The MHIC and PRC are herein referred to as facility or site.

Evergreen's consultants collect data in pursuit of site characterization and remediation that will meet the expectations of the appropriate regulatory agencies. This document shall be used in conjunction with the site-specific work plans developed for each site and the QA/QC Plan of which this manual was incorporated as Appendix A.

## *1.1 Training Qualifications*

All field personnel involved in field work at MHIC and the PRC shall have completed and where applicable, be current with OSHA 40-hour HAZWOPER training, annual OSHA 8-hour HAZWOPER refresher, Process Safety Management (PSM) training, site-specific safety module training for current facility badges (including fire watch and hole watch, if required), TWIC Card, annual drug screening, and annual respirator fit testing. All field personnel new to the facility should be provided with onsite health and safety (H&S) orientation by an experienced member of the project team. The onsite orientation should include review of the facility's emergency action plan and training on Evergreen and site-specific H&S requirements. Appropriately qualified personnel should perform field work, based on the work scope and experience level required by the task to be executed.

## *1.2 Health and Safety Requirements*

All consultants performing work at the referenced sites on behalf of Evergreen shall comply with the *Evergreen Resources Management Operations Health and Safety Requirements* dated June 1, 2014. This includes contractors, sub-contractors, and third party companies performing

work for Evergreen at MHIC and the PES PRC. Each consultant must also have their own site-specific health and safety plan (HASP) submitted to and approved by Evergreen prior to performing any work. A site-specific HASP must be reviewed and signed by all field personnel prior to commencement of field activities.

### *1.3 PPE Requirements*

The minimum standard PPE at the facilities includes fire resistant clothing (FRC; coveralls may be Nomex or other FRC, 6 ounce minimum, orange in color) with the name of the company displayed on the back of the garment, hard hat, sturdy safety-toe boots, safety glasses, long-gauntlet leather gloves, and personal $H_2S$ monitors. Nitrile gloves for chemical protection and hearing protection may also be required depending on the location and type of work. Workers are to be trained on these PPE requirements before being permitted onsite. An appropriate respirator may be required if site-specific air monitoring action levels are met, in accordance with the site-specific HASP. If a worker has a particular sensitivity or concern, a respirator may be worn regardless of OSHA action levels. During winter weather conditions, slip prevention footwear such as crampons or overshoes should be worn for traction. Task-specific PPE will be further identified in following sections.

### *1.4 Site Controls*

Safety cones and/or caution tape should be used in high traffic areas. The "Buddy System" may also be employed in high traffic areas, in areas where other contractors are working, and in remote areas. Additional task-specific site controls will be detailed in following sections.

### *1.5 Equipment and Decontamination*

Numerous practices are employed throughout the processes of site investigation and sampling to assure the integrity of the resulting data. The risk in use of non-dedicated equipment at multiple sampling locations lies in the potential for cross-contamination. While the threat of cross-contamination is always present, it can be minimized through the implementation of a consistent decontamination program during sensitive site measurement and data collection activities.

All site equipment to be used in multiple locations (non-dedicated) for sampling of soil, sediment, and/or groundwater will be decontaminated immediately prior to initial use and between uses at each location according to the following steps:

- Remove particulates with a sorbent pad or towel and/or initial rinse with clean potable tap water;
- Wash equipment with clean sponge, soft cloth, or scrub brush as necessary in a solution of tap water/laboratory grade detergent (Alconox®, Liquinox®, or equivalent);
- Rinse with tap water;
- Rinse with deionized or distilled water; and
- Air dry for as long as possible.

Rinse water generated during decontamination procedures will be treated onsite by passing the water through a bucket or tube filled with activated carbon prior to discharge to the ground surface. Additional decontamination procedures may be appropriate depending on the task, and will be identified in the following sections, as applicable.

### *1.6 Documentation*

All site activities and conditions for characterization activities should be recorded by field personnel in a field computer (e.g., YUMA) using the EQuIS Data Gathering Engine (EDGE) application, or if necessary, a field book may be used. The entry shall include at a minimum, the date, time, weather conditions, location, personnel present onsite, field readings, sampling methodology, as well as additional comments or observations. Task specific observations which should also be recorded will be identified in the following applicable sections.

## 2.0 LIQUID LEVEL ACQUISITION (WELL GAUGING) PROCEDURES

### *2.1 Potential Hazards*

Traffic, pinch points, chemical (airborne and physical contact), and biological are all likely hazards to be encountered as well as slip/trip/fall potential during onsite well gauging activities. Additional hazards may be mentioned in the site-specific HASP and/or the daily job safety analysis (JSA).

### *2.2 Materials and Equipment Necessary for Task Completion*

Optical oil/water interface probe with a graduated measuring tape to 0.01 foot accuracy, decontamination supplies (laboratory-grade detergent, deionized or distilled water, appropriate containers, scrub brush, and sorbent pads or paper towels), socket set, flathead screwdriver (or pry bar or manhole cover lifter), clear bailers with string for confirmation of light non-aqueous phase liquids (LNAPL), if necessary, and air monitoring instruments (optional, based on previous site visits).

### *2.3 Methodology*

This task involves the deployment of an optical oil/water interface probe with a graduated measuring tape to 0.01 foot accuracy into a well (in most cases), recording the measurement, and decontaminating the probe. The recorded field measurements may then be utilized for one of several applications including: well sampling, water table gradient mapping, LNAPL occurrence, LNAPL thickness, and/or gradient mapping, and various testing procedures. Wells should be gauged in order of least to most contaminated, based on existing sampling data or LNAPL occurrence, to minimize the potential for cross-contamination between wells. If LNAPL is detected in a well that does not typically have LNAPL, it should be confirmed with a clear bailer.

The proper procedure for liquid level acquisition is as follows:

1) Decontaminate the optical oil/water interface probe with a graduated measuring tape to 0.01 foot accuracy prior to initial deployment, and again after each well measurement to prevent cross-contamination between wells.

2) If warranted, mark off a work area surrounding the well(s) to be gauged with safety cones and/or caution tape in order to protect personnel from auto traffic; the "Buddy System" may also be employed.

3) Where applicable, lift the manhole cover off of the well head (a screwdriver, pry bar, or manhole cover lifter may be used to lift the cover depending on the size of the manhole) or open protective well casing (stickup) and remove the well plug, if present.

4) Most wells should contain a mark or notch in the top edge of the casing from which normalized readings are to be measured (reference point elevation). Slowly lower the optical oil/water interface probe with a graduated measuring tape to 0.01 foot accuracy into the well until the instrument signals contact with liquid. Note whether or not the instrument's tone is indicative of the presence of free-phase LNAPL (commonly a solid tone), or water (commonly an oscillating or beeping tone). If LNAPL is present, record the depth at which LNAPL was first indicated to the nearest hundredth of a foot, as measured from the top of well casing mark/notch. Slowly lower the probe through the LNAPL until the instrument's tone changes to indicate the presence of water. Record the depth at which water was first indicated to the nearest hundredth of a foot. A clear bailer may be used to verify the existence or approximate amount and appearance of LNAPL. If no LNAPL is apparent, record the depth to water.

5) Retract the probe from the well and secure the well appropriately.

6) Note the date and time of measurement for gauging and record all measurements and observations in the field computer or, if necessary, in a field book for subsequent electronic data entry.

7) Decontaminate the probe in accordance with the decontamination procedure outlined in Section 1.5.

8) Clean up the work area, remove gauging equipment, and remove any traffic control devices.

## 3.0 GROUNDWATER MONITORING PROCEDURES

### *3.1 Potential Hazards*

Traffic, pinch points, chemical (airborne and physical contact), and biological are all likely hazards to be encountered as well as slip/trip/fall potential during onsite well gauging activities. Additional hazards may be mentioned in the site-specific HASP and/or the daily JSA.

### *3.2 Materials and Equipment Necessary for Task Completion*

A list of equipment required to access, gauge, purge, and sample site monitoring wells is presented below. Also listed are materials necessary to store, label, preserve, and transport groundwater samples.

- Current site map detailing well locations;
- Field book and/or field computer for recording site data;
- Graduated, optical oil/water interface probe;
- Keys and tools to provide well access;
- Appropriate, laboratory prepared sample containers and labels;
- Appropriate well purging apparatus as determined by volume of groundwater to be purged and compounds to be analyzed;
- Water quality meter for monitoring indicator field parameters (DO, pH, specific conductance, redox potential, and turbidity if available);
- Dedicated polyethylene bottom-loading bailer or well pump and disposable tubing for groundwater sample collection;
- Clean nylon or polypropylene bailer cord;
- Disposable nitrile sampling gloves;
- Decontamination supplies;
- Calibrated five-gallon bucket and watch or stopwatch to determine discharge rate during purging;
- Blank chain-of-custody forms; and

- Cooler(s) and ice for sample preservation.

### *3.3 Methodology for Three Well Volume Sampling*

Prior to site visitation for the groundwater sampling event, the following data will be reviewed to ensure proper preparation for field activities:

- Most recent liquid level data from all wells;
- Most recent analytical data from all wells to determine gauging and sampling sequence; and
- Well construction characteristics.

Each monitoring well to be sampled will be gauged to obtain liquid level data immediately prior to initiation of the sampling process (refer to well gauging procedures above). Liquid level data should be recorded in a field computer or if necessary, a field book. Should free-phase LNAPL be detected by the gauging process, routine groundwater sampling will not be conducted at that location. If groundwater sampling under LNAPL is warranted, refer to the sub-LNAPL sampling section and methodology in Section 3.6.

Groundwater sampling will be initiated by purging from the well a minimum of three well volumes, except in cases where the well is pumped dry, as referenced below. Well purging is performed to remove stagnant water and to draw representative water from the aquifer into the well for subsequent sampling and analysis. In extreme cases where a well is pumped dry and/or shows little recharge capacity, the well should be evacuated once prior to sampling. Wellbore storage volume should be estimated using as-built information stored in the field computer or as indicated on the well log, and the depth to water measurement obtained immediately prior to sampling.

Water quality should be monitored and readings recorded in the field computer or field book while purging, typically through use of a multi-parameter water quality meter with a flow through cell or cord for down-well measurements. Water quality readings should be recorded a minimum of three times (pre-purge, during purge, and post-purge/sample collection) or four times (pre-purge and following each well volume). The parameters to be monitored and recorded are

dissolved oxygen, pH, specific conductance, redox potential, temperature, and turbidity if available.

Well purging can be performed with various equipment including: a dedicated bailer for hand bailing low volumes of water; a surface mounted electric centrifugal pump with dedicated polyethylene tubing; and/or submersible pump (particularly when the depth to water is greater than 20 feet) with dedicated polyethylene tubing. During pumping, the intake will be placed directly below the static water surface and slowly lowered during the purging process. This procedure may not be necessary in low-yielding wells but is important in high-yielding, permeable strata where an intake initially placed deep in a well may draw laterally and have little influence in exchanging water from shallower depths within the well bore.

Flow rate during well purging will be approximated by the bucket and stop watch method. The duration of pumping required to remove three well volumes will be calculated directly from this flow rate. All fluids removed during purging will be treated onsite with activated carbon or in accordance with an approved work plan.

The sequence of obtaining groundwater samples will be based upon available historical site data for existing wells and photoionization detector (PID) readings for newly installed wells. Monitoring wells will be sampled in order of those having the lowest to highest concentration of constituents of concern (or PID readings for new wells), based upon the most recent available set of laboratory analyses, to reduce the potential for cross-contamination. For general monitoring events, groundwater samples will not be obtained for analysis from any well containing measurable free product. If groundwater sampling under LNAPL is warranted, refer to the sub-LNAPL sampling section and methodology in Section 3.6.

The following sequence of procedures will be implemented for the collection of groundwater samples from monitoring wells.

1) Establish a clean work area where sampling equipment will not come in contact with the ground or any potentially contaminated surfaces.
2) Use a dedicated polyethylene sampling bailer for each well.
3) Use a clean pair of nitrile gloves.

4) Attach an appropriate length of unused, clean nylon or polypropylene cord to the designated sampling bailer.

5) Select appropriate laboratory-provided sample containers.

6) Slowly lower sampling bailer into well until water surface is encountered; continue to lower the sampling bailer into the standing water column to one foot below the water surface.

7) Retrieve bailer at a steady rate to avoid excess agitation.

8) Visually inspect bailed sample to ensure that no free product or organic detritus has been collected.

9) Uncap first designated sample vial and fill from bailer as rapidly as possible but minimizing agitation; secure septum and lid.

10) Inspect sealed sample for entrapped air; if air is present, remove the lid and gently top off sample in vial, seal and inspect. Repeat until no air is apparent.

11) Repeat Steps 9 and 10 for the remaining sample vials based on the laboratory and/or regulatory protocol.

12) Complete and attach labels to sample containers noting sample collector, date, time, and location of sample; record same data in field computer or field book.

13) Place samples in ice-filled cooler in such a manner as to avoid breakage. Samples will be maintained at a temperature of approximately 4°C.

14) Dispose of gloves, bailer, and bailer cord as solid waste and move to next sample location.

### *3.4 Methodology for Low-Flow Purging and Sampling*

For wells that will be purged and sampled via low-flow methodology, the USEPA Region III Bulletin QAD023: *Procedure for Low-Flow Purging and Sampling of Groundwater Monitoring Wells* will be followed. The following data will be reviewed for each well in order to set the pump intake for the low-flow sampling:

- Soil boring lithologic log;
- Well construction log showing the screened interval;
- Identification of the most permeable zone screened by the well;
- Approximate depth to static water;

- Proposed pump intake setting; and
- Technical rationale for the pump intake setting, preferably across from the most impacted/contaminated subsurface interval.

Adjustable rate, submersible, bladder pumps in conjunction with polyethylene tubing for purging and sampling will be used. An alternate set up could include a stainless steel submersible pump, such as a Hurricane® pump or a Monsoon® pump with dedicated polyethylene tubing. The tubing diameter will be between 3/16-inch and ½-inch inner diameter and the length of the tubing extended outside of the well should be minimized. Flow-through cells will be used to monitor groundwater quality parameters during sampling. Monitoring well information, equipment specifications, water level measurements, parameter readings, and other pertinent information will be recorded during well purging and sampling.

The following sequence of procedures will be implemented for the collection of groundwater samples from monitoring wells by the low-flow methodology.

1) PID Screening of Well: A PID measurement may be collected at the rim of the well immediately after the well cap is removed and recorded in the field computer or field book, if historic data is not available.
2) Depth to Water Measurement: A depth to water measurement will be collected and recorded. To avoid disturbing accumulated sediment and to prevent the inadvertent mixing of stagnant water, measuring the total depth of the well should be done at the completion of sampling.
3) Low Stress Purging Startup: Water pumping will commence at a rate of 100 to 400 milliliters per minute (mL/min). This pumping should cause very little drawdown in the well (less than 0.2-0.3 feet) and the water level should stabilize. Water level measurements are made frequently, and flow rate will be recorded in mL/min on the sampling form or field computer.
4) Low Stress Purging and Sampling: The water level and pumping rate will be monitored and recorded every five minutes during purging, and any pumping rate adjustments will be recorded. During the early phase of purging, emphasis will be placed on minimizing and stabilizing pumping stress, and recording any necessary adjustments. Adjustments, when necessary, will be made in the first 15 minutes of purging. If necessary, pumping rates will

be reduced to the minimum capabilities of the pump to avoid well dewatering. If the minimal drawdown exceeds 0.3 feet, but the water level stabilizes above the pump intake setting, purging will continue until indicator field parameters stabilize, as detailed in Step 5 below. If the water level drops below the pump intake setting at the absolute minimum purge rate, the pump will remain in place and the water level will be allowed to recover repeatedly until there will be sufficient water volume in the well to permit the collection of samples.

5) Indicator Field Parameter Monitoring: During well purging, indicator field parameters (DO, pH, specific conductance, redox potential, and turbidity if available) will be monitored every five minutes (or less frequently, if appropriate). Purging will be considered complete and sampling can commence when all the indicator field parameters have stabilized. Stabilization will be achieved when three consecutive readings, taken at five minute intervals (or less frequently, if appropriate), are within the following limits:
    - DO (±10 percent);
    - turbidity (±10 percent);
    - specific conductance (±3 percent);
    - pH (± 0.1 unit); and
    - redox potential ([Eh] ±10 mv).

    Temperature and depth to water will be also monitored during purging. Should any of the parameter-specific components of the water quality meter fail during monitoring, the sampling team will attempt to locate a replacement multi-meter or individual criteria meter. If none are available, the sampling team will continue recording the parameters that are operational, and proceed with the sampling. Any other field observations relating to sample quality, such as odor, foaming, effervescence, and sheens, will also be recorded in the field computer or on the sampling form.
6) Collection of Ground Water Samples: Water samples for laboratory analyses will be collected prior to the flow-through cell by either using a bypass assembly or by temporarily disconnecting the flow-through cell. All sample containers will be filled by allowing the pump discharge to flow gently down the inside of the container with minimal turbulence. During purging and sampling, the tubing should remain filled with water in order to minimize possible changes in water chemistry upon contact with the atmosphere. Methods employed to ensure that the outlet tubing will be filled include adjusting the tubing angle upward to

completely fill the tubing and restricting the diameter of the tubing near the outlet of the tubing.

The order in which samples will be collected is as follows:

- Volatile organics;
- Gas sensitive (e.g., $Fe^{+2}$, $CH_4$, $H_2S$/HS);
- Base neutrals or PAHs;
- Total petroleum hydrocarbons;
- Total metals;
- Dissolved metals;
- Cyanide;
- Sulfate and chloride;
- Nitrate and ammonia;
- Preserved inorganic;
- Non-preserved inorganic; and
- Bacteria.

After the appropriate laboratory-provided glassware is filled and labeled, the samples shall be placed in an ice-filled cooler and maintained at approximate 4°C for submittal to the laboratory. Upon completion of sampling at the well, decontaminate non-dedicated equipment in accordance with the decontamination procedure outlined in Section 1.5, and dispose of all dedicated equipment (gloves, tubing, etc.) as solid waste before moving to the next location.

### *3.5 Methodology for Passive (No-Purge) Sampling for Groundwater Collection*

There are many passive groundwater sampling devices that allow for accurate sample collection without purging. Each device has specific uses and conditions for which they are more applicable. This methodology presents details for the use of HydraSleeve samplers.

The HydraSleeve is a disposable, single use device for the collection of representative groundwater samples for laboratory analysis of physical and chemical parameters.

HydraSleeves are placed within the screened interval (or other defined interval) of the well and activated after an equilibrium period. When used according to the manufacturer's instruction, the HydraSleeve will collect a groundwater sample without purging, thus causing no drawdown, agitation, or water column mixing. The HydraSleeve collects a sample from the screened interval only, and excludes water (or other fluids) from other parts of the well by use of check valve that seals when the sampler is full. The HydraSleeve takes advantage of the continuous natural movement of groundwater, which produces an equilibrium condition between the water in a well screen and the adjacent formation. HydraSleeves produce reliable data from low yield wells where other sample methods cannot due to well screen dewatering and associated alteration in water chemistry.

The HydraSleeve consists of the following components:

1) A long (usually 3 to 5 feet), flexible, lay-flat polyethylene sample sleeve, which is sealed at the bottom, and is equipped with a reed valve at the top allowing water to enter the HydraSleeve only during active sample retrieval.
2) A reusable, stainless steel weight attached with a clip to the bottom of the sleeve. The weight is used to carry the sample sleeve down the well to the specified depth (usually the bottom of the well screen). An optional top weight is also available to compress the sleeve in wells with short well screens.
3) A tether line attached to a spring clip at the top of the sample sleeve to deploy the device within the well and later retrieve it for sample collection.
4) A discharge tube is supplied with the device, which is used to puncture the wall of the sleeve after it is recovered to allow direct filling of sample bottles.

Deployment

Upon retrieval, the HydraSleeve is designed to effectively collect a "core" of water from within the well screen, which is equivalent in length and diameter to the sample sleeve. The upward motion opens the valve at the top, which then allows the device to fill with water. The Hydrasleeve should be installed with the top of the sample sleeve as close to the desired sample interval as possible. This will allow the sampler to fill and the check valve to close before the top of the device is pulled past the top of the sample interval.

To assemble and deploy the HydraSleeve:

1) Remove the Hydrasleeve from its package and hold it by the top, pinching the top at the holes.
2) Attach the spring clip and tether in the holes.
3) Slide the clip and bottom weight assembly into the holes at the bottom of the sleeve.
4) Lower the Hydrasleeve by the tether to the bottom or to the specified depth and secure the tether at the wellhead (Note: do not pull the HydraSleeve upward at any time during deployment, as this could cause the check valve to open and water to fill the sleeve inadvertently).

Sample Collection

Although the HydraSleeve only displaces approximately 100 milliliters (ml) of water during deployment, the well should be allowed to stabilize prior to sample collection so that natural flow conditions and contaminant distribution can return to equilibrium conditions. In certain jurisdictions, regulatory directives may prescribe a minimum equilibration period. When used for periodic monitoring programs, such as quarterly or semi-annual sampling, the HydraSleeve can be installed and remain in the well until the next sampling event, thus providing ample time for the well to equilibrate.

To collect a sample:

1) Be sure the tether is secured to the top of the well.
2) In one smooth motion, pull the tether upward at a rate of approximately 1 foot per second. The weight of the sampler will be felt when the valve closes. Continue pulling upward until the HydraSleeve is clear of the well.
3) Discard the water trapped at the top of the HydraSleeve above the reed valve.
4) Hold the HydraSleeve at the reed valve, and puncture the sleeve with the discharge tube just below the reed valve.
5) Decant the water into sample containers.
6) Discard the HydraSleeve as solid waste and process the excess water through activated carbon prior to discharge to the ground surface.

The weight and clips should be decontaminated prior to deploying a replacement HydraSleeve in the well. Tethers can be dedicated to individual wells or decontaminated and reused.

### *3.6 Methodology for Sub-LNAPL Sampling*

The following section describes the methodology used for obtaining groundwater samples from the water column beneath LNAPL. Wells for sub-LNAPL sampling are not purged of three well volumes prior to sampling. This will prevent the potential of drawing LNAPL into the sample and to be representative of steady-state groundwater conditions beneath the LNAPL.

The following data will be reviewed for each well in order determine the appropriate equipment necessary:

- Well construction log showing diameter and total depth of the well;
- Approximate depth to LNAPL; and
- Approximate depth to static water.

A list of equipment for sub-LNAPL sampling is presented below:

- Field book or field computer for recording site data;
- Optical oil/water interface probe with a graduated measuring tape to 0.01 foot accuracy;
- Keys and tools to provide well access;
- Peristaltic pump;
- Polyethylene tubing specifications of 0.25-inch outer diameter x 0.17-inch inner diameter is preferable as this small diameter assists in achieving lower flow rates;
- Silicone tubing of appropriate diameter to operate peristaltic pump;
- Polyvinyl chloride (PVC) drop tube (1.5-inch or other appropriate diameter);
- PVC rod (0.5-inch or other appropriate diameter);
- PVC end cap for drop tube;
- Tether for end cap;
- Clamps for securing drop tube to well casing;
- Appropriate sample containers and labels;

- Decontamination supplies;
- Blank chain-of-custody forms; and
- Cooler and ice for sample preservation.

The following sequence of procedures will be implemented for the collection of sub-LNAPL groundwater samples.

1) Determine LNAPL Thickness: Use an optical oil/water interface probe with a graduated measuring tape to 0.01 foot accuracy to collect depth to LNAPL and depth to water measurements.
2) Installing Sampling Equipment: Deploy a 1.5-inch (or other appropriate diameter) PVC pipe (drop tube), with an attached end cap, through the LNAPL layer in the well. The end cap should be tethered to the drop tube so it is not lost in the well when removed and in a way that allows the drop tube to be sealed during installation. Lower the drop tube until the bottom of the tube is approximately two feet into the water column below the bottom of the LNAPL. Secure the drop tube to the well, and allow the system to equilibrate, approximately one half hour. The end cap is then removed by inserting a 0.5-inch (or other appropriate diameter) PVC rod into the drop tube and pushing on the cap until the lid is removed. The cap will be removed along with the tube upon completion of sampling.
3) Collection of Groundwater Samples: Lower polyethylene tubing through the 1.5-inch drop tube into the water column. Connect the polyethylene tubing to silicon tubing and engage the peristaltic pump for groundwater retrieval. Set the flow rate to the lowest pumping rate that can be sustained so that the LNAPL is not drawn into the tubing. Begin collecting groundwater in the sample container and continue until enough volume is obtained for all bottleware required by the laboratory for the requested analyses.

### *3.7 Decontamination Requirements*

Of particular significance to the procedures of groundwater measurement and sampling is the limitation, whenever possible, of materials inserted into a well bore and, even more importantly, of materials transferred from well to well.

Many items can be discarded between well sampling and/or gauging locations without significantly impacting project costs. Dedicated sampling equipment which can be discarded

between well sampling locations, will be used whenever possible to preclude decontamination requirements. Sampling equipment included in this category are polyethylene bailers, bailer cord, nitrile gloves, and sampling tubing. However, other monitoring and sampling equipment, such as oil/water interface probes and submersible sampling pumps, must be reused from well to well.

All site equipment to be used in multiple locations (non-dedicated) for gauging and/or sampling of groundwater will be decontaminated immediately prior to initial use and between uses at each location according to the following steps:

- Remove particulates with a sorbent pad or towel and/or initial rinse with clean potable tap water;
- Wash equipment with clean sponge, soft cloth, or scrub brush as necessary in a solution of tap water/laboratory grade detergent (Alconox®, Liquinox®, or equivalent);
- Rinse with tap water;
- Rinse with deionized or distilled water; and
- Air dry for as long as possible.

Rinse water generated during decontamination procedures will be treated onsite by passing the water through a bucket filled with activated carbon prior to disposal.

### *3.8 Documentation*

All site activities and conditions at the time of purging and groundwater sampling should be recorded by field personnel in a field computer via the EDGE application or, if necessary, a field book may be used. The entry shall include the date, time, weather conditions, location (well name), personnel present onsite, PID readings, sampling methodology, purge rate, purge volume, and the aforementioned groundwater indicator parameters. A field qualifier “SL” shall be applied to each sub-LNAPL sample entry to denote sample collection as sub-LNAPL. Additional comments or observations (e.g., well damage, nearby pumping, LNAPL sheen) should also be recorded.

## 4.0 SOIL SAMPLING & WELL INSTALLATION PROCEDURES

### *4.1 Site Controls*

Prior to hand augering, hydroexcavation, utilizing a backhoe, or deploying any drilling apparatus to the site, an underground utility line protection request must be made (i.e., Pennsylvania One Call) for mark-out of known subsurface utilities and associated laterals proximal to the drilling location. Site plans, if available, should be reviewed to document and avoid the location of onsite utilities.

After review of all known mapped and marked utilities, a site reconnaissance will be performed to document the location of utility meters and storm sewer drains. In addition, the location of overhead utilities must be documented. After completing the subsurface and overhead utility review, the area to drill may be considered clear of utilities, or the location may be adjusted to a nearby location, which must also be cleared.

Lastly, any drilling activities must be preceeded by clearing of the borehole, prior to advancement of augers or split spoons. To ensure the safety of workers, the borehole will be cleared by hand, hydroexcavator, or backhoe to a depth of approximately 8 feet below ground surface.

### *4.2 Potential Hazards*

Traffic, pinch points, chemical (airborne and physical contact), and biological are all likely hazards to be encountered during soil sampling and well installation, as well as slip/trip/fall potential. Drilling is considered a high risk activity which requires facility approval prior to implementation. Additional hazards are identified in the site-specific HASP and/or the daily JSA.

### *4.3 Materials and Equipment Necessary for Task Completion*

A list of equipment required to oversee test boring advancement and, where applicable, sample soil is presented below. Also listed are materials necessary to store, label, preserve, and transport soil samples.

- Current site map detailing well locations;
- Field computer and/or field book for recording site data;

- Appropriate, laboratory prepared sample containers and labels;
- PID;
- Single-use, disposable plastic scoops or stainless steel scoop for collecting soil samples;
- Single-use, disposable, laboratory-supplied syringes for soil sample collection (if applicable);
- Scale for weighing samples (e.g., methanol kits, if necessary);
- Disposable nitrile sampling gloves;
- Measuring tape (for measuring core recovery);
- Munsell soil color chart/book (recommended);
- Decontamination equipment (if applicable);
- Blank chain-of-custody forms; and
- Cooler(s) and ice for sample preservation.

### *4.4 Decontamination Requirements*

All down-hole drilling equipment must be steam cleaned prior to drilling at each soil boring or well location. All soil sampling equipment must be cleaned with detergent and rinsed with deionized or distilled water prior to deployment into the borehole. All well construction materials (i.e. PVC well casing, PVC well screen, sand pack, bentonite) should be clean and dedicated to each borehole.

### *4.5 Methodology for Soil Boring Installation*

#### 4.5.1. Borehole Advancement

During test drilling activities, a borehole is advanced into the subsurface via a rotary or direct-push drilling technique. Various types of drilling methods could be deployed at these facilities to advance the borehole and gain access to the subsurface for characterization and sampling. A description of the most commonly utilized drilling methods is included below:

#### 4.5.1.1 Hollow Stem Auger

A hollow, steel pipe (available diameters vary) with welded, exterior steel "flights" is used to convey subsurface material to the surface when rotated clockwise. A bit at the bottom of the lead auger cuts into the subsurface material, and the rotation conveys the loosened material (cuttings) up the flights, allowing the hole to be advanced (cuttings may not always return to the surface, such as when drilling in soft, saturated materials). The hollow center of the auger allows the driller to access the subsurface for soil sample collection and, where applicable, well installation during borehole advancement. During borehole advancement, a center stem of steel rods connected to an auger plug prevent soil cuttings from entering the drill column. Once a desired drilling depth is reached, the center plug and rods can be pulled out, leaving the auger stem in place to prevent borehole collapse. A split-spoon sampler can be threaded onto the rods in place of the plug and driven via a hammer to obtain a sample (Standard Penetration Test), or if terminal depth has been reached a monitoring well could be installed through the augers.

#### 4.5.1.2 Air and Mud Rotary

Rotary drilling methods are similar to hollow stem auger drilling, however specialized drilling bits at the bottom of rods are used to cut into the subsurface material using compressed air, vibration, and/or pressurized drilling mud. Compressed air or mud is forced through the drilling rods via an air compressor or pump, and escapes through small holes in the drill bit. The circulation of drilling mud, or air combined with introduced water or formation water, conveys the soil cuttings to the surface (while also cooling the drilling bit and preventing borehole collapse).

#### 4.5.1.3 Geoprobe®

A direct-push drilling method, Geoprobe® sampling utilizes a hydraulic hammer to drive steel rods into the subsurface for soil sampling. This method advances a core barrel lined with a plastic Macro-Core® sleeve into the soil column for continuous soil core collection.

#### 4.5.1.4 Hand Auger

A stainless steel or aluminum hand auger is physically advanced to a desired soil sampling depth through rotation of the auger and head.

### 4.5.2 Soil Sampling

Soil samples will be obtained for lithologic logging and where appropriate, for laboratory analysis with one of three different sampling devices: Split barrel spoon sampler, hand auger, or Geoprobe® soil sampler. For either method, the sampling devices are lowered through the hollow-stem augers or open borehole to allow sampling of undisturbed sediments below the bit or drive shoe. Soil samples will be collected at regular intervals for subsurface characterization and selection of appropriate well screen interval(s). Soils which appear to be visually impacted or from intervals which exhibit the highest deflections on the screening device (PID or similar) will be sampled for laboratory analysis in accordance with an approved sampling plan.

#### 4.5.2.1. Split barrel spoon sampler (split spoon)

The split spoon sampler will be driven into the soil column in accordance with ASTM Standard Method D1586 (Reference A6, Appendix E). Soil sampling by split spoon is characterized by drilling a borehole with a hollow-stem auger to the desired sampling depth (the standard calls for one sample per five foot depth interval). The split spoon sampler is attached to the drilling rods after removal of the auger plug. The drill operator will drive the sampler into the undisturbed soil by repeatedly striking the drilling rods with a 140 pound safety hammer over a 30 inch drop. Field personnel will record the number of blows required to drive the split spoon sampler for each successive six-inch interval. After the sampler has been filled, the driller will remove the rods and sampler from the borehole and should provide the intact sampler to field personnel for opening (the drive shoe and head can be loosened). Field personnel should split the spoon, scan with PID, measure sample recovery, thoroughly describe the soil lithology, note visual observations and odors, note degree of saturation, and where applicable collect soil sample(s) utilizing a stainless steel or disposable scoop. An approved, retractable knife may be used to trim the top and edges of the sample, and once prepared the sample should be containerized in appropriate sample containers.

#### 4.5.2.2. Geoprobe®

The Geoprobe® operator will advance the drilling rods into the subsurface using a truck or track-mounted drill with a hydraulic hammer. A dedicated Geoprobe® Macro-Core® liner is

inserted into the core barrel to collect continuous core samples, usually one per 4 foot interval. The Geoprobe® operator will remove the soil filled liner from the core barrel, cut the liner, and provide field personnel with the intact cores. After retrieval of the sample, the liner may be removed by field personnel and the soil core should be scanned with a PID and logged, including documentation of core recovery, soil lithology, visual observations and odors, and degree of saturation. Where applicable, field staff should remove the soil sample utilizing a stainless steel or disposable scoop and containerize in an appropriate sample container.

#### 4.5.2.3. Hand Auger

The self-powered hand auger allows for soil from the desired interval to be collected directly through removal of the soil sample that is collected in the auger head for every six inches of advancement.

### *4.6 Methodology for Leaded Tank Bottoms Soil Sampling*

Leaded tank bottom material is described as containing materials distinguished by distinctive rust/red to black, metallic, mostly oxidized scale materials, sometimes in a matrix of petroleum wax sludge. The approach for identifying leaded tank bottom materials is summarized below:

- If materials are encountered within the previously designated leaded tank bottom areas, matching the physical description given above for leaded tank bottoms, then samples should be collected for lead analysis.
- If total lead results are above the site-specific standard (SSS) for lead of 2,240 milligrams per kilogram (mg/kg) then samples should be analyzed for lead via Toxicity Characteristic Leaching Procedure (TCLP), EPA Test Method 1311.
- Delineated areas that exhibit soils that physically resemble leaded tank bottoms, exhibit lead concentrations greater than 2,240 mg/kg, and exceed 5 milligrams per liter (mg/l) for lead in the TCLP leachate (which is characteristically hazardous for lead) will retain the leaded tank bottom designation. If no soils are encountered that meet all three of these criteria, then the area will no longer be classified as a leaded tank bottom area.

## *4.7 Methodology for Monitoring Well or Recovery Well Installation*

### 4.7.1 Well Construction

After drilling to a desired terminal depth via any of the drilling methods referenced above, permanent monitoring wells can be installed to allow access to groundwater for future monitoring and groundwater sampling. In general, monitoring wells are constructed of pipe with a slotted interval(s) (screen) through which groundwater can flow into the well from a desired water-bearing stratum. In most cases, PVC materials are utilized for monitoring well construction.

- For applications where LNAPL thickness measurement is necessary, the screened interval should extend above the presumed highest groundwater level.
- For applications where the shallowest groundwater interval is to be monitored (e.g., water-table aquifer), a single well casing is installed.
- For applications where multiple water bearing strata will be penetrated and where deep groundwater conditions are selected for monitoring, a double-cased well may be installed to prevent the vertical migration of contaminants to the deeper water bearing zone from shallower zone(s).

Each well construction type and considerations for field staff regarding how many casings are needed have been provided below.

#### 4.7.1.1 Single Casing Construction

The most commonly installed monitoring well at the facilities have single casings and are constructed of PVC. To determine the length of screen used, seasonal groundwater table or tidal fluctuations should be considered to allow the water table to intercept the well screen throughout the year. Field personnel should advise the driller on the required well diameter, total well depth, screen interval, screen length, and slot size based on available subsurface information prior to drilling. Once the borehole is completed and the drilling crew has been advised on the desired construction, the drilling crew will thread the well screen onto an end cap at the wellhead and will lower the well into the borehole, adding lengths of casing until the terminal depth is reached.

While the well is held near the center of the borehole, the annular space between the well screen and formation is carefully backfilled with a sand filter pack, which consists of clean,

sorted quartz sand sized to the formation grain size (typically #1 or #2 sand). The sand pack establishes continuity with the formation and acts as a filter to prevent soil from entering the well (the well screen slot size should be sized according to the formation median grain size to mitigate sediment intrusion, however is most commonly available from suppliers as 0.01 or 0.02-inch diameter slot size).

The sand pack should extend one to two feet above the top of well screen, and care must be taken by the driller to not bridge the sand or overshoot the top of sand target depth (particularly when installing wells through the auger stem). Above the sand pack, a seal (grout) is installed in the annular space between the well casing and the soil. The seal is comprised of hydrated bentonite, sometimes amended with pellets or a grout consisting of hydrated Portland cement, bentonite powder, or a blend of the two. A conventional grout blend is 95% Portland cement and 5% bentonite powder. The purpose of the seal is to prevent surface water from infiltrating the well screen. It is installed from the top of the sand to one to two feet below ground surface.

In circumstances where the top of well sand terminates below the water table (e.g., deeper groundwater or submerged screen), grout should be mixed into a slurry at the ground surface and pumped via tremmie pipe or hose to prevent bridging. Above the well seal, the annular space can be backfilled with granular bentonite or concrete. A cement cap or well pad is placed at the surface to further mitigate potential infiltration of surface water. A locking, steel protective casing (stand pipe) or a locking, flush-mounted curb box should be installed to protect the well.

#### 4.7.1.2 Double Casing Construction

Construction of a double cased well is similar to that of a single case well; however, to prevent groundwater infiltration from shallower water bearing zones, a second casing is installed through a surface casing. This type of construction requires drilling two different diameter boreholes.

During drilling through the shallower groundwater bearing zone(s), a larger diameter borehole is drilled and should be sized according to the desired well and/or outer casing diameter. This may require reaming of the borehole depending on the conditions and

drilling equipment. An outer (surface) casing is installed and the annulus is grouted. After the outer casing is installed and the grout has set, the borehole is advanced through the surface casing with a smaller diameter drill stem and bit. When the desired terminal depth is reached, a monitoring well is installed through the inner casing using the above-referenced single casing construction procedure (the annular space between the outer and inner casings above the well filter sand should be pressure grouted).

### 4.7.2 Handling of Soil Cuttings

Soil cuttings generated during drilling will be containerized or stockpiled on plastic until sampling and analytical data can be obtained. Soil cutting final placement (onsite soil reuse or offsite disposal) will be performed in accordance with Pennsylvania Department of Environmental Protection (PADEP) approved onsite soil reuse plans for each facility.

### 4.7.3 Well Development

After installation, monitoring wells will be developed to remove residual soil from within the well and filter media and to establish communication between the well and formation. Pump and surge methodology, either through use of a ditch pump or air compressor connected to black polyethylene pipe and surge block, should be utilized to successively agitate relatively clear groundwater from the well. Surging should begin from the bottom of the screened interval and continue iteratively to the top of the well screen in approximately 2 to 4-foot intervals (i.e., pump and surge each 2 to 4 foot interval of well screen several times until relatively clear discharge water is maintained, then move up to the next screen interval until all of the screen has been developed).

Alternately, a submersible pump may be used to pump water from the screened interval of shallow wells, with the screen of the well surged to evacuate silt that remains in the sand pack. The well should be alternately surged and purged until groundwater flowing from the well appears relatively free of sediments. A vacuum truck may be used for development for wells that contains product. Well development water should be managed/treated in accordance with the site-specific work plan.

### *4.8 Documentation*

All site activities and conditions at the time of soil sampling, well installation, and well development should be recorded by field personnel in a field computer via the EDGE application or, if necessary, a field book may be used. The entry shall include the date, time, weather conditions, location (well or boring name), personnel present onsite, and the aforementioned lithologic data and well construction information. The entry shall include detailed data required to create representative soil boring lithologic logs and well as-built logs (if a well is constructed). This data should include but not be limited to soil type, soil texture (e.g., USCS), soil color, relative moisture content, depth of apparent water table, PID readings, blow counts (if split spoon samples are collected), sample recovery, total depth of borehole, length of well screen, length of well casing, sand pack interval, filter sand size, grout materials used, well seal interval, and all well construction materials. Notes should also include well development pumping rate, duration, and observations. Additional comments or observations should also be recorded, as appropriate.

# 5.0 LIGHT NON-AQUEOUS PHASE LIQUID (LNAPL) SAMPLING PROCEDURES

## *5.1 Potential Hazards*

Traffic, pinch points, chemical (airborne and physical contact), and biological are all likely hazards to be encountered during LNAPL sampling, as well as slip/trip/fall potential. Additional hazards may be mentioned in the site-specific HASP and/or the daily JSA. If significant amounts of LNAPL are being handled, a Tyvek suit should also be worn.

## *5.2 Materials and Equipment Necessary for Task Completion*

A list of equipment required to sample LNAPL from a monitoring well is presented below:

- Current site map detailing well locations;
- Field book or field computer for recording site data;
- Optical oil/water interface probe with a graduated measuring tape to 0.01 foot accuracy;
- Keys and tools to provide well access;
- Appropriate sample containers and labels. LNAPL samples will be collected in laboratory provided glassware with appropriate preservative, if applicable. A minimum of 10 ml is required for most laboratory analyses. In the case that sufficient volume is not obtained, a swabbing technique (described below) could be used;
- Sorbent pads (required for swabbing technique);
- Stainless steel or clear bottom-loading or top-loading bailer, depending on product thickness;
- Clean nylon or polypropylene bailer cord;
- Decontamination supplies;
- Blank chain-of-custody forms; and
- Cooler and ice for sample preservation.

### *5.3 Decontamination Requirements*

During LNAPL sampling activities, dedicated sampling equipment (i.e., clear bailers, nitrile gloves, and bailer cord) may be utilized; thereby, minimizing decontamination requirements. However, a stainless steel bailer may be used and decontaminated between LNAPL sampling locations. The optical oil/water interface probe with a graduated measuring tape to 0.01 foot accuracy used to record the presence or absence and approximate thickness of LNAPL prior to sampling also requires decontamination between sampling locations. Decontamination procedures are detailed in Section 1.5.

### *5.4 Sampling Procedure*

Immediately prior to sampling, each monitoring well should be gauged to obtain liquid levels (i.e., depth to LNAPL and depth to water) for estimation of current LNAPL thickness. Refer to Section 3.0 for appropriate well gauging procedures. Liquid level data should be recorded in a field book or field computer through the EDGE application or, if necessary, a field book.

LNAPL sampling may be performed via two different methods, based upon the LNAPL thickness/availability at the time of sampling: direct sample or swabbing. As indicated above, a minimum LNAPL volume of 10 mL is typically required by the analytical laboratory for most LNAPL characterization.

The following sequence of procedures will be implemented for the collection of LNAPL samples from monitoring wells:

1) A clean work area will be established so that sampling equipment will not come in contact with the ground surface or any other potentially contaminated surfaces near the wellhead.
2) A pre-cleaned stainless steel bailer or dedicated disposable bailer will be used for each well.
3) A new pair of nitrile gloves will be worn during sampling and replaced for each well.
4) Based on the gauged depth to LNAPL, an appropriate length of dedicated nylon or polypropylene cord will be tied to the sampling bailer.
5) An appropriately sized (i.e., 40 ml glass vial with plastic cap fitted with Teflon® lined septum) laboratory-provided sample container will be used to containerize the LNAPL sample.

6) The sampling bailer will be slowly lowered into the well until the liquid level is encountered. Once encountered, the sampling bailer should be lowered into the standing liquid column to a depth of approximately 1 foot, or other appropriate depth based on product thickness.

7) The bailer should be retrieved at a steady rate to avoid excess agitation.

8) The bailed sample should be visually evaluated for the presence or absence of LNAPL. If sufficient LNAPL volume is present (>10 ml), a direct sample of the LNAPL will be collected into the laboratory vial. If less than 10 ml of LNAPL is apparent, a sorbent pad may be used to absorb the LNAPL from the surface of the groundwater sample and the swab placed in the laboratory vial. The site-specific work plan should dictate whether a swab sample should be analyzed, or if the well should be monitored at a later date for re-sampling.

9) Labels will be completed and attached to the sample vials, indicating the sample collector's name, date, time, and location of sample; record same data in field computer or field notebook.

10) Store samples in a secure location until possession is transferred to the laboratory.

11) Nitrile gloves, bailer, bailer cord, and any other trash will be disposed of as solid waste.

### *5.5 Documentation*

All site activities and conditions at the time of sampling should be recorded by field personnel in a field computer via the EDGE application or, if necessary, a field book may be used. The entry shall include the date, time, weather conditions, location (well name), personnel present onsite, and the aforementioned well gauging parameters. Additional comments or observations (e.g., color or apparent viscosity of LNAPL) should be recorded.

## 6.0 INDOOR AND AMBIENT AIR SAMPLING PROCEDURES

In preparation for indoor and/or ambient air sampling, appropriate facility personnel should be notified of intended sampling prior to mobilization. The purpose of this would be to confirm that there are not any non-routine activities occurring in the building, such as painting of indoor walls, which would cause incidental contamination of the samples.

### *6.1 Materials and Equipment Necessary for Task Completion*

A list of equipment required to collect indoor and/or ambient air samples is presented below:

- Field data book or field computer for recording site data;
- Laboratory certified Summa canisters (standard size is 6 liters);
- Flow controllers (standard duration is 8-hours) with integrated vacuum gauge;
- Equipment for elevating sample intake height (examples: extended sampling inlets, zip ties to attach units to fencing, tables, etc);
- Camera; and
- Blank chain-of-custody forms.

### *6.2 Precautions to Avoid Incidental Contamination*

EPA Method TO-15 is the most common method used for analysis of air samples at these sites. This method is highly sensitive to trace concentrations of volatile organic compounds (VOCs). To avoid incidental contamination:

- Do not wear cologne or fragrance on day of sampling;
- Do not use hand sanitizers or lotions;
- Do not store canisters near containers of gasoline, or any fuel; and
- Make sure there are no sources of VOCs in the vehicle used to transport the canisters.

### *6.3 Sampling Procedure*

1) Set Up Summa Canister. Inlets of the flow controllers are to be placed in the breathing zone, approximately 4 to 6 feet above the ground surface. Elevate Summa canisters using appropriate materials available onsite or use laboratory-provided extended inlets (approximately 3 ft long sampling canes). Indoor air samples should be representative of air

in the buildings and should be placed away from obvious ventilation to outdoor air or sources of VOCs. Securely attach flow controller and extended sampling inlet if applicable.

2) Start Air Sample Collection. Open the valve. Document the initial vacuum (should be between approximately -30 inHg and -26 inHg) and the start time of the test. If the vacuum is significantly outside of the range or has a high rate of change, consider using an alternate canister or flow controller as there may be leakage.
3) Monitoring Summa Condition During Sampling Period. Several times during the sampling period, verify that the Summa is in good condition and that the vacuum is decreasing at an appropriate rate several times during the sampling period. An example of a reasonable frequency would be every two hours during an 8-hour event. During these checks, record the time, remaining vacuum, and canister condition. If necessary, obtain a permit to operate a camera, and take a least one photo of each sampling location.
4) Completing Air Sample Collection. Near the end of the sampling period, monitor the gauge more frequently. The sample collection should be stopped when the gauge reads approximately -5 inHg. At this point, close the canister valve. Record the sample end time and sample end vacuum. Ensure that the canister is labeled with the sample ID. Remove all of the attached equipment from the canister. Pack the canisters, flow controller wrapped in bubble wrap, chain of custody (additional information in the following section), and any other laboratory provided equipment back into the original packaging.

### *6.4 Documentation*

All site activities and conditions at the time of air sampling should be recorded by field personnel. The entry shall include the date, time, weather conditions (including wind direction and start/end barometric pressure), sample locations and IDs, and personnel present onsite. Any observation that could influence the level of VOCs in the samples should be noted.

# 7.0 SURFACE WATER SAMPLING PROCEDURES

## *7.1 Field Procedures for Surface Water Sampling*

### 7.1.1 General

Surface water sampling is performed to obtain samples for surface water bodies that are representative of existing surface water conditions. Surface water sampling (or gauging) within 3 feet of a bulkhead at certain facilities will require field personnel to wear a life vest.

Surface water sampling locations for surface water quality and groundwater interaction studies are selected based on the following:

1) Study objectives
2) Location of point surface discharges
3) Non-point source discharges and tributaries
4) Presence of structures (e.g., bridge, dam)
5) Accessibility

During surface water sampling it is important to obtain samples that are not impacted by the re-suspension of sediment produced because of improper or poor surface water sampling techniques.

### 7.1.2 Surface Water Sample Location Selection

Prior to conducting surface water sampling activities, the first requirement is the consideration and development of surface water sampling locations. It is important that all surface water sampling locations be selected in accordance with the work plan.

Wading for surface water samples increases the chances of disturbance of sediments from the floor of the surface water body. When wading for surface water samples be aware of potential safety and health risks. A life vest and safety line must be worn at all times where footing is unstable or when sampling in fast moving or more than 3 feet (0.9 m) deep. A two-person team is required for most surface water sampling activities. If the site conditions require the use of the life vest and safety line, the two people involved in the sampling must be competent swimmers.

Surface water samples must be collected with no suspended sediments. Surface water samples are collected commencing with the furthest downstream location to avoid sediment interference with upstream locations.

#### 7.1.2.1 Rivers, Streams, and Creeks

Surface water samples are generally collected in areas of surface water bodies that are representative of the surface water body conditions. Representative surface water samples will usually be collected in sections of surface water bodies that have a uniform cross section and flow rate. Mixing is influenced by turbulence and water velocity, therefore the selection of surface water sampling locations immediately downstream of a riffle area (i.e., fast flow zone) will ensure good vertical mixing. These locations are also likely areas for deposition of sediment since this occurs in areas of decreased flow velocity.

Surface water sampling locations should not be established in areas near point source discharges. Surface water sampling of these source discharge points can be performed to assess the impact of these source areas on overall surface water quality. Sample tributaries as close to the mouth as possible. It is important to select surface water sample locations considering the impact downstream, including tributary flow and sediment.

In all instances, properly document all surface water sampling locations. Documentation may include photographs and tie-ins to known structures.

#### 7.1.2.2. Sampling Equipment and Techniques

When collecting surface water samples, direct dipping of the sample container into the stream or water is acceptable unless the sample container contains preservatives. If preserved, a pre-cleaned unpreserved sample container should be used to collect the surface water sample. The surface water sample is then transferred to the appropriate preserved sample container. When collecting surface water samples, submerse the inverted bottle to the desired sample depth and tilt the opening of the sample container upstream to fill. During surface water sample collection, wading or movement may cause sediment deposits to be re-suspended and can result in biased samples. Wading is acceptable if the stream has a noticeable current and the samples are collected directly in

the sample container when faced upstream. If the stream is too deep to wade in or if addition samples must be collected at various depths, additional sampling equipment will be required. Surface water samples should be collected about 6 inches (15 cm) below the surface, with the sample bottles being completely submerged. Taking the surface water sample at this depth eliminates the collection of floating debris in the sample container.

Surface water sample collection where the flow depth is less than 1 inch (<2.5 cm) requires the use of special equipment to eliminate sediment disturbance. Surface water sampling may be conducted with a container then transferred to the appropriate sample container, or collection may be performed using a peristaltic pump. A small excavation in the stream bed to create a sump for sample collection can also be considered but should be prepared in advance to allow all the sediment to settle prior to surface water sampling activities.

Teflon™ bailers can be used for surface water sampling if it is not necessary to collect surface water samples at specific depths. A bottom loading bailer with a check ball is sufficient. When the bailer is lowered through the water, the water is continually displaced through the bailer until the desired depth is reached. The bailer is retrieved and the check ball prohibits the release of the collected surface water sample. Bailers are not suitable in surface water bodies with strong currents, or where depth-specific sampling is required. For discrete and specified depth surface water sampling, and the parameters to be monitored do not require a Teflon™ coated sampling device, a standard Kemmerer or Van Dorn sampler can be used. The Kemmerer sampler is a brass cylinder with rubber stoppers that leave the sampler ends open while the sampler is being lowered. The sampler is lowered in a vertical position to allow water to pass through. The Van Dorn sampler is plastic and is lowered in a horizontal position. For both samplers, a messenger is sent down a rope when the sampler has reached the required depth. The messenger causes the stopper on the sampler to close. The sampler is then retrieved and the surface water sample can be collected through a valve. DO sample bottles can be filled by allowing overflow using a rubber tube attached to the valve. During depth-specific surface water sampling, take care not to disturb bottom sediments.

Glass beakers or stainless steel cups may also be used to collect surface water samples if

parameter interference does not occur. The beaker or cup must be rinsed at least three times with the surface water sample prior to sample collection.

All equipment must be thoroughly decontaminated.

#### 7.1.2.3 Field Notes for Surface Water Sampling

Record daily surface sampling activities, describe surface water sampling locations, sampling techniques, and, if applicable, provide a description of photographs taken. Visual observations are important and provide valuable information when interpreting surface water quality results. Observations include:

1) Weather conditions
2) Stream flow directions
3) Stream physical conditions (width, depth, etc.)
4) Tributaries
5) Effluent discharges
6) Impoundments
7) Bridges
8) Railway trestles
9) Oil sheens
10) Odors
11) Buried debris
12) Vegetation
13) Algae
14) Fish and other aquatic life
15) Surrounding industrial areas

The following factors should be considered for surface water sampling:

1) Predominant Surrounding Land Use: Observe the prevalent land use type in the vicinity and note any other land uses in the area which, although not dominant, may potentially affect surface water quality.

2) Local Watershed Erosion: Note the existing or potential erosion of soil in the local watershed and its movement into the stream. Erosion can be rated through visual observation of watershed stream characteristics including increases or decreases in turbidity.

3) Local Watershed Non-Point Source Pollution: This refers to problems or potential problems other than erosion and sedimentation. Nonpoint source pollution can be diffuse agricultural and urban runoff. Other factors may include feed lots, wetlands, septic systems, dams, impoundments, and mine seepage.

4) Estimated Stream Width: The estimated distance from shore at a transect representative of the stream width in the area.

5) Estimated Stream Depth: Riffle (rocky area), run (steady flow area), and pool (still area). Estimate the vertical distance from the water surface to the bottom of the surface water body at a representative depth at three locations.

6) High Water Mark: Estimate the vertical distance from the bank of the surface water body to the peak overflow level, as indicated by debris hanging in bank or flood plain vegetation, and deposition of silt. In instances where bank flow is rare, high water marks may not be evident.

7) Velocity: Record or measure the stream velocity in a representative run area.

8) Dam Present: Indicate the presence or absence of a dam upstream or downstream of the surface water sampling location. If a dam is present, include specific information detailing the alteration of the surface water flow.

9) Channelized: Indicate if the area surrounding the surface water sampling location is channelized.

10) Canopy Cover: Note the general proportion of open to shaded areas which best describes the amount of cover at the surface water sampling location.

## *7.2 References*

For additional information pertaining to surface water sampling, the user of this manual may reference the following:

ASTM D5358 Practice for Sampling with a Dipper or Pond Sampler

ASTM D4489 Practices for Sampling of Waterborne Oils

ASTM D3325 Practice for the Preservation of Waterborne Oil Samples

ASTM D4841 Practice for Estimation of Holding Time for Water Samples Containing Organic and Inorganic Constituents

ASTM D4411 Guide for Sampling Fluvial Sediment in Motion

ASTM D4823 Guide for Core-Sampling Submerged, Unconsolidated Sediments

ASTM D3213 Practice for Handling, Storing, and Preparing Soft Undisturbed Marine Soil

ASTM D3976 Practice for Preparation of Sediment Samples for Chemical Analysis

ASTM E1391 Guide for Collection, Storage, Characterization, and Manipulation of Sediments for Toxicological Testing

ASTM D4581 Guide for Measurement of Morphologic Characteristics of Surface Water Bodies

ASTM D5906 Guide for Measuring Horizontal Positioning During Measurements of Surface Water Depths

ASTM D5073 Practice for Depth Measurement of surface water

# 8.0 SEDIMENT SAMPLING PROCEDURES

## *8.1. Introduction*

Sediment sampling is conducted to obtain samples that are representative of existing chemical and/or physical conditions of sediment.

## *8.2 Equipment Decontamination*

On environmental sites, sediment sampling equipment (e.g., split spoons, trowel, spoons, shovels, bowls, dredges, corers, scoops) are typically cleaned as follows:

1) Wash with clean potable water and laboratory detergent, using a brush as necessary to remove particulates.
2) Rinse with tap water.
3) Rinse with deionized water.
4) Air dry for as long as possible.

Additional or different decontamination procedures may be necessary if sampling for some parameters, including VOCs and metals.

## *8.3 Sample Site Selection*

Before any sampling is conducted, the first requirement is to consider suitable sampling locations. Sampling locations should be selected in accordance with the work plan. Wading for sediment samples in lagoons, lakes, ponds, and slow-moving rivers and streams must be done with caution since bottom deposits are easily disturbed. Sampling must only be attempted where safe conditions exist and samples must be collected from undisturbed sediments. All sediment samples are to be collected commencing with the most downstream sample to avoid sediment interference with other downstream samples. A life vest and safety line should be worn in all cases where footing is unstable or where water is fast moving or over 3 feet (0.85 m) in depth. A second person may also be required for most of the sampling scenarios.

#### 8.3.1. Rivers, Streams, and Creeks

Sediment samples may be collected along a cross-section of a river or stream in order to adequately characterize the bed material, or from specific sediment deposits as described in the work plan. A common procedure is to sample at quarter points along the cross-section of the sampling site selected. Samples may be composited as described in the work plan. Samples of dissimilar composition (e.g., grain size, organic content) should not be combined. Representative samples can usually be collected in portions of the surface water body that have a uniform cross-section and flow rate. Since mixing is influenced by turbulence and water velocity, the selection of a site immediately downstream of a riffle area (e.g., fast flow zone) are likely areas for deposition of sediment since the greatest deposition occurs where stream velocity slows.

A site that is clear of immediate point sources (e.g., tributaries and industrial and municipal effluents) is preferred for the collection of sediment samples unless the sampling is being performed to assess these sources.

### *8.4 Sampling Equipment and Techniques*

#### 8.4.1. General

Any equipment or sampling technique(s) [e.g., stainless steel, polyvinyl chloride (PVC)] used to collect a sample is acceptable so long as it provides a sample which is representative of the area being sampled and is consistent with the work plan.

#### 8.4.2. Sediment Sampling Equipment and Techniques

A variety of methods may be used to collect sediment samples from a stream, river, or lake bed. Dredging (Peterson, Ponar, Van Veen), coring and scooping are acceptable sediment sample collection techniques. Precautions shall be taken to ensure that a representative sample of the targeted sediment is collected. Caution should be exercised when wading in shallow water so as not to disturb the area to be sampled. Samplers should be selected based on the interval to be sampled, type of sediment/sludge (silt, sand, gravel), and required sample volume. More than one sampler is often required to implement a sampling program at a site. The following

describes some of these methods. Manufacturer's information should be consulted to determine the limitations of each type of sampling equipment.

### 8.4.3 Dredging

The Peterson dredge is best used for rocky bottoms, in very deep water, or when the stream velocity is rapid. The dredge should be lowered slowly as it approaches the bottom, so as to not disturb the lighter sediments.

The Ponar dredge is similar to the Peterson dredge in size and weight. The Ponar dredge is a "clam-shell" type unit that closes on contact with the river/lake bottom. Depending on the size of the unit, a winch is required for larger units, whereas smaller units are available for lowering by a hand line. Once retrieved, the unit is opened and the sample extracted using a sample scoop or spoon. The unit has been modified by the addition of side plates and a screen on top of the sample compartment. This permits water to pass through the sampler as it descends.

The Ponar grab sampler functions by the use of a spring-latch-messenger arrangement. The sampler is lowered to the bottom of the water body by means of a rope, then the messenger is sent down to trip the latch causing the sampler to close on the sediments. The sampler is then raised slowly to minimize the disturbance of the lighter sediments. Sediment is then placed into a stainless steel bowl, homogenized, and placed into the appropriate sample container (if collecting for VOC parameters, fill the VOC jars before homogenization).

### 8.4.4. Corers

Core samplers are used to obtain vertical columns of sediment. Many types of coring devices are available, depending on the depth of water from which the sample is to be collected, the type of bottom material, and the length of core to be obtained. They vary from hand-push tubes to weight or gravity-driven devices to vibrating penetration devices.

Coring devices are useful in contaminant monitoring due to the minimal disturbance created during descent. The sample is withdrawn intact, allowing the removal of only those layers of interest. Core liners consisting of plastic or Teflon may also be added, thereby reducing the potential for sample contamination and maintaining a stratified sample. The samples may be shipped to the lab in the tubes in which they were collected. The disadvantage of coring devices

is that only a small sampling surface area and sample size is obtained, often necessitating repetitive sampling in order to collect the required amount of sediment for analysis. It is also often difficult to extract the sediment sample back out through the water column without losing the sample.

The core tube is pushed/driven into the sediment until only 4 inches (10 cm) or less of tube is above the sediment-water interface. When sampling hard or coarse sediments, a slight rotation of the tube while it is pushed will create greater penetration and reduce compaction. Cap the tube with a Teflon plug or a sheet of Teflon. The tube is then slowly withdrawn, keeping the sample in the tube. Before pulling the bottom part of the core above the water surface, it must be capped.

### 8.4.5 Scooping

The easiest way to collect a sediment sample is to scoop the sediment using a stainless steel spoon or scoop. This may be done by wading into the stream or pond and, while facing upstream (into the current), scooping the sample from along the bottom in an upstream direction. This method is only practical in very shallow water.

### 8.4.6 Mixing

Sediment samples collected for chemical analysis should be thoroughly mixed (except for VOCs) in a stainless steel bowl prior to placement in the appropriate sample container. Standard procedures exist for preparation of sediment samples (ASTM D3976). These should be followed or the laboratory informed of applicable procedures.

### 8.4.7 Air Monitoring

Prior to sediment/sludge sampling, measure the breathing space above the sample location with a PID, should the potential for volatiles be present, and use a hydrogen sulfide meter should hydrogen sulfide be present. Repeat these measurements during sampling. If either of these measurements exceed any of the air quality criteria established in the HASP, air purifying respirators (APRs) or supplied air systems will be required.

### 8.4.8 Sample Location Tie-In/Surveying

The recording of the sample locations and depth on the site plan is extremely important. This may be accomplished by manual measurement (i.e., swing ties), global positioning system (GPS) survey, or stadia methods. Manual measurements for each sample location should be tied into three permanent features (e.g., buildings, utility poles, hydrants). Diagrams with measurements should be included in the field book.

## *8.5 Field Notes*

A bound field book is used to record daily activities, describe sampling locations and techniques, and describe photographs (if taken). Visual observations are important, as they may prove invaluable in interpreting water or sediment quality results. Observations shall include (as applicable) weather, stream flow conditions, stream physical conditions (width, depth, etc.), tributaries, effluent discharges, impoundments, bridges, railroad trestles, oil sheens, odors, buried debris, vegetation, algae, fish or other aquatic life, and surrounding industrial areas. The following observations should be considered:

- Predominant Surrounding Land Use: Observe the prevalent land use type in the vicinity (noting any other land uses in the area which, although not predominant, may potentially affect water quality).
- Local Watershed Erosion: The existing or potential erosion of soil within the local watershed (the portion of the watershed that drains directly into the stream) and its movement into a stream is noted. Erosion can be rated through visual observation of watershed and stream characteristics. (Note any turbidity observed during water quality assessment.)
- Local Watershed Non-point Source Pollution: This item refers to problems and potential problems other than siltation. Non-point source pollution is defined as diffuse agricultural and urban runoff (e.g., stormwater runoff). Other compromising factors in a watershed that may affect water quality are feedlots, wetlands, septic systems, dams and impoundments, and/or mine seepage.
- Estimated Stream Width: Estimate the distance from shore at a transect representative of the stream width in the area.

- Estimated Stream Depth: Riffle (rocky area), run (steady flow area), and pool (still area). Estimate the vertical distance from water surface to stream bottom at a representative depth at each of the three locations.
- High Water Mark: Estimate the vertical distance from the stream bank to the peak overflow level, as indicated by debris hanging in bank or floodplain vegetation, and deposition of silt or soil. In instances where bank overflow is rare, a high water mark may not be evident.
- Velocity: Record an estimate of stream velocity in a representative run area (see Section 12.0).
- Dam Present: Indicate the presence or absence of a dam upstream or downstream of the sampling station. If a dam is present, include specific information relating to alteration of flow.
- Channelized: Indicate whether the area around the sampling station is channelized.
- Canopy Cover: Note the general proportion of open to shaded area which best describes the amount of cover at the sampling station.
- Sediment Odors: Disturb sediment and note any odors described (or include any other odors not listed) which are associated with sediment in the area of the sampling station.
- Sediment Oils: Note the term which best describes the relative amount of any sediment oils observed in the sampling area.
- Sediment Characteristics: Note the grain size, color, consistency, layering, presence of biological organisms, man-made debris, etc. in accordance with standard ASTM soil description protocols.
- Sediment Deposits: Note those deposits described (or include any other deposits not listed) which are present in the sampling area. Also indicate whether the undersides of rocks not deeply embedded are black (which generally indicates low dissolved oxygen or anaerobic conditions).

### *8.6 References*

For additional information pertaining to this topic, the user of this manual may reference the following:

ASTM D5358 Practice for Sampling with a Dipper or Pond Sampler

ASTM D4489 Practices for Sampling of Waterborne Oils

ASTM D3325 Practice for the Preservation of Waterborne Oil Samples

ASTM D4841 Practice for Estimation of Holding Time for Water Samples Containing Organic and Inorganic Constituents

ASTM D4416 Guide for Sampling Fluvial Sediment in Motion

ASTM D4823 Guide for Core-Sampling Submerged, Unconsolidated Sediments

ASTM D3213 Practice for Handling, Storing, and Preparing Soft Undisturbed Marine Soil

ASTM D3976 Practice for Preparation of Sediment Samples for Chemical Analysis

ASTM E1391 Guide for Collection, Storage, Characterization, and Manipulation of Sediments for Toxicological Testing

ASTM D4581 Guide for Measurement of Morphologic Characteristics of Surface Water Bodies

ASTM D5906 Guide for Measuring Horizontal Positioning During Measurements of Surface Water Depths

ASTM D5073 Practice for Depth Measurement of Surface Water

ASTM D5413 Test Methods for Measurement of Water Levels in Open-Water Bodies

## 9.0 SLUG TEST PROCEDURES

### *9.1 Materials and Equipment Necessary for Task Completion*

Water level (data) logger capable of recording pressure and/or depth at sub-second time intervals (preferably a vented logger capable of advanced logging modes); vented, direct-read cable of sufficient length (with dessicant); interface tape/probe or water level meter; solid (mechanical) slug, pneumatic slug, or packer system [the introduction or removal of water is not recommended (e.g., bailer or bucket)]; 5 gallon bucket, traffic cones and/or barricades, deionized or distilled water and Alconox®; decontamination bucket and brush; and laptop computer or rugged reader.

### *9.2 Decontamination Requirements*

Equipment utilized during slug testing must be thoroughly decontaminated with Alconox® and deionized/distilled water prior to and between uses at each test well to prevent cross contamination between wells. Any groundwater removed from the well during testing must be containerized and either treated and discharged to ground surface, or disposed of in an approved manner, preferably in a properly installed, onsite holding tank. If LNAPL is encountered/recovered, it should be containerized and properly disposed onsite. However, the preferred test initiation methods (solid and/or pneumatic slug) do not generate any groundwater.

### *9.3 Methodology for Slug Testing*

Slug tests are utilized to provide in-situ estimations of hydraulic conductivity (k) in saturated media, most often in geologic formations that exhibit aquifer properties (low k media can also be tested with special consideration). Slug tests involve rapidly displacing the static water level in a well, and analyzing the well's rate and pattern of recovery back to near-static conditions. Falling head or slug-in tests involve analysis of displacement due to the addition of volume, and rising head or slug-out tests involve the analysis of displacement due to the removal of volume. Displacement is initiated using either a solid or pneumatic slug. Water level response is monitored immediately following the initial displacement and for the ensuing time period until the water level has returned to near-static level (generally within 5% of static). Water level response should be recorded using a water level (data) logger capable of recording pressure and/or depth at sub-second time intervals (preferably a vented logger). Logarithmic logging modes are preferred to shorten the data file while still providing high resolution data just after test initiation.

*9.4 Field Procedures*

1) Test Well Construction and Configuration - Well construction details are needed to perform slug test calculations and are important considerations when selecting appropriate wells for testing. Important as-built details include: total well depth, well screened interval(s), depth to (static) water, casing diameter, screen diameter, filter pack diameter, filter pack size, and filter pack interval. While these details should be documented on the well log, static water level and total well depth should be field-confirmed before the test. Of particular importance to the testing procedure is the relationship between static water level and well screened interval, and the degree of well development. Test results for poorly or insufficiently-developed wells may be strongly affected by drilling debris/disturbance in the formation that can create skin effects, lowering the apparent formation k. Analysis of testing data for wells screened across the water-table should consider drainage of the filter pack media. In addition, a pneumatic slug assembly should not be utilized unless the test well is screened below the water table and the water level remains above the screen throughout the test.

2) Test Setup and Initiation - Upon arrival, the test well should be gauged for static depth to water and total well depth so that the total water column length can be estimated. Well gauging data should be recorded in a rugged reader using an EDGE file, if available, or field form or book.

   a. Solid Slug

      The displacement volume of the slug is needed. It is suggested that the slug be prefabricated and calibrated for displacement volume prior to site use. Calculate the expected initial well displacement, using the slug volume and well casing radius, and deploy the data logger/cable to a depth just below that level while considering the slug length (to avoid conflict and tangling of the slug and transducer). Also consider the submergence depth limit of the data logger (usually indicated on the logger body). Generally, placing the data logger a foot or two below the bottom of the slug is good practice. Once submerged, allow the

data logger temperature to equilibrate with groundwater prior to initiating the test (up to 30 minutes).

While the data logger temperature equilibrates, secure the slug to an adequate length of disposable string or rope and hang in the well to a depth just above the water surface. Mark the string/rope to accommodate the slug length and tie off. Using the rugged reader or field computer, set up a new test (logarithmic mode or sub-second recording interval) in the data logger supplied software and start the test. Indicate in the file name the type of test and test number (e.g., rising or falling head; test 1 or 2). Once logging is initiated, quickly and smoothly lower the slug (slug-in or falling head test) to the submerged depth and tie off the string/rope (displacement should be instantaneous). Monitor the data logger data until the water level has returned to near-static level. Stop the falling head test.

Without moving the slug or data logger, set up a new test in the data logger supplied software with the same settings and indicate in the file name the type of test being performed (rising head or slug out). Start the test and once the data logger is running, instantaneously lift the slug and tie off the string/rope to its pre-test position (just above static). Monitor the data being recorded by the data logger and stop the test when the water level has returned to near-static.

b. Pneumatic Slug

If a high formation k is anticipated, solid slug removal is found to be too slow to capture well recovery, or to minimize equipment decontamination for wells with submerged screens, a pneumatic slug assembly should be utilized.

Open air release valve, secure pneumatic slug assembly to well casing and tighten coupling to provide an air tight seal. Insert the data logger/cable and deploy to the target submergence depth [it is generally best to keep the data logger shallow (~1-2 feet below static water level) and use small initial displacements to avoid dynamic recovery effects in high k formations]. Close the air release valve and attach the air pump or compressor. Pressurize the well and

use the pressure gauge to set initial displacement. Check for air leaks using a soapy water mixture and sprayer (assembly must be air tight). Allow the water level to return to static and remove the air pump. Using the rugged reader or field computer, set up a new test (logarithmic mode or sub-second recording interval) in the data logger supplied software and start the test. Indicate in the file name the type of test and test number (e.g., rising head; test number). Once logging is initiated, open the air release valve and monitor the test data. Stop the test when the water level has returned to near-static.

3) Test Monitoring and Guidelines - The following are general guidelines for slug testing performance as published by Midwest Geosciences Group in "Field Guide for Slug Testing and Data Analysis:"

- Conduct at least three or more tests per well and if possible conduct both rising and falling head test data.
- Use two or more initial displacement values (2 slug sizes or air pressures applied) that vary by an order of magnitude or more.
- Final slug test initial displacement should be nearly equivalent to the first test's displacement.
- Allow tests to run until near-static conditions are achieved (+/- 5% of static)
- Digital slug test data files collected with the data loggers and/or EDGE files should be backed up to either a thumb drive, corporate email server, and/or corporate file server immediately after collection.

4) Test Data Reduction and Processing - Prior to slug test analyses, digital data logger files should be normalized so that multiple tests conducted on the same test well can be compared for the assessment of test validity and well conditions. Reducing the data as follows:

- From each raw data file, estimate the time of test initiation and the head (depth or pressure) under static conditions.

- In each slug test data file, subtract the time of test initiation from the elapsed time and save to a new field (normalized time or test time; start of test should be time zero).
- In each slug test data file, subtract the static pressure head from the test period pressure head values and save to a new field (deviation from static).
- To normalize the deviation from static values, divide that field by the displacement expected based upon the slug volume or air pressure head applied.
- Create a graphical plot of the normalized head data versus test time for each test performed on the test well. Review the data plots and confirm that the testing data for each repeat test roughly concur. Also confirm that the actual and expected initial displacements are nearly equal.
- If repeat testing data and/or expected versus actual initial displacements vary widely, review well completion details and testing methods prior to performing further analysis (step 5 below) as the results may not be valid (e.g., the well screen interval may be poorly developed or fouled, the data logger may have moved or placed too deep in the well, slug was removed too slowly). The well may need to be retested.

5) Test Data Analysis - For the purposes of this standard operating procedural document, it is assumed that slug test analysis software will be used to apply standard solution methods to the testing data. Various computer programs are available, such as AQTESOLV Professional. Choose an appropriate test solution method by considering the following well configurations (in AQTESOLV, use the Solution Expert):

a. Submerged Screen and/or Confined Aquifer Well - If the well screen fully penetrates the intersecting aquifer, utilize the Cooper et al. Model or Hvorslev Model and analyze the curve match and/or best fit. If well is partially penetrating a confined formation, utilize the KGS Model or Hvorslev Model. If well screen is submerged in an unconfined formation, utilize the KGS Model or Bouwer and Rice Model.

b. Water-Table Intersects Well Screen - If the well screen is intersected by the water table, utilize the Bouwer and Rice Model (double straight line effect) or KGS Model.

c. Rapid Well Recovery in High k Formations - If well response to displacement is extremely rapid and normalized head plots display an oscillatory or concave-downward form, utilize the Butler and Zhan Model (most comprehensive solution available) or High-k Hvorslev Model for confined wells, or the High-k Bouwer and Rice Model.

### *9.5 Limitations*

In general, results of slug test data analyses provide an initial estimate of formation k and have a small scale of relevance (particularly in high k settings). Slug tests can be strongly affected by the degree of well development and can be used diagnostically to assess the degree of well development. In most cases, slug testing should be performed on several wells in an area of interest to develop an understanding of the formation characteristics (e.g., heterogeneous or homogeneous formations).

# 10.0 PUMP TEST PROCEDURES

## *10.1 Materials and Equipment Necessary for Task Completion*

Water-level (data) loggers (transducers) capable of recording pressure and/or depth at sub-second time intervals (preferably a vented logger capable of advanced logging modes for at least the pumping well); vented, direct-read cables of sufficient length (with dessicant packs); interface tape/probe or water-level meter; well pump (preferably a submersible pump), drop pipe and layflat or comparable discharge line of sufficient length, totalizing flow meter (recommended) and 5 gallon bucket, stop watch, rain gauge or nearby weather station; materials needed to monitor surface water bodies near the test site (e.g., staff gauge, weir, stakes, data logger, camera with permission from refinery personnel); traffic cones and/or barricades, deionized or distilled water and Alconox®; decontamination bucket and brush; laptop computer or rugged reader; portable generator or other power supply appropriate for the submersible pump; and containment (e.g., frac tank) or activated carbon filtration for the temporary staging or filtering of discharge water.

## *10.2 Decontamination Requirements*

Equipment utilized during pumping tests must be thoroughly decontaminated with Alconox® and deionized/distilled water prior to and between uses at each test well to prevent cross contamination between wells. Any groundwater removed from the tested well must be containerized and either treated (filtered as appropriate) and discharged to ground surface, or disposed of in an approved manner, preferably in a properly installed, onsite holding tank. If LNAPL is encountered/recovered, it should be containerized and properly disposed of on or off-site.

## *10.3 Methodology for Pump Testing*

### 10.3.1 Pre-test Considerations

In general, pumping tests are performed to estimate large-scale in-situ hydraulic properties of water-bearing strata in the subsurface (i.e., transmissivity and storativity) and average out local-scale heterogeneity that can limit the applicability of smaller-scale testing methods, such as slug tests. The geographical area influenced by a pumping test will be determined by the hydraulic properties of the strata being tested (including hydraulic properties of other strata supplying recharge to the pumped formation), boundary conditions, and on the duration of the test.

Pumping tests are also commonly performed to generate drawdown data from which hydraulic boundary conditions, hydraulic flow regime (e.g., anisotropy), and aquifer type (i.e., unconfined or confined, leaky confined) may be estimated. Smaller-scale pumping tests may also be utilized to address pumping efficiency and/or signal to noise ratio (pumping rate) at the pumping well, or to assist in remedial system design. However at this scale, the assumptions of some data analysis methods may not be applicable and should be considered prior to testing.

Appropriate design of a pumping test should include review of site-specific information regarding the geology and hydrogeology of the test area. Pumping test design should also consider the goal(s) of the test (i.e., scale of application of derived aquifer properties, identification of boundary influences, sources of recharge, well efficiency). This should include review of available lithologic well logs or test boring logs, geologic maps, cross sections, structure contour maps, isopach maps, and any other available information so that a conceptual model relating geologic units to hydrostratigraphic units or water-bearing strata can be developed. Additional pre-test considerations should include identification of any potential positive or negative hydraulic barriers, tidal effects, and/or influence from other wells that may be pumping in the test area. Without sufficient knowledge of factors influencing water-levels and hydrology of the test area, test results could be misinterpreted.

Often times, budget considerations and/or time limitations will necessitate the use of an existing monitoring well as the pumping well and/or existing wells as observation points. While this is generally acceptable, the wells must be screened appropriately with respect to the goals of the test and knowledge of well construction is critical to applying test solutions. Wells should also be redeveloped prior to testing if they are relatively old or if records of sufficient well development at the time of installation are not readily available.

Pumping tests can be divided into two general classifications: step-drawdown tests and constant rate tests. Step tests typically involve pumping a well at progressively higher rates or “steps” at intervals of one or two hours per step (typically up to 3 steps). They are often used to estimate the yield a well will sustain during a constant rate pumping test and to evaluate well efficiency (frictional head losses between the screen/gravel pack and the formation). Constant rate pumping tests are used primarily to evaluate hydraulic properties of water-bearing strata for design of groundwater treatment systems and/or water supply purposes (e.g., groundwater

allocation). Where budgets permit, the best pumping test approach is to first perform a step-drawdown test on the pumping well to evaluate well efficiency and sustainable yield (and to gauge whether or not the pumping well needs additional development), allow recovery to near-static conditions, and then initiate a constant rate test.

The test duration is subject to goals of the test and to budget considerations. Optimally, a constant rate test should be run until all drawdowns have stabilized or boundary conditions are identified, and gravity drainage effects are curtailed; however, this is seldom practical due to time limitations. In most instances, an 8 hour constant rate test will be adequate, and a 24 hour test will be sufficient for higher sensitivity sites. Occasionally a 72 hour pumping test is warranted, though this is usually reserved for large scale water supply work. If there are any unexplained water level anomalies observed toward the scheduled end of a test, the test should be continued if at all possible.

The approximate test flow rate needs to be determined in advance for proper pump and discharge design selection, and sizing of discharge containment. If it is not appropriate to perform a step test, sustainable yield can be estimated from slug test data or a brief (<30 minutes) pumping episode the day before the actual test. Generally, it is best to pump the test well at a rate that maximizes the signal to noise ratio (a higher pumping rate does not influence test scale and should not be used as a means to shorten the test duration).

If testing must be performed in an area where contamination is known to be present, careful consideration of the impacts of the test scale should be considered prior to testing so that the spread of subsurface contamination is not increased. If floating product (LNAPL) is present at or near the pumping well, drawdown should be limited so as to not impact uncontaminated soils below the static water table (i.e., create a “smear” zone or allow for the significant migration of free-phase product). Discharge water must be either 1) treated prior to discharge or 2) containerized for on or off-site disposal. If it is to be discharged directly on-site and allowed to infiltrate, it must be routed sufficiently far enough from the test area as to avoid any artificial recharge effects. All appropriate withdrawal and discharge permits must be obtained and complied with. If discharge water is to be treated on-site, proper contaminant loading calculations for the test flow rate, approximate contaminant loading and test duration must be performed in advance to insure treatment is sufficient. Any on-site treatment should also

include at least one discharge effluent sample analysis by an approved laboratory to document treatment effectiveness.

### 10.3.2 Pre-Test Water Level Monitoring

Water-level conditions in the test area should be monitored for at least one week prior to initiation of testing to identify background trends and factors influencing groundwater levels in the test area. Data loggers should be deployed in all wells to be utilized in the pumping test and set to record depth or pressure at a resolution that is high enough to identify any potential trends (generally a 15 minute recording interval is sufficient for background monitoring). A manual water level should be measured with a water-level meter or interface probe and referenced to the top of casing mark to calibrate the data logger data at the time of deployment and at sufficient intervals throughout the recording period to validate the data and provide backup data in the event that a data logger was to fail.

Ideally, groundwater levels should be static prior to starting a pumping test so that pumping influences alone can be readily evaluated. Any significant precipitation events within the previous several days (documented through use of a site rain gauge or nearby weather station) will usually result in noticeable water level changes. If there are any major water level changes observed that cannot be explained prior to testing, additional investigation into possible area influences (e.g., local well pumping or construction de-watering) should be conducted.

### 10.3.3 Pumping Test Set Up

Prior to starting the test, all well measuring points (i.e. top of casing) should be clearly marked and preferably surveyed to the nearest 0.01 feet in elevation. The horizontal distance between all wells utilized should be measured and illustrated on a base map. If there are any surface water bodies in the vicinity, a staff gauge (or similar measuring device) should be set up and surveyed to evaluate possible test influences on water levels or stream flow.

The preferred pump to be used for a pumping test is a submersible centrifugal pump powered by either existing site power or a portable generator. These pumps are not explosion proof, so a conductivity probe must be tied into the pump controls to alleviate any possibility of product coming into contact with the pump (if product is anticipated). If the test pump is designed to pump total fluids (e.g. air operated double diaphragm pump, jack pump, etc.) discharge must

either be containerized, or treatment must include an oil/water separator to handle any floating product. The submersible pump should be set deep enough to maintain flow during the test period or at a maximum of just above the screened interval, using a handling line to support the pump's weight [**NOTE:** extreme care must be taken that the power cord is neither bearing any of the pumps weight, nor damaged during installation due to the potential for severe electric shock]. A check valve (or two check valves) should be installed above the pump in the discharge line to prevent backflow into the well after testing.

Discharge piping from the pump should include a flow meter (preferably with totalizer), followed by a flow adjustment valve. The flow meter should be installed in a straight section of hard piping of sufficient length to avoid meter distortion caused by turbulence (typically about 10 pipe diameters on either side of the meter). In low-flow pumping tests, flow rate can be calculated by measuring the exact time required to fill a known-sized container (bucket and stop watch) several times throughout the testing period. The bucket and stop watch method of estimating flow should also be used to back up and check the flow meter data.

Precise and frequent water-level measurements (to the nearest 0.01 feet) and time denotations before, during, and after pumping tests are critical to achieving accurate test results. In terms of prioritization, data loggers should be utilized in at least the pumping well and observation wells closest to the pumping well. Wells further from the pumping well may be manually monitored, due to the reduced likelihood that early-time drawdown will be critical at distal locations. Back-up manual measurements should be collected at least hourly during the first 8 hours of the test, and then at least every 3 hours, to verify data logger measurements. Readings from the transducers are not completely reliable until they have been submerged for at least 30 minutes (sensor equilibration period). All field personnel should have watches with a second hand, and they should all be calibrated to the same time. Liquid level measurements should be obtained using an optical oil/water interface probe with a graduated measuring tape to 0.01 foot accuracy for those wells with floating product. For wells without product, a water-level meter may be sufficient. All non-dedicated probes must be properly decontaminated after each level reading to prevent any possibility of cross- contamination between wells.

Data loggers should be deployed in each selected well to a depth that will maintain submergence through the test period. Data loggers selected should be capable of being

submerged to that anticipated depth (typically noted on the instrument body). The transducer cable should be secured at the wellhead (manufacturer supplied hangers, well caps, or electrical tape/cable ties) to minimize any movement of the sensor. Care must be taken that the transducer cable is not damaged from rough edges at the well head, and that no vehicles run over the cable. The data logger installed in the pumping well will need to be installed at a depth that will maintain submergence through the test, but also remain clear of the submersible pump (and pump noise if possible). In addition, wells with floating product may require an inner PVC stilling well surrounding the data logger cable to prevent damage from contact with the product. A stilling well may also eliminate the need for any water-level corrections for product thickness.

### 10.3.4 Running the Test

Once the data loggers have been deployed and secured, tests should be set up in each device and each device either started or “future” started to begin logging when the pump is turned on. The data logger in the pumping well should be set to logarithmic logging mode to capture sub-second data during the early portion of the test. If possible, the pump discharge control valve should be have been pre-set (based on the step test or mini pump test) to the desired flow rate prior to turning on the pump. However, depending on the test pumps performance curves, minor flow rate adjustments are generally needed during the first hour or two of the test to correct for the additional lift required by the pump due to increasing drawdown. In addition, movement of the discharge hose after the test has been started should be avoided, since any change in the elevation of the discharge will affect the pumping rate. All changes in flow rate should be recorded and time stamped.

A minimum of two field personnel are needed to run a pumping test, with additional personnel required for tests with multiple observations wells or additional complexity. One person should be designated to turn on the pump, monitor and adjust flow rate, maintain discharge and treatment, maintain the generator, etc. The second person should be responsible for data logger management and manual water-level measurements. As a rule of thumb regarding the frequency of manual well gauging, one measurement every half minute during the first 5 to 10 minutes, followed by one measurement every 3 to 5 minutes during the first hour, one measurement every 10 to 20 minutes for the second hour, and one hourly measurement thereafter is acceptable.

Throughout the test, data loggers should be downloaded in real time through use of direct-read, vented cables (or non-vented with a barometric logger for compensation) to monitor water-level conditions. It is essential that some data reduction be accomplished in the field, so that major water level trends are recognized during the test. At a minimum, drawdown trends from the pumping well and two of the nearest monitoring wells need to be semi-log plotted against time so that deviations indicative of boundary conditions can be discerned before pumping is ceased. This will allow decisions to be made about whether the test should run longer than planned.

Generally, water quality samples are collected during a pumping test for laboratory analysis of constituents of concern. These are generally collected after the first hour of pumping and just prior to pump shutdown. If the test is of more than 24 hours duration, it is advisable to collect additional samples during the testing period. All groundwater samples should be collected following Evergreen Field Procedures.

### 10.3.5 Post-test Recovery

At the conclusion of the test, water level recovery data should be collected until near-static conditions are re-established. This requires the installation of a check valve in the discharge line above the submersible pump to prevent backflow. The recovery data has the advantage in that there are no variations in the curve produced due to variations in pumping rate and is independent of test length. In water-table aquifers, however, the effects of formation de-watering can cause the recovery trends to be substantially different from drawdown trends. Consequently, recovery (residual drawdown) data should be used in conjunction with drawdown data where possible.

### 10.3.6 Data Analysis

The data collected during pumping tests are analyzed to estimate aquifer hydraulic properties, such as transmissivity, conductivity, and storage. Data collected by transducers must be downloaded and transformed (dimensionless drawdown or displacement from static) prior to analysis. Analysis typically involves curve matching of site data to type curves established in literature for particular flow regimes. Curve matching is commonly performed utilizing computer software, such as HydroSOLV's AQTESOLV program, along with diagnostic methods and derivative analysis to best estimate aquifer properties through identification of flow regimes and conditions.

It is noted that the mathematical solutions used in pumping test analysis include many assumptions that must be considered in the context of each test area (e.g., the formation is of uniform thickness and of infinite areal extent). In addition, some of the values incorporated into typical pumping test solutions are not actually measured, but are educated estimates (e.g., porosity based on lithology, etc.). Many problems associated with pumping test data evaluation are due to not recognizing, and/or correcting for, deviations from the theoretical solution employed. Some of the more common analytical errors occur due to: partial well penetration effects, formation de-watering effects, casing storage effects, poor pumping well efficiency and/or the application of incorrect equations or units. Consequently, a thorough understanding of the underlying assumptions inherent to the solution employed is required before the validity of the results can be trusted.

PROJECT: **Philadelphia Refinery**
LOCATION: **AOI-8**
PROJECT NUMBER:

WELL / PROBEHOLE / BOREHOLE NO:

# BH-16-062

PAGE 1 OF 1

Aquaterra Technologies, Inc.

DRILLING / INSTALLATION:
STARTED **9/13/16** COMPLETED: **9/13/16**
DRILLING COMPANY: **Sweeney**
DRILLING EQUIPMENT: **Backhoe**
DRILLING METHOD: **Backhoe**
SAMPLING EQUIPMENT: **Hand Auger**

NORTHING (ft):
EASTING (ft):
LAT:
LONG:
GROUND ELEV (ft):
TOC ELEV (ft):
INITIAL DTW (ft): **Not Encountered**
WELL DEPTH (ft): **---**
STATIC DTW (ft): **Not Encountered**
BOREHOLE DEPTH (ft): **14.0**
WELL CASING DIA. (in): **---**
BOREHOLE DIA. (in): **12**
LOGGED BY: **LM**
CHECKED BY: **MS**

| Time & Depth (feet) | Graphic Log | USCS | Description | Sample | Time Sample ID | Measured Recov. (feet) | Blow Count | Headspace PID (units) | Depth (feet) |
|---|---|---|---|---|---|---|---|---|---|
| | | | **CLAYEY SILT** ; weak cementation; Multicolored (orange, brown and silver); Micaceous | | 12:00 BH-16-062 -0-2 -20160913 | | | 2.1 | |
| | | | | | BH-16-062@ 2-4' | | | 5.0 | |
| 5 | | | **SILT WITH SAND AND GRAVEL** ; gray and black; strong cementation | | BH-16-062@ 4-6' | | | 7.0 | 5 |
| | | | **CLAYEY SILT SOME SAND AND GRAVEL** ; Multicolored (dark gray, brown, and black) | | BH-16-062@ 6-8' | | | 35.0 | |
| | | | | | BH-16-062@ 8-10' | | | 50.7 | |
| 10 | | | **SILT** ; moist; Multicolored (white, gray, silver, brown, and orange); Micaceous | | BH-16-062@ 10-12' | | | 161.0 | 10 |
| | | | | | 13:00 BH-16-062 -12-14 -20160913 | | | 232 | |
| 15 | | | Borehole terminated at 14 feet. | | | | | | 15 |
| 20 | | | | | | | | | 20 |
| 25 | | | | | | | | | 25 |
| 30 | | | | | | | | | 30 |
| 35 | | | | | | | | | 35 |

PROJECT: **Philadelphia Refinery**
LOCATION: **AOI-8**
PROJECT NUMBER:

WELL / PROBEHOLE / BOREHOLE NO:
**BH-16-073** PAGE 1 OF 1

Aquaterra Technologies, Inc.

DRILLING / INSTALLATION:
STARTED **9/13/16** COMPLETED: **9/13/16**
DRILLING COMPANY: **Sweeney**
DRILLING EQUIPMENT: **Backhoe**
DRILLING METHOD: **Backhoe**
SAMPLING EQUIPMENT: **Hand Auger**

NORTHING (ft):
EASTING (ft):
LAT:
LONG:
GROUND ELEV (ft):
TOC ELEV (ft):
INITIAL DTW (ft): **Not Encountered**
WELL DEPTH (ft): **---**
STATIC DTW (ft): **Not Encountered**
BOREHOLE DEPTH (ft): **14.0**
WELL CASING DIA. (in): **---**
BOREHOLE DIA. (in): **12**
LOGGED BY: **LM**
CHECKED BY: **MS**

| Time & Depth (feet) | Graphic Log | USCS | Description | Sample | Time Sample ID | Measured Recov. (feet) | Blow Count | Headspace PID (units) | Depth (feet) |
|---|---|---|---|---|---|---|---|---|---|
| | | | **SANDY SILT** ; black and dark brown; FILL (Bricks, glass and black tar) | | 13:30 BH-16-073 -0-2 -20160913 | | | 43 | |
| | | | **CLAY** ; dark gray and black; With sheen and FILL | | BH-16-073@ 2-4' | | | 246 | |
| 5 | | | **SILT** ; black and grayish brown; Micaceous, with FILL (brick, glass and timber) | | BH-16-073@ 4-6' | | | 301 | 5 |
| | | | **SILT** ; black and white; White mica, with FILL, with strong odor | | BH-16-073@ 6-8' | | | 576 | |
| | | | **CLAY** ; white with black; moist; weak cementation | | BH-16-073@ 8-10' | | | 765 | |
| 10 | | | | | BH-16-073@ 10-12' | | | 832 | 10 |
| | | | **CLAY** ; black; moist; With mica | | 14:00 BH-16-073 -12-14 -20160913 | | | 1001 | |
| | | | Borehole terminated at 14 feet. | | | | | | |
| 15 | | | | | | | | | 15 |
| 20 | | | | | | | | | 20 |
| 25 | | | | | | | | | 25 |
| 30 | | | | | | | | | 30 |
| 35 | | | | | | | | | 35 |

GEO FORM 304 2016-07_PHL_AOI8_SOIL BORINGS.GPJ STANTEC ENVIRO TEMPLATE 010509.GDT 11/15/16

PROJECT: **Philadelphia Refinery**
LOCATION: **AOI-8**
PROJECT NUMBER:

WELL / PROBEHOLE / BOREHOLE NO:

# BH-16-074 PAGE 1 OF 1

Aquaterra Technologies, Inc.

DRILLING / INSTALLATION:
STARTED **8/25/16** COMPLETED: **8/25/16**
DRILLING COMPANY: **Sweeney**
DRILLING EQUIPMENT: **Backhoe**
DRILLING METHOD: **Backhoe**
SAMPLING EQUIPMENT: **Hand Auger**

NORTHING (ft):
EASTING (ft):
LAT:
LONG:
GROUND ELEV (ft):
TOC ELEV (ft):
INITIAL DTW (ft): **Not Encountered**
WELL DEPTH (ft): **---**
STATIC DTW (ft): **Not Encountered**
BOREHOLE DEPTH (ft): **8.0**
WELL CASING DIA. (in): **---**
BOREHOLE DIA. (in): **12**
LOGGED BY: **SS**
CHECKED BY: **MS**

| Time & Depth (feet) | Graphic Log | USCS | Description | Sample | Time Sample ID | Measured Recov. (feet) | Blow Count | Headspace PID (units) | Depth (feet) |
|---|---|---|---|---|---|---|---|---|---|
| | | | **GRAVEL WITH SILT AND MEDIUM TO COARSE SAND** ; dark brown; medium to coarse-grained; dry; Fill (slag) | | 08:55 BH-16-074 -0-2 -20160825 | | | 0.0 | |
| | | | | | BH-16-074@ 2-4' | | | 0.0 | |
| 5 | | | **LITTLE SILT LITTLE SAND** ; wet; Fill (slag). Wet at 5' bgs. | | BH-16-074@ 4-6' | | | 1.2 | 5 |
| | | | | | 09:10 BH-16-074 -6-8 -20160825 | | | 13.2 | |
| | | | Borehole terminated at 8 feet. | | | | | | |
| 10 | | | | | | | | | 10 |
| 15 | | | | | | | | | 15 |
| 20 | | | | | | | | | 20 |
| 25 | | | | | | | | | 25 |
| 30 | | | | | | | | | 30 |
| 35 | | | | | | | | | 35 |

GEO FORM 304 2016-07_PHL_AOI8_SOIL BORINGS.GPJ STANTEC ENVIRO TEMPLATE 010509.GDT 11/15/16

PROJECT: **Philadelphia Refinery**
LOCATION: **AOI-8**
PROJECT NUMBER:

WELL / PROBEHOLE / BOREHOLE NO:

# BH-16-075



Aquaterra Technologies, Inc.

DRILLING / INSTALLATION:
STARTED **8/25/16** COMPLETED: **8/25/16**
DRILLING COMPANY: **Sweeney**
DRILLING EQUIPMENT: **Backhoe**
DRILLING METHOD: **Backhoe**
SAMPLING EQUIPMENT: **Hand Auger**

NORTHING (ft):
EASTING (ft):
LAT:
LONG:
GROUND ELEV (ft):
TOC ELEV (ft):
INITIAL DTW (ft): **Not Encountered**
WELL DEPTH (ft): **---**
STATIC DTW (ft): **Not Encountered**
BOREHOLE DEPTH (ft): **6.0**
WELL CASING DIA. (in): **---**
BOREHOLE DIA. (in): **12**
LOGGED BY: **SS**
CHECKED BY: **MS**

| Time & Depth (feet) | Graphic Log | USCS | Description | Sample | Time Sample ID | Measured Recov. (feet) | Blow Count | Headspace PID (units) | Depth (feet) |
|---|---|---|---|---|---|---|---|---|---|
| | | | **GRAVEL WITH SILT AND SAND** ; dark brown; dry; Fill (brick) | | 10:55 BH-16-075 -0-2 -20160825 | | | 25.6 | |
| | | | **SANDY SILT** ; grayish orange and brown; fine-grained; dry; Fill. | | BH-16-075@ 2-4' | | | 5.1 | |
| 5 | | | **LITTLE SILT LITTLE SAND** ; moist to wet; Fill (slag). Wet at 5' bgs. | | 11:10 BH-16-075 -4-6 -20160825 | | | 3.0 | 5 |
| | | | Borehole terminated at 6 feet. | | | | | | |
| 10 | | | | | | | | | 10 |
| 15 | | | | | | | | | 15 |
| 20 | | | | | | | | | 20 |
| 25 | | | | | | | | | 25 |
| 30 | | | | | | | | | 30 |
| 35 | | | | | | | | | 35 |

GEO FORM 304 2016-07_PHL_AOI8_SOIL BORINGS.GPJ STANTEC ENVIRO TEMPLATE 010509.GDT 11/15/16

PROJECT: **Philadelphia Refinery**
LOCATION: **AOI-8**
PROJECT NUMBER:

WELL / PROBEHOLE / BOREHOLE NO:

# BH-16-076



Aquaterra Technologies, Inc.

DRILLING / INSTALLATION:
STARTED **8/25/16** COMPLETED: **8/25/16**
DRILLING COMPANY: **Sweeney**
DRILLING EQUIPMENT: **Backhoe**
DRILLING METHOD: **Backhoe**
SAMPLING EQUIPMENT: **Hand Auger**

NORTHING (ft):
EASTING (ft):
LAT:
LONG:
GROUND ELEV (ft):
TOC ELEV (ft):
INITIAL DTW (ft): **Not Encountered**
WELL DEPTH (ft): **---**
STATIC DTW (ft): **Not Encountered**
BOREHOLE DEPTH (ft): **6.0**
WELL CASING DIA. (in): **---**
BOREHOLE DIA. (in): **12**
LOGGED BY: **SS**
CHECKED BY: **MS**

| Time & Depth (feet) | Graphic Log | USCS | Description | Sample | Time Sample ID | Measured Recov. (feet) | Blow Count | Headspace PID (units) | Depth (feet) |
|---|---|---|---|---|---|---|---|---|---|
| | | | **GRAVEL WITH SILT AND SAND** ; dark brown and black; dry; Fill (brick, concrete) | | 13:10 BH-16-076 -0-2 -20160825 | | | 17.4 | |
| | | | **SANDY SILT** ; gray and tannish brown; dry; Fill. | | BH-16-076@ 2-4' | | | 0.0 | |
| 5 | | | **SANDY SILT** ; dark brown and black; wet; Fill (slag). Wet at 5' bgs. Visible LNAPL. | | 13:30 BH-16-076 -4-6 -20160825 | | | 31.3 | 5 |
| | | | Borehole terminated at 6 feet. | | | | | | |
| 10 | | | | | | | | | 10 |
| 15 | | | | | | | | | 15 |
| 20 | | | | | | | | | 20 |
| 25 | | | | | | | | | 25 |
| 30 | | | | | | | | | 30 |
| 35 | | | | | | | | | 35 |

GEO FORM 304 2016-07_PHL_AOI8_SOIL BORINGS.GPJ STANTEC ENVIRO TEMPLATE 010509.GDT 11/15/16

PROJECT: **Philadelphia Refinery**
LOCATION: **AOI-8**
PROJECT NUMBER:

WELL / PROBEHOLE / BOREHOLE NO:

# BH-16-077



Aquaterra Technologies, Inc.

DRILLING / INSTALLATION:
STARTED **8/25/16** COMPLETED: **8/25/16**
DRILLING COMPANY: **Sweeney**
DRILLING EQUIPMENT: **Backhoe**
DRILLING METHOD: **Backhoe**
SAMPLING EQUIPMENT: **Hand Auger**

NORTHING (ft):
EASTING (ft):
LAT:
LONG:
GROUND ELEV (ft):
TOC ELEV (ft):
INITIAL DTW (ft): **Not Encountered**
WELL DEPTH (ft): **---**
STATIC DTW (ft): **Not Encountered**
BOREHOLE DEPTH (ft): **8.0**
WELL CASING DIA. (in): **---**
BOREHOLE DIA. (in): **12**
LOGGED BY: **SS**
CHECKED BY: **MS**

| Time & Depth (feet) | Graphic Log | USCS | Description | Sample | Time Sample ID | Measured Recov. (feet) | Blow Count | Headspace PID (units) | Depth (feet) |
|---|---|---|---|---|---|---|---|---|---|
| | | | **GRAVEL WITH SILT AND SAND** ; brown to orangeish gray; dry; Fill (brick) | | 11:40 BH-16-077 -0-2 -20160825 | | | 0.0 | |
| | | | **SANDY SILT AND GRAVEL** ; dark brown; dry; Fill. | | BH-16-077@ 2-4' | | | 0.0 | |
| 5 | | | **SILT** ; dark brown and black; moist to wet; Fill (slag). Wet at 5' bgs. Visible LNAPL. | | 12:00 BH-16-077 -4-6 -20160825 | | | 31.1 | 5 |
| | | | | | BH-16-077@ 6-8' | | | 327 | |
| | | | Borehole terminated at 8 feet. | | | | | | |
| 10 | | | | | | | | | 10 |
| 15 | | | | | | | | | 15 |
| 20 | | | | | | | | | 20 |
| 25 | | | | | | | | | 25 |
| 30 | | | | | | | | | 30 |
| 35 | | | | | | | | | 35 |

GEO FORM 304 2016-07_PHL_AOI8_SOIL BORINGS.GPJ STANTEC ENVIRO TEMPLATE 010509.GDT 11/15/16

PROJECT: Philadelphia Refinery Complex
LOCATION: AOI-8 Point Breeze North Yard, Philadelphia, PA
PROJECT NUMBER: 213402435

WELL / PROBEHOLE / BOREHOLE NO: N-146
PAGE 1 OF 1

Stantec

DRILLING: STARTED 11/5/13 COMPLETED: 11/8/13
INSTALLATION: STARTED COMPLETED:
DRILLING COMPANY: Total Quality Drilling
DRILLING EQUIPMENT: Mobil B57
DRILLING METHOD: Hollow Stem Auger
SAMPLING EQUIPMENT: Hand Auger/Split Spoon

NORTHING (ft): 227726 EASTING (ft): 2682830
LATITUDE: LONGITUDE:
GROUND ELEV (ft): 22.775 TOC ELEV (ft): 26.31
INITIAL DTW (ft): ~21 BOREHOLE DEPTH (ft): 26
STATIC DTW (ft): ~16 WELL DEPTH (ft): 26
WELL CASING DIAMETER (in): 4 BOREHOLE DIAMETER (in): 12
LOGGED BY: J. DeBoer CHECKED BY: J. Menges

| Time & Depth (feet) | Graphic Log | USCS | Description | Sample | Time Sample ID | Measured Recov. (feet) | Blow Count | Headspace PID (ppm) | Depth (feet) | Well Construction |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | 0'-2' - FILL, gray, medium sand and gravel, moist | | 1300 AOI-8-N-146 0-2 | | | 0.0 | | |
| 2 | | | 2'-10' - FILL, black and brown, fine sand and clay, some rounded gravel | | -- -- | | | 1.1 | | |
| 3 | | | | | | | | | | |
| 4 | | | | | -- -- | | | 3.8 | | |
| 5 | | | | | | | | | 5 | 4" PVC Riser |
| 6 | | | 6'-8' - Moist to wet | | -- -- | | | 1.6 | | Bentonite Slurry |
| 7 | | | | | | | | | | |
| 8 | | | | | -- -- | | | 0.0 | | |
| 9 | | | | | | 0.7 | 4 8 9 26 | | | |
| 10 | | | 9.5'-10' - Brick<br>10'-21' - FILL, white and black to brown, fine to medium sand and clay, sand is flaked mica, very light, moist, likely "clay-like" material for tank dike | | -- -- | | | 0.0 | 10 | |
| 11 | | | | | | 1.2 | 6 6 6 6 | | | |
| 12 | | | | | -- -- | | | 25 | | |
| 13 | | | | | | 1.2 | 3 3 5 6 | | | |
| 14 | | | | | -- -- | | | 38 | | |
| 15 | | | | | | 2 | 5 6 9 9 | | 15 | |
| 16 | | | | | | | | | | |
| 17 | | | | | 1415 AOI-8-N-146 17-18 | 2 | 4 5 4 4 | 55 | | |
| 18 | | | | | | | | | | #1 Sand |
| 19 | | | | | -- -- | NM | 3 4 5 5 | 51 | | 4" 0.020 PVC Screen |
| 20 | | | | | -- -- | | 4 8 9 8 | 0.0 | 20 | |
| 21 | | | 21'-25' - FILL, dark gray clay, sand and gravel, wet | | | NM | | | | |
| 22 | | | | | -- -- | | 3 5 5 7 | 0.0 | | |
| 23 | | | | | | NM | | | | |
| 24 | | | Glass fragment at 24' | | -- -- | | 4 | 0.0 | | |
| 25 | | | Auger refusal and wood fragment at 25'<br>Brick fragment at 25.5' | | | NM | 49 30 49 | | 25 | |
| 26 | | | Borehole terminated at 26 feet<br>Notes: Hydroexcavated to 8 feet<br>NM - Not Measured | | | | | | | |
| 27 | | | | | | | | | | |
| 28 | | | | | | | | | | |
| 29 | | | | | | | | | | |

# Aquaterra Technologies, Inc.
# Subsurface Log: GP-1

**Project Name:** Tank 552
**Location:** Point Breeze Refinery
**Boring Number:** GP-1
**Casing Elevation:** N/A
**Screen Diameter:** N/A **Length:** N/A
**Casing Diameter:** N/A **Length:** N/A
**Drilling Method:** Geoprobe

**Owner:** Sunoco, Inc. (R&M)
**Permit No.:** N/A
**Log By:** M. Brad Spancake
**Driller:** BL Myers
**Slot Size:** N/A
**Type:** N/A
**Sample Method:** Acetate Sleeve

**Date:** 6/3/03
**Borehole Dia:** N/A
**Water Level (Init):** 12
**Rig Type:**

**Total Boring Depth:** 16'
**Screen Interval:** N/A
**Sand Pack Interval:** N/A
**Completion Details:** N/A

**Construction Details**
**Bentonite Interval:** N/A
**Cement/Grout Interval:** N/A
**Sand Pack Type:** N/A

= Backfill
= Cement/Grout
= Bentonite
= Sand

| Depth (ft) | Sample Depth (ft) | PID (ppm) | Recovery (ft) | Lithology |
|---|---|---|---|---|
| 0 | 0-2 | 26 | 2 | Backfill material, light brown silt, medium grain sand and gravel. Dry |
| 2 | 2-4 | 37 | 2 | Slightly moist medium brown silt. Coarse sand and gravel |
| 4 | 4-6 | 0 | 2 | Medium brown clay and silt, slightly moist. Some gravel |
| 6 | 6-8 | 103 | 2 | Same as above |
| 8 | 8-10 | 141 | 2 | Medium brown silt and clay, some gravel and fine sand. Slightly moist |
| 10 | 10-12 | 399 | 2 | Gravel and coarse sand in a medium brown silt matrix. Becoming wet. |
| 12 | **12-14** | 372 | 2 | Wet sand and gravel in a medium brown silt and rock matrix. |
| 14 | 14-16 | 223 | 2 | Same as above |
| 16 | | | | End boring at 16' BGS |

NOTE: Shaded sample submitted for laboratory analysis

# Aquaterra Technologies, Inc.
# Subsurface Log: GP-2

**Project Name:** Tank 552
**Location:** Point Breeze Refinery
**Boring Number:** GP-2
**Casing Elevation:** N/A
**Screen Diameter:** N/A **Length:** N/A
**Casing Diameter:** N/A **Length:** N/A
**Drilling Method:** Geoprobe

**Owner:** Sunoco, Inc. (R&M)
**Permit No.:** N/A
**Log By:** M. Brad Spancake
**Driller:** BL Myers
**Slot Size:** N/A
**Type:** N/A
**Sample Method:** Acetate Sleeve

**Date:** 6/3/03
**Borehole Dia:** N/A
**Water Level (Init):** 10'
**Rig Type:**

**Total Boring Depth:** 12'
**Screen Interval:** N/A
**Sand Pack Interval:** N/A
**Completion Details:** N/A

**Construction Details**
**Bentonite Interval:** N/A
**Cement/Grout Interval:** N/A
**Sand Pack Type:** N/A

= Backfill
= Cement/Grout
= Bentonite
= Sand

| Depth (ft) | Sample Depth (ft) | PID (ppm) | Recovery (ft) | Lithology |
|---|---|---|---|---|
| 0 | 0-2 | 0 | 2 | Backfill material, medium brown silt and gravel, stones. Dry |
| 2 | 2-4 | 13 | 1 | Slightly moist, same as above. |
| 4 | 4-6 | 200 | 2 | Wet backfill material, stained brown silt and clay matrix |
| 6 | 6-8 | 163 | 1 | Slightly moist brown clay and silt matrix. Thin layer of fine sand |
| 8 | 8-10 | 379 | 2 | Moist to wet coarse sand and gravel in medium brown silt matrix |
| 10 | **10-12** | 343 | 2 | Same as above |
| 12 | | | | End boring at 12' BGS |

NOTE: Shaded sample submitted for laboratory analysis

# Aquaterra Technologies, Inc.
# Subsurface Log: GP-3

**Project Name:** Tank 552
**Location:** Point Breeze Refinery
**Boring Number:** GP-3
**Casing Elevation:** N/A
**Screen Diameter:** N/A **Length:** N/A
**Casing Diameter:** N/A **Length:** N/A
**Drilling Method:** Geoprobe

**Owner:** Sunoco, Inc. (R&M)
**Permit No.:** N/A
**Log By:** M. Brad Spancake
**Driller:** BL Myers
**Slot Size:** N/A
**Type:** N/A
**Sample Method:** Acetate Sleeve

**Date: 6/3/03**
**Borehole Dia: N/A**
**Water Level (Init): 10'**

**Rig Type:**

**Total Boring Depth:** 12'
**Screen Interval:** N/A
**Sand Pack Interval:** N/A
**Completion Details:** N/A

**Construction Details**
**Bentonite Interval:** N/A
**Cement/Grout Interval:** N/A
**Sand Pack Type:** N/A

= Backfill
= Cement/Grout
= Bentonite
= Sand

| Depth (ft) | Sample Depth (ft) | PID (ppm) | Recovery (ft) | Lithology |
|---|---|---|---|---|
| 0 | 0-2 | 32 | 2 | Backfill material, medium brown silt matrix with some gravel. Staining at bottom. Rock in bottom of sleeve |
| 2 | 2-4' | NA | 0 | N/A |
| 4 | 4-6' | 127 | 2 | Medium brown silt and clay. Stained at the top. Slightly moist, some gravel and sand |
| 6 | 6-8' | 293 | 2 | Moist fine sand in a dark brown silt and clay matrix. Some gravel towards bottom |
| 8 | **8-10'** | 574 | 2 | Moist to wet coarse sand in brown silt and clay matrix. Gravel and small rocks. |
| 10 | 10-12' | 405 | 1 | Wet, same as above |
| 12 | | | | End boring at 12' BGS |

NOTE: Shaded sample submitted for laboratory analysis

# Aquaterra Technologies, Inc.
# Subsurface Log: GP-4

**Project Name:** Tank 552
**Location:** Point Breeze Refinery
**Boring Number:** GP-4
**Casing Elevation:** N/A
**Screen Diameter:** N/A **Length:** N/A
**Casing Diameter:** N/A **Length:** N/A
**Drilling Method:** Geoprobe

**Owner:** Sunoco, Inc. (R&M)
**Permit No.:** N/A
**Log By:** M. Brad Spancake
**Driller:** BL Myers
**Slot Size:** N/A
**Type:** N/A
**Sample Method:** Acetate Sleeve

**Date:** 6/3/03
**Borehole Dia:** N/A
**Water Level (Init):** 10'
**Rig Type:**

**Total Boring Depth:** 12'
**Screen Interval:** N/A
**Sand Pack Interval:** N/A
**Completion Details:** N/A

**Construction Details**
**Bentonite Interval:** N/A
**Cement/Grout Interval:** N/A
**Sand Pack Type:** N/A

= Backfill
= Cement/Grout
= Bentonite
= Sand

| Depth (ft) | Sample Depth (ft) | PID (ppm) | Recovery (ft) | Lithology |
|---|---|---|---|---|
| 0 | 0-2 | 0 | 2 | Gravel and subangular base stone |
| 2 | 2-4 | 2 | 1 | Medium brown silt and clay |
| 4 | 4-6 | 0 | 2 | Same as above |
| 6 | 6-8 | 22 | 1 | Coarse sand in a brown silt matrix with small gravel. Slightly moist |
| 8 | 8-10 | 165 | 2 | Same as above |
| 10 | **10-12** | 492 | 2 | Wet, same as above |
| 12 | | | | End boring at 12' BGS |

NOTE: Shaded sample submitted for laboratory analysis

# Aquaterra Technologies, Inc.
# Subsurface Log: GP-5

**Project Name:** Tank 552
**Location:** Point Breeze Refinery
**Boring Number:** GP-5
**Casing Elevation:** N/A
**Screen Diameter:** N/A **Length:** N/A
**Casing Diameter:** N/A **Length:** N/A
**Drilling Method:** Geoprobe

**Owner:** Sunoco, Inc. (R&M)
**Permit No.:** N/A
**Log By:** M. Brad Spancake
**Driller:** BL Myers
**Slot Size:** N/A
**Type:** N/A
**Sample Method:** Acetate Sleeve

**Date:** 6/4/03
**Borehole Dia:** N/A
**Water Level (Init):** 10'

**Rig Type:**

**Total Boring Depth:** 12'
**Screen Interval:** N/A
**Sand Pack Interval:** N/A
**Completion Details:** N/A

**Construction Details**
**Bentonite Interval:** N/A
**Cement/Grout Interval:** N/A
**Sand Pack Type:** N/A

= Backfill
= Cement/Grout
= Bentonite
= Sand

| Depth (ft) | Sample Depth (ft) | PID (ppm) | Recovery (ft) | Lithology |
|---|---|---|---|---|
| 0 | 0-2 | 0 | 2 | Backfill material, medium brown/orange silty clay with some sand |
| 2 | 2-4 | 0 | 2 | Dark brown clay and silt matrix, slightly moist with some fine sand |
| 4 | 4-6 | 3.5 | 2 | Fine sand in a brown silt matrix |
| 6 | 6-8 | 23 | 2 | Medium and coarse sand and gravel in a dark brown silt matrix. |
| 8 | 8-10 | 546 | 2 | Coarse sand, gravel, and rock in brown silt matrix, slightly moist |
| 10 | **10-12** | 411 | 2 | Wet fine and medium sand in brown silt matrix |
| 12 | | | | End boring at 12' BGS |

NOTE: Shaded sample submitted for laboratory analysis

# Aquaterra Technologies, Inc.
# Subsurface Log: GP-6

**Project Name:** Tank 552
**Location:** Point Breeze Refinery
**Boring Number:** GP-6
**Casing Elevation:** N/A
**Screen Diameter:** N/A **Length:** N/A
**Casing Diameter:** N/A **Length:** N/A
**Drilling Method:** Geoprobe

**Owner:** Sunoco, Inc. (R&M)
**Permit No.:** N/A
**Log By:** M. Brad Spancake
**Driller:** BL Myers
**Slot Size:** N/A
**Type:** N/A
**Sample Method:** Acetate Sleeve

**Date: 6/4/03**
**Borehole Dia: N/A**
**Water Level (Init): 10'**

**Rig Type:**

**Total Boring Depth:** 12'
**Screen Interval:** N/A
**Sand Pack Interval:** N/A
**Completion Details:** N/A

**Construction Details**
**Bentonite Interval:** N/A
**Cement/Grout Interval:** N/A
**Sand Pack Type:** N/A

= Backfill
= Cement/Grout
= Bentonite
= Sand

| Depth (ft) | Sample Depth (ft) | PID (ppm) | Recovery (ft) | Lithology |
|---|---|---|---|---|
| 0 | 0-2 | 4.5 | 2 | Backfill material, brown silt and clay matrix, rocks and some gravel |
| 2 | 2-4 | 2.3 | 1 | Slightly moist brown silt and clay matrix, some fine sand |
| 4 | 4-6 | 13 | 2 | Same as above, coarse sand and gravel in bottom, some rock fragments |
| 6 | 6-8 | 7 | 1.5 | Coarse sand and gravel in brown silt matrix with gravel and rock fragments |
| 8 | 8-10 | 583 | 2 | Moist brown silt matrix with coarse sand and gravel, small rock fragments. |
| 10 | **10-12** | 616 | 2 | Wet dark brown silt, some small pebble and fine sand. Clay in bottom. |
| 12 | | | | |

NOTE: Shaded sample submitted for laboratory analysis

# Aquaterra Technologies, Inc.
# Subsurface Log: GP-7

**Project Name:** Tank 552
**Location:** Point Breeze Refinery
**Boring Number:** GP-7
**Casing Elevation:** N/A
**Screen Diameter:** N/A **Length:** N/A
**Casing Diameter:** N/A **Length:** N/A
**Drilling Method:** Geoprobe

**Owner:** Sunoco, Inc. (R&M)
**Permit No.:** N/A
**Log By:** M. Brad Spancake
**Driller:** BL Myers
**Slot Size:** N/A
**Type:** N/A
**Sample Method:** Acetate Sleeve

**Date: 6/4/03**
**Borehole Dia: N/A**
**Water Level (Init): 10'**
**Rig Type:**

**Total Boring Depth:** 12'
**Screen Interval:** N/A
**Sand Pack Interval:** N/A
**Completion Details:** N/A

**Construction Details**
**Bentonite Interval:** N/A
**Cement/Grout Interval:** N/A
**Sand Pack Type:** N/A

= Backfill
= Cement/Grout
= Bentonite
= Sand

| Depth (ft) | Sample Depth (ft) | PID (ppm) | Recovery (ft) | Lithology |
|---|---|---|---|---|
| 0 | 0-2 | 13 | 2 | Backfill material to brown/orange compact clay |
| 2 | 2-4 | 2 | 1.5 | Same as above |
| 4 | 4-6 | 4.5 | 2 | Fine sand in brown silt matrix, slightly moist |
| 6 | 6-8 | 3.2 | 1.5 | Brown silt matrix with fine and coarse sand, gravel, and small rock. Slightly moist |
| 8 | 8-10 | 133 | 2 | Brown silt matrix with coarse sand and gravel, small rocks. Moist to wet |
| 10 | **10-12** | 231 | 2 | Wet. Same as above. Bottom 1' was brown/orange compact clay |
| 12 | | | | End boring at 12' BGS |

NOTE: Shaded sample submitted for laboratory analysis

# Aquaterra Technologies, Inc.
# Subsurface Log: GP-8

**Project Name:** Tank 552
**Location:** Point Breeze Refinery
**Boring Number:** GP-8
**Casing Elevation:** N/A
**Screen Diameter:** N/A **Length:** N/A
**Casing Diameter:** N/A **Length:** N/A
**Drilling Method:** Geoprobe

**Owner:** Sunoco, Inc. (R&M)
**Permit No.:** N/A
**Log By:** M. Brad Spancake
**Driller:** BL Myers
**Slot Size:** N/A
**Type:** N/A
**Sample Method:** Acetate Sleeve

**Date: 6/4/03**
**Borehole Dia: N/A**
**Water Level (Init): 10'**
**Rig Type:**

**Total Boring Depth:** 12'
**Screen Interval:** N/A
**Sand Pack Interval:** N/A
**Completion Details:** N/A

**Construction Details**
**Bentonite Interval:** N/A
**Cement/Grout Interval:** N/A
**Sand Pack Type:** N/A

= Backfill
= Cement/Grout
= Bentonite
= Sand

| Depth (ft) | Sample Depth (ft) | PID (ppm) | Recovery (ft) | Lithology |
|---|---|---|---|---|
| 0 | 0-2 | 6 | 2 | Backfill material, clay and brown silt matrix |
| 2 | 2-4 | 3 | 1 | Same as above |
| 4 | 4-6 | 6 | 2 | Same as above |
| 6 | 6-8 | 2 | 2 | Gray clay and brown silt matrix, sand and gravel in bottom 2" |
| 8 | 8-10 | N/A | 0 | Sleeve stuck, No recovery |
| 10 | **10-12** | 114 | 1.5 | Wet coarse sand and gravel in dark brown and gray silt and clay. Orange/gray clay in bottom |
| 12 | | | | End boring at 12' BGS |

NOTE: Shaded sample submitted for laboratory analysis

# Aquaterra Technologies, Inc.
# Subsurface Log: GP-9

**Project Name:** Tank 552
**Location:** Point Breeze Refinery
**Boring Number:** GP-9
**Casing Elevation:** N/A
**Screen Diameter:** N/A **Length:** N/A
**Casing Diameter:** N/A **Length:** N/A
**Drilling Method:** Geoprobe

**Owner:** Sunoco, Inc. (R&M)
**Permit No.:** N/A
**Log By:** M. Brad Spancake
**Driller:** BL Myers
**Slot Size:** N/A
**Type:** N/A
**Sample Method:** Acetate Sleeve

**Date:** 6/4/03
**Borehole Dia:** N/A
**Water Level (Init):** 10'
**Rig Type:**

**Total Boring Depth:** 12'
**Screen Interval:** N/A
**Sand Pack Interval:** N/A
**Completion Details:** N/A

**Construction Details**
**Bentonite Interval:** N/A
**Cement/Grout Interval:** N/A
**Sand Pack Type:** N/A

= Backfill
= Cement/Grout
= Bentonite
= Sand

| Depth (ft) | Sample Depth (ft) | PID (ppm) | Recovery (ft) | Lithology |
|---|---|---|---|---|
| 0 | 0-2 | 74 | 2 | Backfill material to brown/gray clay |
| 2 | 2-4 | 17 | 2 | Same as above, slight moisture and gravel towards bottom |
| 4 | 4-6 | 23 | 2 | Brown clay and silt matrix, some fine sand. Slightly moist |
| 6 | 6-8 | 17 | 2 | Fine to medium tan sand, rock fragments in a brown silt matrix. Coarse sand and gravel at the bottom, becoming moist |
| 8 | 8-10 | 54 | 2 | Moist sand and gravel in a brown/gray silt, becoming wet |
| 10 | **10-12** | 132 | 2 | Same as above, grey sand at bottom, wet |
| 12 | | | | End boring at 12' BGS |

NOTE: Shaded sample submitted for laboratory analysis

# Aquaterra Technologies, Inc.
# Subsurface Log: GP-10

**Project Name:** Tank 552
**Location:** Point Breeze Refinery
**Boring Number:** GP-10
**Casing Elevation:** N/A
**Screen Diameter:** N/A **Length:** N/A
**Casing Diameter:** N/A **Length:** N/A
**Drilling Method:** Geoprobe

**Owner:** Sunoco, Inc. (R&M)
**Permit No.:** N/A
**Log By:** M. Brad Spancake
**Driller:** BL Myers
**Slot Size:** N/A
**Type:** N/A
**Sample Method:** Acetate Sleeve

**Date:** 6/4/03
**Borehole Dia:** N/A
**Water Level (Init):** 10'
**Rig Type:**

**Total Boring Depth:** 12'
**Screen Interval:** N/A
**Sand Pack Interval:** N/A
**Completion Details:** N/A

**Construction Details**
**Bentonite Interval:** N/A
**Cement/Grout Interval:** N/A
**Sand Pack Type:** N/A

= Backfill
= Cement/Grout
= Bentonite
= Sand

| Depth (ft) | Sample Depth (ft) | PID (ppm) | Recovery (ft) | Lithology |
|---|---|---|---|---|
| 0 | 0-2 | 1 | 2 | Backfill to gray/brown clay and silt matrix |
| 2 | 2-4 | 0 | 1 | Same as above |
| 4 | 4-6 | 4 | 2 | Same as above |
| 6 | 6-8 | 1 | 2 | Medium sand in brown silt matrix. Some gravel and rock. Slightly moist |
| 8 | 8-10 | 13 | 2 | Coarse sand and gravel in brown silt matrix, becoming wet |
| 10 | **10-12** | 65 | 2 | Wet, same as above. Gray clay in bottom of sample |
| 12 | | | | End boring at 12' BGSA |

NOTE: Shaded sample submitted for laboratory analysis

# Aquaterra Technologies, Inc.
# Subsurface Log: GP-11

**Project Name:** Tank 552
**Location:** Point Breeze Refinery
**Boring Number:** GP-11
**Casing Elevation:** N/A
**Screen Diameter:** N/A **Length:** N/A
**Casing Diameter:** N/A **Length:** N/A
**Drilling Method:** Geoprobe

**Owner:** Sunoco, Inc. (R&M)
**Permit No.:** N/A
**Log By:** M. Brad Spancake
**Driller:** BL Myers
**Slot Size:** N/A
**Type:** N/A
**Sample Method:** Acetate Sleeve

**Date: 6/4/03**
**Borehole Dia: N/A**
**Water Level (Init): 10'**
**Rig Type:**

**Total Boring Depth:** 12'
**Screen Interval:** N/A
**Sand Pack Interval:** N/A
**Completion Details:** N/A

**Construction Details**
**Bentonite Interval:** N/A
**Cement/Grout Interval:** N/A
**Sand Pack Type:** N/A

= Backfill
= Cement/Grout
= Bentonite
= Sand

| Depth (ft) | Sample Depth (ft) | PID (ppm) | Recovery (ft) | Lithology |
|---|---|---|---|---|
| 0 | 0-2 | 1 | 2 | Backfill material to brown silt and clay matrix, some gravel |
| 2 | 2-4 | 1 | 1 | Brown silt and clay, slight moisture |
| 4 | 4-6 | 19 | 2 | Same as above. Becoming medium sand and gravel, slight moisture |
| 6 | 6-8 | 118 | 2 | Coarse sand and gravel in brown silt matrix, some rock fragments. Becoming moist |
| 8 | 8-10 | 135 | 2 | Moist coarse sand, gravel and rock fragments in brown silt matrix. Becoming wet at bottom |
| 10 | **10-12** | 227 | 2 | Same as above, wet. Clay in bottom of sample |
| 12 | | | | |

NOTE: Shaded sample submitted for laboratory analysis

# Evergreen Comprehensive List (June 2016)

| VOCs by EPA Method 8260 | CAS No. |
|---|---|
| Benzene | 71-43-2 |
| Butylbenzene, sec- | 135-98-8 |
| Butylbenzene, tert- | 98-06-6 |
| Cumene | 98-82-8 |
| Cyclohexane | 110-82-7 |
| Dichloroethane, 1,2- | 107-06-2 |
| Ethylbenzene | 100-41-4 |
| Ethylene Dibromide* | 106-93-4 |
| Hexane | 110-54-3 |
| Methyl tert butyl ether | 1634-04-4 |
| Toluene | 108-88-3 |
| Trimethylbenzene, 1,2,4- | 95-63-6 |
| Trimethylbenzene, 1,3,5- | 108-67-8 |
| Xylenes | 1330-20-7 |

| Metals by Method 6010/6020 | CAS No. |
|---|---|
| Cobalt *** | 7440-48-4 |
| Lead*** | 7439-92-1 |
| Nickel*** | 7440-02-0 |
| Vanadium*** | 7440-62-2 |
| Zinc*** | 7440-66-6 |

| SVOCs by EPA Method 8270 | CAS No. |
|---|---|
| Acenaphthene | 83-32-9 |
| Anthracene | 120-12-7 |
| Benzo(a)anthracene | 56-55-3 |
| Benzo(a)pyrene | 50-32-8 |
| Benzo(b)fluroranthene | 205-99-2 |
| Benzo(g,h,i)perylene | 191-24-2 |
| Benzo(k)fluoranthene | 207-08-9 |
| Biphenyl, 1,1- | 92-52-4 |
| Bis(2-ethylhexyl) phthalate | 117-81-7 |
| Chrysene | 218-01-9 |
| Cresol, m- (3-methylphenol) | 108-39-4 |
| Cresol, o- (2-methylphenol) | 95-48-7 |
| Cresol, p- (4-methylphenol) | 106-44-5 |
| Dibenz(a,h)anthracene | 53-70-3 |
| Diethyl phthalate | 84-66-2 |
| Dimethylphenol, 2,4- | 105-67-9 |
| Dibutyl phthalate, n- | 84-74-2 |
| Dinitrophenol, 2,4- | 51-28-5 |
| Fluoranthene | 206-44-0 |
| Fluorene | 86-73-7 |
| Indeno(1,2,3-cd)pyrene | 193-39-5 |
| Methylnaphthalene, 2- | 91-57-6 |
| Naphthalene** | 91-20-3 |
| Nitrophenol, 4- | 100-02-7 |
| Phenanthrene | 85-01-8 |
| Phenol | 108-95-2 |
| Pyrene | 129-00-0 |
| Pyridine | 110-86-1 |
| Quinoline | 91-22-5 |

*Ethylene Dibromide (EDB) should be analyzed by Method 8011 instead of 8260 in soil for tank investigations and in **all groundwater samples**. EDB in all trip blank samples should be analyzed by 8260 regardless of method used for primary samples.

**Naphthalene should be analyzed by EPA Method 8260 instead of 8270 for tank investigations.

***Metals analysis should be total in soil and dissolved in groundwater.

This list is generated from the PADEP SERO Crude Oil Parameters for Corrective Action (CDB|SERO|PADEP|9 Aug 2013) combined with PADEP Short List of Petroleum Products (leaded and unleaded gasoline and No. 1, 2, 4, 5, 6 Fuel Oils).

Lancaster Laboratories

ANALYTICAL RESULTS

Prepared for:

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381
610-431-5733

Prepared by:

Lancaster Laboratories
2425 New Holland Pike
Lancaster, PA 17605-2425

SAMPLE GROUP

The sample group for this submittal is 854405. Samples arrived at the laboratory on Wednesday, June 04, 2003. The PO# for this group is TANK 552.

| Client Description | Lancaster Labs Number |
|---|---|
| GP-1 12-14' Grab Soil Sample | 4056154 |
| GP-2 10-12' Grab Soil Sample | 4056155 |
| GP-3 8-10' Grab Soil Sample | 4056156 |
| GP-4 10-12' Grab Soil Sample | 4056157 |

1 COPY TO SUN: Aquaterra Tech. Attn: Mr. Kevin Martin

Questions? Contact your Client Services Representative
Sandra L Patton at (717) 656-2300.

Respectfully Submitted,

Victoria M. Martell
Chemist

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4056154**

Collected:06/03/2003 09:05 by MBS

Account Number: 10132

Submitted: 06/04/2003 18:30
Reported: 06/18/2003 at 16:49
Discard: 06/26/2003
GP-1 12-14' Grab Soil Sample

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

SUN: Point Breeze - Tank 552 Closure

GP112

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | n.a. | 12.3 | 0.50 | % | 1 |
| | "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. | | | | | |
| 08179 | BTEX/MTBE/Cumene/Napht.(8021) | | | | | |
| 08183 | Benzene | 71-43-2 | < 110. | 110. | ug/kg | 386 |
| 08184 | Toluene | 108-88-3 | < 230. | 230. | ug/kg | 386 |
| 08185 | Ethylbenzene | 100-41-4 | < 340. | 340. | ug/kg | 386 |
| 08186 | Total Xylenes | 1330-20-7 | < 3,400. | 3,400. | ug/kg | 386 |
| 08188 | Isopropylbenzene | 98-82-8 | 4,000. | 180. | ug/kg | 386 |
| 08189 | Naphthalene | 91-20-3 | 16,000. | 8,800. | ug/kg | 386 |
| | The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately. | | | | | |

Sufficient sample volume was not available to perform a MS/MSD for this analysis. Therefore, a LCS/LCSD was performed to demonstrate precision and accuracy at a batch level.

Due to the presence of interferents near their retention time, normal reporting limits were not attained for the compounds listed below. The presence or concentration of these compounds cannot be determined below the reporting limits due to the presence of these interferents.
benzene, toluene, ethylbenzene, and total xylenes

The concentration reported for naphthalene is the maximum amount that could be in the soil. There are compounds coeluting with naphthalene that may be adding additional mass to its peak. Therefore, the actual concentration of naphthalene may be less than what is being reported.

Poor surrogate recoveries were observed for this sample due to the dilution needed to perform the analysis.

00941 PAH's in Solids by HPLC

MEMBER ACIL
Lancaster Laboratories, Inc.
2425 New Holland Pike
PO Box 12425
Lancaster, PA 17605-2425
717-656-2300 Fax: 717-656-2681

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4056154**

Collected:06/03/2003 09:05 by MBS

Account Number: 10132

Submitted: 06/04/2003 18:30
Reported: 06/18/2003 at 16:49
Discard: 06/26/2003
GP-1 12-14' Grab Soil Sample

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

SUN: Point Breeze - Tank 552 Closure

GP112

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|
| 00974 | Fluorene | 86-73-7 | 4,400. | 310. | ug/kg | 10 |
| 01007 | Phenanthrene | 85-01-8 | 14,000. | 760. | ug/kg | 50 |

The surrogate data is outside the QC limits due to unresolvable matrix problems evident in the sample extraction.

Due to the sample matrix an initial dilution was necessary to perform the analysis. Therefore, the reporting limits for the PAH by HPLC compounds were raised.

Commonwealth of Pennsylvania Lab Certification No. 36-037

## Laboratory Chronicle

| CAT No. | Analysis Name | Method | Trial# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | EPA 160.3 modified | 1 | 06/05/2003 16:53 | Scott W Freisher | 1 |
| 08179 | BTEX/MTBE/Cumene/Napht.(8021) | SW-846 8021B | 1 | 06/06/2003 12:16 | Deborah S Garrison | 386 |
| 00941 | PAH's in Solids by HPLC | SW-846 8310 | 1 | 06/14/2003 07:17 | Timothy J Trees | 10 |
| 00941 | PAH's in Solids by HPLC | SW-846 8310 | 1 | 06/16/2003 03:01 | Timothy J Trees | 50 |
| 03338 | PAH Solid Extraction | SW-846 3550B | 1 | 06/05/2003 10:00 | Olivia Arosemena | 1 |
| 08390 | High Level Volatile Soil Prep | SW-846 5035 | 1 | 06/04/2003 21:10 | Medina A Long | n.a. |

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4056155**

Collected:06/03/2003 09:40 by MBS

Account Number: 10132

Submitted: 06/04/2003 18:30
Reported: 06/18/2003 at 16:49
Discard: 06/26/2003
GP-2 10-12' Grab Soil Sample

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

SUN: Point Breeze - Tank 552 Closure

GP210

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | n.a. | 22.2 | 0.50 | % | 1 |

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.

| | | | | | | |
|---|---|---|---|---|---|---|
| 08179 | BTEX/MTBE/Cumene/Napht.(8021) | | | | | |
| 08183 | Benzene | 71-43-2 | < 220. | 220. | ug/kg | 850 |
| 08184 | Toluene | 108-88-3 | < 510. | 510. | ug/kg | 850 |
| 08185 | Ethylbenzene | 100-41-4 | < 770. | 770. | ug/kg | 850 |
| 08186 | Total Xylenes | 1330-20-7 | < 4,500. | 4,500. | ug/kg | 850 |
| 08188 | Isopropylbenzene | 98-82-8 | 13,000. | 440. | ug/kg | 850 |
| 08189 | Naphthalene | 91-20-3 | 33,000. | 870. | ug/kg | 850 |

The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.

Sufficient sample volume was not available to perform a MS/MSD for this analysis. Therefore, a LCS/LCSD was performed to demonstrate precision and accuracy at a batch level.

Due to the presence of interferents near their retention time, normal reporting limits were not attained for the compounds listed below. The presence or concentration of these compounds cannot be determined below the reporting limits due to the presence of these interferents.
benzene, toluene, ethylbenzene, and total xylenes

The concentration reported for naphthalene is the maximum amount that could be in the soil. There are compounds coeluting with naphthalene that may be adding additional mass to its peak. Therefore, the actual concentration of naphthalene may be less than what is being reported.

Poor surrogate recoveries were observed for this sample due to the dilution needed to perform the analysis.

00941 PAH's in Solids by HPLC

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4056155**

Collected:06/03/2003 09:40 by MBS

Account Number: 10132

Submitted: 06/04/2003 18:30
Reported: 06/18/2003 at 16:49
Discard: 06/26/2003
GP-2 10-12' Grab Soil Sample

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

SUN: Point Breeze - Tank 552 Closure

GP210

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|
| 00974 | Fluorene | 86-73-7 | 1,600. | 350. | ug/kg | 10 |
| 01007 | Phenanthrene | 85-01-8 | 4,800. | 170. | ug/kg | 10 |

The surrogate data is outside the QC limits due to unresolvable matrix problems evident in the sample extraction.

The quantitation limits for the HPLC PAH compounds were raised because sample dilution was necessary to bring target compounds into the calibration range of the system.

Commonwealth of Pennsylvania Lab Certification No. 36-037

## Laboratory Chronicle

| CAT No. | Analysis Name | Method | Trial# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | EPA 160.3 modified | 1 | 06/05/2003 16:53 | Scott W Freisher | 1 |
| 08179 | BTEX/MTBE/Cumene/Napht.(8021) | SW-846 8021B | 1 | 06/06/2003 16:51 | Deborah S Garrison | 850 |
| 00941 | PAH's in Solids by HPLC | SW-846 8310 | 1 | 06/14/2003 15:17 | Timothy J Trees | 10 |
| 03338 | PAH Solid Extraction | SW-846 3550B | 1 | 06/05/2003 10:00 | Olivia Arosemena | 1 |
| 08390 | High Level Volatile Soil Prep | SW-846 5035 | 1 | 06/04/2003 21:11 | Medina A Long | n.a. |

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4056156**

Collected:06/03/2003 10:30 by MBS

Account Number: 10132

Submitted: 06/04/2003 18:30
Reported: 06/18/2003 at 16:49
Discard: 06/26/2003
GP-3 8-10' Grab Soil Sample

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

SUN: Point Breeze - Tank 552 Closure

GP3-8

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | n.a. | 7.3 | 0.50 | % | 1 |
| | "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. | | | | | |
| 08179 | BTEX/MTBE/Cumene/Napht.(8021) | | | | | |
| 08183 | Benzene | 71-43-2 | < 190. | 190. | ug/kg | 890 |
| 08184 | Toluene | 108-88-3 | < 220. | 220. | ug/kg | 890 |
| 08185 | Ethylbenzene | 100-41-4 | < 540. | 540. | ug/kg | 890 |
| 08186 | Total Xylenes | 1330-20-7 | < 4,300. | 4,300. | ug/kg | 890 |
| 08188 | Isopropylbenzene | 98-82-8 | 6,400. | 380. | ug/kg | 890 |
| 08189 | Naphthalene | 91-20-3 | 19,000. | 770. | ug/kg | 890 |

The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.

Sufficient sample volume was not available to perform a MS/MSD for this analysis. Therefore, a LCS/LCSD was performed to demonstrate precision and accuracy at a batch level.

Due to the presence of interferents near their retention time, normal reporting limits were not attained for the compounds listed below. The presence or concentration of these compounds cannot be determined below the reporting limits due to the presence of these interferents.
benzene, toluene, ethylbenzene, and total xylenes

The concentration reported for naphthalene is the maximum amount that could be in the soil. There are compounds coeluting with naphthalene that may be adding additional mass to its peak. Therefore, the actual concentration of naphthalene may be less than what is being reported.

Poor surrogate recoveries were observed for this sample due to the dilution needed to perform the analysis.

00941 PAH's in Solids by HPLC

MEMBER ACIL
Lancaster Laboratories, Inc.
2425 New Holland Pike
PO Box 12425
Lancaster, PA 17605-2425
717-656-2300 Fax: 717-656-2681

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4056156**

Collected:06/03/2003 10:30 by MBS

Account Number: 10132

Submitted: 06/04/2003 18:30
Reported: 06/18/2003 at 16:49
Discard: 06/26/2003
GP-3 8-10' Grab Soil Sample

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

SUN: Point Breeze - Tank 552 Closure

GP3-8

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|
| 00974 | Fluorene | 86-73-7 | 4,300. | 290. | ug/kg | 10 |
| 01007 | Phenanthrene | 85-01-8 | 12,000. | 720. | ug/kg | 50 |

The surrogate data is outside the QC limits due to unresolvable matrix problems evident in the sample extraction.

The quantitation limits for the HPLC PAH compounds were raised because sample dilution was necessary to bring target compounds into the calibration range of the system.

Commonwealth of Pennsylvania Lab Certification No. 36-037

## Laboratory Chronicle

| CAT No. | Analysis Name | Method | Trial# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | EPA 160.3 modified | 1 | 06/05/2003 16:53 | Scott W Freisher | 1 |
| 08179 | BTEX/MTBE/Cumene/Napht.(8021) | SW-846 8021B | 1 | 06/06/2003 17:28 | Deborah S Garrison | 890 |
| 00941 | PAH's in Solids by HPLC | SW-846 8310 | 1 | 06/14/2003 15:59 | Timothy J Trees | 10 |
| 00941 | PAH's in Solids by HPLC | SW-846 8310 | 1 | 06/16/2003 03:43 | Timothy J Trees | 50 |
| 03338 | PAH Solid Extraction | SW-846 3550B | 1 | 06/05/2003 10:00 | Olivia Arosemena | 1 |
| 08390 | High Level Volatile Soil Prep | SW-846 5035 | 1 | 06/04/2003 21:12 | Medina A Long | n.a. |

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4056157**

Collected:06/03/2003 11:00 by MBS

Account Number: 10132

Submitted: 06/04/2003 18:30
Reported: 06/18/2003 at 16:49
Discard: 06/26/2003
GP-4 10-12' Grab Soil Sample

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

SUN: Point Breeze - Tank 552 Closure

GP410

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | n.a. | 9.8 | 0.50 | % | 1 |

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.

08179 BTEX/MTBE/Cumene/Napht.(8021)

| | | | | | | |
|---|---|---|---|---|---|---|
| 08183 | Benzene | 71-43-2 | < 200. | 200. | ug/kg | 920 |
| 08184 | Toluene | 108-88-3 | < 330. | 330. | ug/kg | 920 |
| 08185 | Ethylbenzene | 100-41-4 | < 550. | 550. | ug/kg | 920 |
| 08186 | Total Xylenes | 1330-20-7 | < 3,300. | 3,300. | ug/kg | 920 |
| 08188 | Isopropylbenzene | 98-82-8 | 7,100. | 410. | ug/kg | 920 |
| 08189 | Naphthalene | 91-20-3 | 24,000. | 820. | ug/kg | 920 |

The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.

Sufficient sample volume was not available to perform a MS/MSD for this analysis. Therefore, a LCS/LCSD was performed to demonstrate precision and accuracy at a batch level.

Due to the presence of interferents near their retention time, normal reporting limits were not attained for the compounds listed below. The presence or concentration of these compounds cannot be determined below the reporting limits due to the presence of these interferents.
benzene, toluene, ethylbenzene, and total xylenes

The concentration reported for naphthalene is the maximum amount that could be in the soil. There are compounds coeluting with naphthalene that may be adding additional mass to its peak. Therefore, the actual concentration of naphthalene may be less than what is being reported.

Poor surrogate recoveries were observed for this sample due to the dilution needed to perform the analysis.

00941 PAH's in Solids by HPLC

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4056157**

Collected:06/03/2003 11:00 by MBS

Submitted: 06/04/2003 18:30
Reported: 06/18/2003 at 16:49
Discard: 06/26/2003
GP-4 10-12' Grab Soil Sample

SUN: Point Breeze - Tank 552 Closure

Account Number: 10132

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

GP410

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|
| 00974 | Fluorene | 86-73-7 | 6,200. | 300. | ug/kg | 10 |
| 01007 | Phenanthrene | 85-01-8 | 18,000. | 740. | ug/kg | 50 |

The surrogate data is outside the QC limits due to unresolvable matrix problems evident in the sample extraction.

The quantitation limits for the HPLC PAH compounds were raised because sample dilution was necessary to bring target compounds into the calibration range of the system.

Commonwealth of Pennsylvania Lab Certification No. 36-037

## Laboratory Chronicle

| CAT No. | Analysis Name | Method | Trial# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | EPA 160.3 modified | 1 | 06/05/2003 16:53 | Scott W Freisher | 1 |
| 08179 | BTEX/MTBE/Cumene/Napht.(8021) | SW-846 8021B | 1 | 06/06/2003 18:05 | Deborah S Garrison | 920 |
| 00941 | PAH's in Solids by HPLC | SW-846 8310 | 1 | 06/14/2003 16:41 | Timothy J Trees | 10 |
| 00941 | PAH's in Solids by HPLC | SW-846 8310 | 1 | 06/16/2003 04:26 | Timothy J Trees | 50 |
| 03338 | PAH Solid Extraction | SW-846 3550B | 1 | 06/05/2003 10:00 | Olivia Arosemena | 1 |
| 08390 | High Level Volatile Soil Prep | SW-846 5035 | 1 | 06/04/2003 21:13 | Medina A Long | n.a. |

MEMBER ACIL
Lancaster Laboratories, Inc.
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PO Box 12425
Lancaster, PA 17605-2425
717-656-2300 Fax: 717-656-2681

# Analysis Request / Environmental Services Chain of Custody

Lancaster Laboratories
*Where quality is a science.*

For Lancaster Laboratories use only
Acct. # 10132 Group# 854405 Sample # 4056154-57

**COC #** 0023556

Please print. Instructions on reverse side correspond with circled numbers.

(1)
Client: Sun · Aquaterra Acct. #:
Project Name/#: Tank 552 PWSID #:
Project Manager: Kevin Martin P.O.#:
Sampler: M Brad Spancake Quote #:
Name of state where samples were collected: PA

For Lab Use Only
FSC:
SCR #: 178383

| (2) Sample Identification | Date Collected | Time Collected | (3) Grab | Composite | Matrix: Soil | Water (Potable / NPDES) | Other | (4) Total # of Containers | (5) Analyses Requested: 8021 BTEX, Cumene, Naphthalene / 8310 Phenanthrene / 8310 Fluorene / % Moist | Remarks | (6) Temperature of samples upon receipt (if requested) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| GP-1 12'-14' | 6/3/03 | 0905 | X | | X | | | 2 | | temp 4°C | |
| GP-2 10'-12' | 6/3/03 | 0940 | X | | X | | | 2 | | TB 6/4/03 | |
| GP-3 8'-10' | 6/3/03 | 1030 | X | | X | | | 2 | | | |
| GP-4 10'-12' | 6/3/03 | 1100 | X | | X | | | 2 | | | |
| | | | X | | X | | | 2 | MBS | | |
| | | | X | | X | | | 1 | MBS | | |

(7) **Turnaround Time Requested** (TAT) (please circle): Normal Rush
(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)
Date results are needed:
Rush results requested by (please circle): Phone Fax E-mail
Phone #: Fax #:
E-mail address:

(8) **Data Package Options** (please circle if required)
QC Summary, Type I (Tier I), Type II (Tier II), Type III (NJ Red. Del.), Type IV (CLP), Type VI (Raw Data), GLP, Other
SDG Complete? Yes No
Site-specific QC required? Yes No
(If yes, indicate QC sample and submit triplicate volume.)
Internal Chain of Custody required? Yes No

(9)

| Relinquished by: | Date | Time | Received by: | Date | Time |
|---|---|---|---|---|---|
| K. Martin | 5.22.03 | 1530 | M. Brad Spancake | 5/22/03 | 1530 |
| M. Brad Spancake | 6/4/03 | 0800 | Maureen McCullough | 6/4/03 | 11:05 |
| Maureen McCullough | 6/4/03 | 18:30 | | | |
| | | | | | |
| | | | C. Carter | 6-4-03 | 1830 |

# Analysis Report

Lancaster Laboratories

ANALYTICAL RESULTS

Prepared for:

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381
610-431-5733

Prepared by:

Lancaster Laboratories
2425 New Holland Pike
Lancaster, PA 17605-2425

SAMPLE GROUP

The sample group for this submittal is 854608. Samples arrived at the laboratory on Thursday, June 05, 2003. The PO# for this group is TANK 552.

| Client Description | Lancaster Labs Number |
|---|---|
| GP-5 10-12' Grab Soil Sample | 4057230 |
| GP-6 10-12' Grab Soil Sample | 4057231 |
| GP-7 10-12' Grab Soil Sample | 4057232 |
| GP-8 10-12' Grab Soil Sample | 4057233 |
| GP-9 10-12' Grab Soil Sample | 4057234 |
| GP-10 10-12' Grab Soil Sample | 4057235 |
| GP-11 10-12' Grab Soil Sample | 4057236 |

1 COPY TO SUN: Aquaterra Tech. Attn: Mr. Kevin Martin

Questions? Contact your Client Services Representative
Sandra L Patton at (717) 656-2300.

Respectfully Submitted,
Erik J. Frederiksen
Group Leader

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4057230**

Collected:06/04/2003 08:50 by MBS

Account Number: 10132

Submitted: 06/05/2003 18:40
Reported: 06/18/2003 at 22:28
Discard: 06/26/2003
GP-5 10-12' Grab Soil Sample

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

SUN: Point Breeze - Tank 552 Closure

G510-

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | n.a. | 13.4 | 0.50 | % | 1 |

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.

| | | | | | | |
|---|---|---|---|---|---|---|
| 08179 | BTEX/MTBE/Cumene/Napht.(8021) | | | | | |
| 08183 | Benzene | 71-43-2 | < 210. | 210. | ug/kg | 930 |
| 08184 | Toluene | 108-88-3 | < 290. | 290. | ug/kg | 930 |
| 08185 | Ethylbenzene | 100-41-4 | < 210. | 210. | ug/kg | 930 |
| 08186 | Total Xylenes | 1330-20-7 | < 2,900. | 2,900. | ug/kg | 930 |
| 08188 | Isopropylbenzene | 98-82-8 | 8,700. | 430. | ug/kg | 930 |
| 08189 | Naphthalene | 91-20-3 | 32,000. | 860. | ug/kg | 930 |

The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.

Sufficient sample volume was not available to perform a MS/MSD for this analysis. Therefore, a LCS/LCSD was performed to demonstrate precision and accuracy at a batch level.

Due to the presence of interferents near their retention time, normal reporting limits were not attained for the compounds listed below. The presence or concentration of these compounds cannot be determined below the reporting limits due to the presence of these interferents.
toluene and total xylenes

The concentration reported for naphthalene is the maximum amount that could be in the soil. There are compounds coeluting with naphthalene that may be adding additional mass to its peak. Therefore, the actual concentration of naphthalene may be less than what is being reported.

Poor surrogate recoveries were observed for this sample due to the dilution needed to perform the analysis.

Due to the nature of the sample matrix, normal reporting limits were not attained.

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PO Box 12425
Lancaster, PA 17605-2425
717-656-2300 Fax: 717-656-2681

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4057230**

Collected:06/04/2003 08:50 by MBS

Account Number: 10132

Submitted: 06/05/2003 18:40
Reported: 06/18/2003 at 22:28
Discard: 06/26/2003
GP-5 10-12' Grab Soil Sample

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

SUN: Point Breeze - Tank 552 Closure

G510-

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|
| 00941 | PAH's in Solids by HPLC | | | | | |
| 00974 | Fluorene | 86-73-7 | 6,200. | 150. | ug/kg | 5 |
| 01007 | Phenanthrene | 85-01-8 | 16,000. | 770. | ug/kg | 50 |

The surrogate data is outside the QC limits due to unresolvable matrix problems evident in the sample extraction.

Due to the sample matrix an initial dilution was necessary to perform the analysis. Therefore, the reporting limits for the PAH by HPLC compounds were raised.

Commonwealth of Pennsylvania Lab Certification No. 36-037

## Laboratory Chronicle

| CAT No. | Analysis Name | Method | Trial# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | EPA 160.3 modified | 1 | 06/06/2003 19:57 | Scott W Freisher | 1 |
| 08179 | BTEX/MTBE/Cumene/Napht.(8021) | SW-846 8021B | 1 | 06/09/2003 11:27 | Stephanie A Selis | 930 |
| 00941 | PAH's in Solids by HPLC | SW-846 8310 | 1 | 06/13/2003 21:07 | Timothy J Trees | 5 |
| 00941 | PAH's in Solids by HPLC | SW-846 8310 | 1 | 06/14/2003 18:01 | Timothy J Trees | 50 |
| 03338 | PAH Solid Extraction | SW-846 3550B | 1 | 06/06/2003 22:00 | Sally L Appleyard | 1 |
| 08390 | High Level Volatile Soil Prep | SW-846 5035 | 1 | 06/05/2003 20:54 | Medina A Long | n.a. |

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4057231**

Collected:06/04/2003 09:10 by MBS

Account Number: 10132

Submitted: 06/05/2003 18:40
Reported: 06/18/2003 at 22:29
Discard: 06/26/2003
GP-6 10-12' Grab Soil Sample

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

SUN: Point Breeze - Tank 552 Closure

G610-

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | n.a. | 14.7 | 0.50 | % | 1 |
| | "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. | | | | | |
| 08179 | BTEX/MTBE/Cumene/Napht.(8021) | | | | | |
| 08183 | Benzene | 71-43-2 | < 590. | 590. | ug/kg | 2306 |
| 08184 | Toluene | 108-88-3 | < 1,200. | 1,200. | ug/kg | 2306 |
| 08185 | Ethylbenzene | 100-41-4 | < 1,800. | 1,800. | ug/kg | 2306 |
| 08186 | Total Xylenes | 1330-20-7 | < 7,000. | 7,000. | ug/kg | 2306 |
| 08188 | Isopropylbenzene | 98-82-8 | 19,000. | 1,100. | ug/kg | 2306 |
| 08189 | Naphthalene | 91-20-3 | 48,000. | 2,200. | ug/kg | 2306 |

The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.

Sufficient sample volume was not available to perform a MS/MSD for this analysis. Therefore, a LCS/LCSD was performed to demonstrate precision and accuracy at a batch level.

Due to the presence of interferents near their retention time, normal reporting limits were not attained for the compounds listed below. The presence or concentration of these compounds cannot be determined below the reporting limits due to the presence of these interferents.
benzene, toluene, ethylbenzene, and total xylenes

The concentration reported for naphthalene is the maximum amount that could be in the soil. There are compounds coeluting with naphthalene that may be adding additional mass to its peak. Therefore, the actual concentration of naphthalene may be less than what is being reported.

Poor surrogate recoveries were observed for this sample due to the dilution needed to perform the analysis.

00941 PAH's in Solids by HPLC

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4057231**

Collected:06/04/2003 09:10 by MBS

Account Number: 10132

Submitted: 06/05/2003 18:40
Reported: 06/18/2003 at 22:29
Discard: 06/26/2003
GP-6 10-12' Grab Soil Sample

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

SUN: Point Breeze - Tank 552 Closure

G610-

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|
| 00974 | Fluorene | 86-73-7 | 7,400. | 150. | ug/kg | 5 |
| 01007 | Phenanthrene | 85-01-8 | 16,000. | 790. | ug/kg | 50 |

The surrogate data is outside the QC limits due to unresolvable matrix problems evident in the sample extraction.

Due to the sample matrix an initial dilution was necessary to perform the analysis. Therefore, the reporting limits for the PAH by HPLC compounds were raised.

Commonwealth of Pennsylvania Lab Certification No. 36-037

## Laboratory Chronicle

| CAT No. | Analysis Name | Method | Trial# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | EPA 160.3 modified | 1 | 06/06/2003 19:57 | Scott W Freisher | 1 |
| 08179 | BTEX/MTBE/Cumene/Napht.(8021) | SW-846 8021B | 1 | 06/09/2003 07:11 | Stephanie A Selis | 2306 |
| 00941 | PAH's in Solids by HPLC | SW-846 8310 | 1 | 06/13/2003 23:13 | Timothy J Trees | 5 |
| 00941 | PAH's in Solids by HPLC | SW-846 8310 | 1 | 06/14/2003 18:44 | Timothy J Trees | 50 |
| 03338 | PAH Solid Extraction | SW-846 3550B | 1 | 06/06/2003 22:00 | Sally L Appleyard | 1 |
| 08390 | High Level Volatile Soil Prep | SW-846 5035 | 1 | 06/05/2003 20:55 | Medina A Long | n.a. |

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4057232**

Collected:06/04/2003 09:30 by MBS

Account Number: 10132

Submitted: 06/05/2003 18:40
Reported: 06/18/2003 at 22:29
Discard: 06/26/2003
GP-7 10-12' Grab Soil Sample

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

SUN: Point Breeze - Tank 552 Closure

G710-

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | n.a. | 9.7 | 0.50 | % | 1 |
| | "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. | | | | | |
| 08179 | BTEX/MTBE/Cumene/Napht.(8021) | | | | | |
| 08183 | Benzene | 71-43-2 | < 97. | 97. | ug/kg | 437 |
| 08184 | Toluene | 108-88-3 | < 220. | 220. | ug/kg | 437 |
| 08185 | Ethylbenzene | 100-41-4 | < 97. | 97. | ug/kg | 437 |
| 08186 | Total Xylenes | 1330-20-7 | < 2,200. | 2,200. | ug/kg | 437 |
| 08188 | Isopropylbenzene | 98-82-8 | 4,700. | 190. | ug/kg | 437 |
| 08189 | Naphthalene | 91-20-3 | 16,000. | 390. | ug/kg | 437 |
| | The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately. | | | | | |

Sufficient sample volume was not available to perform a MS/MSD for this analysis. Therefore, a LCS/LCSD was performed to demonstrate precision and accuracy at a batch level.

Due to the presence of interferents near their retention time, normal reporting limits were not attained for the compounds listed below. The presence or concentration of these compounds cannot be determined below the reporting limits due to the presence of these interferents.
benzene, toluene, ethylbenzene, and total xylenes

The concentration reported for naphthalene and isopropylbenzene is the maximum amount that could be in the soil. There are compounds coeluting with naphthalene and isopropylbenzene that may be adding additional mass to their peaks. Therefore, the actual concentrations of naphthalene and isopropylbenzene may be less than what is being reported.

Poor surrogate recoveries were observed for this sample due to the dilution needed to perform the analysis.

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4057232**

Collected:06/04/2003 09:30 by MBS

Account Number: 10132

Submitted: 06/05/2003 18:40
Reported: 06/18/2003 at 22:29
Discard: 06/26/2003
GP-7 10-12' Grab Soil Sample

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

SUN: Point Breeze - Tank 552 Closure

G710-

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|
| 00941 | PAH's in Solids by HPLC | | | | | |
| 00974 | Fluorene | 86-73-7 | 2,400. | 140. | ug/kg | 5 |
| 01007 | Phenanthrene | 85-01-8 | 4,700. | 140. | ug/kg | 10 |

The surrogate data is outside the QC limits due to unresolvable matrix problems evident in the sample extraction.

Due to the sample matrix an initial dilution was necessary to perform the analysis. Therefore, the reporting limits for the PAH by HPLC compounds were raised.

Commonwealth of Pennsylvania Lab Certification No. 36-037

## Laboratory Chronicle

| CAT No. | Analysis Name | Method | Trial# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | EPA 160.3 modified | 1 | 06/06/2003 19:57 | Scott W Freisher | 1 |
| 08179 | BTEX/MTBE/Cumene/Napht.(8021) | SW-846 8021B | 1 | 06/09/2003 07:48 | Stephanie A Selis | 437 |
| 00941 | PAH's in Solids by HPLC | SW-846 8310 | 1 | 06/13/2003 23:55 | Timothy J Trees | 5 |
| 00941 | PAH's in Solids by HPLC | SW-846 8310 | 1 | 06/14/2003 19:26 | Timothy J Trees | 10 |
| 03338 | PAH Solid Extraction | SW-846 3550B | 1 | 06/06/2003 22:00 | Sally L Appleyard | 1 |
| 08390 | High Level Volatile Soil Prep | SW-846 5035 | 1 | 06/05/2003 20:56 | Medina A Long | n.a. |

MEMBER ACIL
Lancaster Laboratories, Inc.
2425 New Holland Pike
PO Box 12425
Lancaster, PA 17605-2425
717-656-2300 Fax: 717-656-2681

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4057233**

Collected:06/04/2003 10:00 by MBS

Account Number: 10132

Submitted: 06/05/2003 18:40
Reported: 06/18/2003 at 22:29
Discard: 06/26/2003
GP-8 10-12' Grab Soil Sample

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

SUN: Point Breeze - Tank 552 Closure

G810-

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | n.a. | 10. | 0.50 | % | 1 |
| | "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. | | | | | |
| 08179 | BTEX/MTBE/Cumene/Napht.(8021) | | | | | |
| 08183 | Benzene | 71-43-2 | < 88. | 88. | ug/kg | 394 |
| 08184 | Toluene | 108-88-3 | < 220. | 220. | ug/kg | 394 |
| 08185 | Ethylbenzene | 100-41-4 | < 88. | 88. | ug/kg | 394 |
| 08186 | Total Xylenes | 1330-20-7 | < 1,000. | 1,000. | ug/kg | 394 |
| 08188 | Isopropylbenzene | 98-82-8 | 3,800. | 180. | ug/kg | 394 |
| 08189 | Naphthalene | 91-20-3 | 13,000. | 350. | ug/kg | 394 |

The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.

Sufficient sample volume was not available to perform a MS/MSD for this analysis. Therefore, a LCS/LCSD was performed to demonstrate precision and accuracy at a batch level.

Due to the presence of interferents near their retention time, normal reporting limits were not attained for the compounds listed below. The presence or concentration of these compounds cannot be determined below the reporting limits due to the presence of these interferents.
toluene and total xylenes

The concentration reported for naphthalene is the maximum amount that could be in the soil. There are compounds coeluting with naphthalene that may be adding additional mass to its peak. Therefore, the actual concentration of naphthalene may be less than what is being reported.

Poor surrogate recoveries were observed for this sample due to the dilution needed to perform the analysis.

Due to the nature of the sample matrix, normal reporting limits were not attained.

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4057233**

Collected:06/04/2003 10:00 by MBS

Account Number: 10132

Submitted: 06/05/2003 18:40
Reported: 06/18/2003 at 22:29
Discard: 06/26/2003
GP-8 10-12' Grab Soil Sample

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

SUN: Point Breeze - Tank 552 Closure

G810-

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|
| 00941 | PAH's in Solids by HPLC | | | | | |
| 00974 | Fluorene | 86-73-7 | 2,500. | 140. | ug/kg | 5 |
| 01007 | Phenanthrene | 85-01-8 | 7,400. | 300. | ug/kg | 20 |

The surrogate data is outside the QC limits due to unresolvable matrix problems evident in the sample extraction.

Due to the sample matrix an initial dilution was necessary to perform the analysis. Therefore, the reporting limits for the PAH by HPLC compounds were raised.

Commonwealth of Pennsylvania Lab Certification No. 36-037

## Laboratory Chronicle

| CAT No. | Analysis Name | Method | Trial# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | EPA 160.3 modified | 1 | 06/06/2003 19:57 | Scott W Freisher | 1 |
| 08179 | BTEX/MTBE/Cumene/Napht.(8021) | SW-846 8021B | 1 | 06/09/2003 08:24 | Stephanie A Selis | 394 |
| 00941 | PAH's in Solids by HPLC | SW-846 8310 | 1 | 06/14/2003 00:37 | Timothy J Trees | 5 |
| 00941 | PAH's in Solids by HPLC | SW-846 8310 | 1 | 06/14/2003 20:08 | Timothy J Trees | 20 |
| 03338 | PAH Solid Extraction | SW-846 3550B | 1 | 06/06/2003 22:00 | Sally L Appleyard | 1 |
| 08390 | High Level Volatile Soil Prep | SW-846 5035 | 1 | 06/05/2003 20:57 | Medina A Long | n.a. |

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4057234**

Collected:06/04/2003 10:30 by MBS

Account Number: 10132

Submitted: 06/05/2003 18:40
Reported: 06/18/2003 at 22:29
Discard: 06/26/2003
GP-9 10-12' Grab Soil Sample

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

SUN: Point Breeze - Tank 552 Closure

G910-

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | n.a. | 10.3 | 0.50 | % | 1 |

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.

08179 BTEX/MTBE/Cumene/Napht.(8021)

| | | | | | | |
|---|---|---|---|---|---|---|
| 08183 | Benzene | 71-43-2 | < 11. | 11. | ug/kg | 42.5 |
| 08184 | Toluene | 108-88-3 | < 22. | 22. | ug/kg | 42.5 |
| 08185 | Ethylbenzene | 100-41-4 | < 22. | 22. | ug/kg | 42.5 |
| 08186 | Total Xylenes | 1330-20-7 | 240. | 19. | ug/kg | 42.5 |
| 08188 | Isopropylbenzene | 98-82-8 | < 280. | 280. | ug/kg | 42.5 |
| 08189 | Naphthalene | 91-20-3 | 1,400. | 38. | ug/kg | 42.5 |

The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.

Sufficient sample volume was not available to perform a MS/MSD for this analysis. Therefore, a LCS/LCSD was performed to demonstrate precision and accuracy at a batch level.

Due to the presence of interferents near their retention time, normal reporting limits were not attained for the compounds listed below. The presence or concentration of these compounds cannot be determined below the reporting limits due to the presence of these interferents.
benzene, toluene, ethylbenzene, and total xylenes

The concentration reported for naphthalene is the maximum amount that could be in the soil. There are compounds coeluting with naphthalene that may be adding additional mass to its peak. Therefore, the actual concentration of naphthalene may be less than what is being reported.

Poor surrogate recoveries were observed for this sample due to the dilution needed to perform the analysis.

00941 PAH's in Solids by HPLC

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4057234**

Collected:06/04/2003 10:30 by MBS

Account Number: 10132

Submitted: 06/05/2003 18:40
Reported: 06/18/2003 at 22:29
Discard: 06/26/2003
GP-9 10-12' Grab Soil Sample

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

SUN: Point Breeze - Tank 552 Closure

G910-

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|
| 00974 | Fluorene | 86-73-7 | 4,400. | 300. | ug/kg | 10 |
| 01007 | Phenanthrene | 85-01-8 | 15,000. | 750. | ug/kg | 50 |

The surrogate data is outside the QC limits due to unresolvable matrix problems evident in the sample extraction.

Due to the sample matrix an initial dilution was necessary to perform the analysis. Therefore, the reporting limits for the PAH by HPLC compounds were raised.

Commonwealth of Pennsylvania Lab Certification No. 36-037

## Laboratory Chronicle

| CAT No. | Analysis Name | Method | Trial# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | EPA 160.3 modified | 1 | 06/06/2003 19:57 | Scott W Freisher | 1 |
| 08179 | BTEX/MTBE/Cumene/Napht.(8021) | SW-846 8021B | 1 | 06/09/2003 18:38 | Stephanie A Selis | 42.5 |
| 00941 | PAH's in Solids by HPLC | SW-846 8310 | 1 | 06/14/2003 01:58 | Timothy J Trees | 10 |
| 00941 | PAH's in Solids by HPLC | SW-846 8310 | 1 | 06/14/2003 20:50 | Timothy J Trees | 50 |
| 03338 | PAH Solid Extraction | SW-846 3550B | 1 | 06/06/2003 22:00 | Sally L Appleyard | 1 |
| 08390 | High Level Volatile Soil Prep | SW-846 5035 | 1 | 06/05/2003 20:58 | Medina A Long | n.a. |

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4057235**

Collected:06/04/2003 10:50 by MBS

Account Number: 10132

Submitted: 06/05/2003 18:40
Reported: 06/18/2003 at 22:29
Discard: 06/26/2003
GP-10 10-12' Grab Soil Sample

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

SUN: Point Breeze - Tank 552 Closure

G1010

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | n.a. | 8.7 | 0.50 | % | 1 |

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.

08179 BTEX/MTBE/Cumene/Napht.(8021)

| | | | | | | |
|---|---|---|---|---|---|---|
| 08183 | Benzene | 71-43-2 | < 44. | 44. | ug/kg | 203 |
| 08184 | Toluene | 108-88-3 | < 110. | 110. | ug/kg | 203 |
| 08185 | Ethylbenzene | 100-41-4 | < 44. | 44. | ug/kg | 203 |
| 08186 | Total Xylenes | 1330-20-7 | < 660. | 660. | ug/kg | 203 |
| 08188 | Isopropylbenzene | 98-82-8 | 2,300. | 89. | ug/kg | 203 |
| 08189 | Naphthalene | 91-20-3 | 17,000. | 4,400. | ug/kg | 203 |

The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.

Sufficient sample volume was not available to perform a MS/MSD for this analysis. Therefore, a LCS/LCSD was performed to demonstrate precision and accuracy at a batch level.

Due to the presence of interferents near their retention time, normal reporting limits were not attained for the compounds listed below. The presence or concentration of these compounds cannot be determined below the reporting limits due to the presence of these interferents.
toluene and total xylenes

The concentration reported for naphthalene is the maximum amount that could be in the soil. There are compounds coeluting with naphthalene that may be adding additional mass to its peak. Therefore, the actual concentration of naphthalene may be less than what is being reported.

Poor surrogate recoveries were observed for this sample due to the dilution needed to perform the analysis.

Due to the nature of the sample matrix, normal reporting limits were not attained.

00941 PAH's in Solids by HPLC

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4057235**

Collected:06/04/2003 10:50 by MBS

Account Number: 10132

Submitted: 06/05/2003 18:40
Reported: 06/18/2003 at 22:29
Discard: 06/26/2003
GP-10 10-12' Grab Soil Sample

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

SUN: Point Breeze - Tank 552 Closure

G1010

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|
| 00974 | Fluorene | 86-73-7 | 5,200. | 300. | ug/kg | 10 |
| 01007 | Phenanthrene | 85-01-8 | 26,000. | 730. | ug/kg | 50 |

The surrogate data is outside the QC limits due to unresolvable matrix problems evident in the sample extraction.

Due to the sample matrix an initial dilution was necessary to perform the analysis. Therefore, the reporting limits for the PAH by HPLC compounds were raised.

Commonwealth of Pennsylvania Lab Certification No. 36-037

## Laboratory Chronicle

| CAT No. | Analysis Name | Method | Trial# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | EPA 160.3 modified | 1 | 06/06/2003 19:57 | Scott W Freisher | 1 |
| 08179 | BTEX/MTBE/Cumene/Napht.(8021) | SW-846 8021B | 1 | 06/09/2003 09:37 | Stephanie A Selis | 203 |
| 00941 | PAH's in Solids by HPLC | SW-846 8310 | 1 | 06/14/2003 02:40 | Timothy J Trees | 10 |
| 00941 | PAH's in Solids by HPLC | SW-846 8310 | 1 | 06/14/2003 21:32 | Timothy J Trees | 50 |
| 03338 | PAH Solid Extraction | SW-846 3550B | 1 | 06/06/2003 22:00 | Sally L Appleyard | 1 |
| 08390 | High Level Volatile Soil Prep | SW-846 5035 | 1 | 06/05/2003 20:59 | Medina A Long | n.a. |

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4057236**

Collected:06/04/2003 11:15 by MBS

Account Number: 10132

Submitted: 06/05/2003 18:40
Reported: 06/18/2003 at 22:29
Discard: 06/26/2003
GP-11 10-12' Grab Soil Sample

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

SUN: Point Breeze - Tank 552 Closure

G1110

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | n.a. | 10.2 | 0.50 | % | 1 |

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.

| | | | | | | |
|---|---|---|---|---|---|---|
| 08179 | BTEX/MTBE/Cumene/Napht.(8021) | | | | | |
| 08183 | Benzene | 71-43-2 | < 190. | 190. | ug/kg | 850 |
| 08184 | Toluene | 108-88-3 | < 220. | 220. | ug/kg | 850 |
| 08185 | Ethylbenzene | 100-41-4 | < 670. | 670. | ug/kg | 850 |
| 08186 | Total Xylenes | 1330-20-7 | < 3,300. | 3,300. | ug/kg | 850 |
| 08188 | Isopropylbenzene | 98-82-8 | 7,100. | 380. | ug/kg | 850 |
| 08189 | Naphthalene | 91-20-3 | 40,000. | 760. | ug/kg | 850 |

The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.

Due to the presence of interferents near their retention time, normal reporting limits were not attained for the compounds listed below. The presence or concentration of these compounds cannot be determined below the reporting limits due to the presence of these interferents.
toluene, ethylbenzene and total xylenes

The concentration reported for naphthalene is the maximum amount that could be in the soil. There are compounds coeluting with naphthalene that may be adding additional mass to its peak. Therefore, the actual concentration of naphthalene may be less than what is being reported.

Poor surrogate recoveries were observed for this sample due to the dilution needed to perform the analysis.

Due to the nature of the sample matrix, normal reporting limits were not attained.

| | | | | | | |
|---|---|---|---|---|---|---|
| 00941 | PAH's in Solids by HPLC | | | | | |
| 00974 | Fluorene | 86-73-7 | 6,500. | 300. | ug/kg | 10 |
| 01007 | Phenanthrene | 85-01-8 | 17,000. | 750. | ug/kg | 50 |

The surrogate data is outside the QC limits due to unresolvable matrix

Lancaster Laboratories



**Lancaster Laboratories Sample No. SW 4057236**

Collected:06/04/2003 11:15 by MBS

Account Number: 10132

Submitted: 06/05/2003 18:40
Reported: 06/18/2003 at 22:29
Discard: 06/26/2003
GP-11 10-12' Grab Soil Sample

SUN: Aquaterra Tech.
P.O. Box 744

West Chester PA 19381

SUN: Point Breeze - Tank 552 Closure

G1110

| CAT No. | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation | Units | Dilution Factor |
|---|---|---|---|---|---|---|

problems evident in the sample extraction.

Due to the sample matrix an initial dilution was necessary to perform the analysis. Therefore, the reporting limits for the PAH by HPLC compounds were raised.

Commonwealth of Pennsylvania Lab Certification No. 36-037

## Laboratory Chronicle

| CAT No. | Analysis Name | Method | Trial# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|
| 00111 | Moisture | EPA 160.3 modified | 1 | 06/06/2003 19:57 | Scott W Freisher | 1 |
| 08179 | BTEX/MTBE/Cumene/Napht.(8021) | SW-846 8021B | 1 | 06/11/2003 19:29 | Stephanie A Selis | 850 |
| 00941 | PAH's in Solids by HPLC | SW-846 8310 | 1 | 06/14/2003 03:22 | Timothy J Trees | 10 |
| 00941 | PAH's in Solids by HPLC | SW-846 8310 | 1 | 06/14/2003 22:15 | Timothy J Trees | 50 |
| 03338 | PAH Solid Extraction | SW-846 3550B | 1 | 06/06/2003 22:00 | Sally L Appleyard | 1 |
| 08390 | High Level Volatile Soil Prep | SW-846 5035 | 1 | 06/05/2003 21:00 | Medina A Long | n.a. |

# Analysis Request / Environmental Services Chain of Custody

Lancaster Laboratories
*Where quality is a science.*

For Lancaster Laboratories use only
Acct. # 10137 Group# 854608 Sample # 4057230-36

**COC #** 0012318

Please print. Instructions on reverse side correspond with circled numbers.

(1) Client: Sun-Aquaterra Acct. #:
Project Name/#: Tank 552 PWSID #:
Project Manager: Kevin Martin P.O.#:
Sampler: M. Brad Spancake Quote #:
Name of state where samples were collected: PA

For Lab Use Only
FSC:
SCR #:

| (2) Sample Identification | Date Collected | Time Collected | (3) Grab | Composite | (4) Matrix: Soil | Water | Other | Potable / NPDES (Check if Applicable) | Total # of Containers | (5) Analyses Requested: 8021 BTEX, Cumene, Naphthalene | 8310 Phenanthrene | 8310 Fluorene | % Moist | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GP-5 10'-12' | 6/4/03 | 0850 | X | | X | | | | 2 | | | | | |
| GP-6 10'-12' | 6/4/03 | 0910 | X | | X | | | | 2 | | | | | |
| GP-7 10'-12' | 6/4/03 | 0930 | X | | X | | | | 2 | | | | | |
| GP-8 10'-12' | 6/4/03 | 1000 | X | | X | | | | 2 | | | | | |
| GP-9 10'-12' | 6/4/03 | 1030 | X | | X | | | | 2 | | | | | |
| GP-10 10'-12' | 6/4/03 | 1050 | X | | X | | | | 2 | | | | | |
| GP-11 10'-12' | 6/4/03 | 1115 | X | | X | | | | 2 | | | | | |

(6) Temperature of samples upon receipt (if requested)

(7) **Turnaround Time Requested** (TAT) (please circle): Normal Rush
(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)
Date results are needed:
Rush results requested by (please circle): Phone Fax E-mail
Phone #: Fax #:
E-mail address:

(8) **Data Package Options** (please circle if required)
QC Summary Type VI (Raw Data)
Type I (Tier I) GLP
Type II (Tier II) Other
Type III (NJ Red. Del.)
Type IV (CLP)

SDG Complete? Yes No

Site-specific QC required? Yes No
(If yes, indicate QC sample and submit triplicate volume.)
Internal Chain of Custody required? Yes No

(9)

| Relinquished by: | Date | Time | Received by: | Date | Time |
|---|---|---|---|---|---|
| M. Brad Spancake | 6/5/03 | 11:10 | Marvin McCallister | 6/5/03 | 11:10 |
| Marvin McCallister | 6/5/03 | 18:40 | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | 6.5.03 | | 1840 |

Lancaster Laboratories, Inc., 2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 (717) 656-2300

2102 Rev. 10/27/02

Copies: White and yellow should accompany samples to Lancaster Laboratories. The pink copy should be retained by the client.

New Jersey
ACCUTEST LABORATORIES

11/21/13

Technical Report for

Stantec Consulting Services Inc.

Sunoco, Philadelphia Refinery, Philadelphia, PA

AOI8

Accutest Job Number: JB52301

Sampling Date: 11/06/13

Report to:

Stantec
1060 Andrew Drive Suite 140
West Chester, PA 19380
jennifer.menges@stantec.com; stephanie.andrews@stantec.com

ATTN: Jennifer Menges

Total number of pages in report: **243**

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

Nancy Cole
Laboratory Director

Client Service contact: Kristin Beebe 732-329-0200

Certifications: NJ(12129), NY(10983), CA, CT, DE, FL, IL, IN, KS, KY, LA, MA, MD, MI, MT, NC, OH VAP (CL0056), PA, RI, SC, TN, VA, WV, DoD ELAP (L-A-B L2248)

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Accutest Laboratories

# Sample Summary

Stantec Consulting Services Inc.

**Job No:** JB52301

Sunoco, Philadelphia Refinery, Philadelphia, PA
Project No: AOI8

| Sample Number | Collected Date | Time | By | Received | Matrix Code | Type | Client Sample ID |
|---|---|---|---|---|---|---|---|
| JB52301-1 | 11/06/13 | 10:35 | JD | 11/06/13 | SO | Soil | AOI-8-BH-13-64-0-2 |
| JB52301-2 | 11/06/13 | 11:15 | JD | 11/06/13 | SO | Soil | AOI-8-BH-13-64-2-4 |
| JB52301-3 | 11/06/13 | 13:00 | JD | 11/06/13 | SO | Soil | AOI-8-N-146-0-2 |
| JB52301-4 | 11/06/13 | 14:00 | JD | 11/06/13 | SO | Soil | AOI-8-N-146-4-6 |
| JB52301-5 | 11/06/13 | 14:05 | JD | 11/06/13 | SO | Soil | AOI-8-N-143-20.5-21 |
| JB52301-6 | 11/06/13 | 14:05 | JD | 11/06/13 | AQ | Trip Blank Soil | TB |

Soil samples reported on a dry weight basis unless otherwise indicated on result page.

# CASE NARRATIVE / CONFORMANCE SUMMARY

| | | | |
|---|---|---|---|
| **Client:** | Stantec Consulting Services Inc. | **Job No** | JB52301 |
| **Site:** | Sunoco, Philadelphia Refinery, Philadelphia, PA | **Report Date** | 11/21/2013 9:27:55 A |

On 11/06/2013, 5 Sample(s), 1 Trip Blank(s) and 0 Field Blank(s) were received at Accutest Laboratories at a temperature of 3.5 C. Samples were intact and chemically preserved, unless noted below. An Accutest Job Number of JB52301 was assigned to the project. Laboratory sample ID, client sample ID and dates of sample collection are detailed in the report's Results Summary Section.Only 3 sampls are active for this report.

Specified quality control criteria were achieved for this job except as noted below. For more information, please refer to the analytical results and QC summary pages.

## Volatiles by GCMS By Method SW846 8260B

**Matrix:** AQ **Batch ID:** V2E4366

- All samples were analyzed within the recommended method holding time.
- Sample(s) JB52479-12MS, JB52479-12MSD were used as the QC samples indicated.
- All method blanks for this batch meet method specific criteria.

**Matrix:** SO **Batch ID:** VD8790

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JB52442-1MS, JB52442-1MSD were used as the QC samples indicated.
- JB52301-5: Dilution required due to sample matrix.

**Matrix:** SO **Batch ID:** VY6078

- All samples were analyzed within the recommended method holding time.
- Sample(s) JB52588-1DUP, JB52588-2MS were used as the QC samples indicated.
- All method blanks for this batch meet method specific criteria.

## Extractables by GCMS By Method SW846 8270D

**Matrix:** SO **Batch ID:** OP70508

- All samples were extracted within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JB52332-1MS, JB52332-1MSD were used as the QC samples indicated.

## Volatiles by GC By Method SW846 8011

**Matrix:** AQ **Batch ID:** M:OP35660

- The data for SW846 8011 meets quality control requirements.
- JB52301-6: Analysis performed at Accutest Laboratories, Marlborough, MA.

**Matrix:** SO **Batch ID:** M:OP35676

- The data for SW846 8011 meets quality control requirements.
- JB52301-5: Analysis performed at Accutest Laboratories, Marlborough, MA.
- JB52301-3: Analysis performed at Accutest Laboratories, Marlborough, MA.

## Metals By Method SW846 6010C

**Matrix:** SO **Batch ID:** M:MP22077

- The data for SW846 6010C meets quality control requirements.
- JB52301-5 for Vanadium: Analysis performed at Accutest Laboratories, Marlborough, MA.
- JB52301-5 for Nickel: Analysis performed at Accutest Laboratories, Marlborough, MA.
- JB52301-5 for Cobalt: Analysis performed at Accutest Laboratories, Marlborough, MA.
- JB52301-3 for Lead: Analysis performed at Accutest Laboratories, Marlborough, MA.
- JB52301-3 for Zinc: Analysis performed at Accutest Laboratories, Marlborough, MA.
- JB52301-3 for Vanadium: Analysis performed at Accutest Laboratories, Marlborough, MA.
- JB52301-5 for Zinc: Analysis performed at Accutest Laboratories, Marlborough, MA.
- JB52301-3 for Nickel: Analysis performed at Accutest Laboratories, Marlborough, MA.
- JB52301-3 for Cobalt: Analysis performed at Accutest Laboratories, Marlborough, MA.
- JB52301-5 for Lead: Analysis performed at Accutest Laboratories, Marlborough, MA.

## Wet Chemistry By Method ASTM 4643-00

**Matrix:** SO **Batch ID:** GN94734

- The data for ASTM 4643-00 meets quality control requirements.

Accutest certifies that data reported for samples received, listed on the associated custody chain or analytical task order, were produced to specifications meeting Accutest's Quality System precision, accuracy and completeness objectives except as noted.

Estimated non-standard method measurement uncertainty data is available on request, based on quality control bias and implicit for standard methods. Acceptable uncertainty requires tested parameter quality control data to meet method criteria.

Accutest Laboratories is not responsible for data quality assumptions if partial reports are used and recommends that this report be used in its entirety. Data release is authorized by Accutest Laboratories indicated via signature on the report cover

# SAMPLE DELIVERY GROUP CASE NARRATIVE

| | | | |
|---|---|---|---|
| **Client:** | Accutest New Jersey | **Job No** | JB52301 |
| **Site:** | SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA | **Report Date** | 11/20/2013 5:18:57 PM |

2 Sample(s), 1 Trip Blank(s) were collected on 11/06/2013 and were received at Accutest on 11/06/2013 properly preserved, at 2.7 Deg. C and intact. These Samples received an Accutest job number of JB52301. A listing of the Laboratory Sample ID, Client Sample ID and dates of collection are presented in the Results Summary Section of this report.

Except as noted below, all method specified calibrations and quality control performance criteria were met for this job. For more information, please refer to QC summary pages.

## Volatiles by GC By Method SW846 8011

**Matrix** AQ **Batch ID:** OP35660

- All samples were extracted within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) MC25769-10MS, MC25769-10MSD were used as the QC samples indicated.

**Matrix** SO **Batch ID:** OP35676

- All samples were extracted within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JB52158-5MS, JB52158-5MSD were used as the QC samples indicated.

## Metals By Method SW846 6010C

**Matrix** SO **Batch ID:** MP22077

- All samples were digested within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JB52158-4MS, JB52158-4MSD, JB52158-4SDL were used as the QC samples for metals.
- MP22077-SD1 for Zinc: Serial dilution indicates possible matrix interference.

The Accutest Laboratories of New England certifies that all analysis were performed within method specification. It is further recommended that this report to be used in its entirety.The Accutest Laboratories of NE, Laboratory Director or assignee as verified by the signature on the cover page has authorized the release of this report(JB52301).

# Summary of Hits



**Job Number:** JB52301
**Account:** Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA
**Collected:** 11/06/13



| Lab Sample ID / Analyte | Client Sample ID | Result/ Qual | RL | MDL | Units | Method |
|---|---|---|---|---|---|---|
| **JB52301-3** | **AOI-8-N-146-0-2** | | | | | |
| Anthracene | | 49.3 | 37 | 13 | ug/kg | SW846 8270D |
| Benzo(a)anthracene | | 192 | 37 | 12 | ug/kg | SW846 8270D |
| Benzo(a)pyrene | | 286 | 37 | 11 | ug/kg | SW846 8270D |
| Benzo(b)fluoranthene | | 330 | 37 | 12 | ug/kg | SW846 8270D |
| Benzo(g,h,i)perylene | | 525 | 37 | 14 | ug/kg | SW846 8270D |
| Benzo(k)fluoranthene | | 98.7 | 37 | 14 | ug/kg | SW846 8270D |
| Chrysene | | 285 | 37 | 12 | ug/kg | SW846 8270D |
| Dibenzo(a,h)anthracene | | 94.6 | 37 | 13 | ug/kg | SW846 8270D |
| Fluoranthene | | 317 | 37 | 16 | ug/kg | SW846 8270D |
| Indeno(1,2,3-cd)pyrene | | 265 | 37 | 13 | ug/kg | SW846 8270D |
| Phenanthrene | | 134 | 37 | 17 | ug/kg | SW846 8270D |
| Pyrene | | 256 | 37 | 14 | ug/kg | SW846 8270D |
| Cobalt [a] | | 6.8 | 4.7 | 0.044 | mg/kg | SW846 6010C |
| Lead [a] | | 125 | 0.93 | 0.16 | mg/kg | SW846 6010C |
| Nickel [a] | | 47.3 | 3.7 | 0.041 | mg/kg | SW846 6010C |
| Vanadium [a] | | 41.4 | 0.93 | 0.12 | mg/kg | SW846 6010C |
| Zinc [a] | | 190 | 1.9 | 0.15 | mg/kg | SW846 6010C |
| **JB52301-5** | **AOI-8-N-143-20.5-21** | | | | | |
| Isopropylbenzene [b] | | 30.3 J | 530 | 15 | ug/kg | SW846 8260B |
| 1,2,4-Trimethylbenzene [b] | | 44.0 J | 530 | 17 | ug/kg | SW846 8260B |
| Benzo(a)anthracene | | 202 | 36 | 12 | ug/kg | SW846 8270D |
| Benzo(a)pyrene | | 84.5 | 36 | 11 | ug/kg | SW846 8270D |
| Benzo(b)fluoranthene | | 76.1 | 36 | 12 | ug/kg | SW846 8270D |
| Benzo(g,h,i)perylene | | 82.8 | 36 | 13 | ug/kg | SW846 8270D |
| Chrysene | | 495 | 36 | 12 | ug/kg | SW846 8270D |
| Dibenzo(a,h)anthracene | | 38.0 | 36 | 12 | ug/kg | SW846 8270D |
| Fluorene | | 1030 | 36 | 12 | ug/kg | SW846 8270D |
| Indeno(1,2,3-cd)pyrene | | 63.3 | 36 | 12 | ug/kg | SW846 8270D |
| Phenanthrene | | 1540 | 36 | 16 | ug/kg | SW846 8270D |
| Cobalt [a] | | 5.0 | 4.6 | 0.044 | mg/kg | SW846 6010C |
| Lead [a] | | 5.9 | 0.93 | 0.16 | mg/kg | SW846 6010C |
| Nickel [a] | | 9.3 | 3.7 | 0.041 | mg/kg | SW846 6010C |
| Vanadium [a] | | 17.7 | 0.93 | 0.12 | mg/kg | SW846 6010C |
| Zinc [a] | | 26.1 | 1.9 | 0.15 | mg/kg | SW846 6010C |
| **JB52301-6** | **TB** | | | | | |

No hits reported in this sample.

(a) Analysis performed at Accutest Laboratories, Marlborough, MA.
(b) Dilution required due to sample matrix.

New Jersey ACCUTEST LABORATORIES



## Sample Results

Report of Analysis

Accutest Laboratories

# Report of Analysis





**Client Sample ID:** AOI-8-N-146-0-2
**Lab Sample ID:** JB52301-3
**Matrix:** SO - Soil
**Method:** SW846 8260B
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

**Date Sampled:** 11/06/13
**Date Received:** 11/06/13
**Percent Solids:** 86.3

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | Y140521.D | 1 | 11/12/13 | PS | n/a | n/a | VY6078 |
| Run #2 | | | | | | | |

| | Initial Weight |
|---|---|
| Run #1 | 5.9 g |
| Run #2 | |

**Leaded Gasoline and Aviation Gas List**

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | ND | 0.98 | 0.12 | ug/kg | |
| 108-88-3 | Toluene | ND | 0.98 | 0.14 | ug/kg | |
| 100-41-4 | Ethylbenzene | ND | 0.98 | 0.17 | ug/kg | |
| 1330-20-7 | Xylene (total) | ND | 0.98 | 0.17 | ug/kg | |
| 1634-04-4 | Methyl Tert Butyl Ether | ND | 0.98 | 0.34 | ug/kg | |
| 135-98-8 | sec-Butylbenzene | ND | 4.9 | 0.18 | ug/kg | |
| 98-06-6 | tert-Butylbenzene | ND | 4.9 | 0.16 | ug/kg | |
| 110-82-7 | Cyclohexane | ND | 4.9 | 0.25 | ug/kg | |
| 107-06-2 | 1,2-Dichloroethane | ND | 0.98 | 0.32 | ug/kg | |
| 110-54-3 | Hexane | ND | 4.9 | 0.53 | ug/kg | |
| 98-82-8 | Isopropylbenzene | ND | 4.9 | 0.14 | ug/kg | |
| 95-63-6 | 1,2,4-Trimethylbenzene | ND | 4.9 | 0.16 | ug/kg | |
| 108-67-8 | 1,3,5-Trimethylbenzene | ND | 4.9 | 0.22 | ug/kg | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 100% | | 59-130% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 90% | | 65-123% |
| 2037-26-5 | Toluene-D8 | 105% | | 80-124% |
| 460-00-4 | 4-Bromofluorobenzene | 99% | | 71-132% |

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

# Report of Analysis





**Client Sample ID:** AOI-8-N-146-0-2
**Lab Sample ID:** JB52301-3
**Matrix:** SO - Soil
**Method:** SW846 8270D SW846 3550C
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

**Date Sampled:** 11/06/13
**Date Received:** 11/06/13
**Percent Solids:** 86.3

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | 2M58228.D | 1 | 11/09/13 | AD | 11/08/13 | OP70508 | E2M2462 |
| Run #2 | | | | | | | |

| | Initial Weight | Final Volume |
|---|---|---|
| Run #1 | 31.5 g | 1.0 ml |
| Run #2 | | |

**ABN Special List**

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 105-67-9 | 2,4-Dimethylphenol | ND | 180 | 62 | ug/kg | |
| 51-28-5 | 2,4-Dinitrophenol | ND | 740 | 45 | ug/kg | |
| 95-48-7 | 2-Methylphenol | ND | 74 | 42 | ug/kg | |
| | 3&4-Methylphenol | ND | 74 | 47 | ug/kg | |
| 100-02-7 | 4-Nitrophenol | ND | 370 | 62 | ug/kg | |
| 108-95-2 | Phenol | ND | 74 | 39 | ug/kg | |
| 83-32-9 | Acenaphthene | ND | 37 | 11 | ug/kg | |
| 120-12-7 | Anthracene | 49.3 | 37 | 13 | ug/kg | |
| 56-55-3 | Benzo(a)anthracene | 192 | 37 | 12 | ug/kg | |
| 50-32-8 | Benzo(a)pyrene | 286 | 37 | 11 | ug/kg | |
| 205-99-2 | Benzo(b)fluoranthene | 330 | 37 | 12 | ug/kg | |
| 191-24-2 | Benzo(g,h,i)perylene | 525 | 37 | 14 | ug/kg | |
| 207-08-9 | Benzo(k)fluoranthene | 98.7 | 37 | 14 | ug/kg | |
| 92-52-4 | 1,1'-Biphenyl | ND | 74 | 4.3 | ug/kg | |
| 218-01-9 | Chrysene | 285 | 37 | 12 | ug/kg | |
| 53-70-3 | Dibenzo(a,h)anthracene | 94.6 | 37 | 13 | ug/kg | |
| 84-74-2 | Di-n-butyl phthalate | ND | 74 | 8.2 | ug/kg | |
| 84-66-2 | Diethyl phthalate | ND | 74 | 13 | ug/kg | |
| 117-81-7 | bis(2-Ethylhexyl)phthalate | ND | 74 | 32 | ug/kg | |
| 206-44-0 | Fluoranthene | 317 | 37 | 16 | ug/kg | |
| 86-73-7 | Fluorene | ND | 37 | 12 | ug/kg | |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | 265 | 37 | 13 | ug/kg | |
| 91-57-6 | 2-Methylnaphthalene | ND | 74 | 21 | ug/kg | |
| 91-20-3 | Naphthalene | ND | 37 | 10 | ug/kg | |
| 85-01-8 | Phenanthrene | 134 | 37 | 17 | ug/kg | |
| 129-00-0 | Pyrene | 256 | 37 | 14 | ug/kg | |
| 110-86-1 | Pyridine | ND | 74 | 15 | ug/kg | |
| 91-22-5 | Quinoline | ND | 180 | 35 | ug/kg | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 367-12-4 | 2-Fluorophenol | 96% | | 13-110% |

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

# Report of Analysis





**Client Sample ID:** AOI-8-N-146-0-2
**Lab Sample ID:** JB52301-3
**Matrix:** SO - Soil
**Method:** SW846 8270D SW846 3550C
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

**Date Sampled:** 11/06/13
**Date Received:** 11/06/13
**Percent Solids:** 86.3

**ABN Special List**

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 4165-62-2 | Phenol-d5 | 95% | | 15-110% |
| 118-79-6 | 2,4,6-Tribromophenol | 100% | | 20-123% |
| 4165-60-0 | Nitrobenzene-d5 | 89% | | 10-110% |
| 321-60-8 | 2-Fluorobiphenyl | 97% | | 17-110% |
| 1718-51-0 | Terphenyl-d14 | 94% | | 30-124% |

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

# Report of Analysis





**Client Sample ID:** AOI-8-N-146-0-2
**Lab Sample ID:** JB52301-3
**Matrix:** SO - Soil
**Method:** SW846 8011 SW846 3550B
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

**Date Sampled:** 11/06/13
**Date Received:** 11/06/13
**Percent Solids:** 86.3

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 [a] | BK32014.D | 1 | 11/13/13 | AMA | 11/11/13 | M:OP35676 | M:GBK1055 |
| Run #2 | | | | | | | |

| | Initial Weight | Final Volume |
|---|---|---|
| Run #1 | 30.5 g | 50.0 ml |
| Run #2 | | |

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 106-93-4 | 1,2-Dibromoethane | ND | 2.8 | 1.1 | ug/kg | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 460-00-4 | Bromofluorobenzene (S) | 88% | | 61-167% |
| 460-00-4 | Bromofluorobenzene (S) | 119% | | 61-167% |

(a) Analysis performed at Accutest Laboratories, Marlborough, MA.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

# Report of Analysis





**Client Sample ID:** AOI-8-N-146-0-2
**Lab Sample ID:** JB52301-3
**Matrix:** SO - Soil
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

**Date Sampled:** 11/06/13
**Date Received:** 11/06/13
**Percent Solids:** 86.3

**Metals Analysis**

| Analyte | Result | RL | MDL | Units | DF | Prep | Analyzed | By | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|---|---|
| Cobalt [a] | 6.8 | 4.7 | 0.044 | mg/kg | 1 | 11/19/13 | 11/20/13 | AMA | SW846 6010C [1] | SW846 3050B [2] |
| Lead [a] | 125 | 0.93 | 0.16 | mg/kg | 1 | 11/19/13 | 11/20/13 | AMA | SW846 6010C [1] | SW846 3050B [2] |
| Nickel [a] | 47.3 | 3.7 | 0.041 | mg/kg | 1 | 11/19/13 | 11/20/13 | AMA | SW846 6010C [1] | SW846 3050B [2] |
| Vanadium [a] | 41.4 | 0.93 | 0.12 | mg/kg | 1 | 11/19/13 | 11/20/13 | AMA | SW846 6010C [1] | SW846 3050B [2] |
| Zinc [a] | 190 | 1.9 | 0.15 | mg/kg | 1 | 11/19/13 | 11/20/13 | AMA | SW846 6010C [1] | SW846 3050B [2] |

(1) Instrument QC Batch: M:MA16423
(2) Prep QC Batch: M:MP22077

(a) Analysis performed at Accutest Laboratories, Marlborough, MA.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
B = Indicates a result > = MDL but < RL

Accutest Laboratories

# Report of Analysis





| | | | |
|---|---|---|---|
| **Client Sample ID:** | AOI-8-N-143-20.5-21 | | |
| **Lab Sample ID:** | JB52301-5 | **Date Sampled:** | 11/06/13 |
| **Matrix:** | SO - Soil | **Date Received:** | 11/06/13 |
| **Method:** | SW846 8260B | **Percent Solids:** | 86.8 |
| **Project:** | Sunoco, Philadelphia Refinery, Philadelphia, PA | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 [a] | D215243.D | 1 | 11/14/13 | CM | n/a | n/a | VD8790 |
| Run #2 | | | | | | | |

| | Initial Weight | Final Volume | Methanol Aliquot |
|---|---|---|---|
| Run #1 | 5.9 g | 10.0 ml | 100 ul |
| Run #2 | | | |

**Leaded Gasoline and Aviation Gas List**

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | ND | 110 | 13 | ug/kg | |
| 108-88-3 | Toluene | ND | 110 | 15 | ug/kg | |
| 100-41-4 | Ethylbenzene | ND | 110 | 18 | ug/kg | |
| 1330-20-7 | Xylene (total) | ND | 110 | 19 | ug/kg | |
| 1634-04-4 | Methyl Tert Butyl Ether | ND | 110 | 36 | ug/kg | |
| 135-98-8 | sec-Butylbenzene | ND | 530 | 19 | ug/kg | |
| 98-06-6 | tert-Butylbenzene | ND | 530 | 17 | ug/kg | |
| 110-82-7 | Cyclohexane | ND | 530 | 27 | ug/kg | |
| 107-06-2 | 1,2-Dichloroethane | ND | 110 | 34 | ug/kg | |
| 110-54-3 | Hexane | ND | 530 | 57 | ug/kg | |
| 98-82-8 | Isopropylbenzene | 30.3 | 530 | 15 | ug/kg | J |
| 95-63-6 | 1,2,4-Trimethylbenzene | 44.0 | 530 | 17 | ug/kg | J |
| 108-67-8 | 1,3,5-Trimethylbenzene | ND | 530 | 23 | ug/kg | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 95% | | 59-130% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 108% | | 65-123% |
| 2037-26-5 | Toluene-D8 | 109% | | 80-124% |
| 460-00-4 | 4-Bromofluorobenzene | 88% | | 71-132% |

(a) Dilution required due to sample matrix.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

# Report of Analysis





**Client Sample ID:** AOI-8-N-143-20.5-21
**Lab Sample ID:** JB52301-5
**Matrix:** SO - Soil
**Method:** SW846 8270D SW846 3550C
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

**Date Sampled:** 11/06/13
**Date Received:** 11/06/13
**Percent Solids:** 86.8

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | 2M58229.D | 1 | 11/09/13 | AD | 11/08/13 | OP70508 | E2M2462 |
| Run #2 | | | | | | | |

| | Initial Weight | Final Volume |
|---|---|---|
| Run #1 | 32.0 g | 1.0 ml |
| Run #2 | | |

**ABN Special List**

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 105-67-9 | 2,4-Dimethylphenol | ND | 180 | 60 | ug/kg | |
| 51-28-5 | 2,4-Dinitrophenol | ND | 720 | 44 | ug/kg | |
| 95-48-7 | 2-Methylphenol | ND | 72 | 41 | ug/kg | |
| | 3&4-Methylphenol | ND | 72 | 46 | ug/kg | |
| 100-02-7 | 4-Nitrophenol | ND | 360 | 61 | ug/kg | |
| 108-95-2 | Phenol | ND | 72 | 38 | ug/kg | |
| 83-32-9 | Acenaphthene | ND | 36 | 10 | ug/kg | |
| 120-12-7 | Anthracene | ND | 36 | 13 | ug/kg | |
| 56-55-3 | Benzo(a)anthracene | 202 | 36 | 12 | ug/kg | |
| 50-32-8 | Benzo(a)pyrene | 84.5 | 36 | 11 | ug/kg | |
| 205-99-2 | Benzo(b)fluoranthene | 76.1 | 36 | 12 | ug/kg | |
| 191-24-2 | Benzo(g,h,i)perylene | 82.8 | 36 | 13 | ug/kg | |
| 207-08-9 | Benzo(k)fluoranthene | ND | 36 | 14 | ug/kg | |
| 92-52-4 | 1,1'-Biphenyl | ND | 72 | 4.2 | ug/kg | |
| 218-01-9 | Chrysene | 495 | 36 | 12 | ug/kg | |
| 53-70-3 | Dibenzo(a,h)anthracene | 38.0 | 36 | 12 | ug/kg | |
| 84-74-2 | Di-n-butyl phthalate | ND | 72 | 8.0 | ug/kg | |
| 84-66-2 | Diethyl phthalate | ND | 72 | 12 | ug/kg | |
| 117-81-7 | bis(2-Ethylhexyl)phthalate | ND | 72 | 32 | ug/kg | |
| 206-44-0 | Fluoranthene | ND | 36 | 16 | ug/kg | |
| 86-73-7 | Fluorene | 1030 | 36 | 12 | ug/kg | |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | 63.3 | 36 | 12 | ug/kg | |
| 91-57-6 | 2-Methylnaphthalene | ND | 72 | 20 | ug/kg | |
| 91-20-3 | Naphthalene | ND | 36 | 9.8 | ug/kg | |
| 85-01-8 | Phenanthrene | 1540 | 36 | 16 | ug/kg | |
| 129-00-0 | Pyrene | ND | 36 | 14 | ug/kg | |
| 110-86-1 | Pyridine | ND | 72 | 14 | ug/kg | |
| 91-22-5 | Quinoline | ND | 180 | 34 | ug/kg | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 367-12-4 | 2-Fluorophenol | 88% | | 13-110% |

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

# Report of Analysis





| | | | |
|---|---|---|---|
| **Client Sample ID:** | AOI-8-N-143-20.5-21 | | |
| **Lab Sample ID:** | JB52301-5 | **Date Sampled:** | 11/06/13 |
| **Matrix:** | SO - Soil | **Date Received:** | 11/06/13 |
| **Method:** | SW846 8270D SW846 3550C | **Percent Solids:** | 86.8 |
| **Project:** | Sunoco, Philadelphia Refinery, Philadelphia, PA | | |

**ABN Special List**

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 4165-62-2 | Phenol-d5 | 92% | | 15-110% |
| 118-79-6 | 2,4,6-Tribromophenol | 88% | | 20-123% |
| 4165-60-0 | Nitrobenzene-d5 | 86% | | 10-110% |
| 321-60-8 | 2-Fluorobiphenyl | 86% | | 17-110% |
| 1718-51-0 | Terphenyl-d14 | 95% | | 30-124% |

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

# Report of Analysis





**Client Sample ID:** AOI-8-N-143-20.5-21
**Lab Sample ID:** JB52301-5
**Matrix:** SO - Soil
**Method:** SW846 8011 SW846 3550B
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

**Date Sampled:** 11/06/13
**Date Received:** 11/06/13
**Percent Solids:** 86.8

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 [a] | BK32015.D | 1 | 11/13/13 | AMA | 11/11/13 | M:OP35676 | M:GBK1055 |
| Run #2 | | | | | | | |

| | Initial Weight | Final Volume |
|---|---|---|
| Run #1 | 30.0 g | 50.0 ml |
| Run #2 | | |

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 106-93-4 | 1,2-Dibromoethane | ND | 2.9 | 1.1 | ug/kg | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 460-00-4 | Bromofluorobenzene (S) | 107% | | 61-167% |
| 460-00-4 | Bromofluorobenzene (S) | 146% | | 61-167% |

(a) Analysis performed at Accutest Laboratories, Marlborough, MA.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

# Report of Analysis





**Client Sample ID:** AOI-8-N-143-20.5-21
**Lab Sample ID:** JB52301-5
**Matrix:** SO - Soil
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

**Date Sampled:** 11/06/13
**Date Received:** 11/06/13
**Percent Solids:** 86.8

**Metals Analysis**

| Analyte | Result | RL | MDL | Units | DF | Prep | Analyzed | By | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|---|---|
| Cobalt [a] | 5.0 | 4.6 | 0.044 | mg/kg | 1 | 11/19/13 | 11/20/13 | AMA | SW846 6010C [1] | SW846 3050B [2] |
| Lead [a] | 5.9 | 0.93 | 0.16 | mg/kg | 1 | 11/19/13 | 11/20/13 | AMA | SW846 6010C [1] | SW846 3050B [2] |
| Nickel [a] | 9.3 | 3.7 | 0.041 | mg/kg | 1 | 11/19/13 | 11/20/13 | AMA | SW846 6010C [1] | SW846 3050B [2] |
| Vanadium [a] | 17.7 | 0.93 | 0.12 | mg/kg | 1 | 11/19/13 | 11/20/13 | AMA | SW846 6010C [1] | SW846 3050B [2] |
| Zinc [a] | 26.1 | 1.9 | 0.15 | mg/kg | 1 | 11/19/13 | 11/20/13 | AMA | SW846 6010C [1] | SW846 3050B [2] |

(1) Instrument QC Batch: M:MA16423
(2) Prep QC Batch: M:MP22077

(a) Analysis performed at Accutest Laboratories, Marlborough, MA.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
B = Indicates a result > = MDL but < RL

Accutest Laboratories

# Report of Analysis





**Client Sample ID:** TB
**Lab Sample ID:** JB52301-6
**Matrix:** AQ - Trip Blank Soil
**Method:** SW846 8260B
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

**Date Sampled:** 11/06/13
**Date Received:** 11/06/13
**Percent Solids:** n/a

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | 2E96793.D | 1 | 11/14/13 | TYG | n/a | n/a | V2E4366 |
| Run #2 | | | | | | | |

| | Purge Volume |
|---|---|
| Run #1 | 5.0 ml |
| Run #2 | |

**Leaded Gasoline and Aviation Gas List**

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | ND | 1.0 | 0.28 | ug/l | |
| 108-88-3 | Toluene | ND | 1.0 | 0.44 | ug/l | |
| 100-41-4 | Ethylbenzene | ND | 1.0 | 0.21 | ug/l | |
| 1330-20-7 | Xylene (total) | ND | 1.0 | 0.19 | ug/l | |
| 1634-04-4 | Methyl Tert Butyl Ether | ND | 1.0 | 0.29 | ug/l | |
| 135-98-8 | sec-Butylbenzene | ND | 5.0 | 0.48 | ug/l | |
| 98-06-6 | tert-Butylbenzene | ND | 5.0 | 0.25 | ug/l | |
| 110-82-7 | Cyclohexane | ND | 5.0 | 0.18 | ug/l | |
| 107-06-2 | 1,2-Dichloroethane | ND | 1.0 | 0.22 | ug/l | |
| 110-54-3 | Hexane | ND | 5.0 | 1.1 | ug/l | |
| 98-82-8 | Isopropylbenzene | ND | 2.0 | 0.22 | ug/l | |
| 95-63-6 | 1,2,4-Trimethylbenzene | ND | 2.0 | 0.23 | ug/l | |
| 108-67-8 | 1,3,5-Trimethylbenzene | ND | 2.0 | 0.43 | ug/l | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 93% | | 79-117% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 95% | | 72-123% |
| 2037-26-5 | Toluene-D8 | 97% | | 82-118% |
| 460-00-4 | 4-Bromofluorobenzene | 104% | | 75-118% |

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

# Report of Analysis





**Client Sample ID:** TB
**Lab Sample ID:** JB52301-6
**Matrix:** AQ - Trip Blank Soil
**Method:** SW846 8011 SW846 8011
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

**Date Sampled:** 11/06/13
**Date Received:** 11/06/13
**Percent Solids:** n/a

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 [a] | BB52383.D | 1 | 11/12/13 | AMA | 11/09/13 | M:OP35660 | M:GBB3070 |
| Run #2 | | | | | | | |

| | Initial Volume | Final Volume |
|---|---|---|
| Run #1 | 35.4 ml | 2.0 ml |
| Run #2 | | |

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 106-93-4 | 1,2-Dibromoethane | ND | 0.015 | 0.011 | ug/l | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 460-00-4 | Bromofluorobenzene (S) | 113% | | 36-173% |
| 460-00-4 | Bromofluorobenzene (S) | 103% | | 36-173% |

(a) Analysis performed at Accutest Laboratories, Marlborough, MA.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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## Misc. Forms

# Custody Documents and Other Forms

Includes the following where applicable:

- Chain of Custody
- Sample Tracking Chronicle
- Internal Chain of Custody

# Accutest Laboratories Southeast
# Chain of Custody

ACCUTEST LABORATORIES

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TEL. 407-425-6700 • FAX: 407-425-0707
www.accutest.com

WTB SLL

Accutest JOB # JB52901 PAGE 1 OF

Accutest Quote # SKIFF#

**Client / Reporting Information**

Company Name: Stantec
Address: 1060 Andrew Dr
City: West Chester State: PA Zip: 19380
Project Contact: Jennifer.Menges@Stantec.com E-mail:
Phone#: 610-840-2500
Sampler(s) Name(s) (Printed): Jenny DeBoer ~~215~~ 610-209-2514 Jason Corbett

**Project Information**

Project Name: Sunoco Philadelphia Refinery AOI 8
Street:
City: State:
Project #:
Fax #:
Client Purchase Order #:

**Analytical Information**

| Accutest Sample # | Field ID / Point of Collection | Date | Time | Sampled By | Matrix | Total # of Bottles | Other | None | HCl | NaOH | HNO3 | H2SO4 | NaOH+ZnAc | DI Water | MeOH | V8266 SL2 | V8011 EDB | AB82765 L | CO, NT, PB, V, ZN | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | AOI-8-BH-13-64-0-2 | 11/5/13 | 1035 | JD | SO | 5 | | 2 | | | | | | 2 | 1 | X | X | X | X | HOLD | | | | | | | | |
| 2 | AOI-8-BH-13-64-2-4 | 11/6/13 | 1115 | JD | SO | 5 | | 2 | | | | | | 2 | 1 | X | X | X | X | HOLD | | | | | | | | |
| 3 | AOI-8-BH-13-65-0-2 | 11/5/13 | 1300 | JC | SO | 5 | | 2 | | | | | | 2 | 1 | X | X | X | X | | | | | | | | | |
| 4 | AOI-8-BH-13-65-4-6 | 11/5/13 | 1400 | JC | SO | 5 | | 2 | | | | | | 2 | 1 | X | X | X | X | HOLD | | | | | | | | |
| 5 | AOI-8-BH-13-65-20.5-21 | 11/5/13 | 1405 | JD | SO | 5 | | 2 | | | | | | 2 | 1 | X | X | X | X | | | | | | | | | |
| 6 | TB110613 | 11/6/13 | 0800 | JD | TB | ~~4~~ 4 | | | 2 | | | | | | | X | X | | | | | | | | | | | |

D.I. slurry voc vials frozen storage
Date: Time: Initials:

Matrix Codes: DW - Drinking Water; GW - Ground Water; WW - Water; SW - Surface Water; SO - Soil; SL - Sludge; OI - Oil; LIQ - Other Liquid; AIR - Air; SOL - Other Solid; WP - Wipe

LAB USE ONLY: B9, M44 T1, 1462, 4947, 2173

**TURNAROUND TIME (Business Days)** — Approved By: / Rush Code

- [X] 10 Days Standard
- [ ] 7 Day RUSH
- [ ] 5 Day RUSH
- [ ] 3 Day EMERGENCY
- [ ] 2 Day EMERGENCY
- [ ] 1 Day EMERGENCY
- [ ] OTHER

Emergency or Rush T/A Data Available VIA Email or Lablink

**Data Deliverable Information**

- [ ] COMMERCIAL "A" (RESULTS ONLY)
- [X] COMMERCIAL "B" (RESULTS PLUS QC)
- [ ] REDT1 (EPA LEVEL 3)
- [ ] FULT1 (EPA LEVEL 4)
- [ ] EDD'S

Rec'd at Exton Service Center 11/6

**Comments / Remarks**

Analyze for comprehensive COC list for Sunoco Characterizations (attached) Hold samples indicated pending further instruction

Sample Custody must be documented below each time samples change possession, including courier delivery.

| | | | | | |
|---|---|---|---|---|---|
| Relinquished by Sampler: 1 | Date Time: 11/6/13 1010 | Received By: 2 | Relinquished by: 3 | Date Time: 11/6/13 1615 | Received By: 4 |
| Relinquished by: 5 | Date Time: 11/6/13 1615 | Received By: 6 | Relinquished by: 7 | Date Time: | Received By: 8 |

**Lab Use Only:** Custody Seal in Place: Y N Temp Blank Provided: Y N Preserved where Applicable: Y N Total # of Coolers: Cooler Temperature (s) Celsius: 3.5 C/C

3

5.1 5

**JB52301: Chain of Custody**
**Page 1 of 3**

| SAMPLE # | MEOH VIAL | D.I. VIAL | D.I. VIAL |
|---|---|---|---|
| 1 | 8094 | 8646 | 8645 |
| 2 | 8093 | 8648 | 8647 |
| 3 | 8105 | 8671 | 8672 |
| 4 | 8103 | 8656 | 8666 |
| 5 | 8121 | 8639 | 8654 |
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**JB52301: Chain of Custody**
**Page 2 of 3**

# Accutest Laboratories Sample Receipt Summary

**Accutest Job Number:** JB52301 **Client:** **Project:**

**Date / Time Received:** 11/6/2013 **Delivery Method:** **Airbill #'s:**

**Cooler Temps (Initial/Adjusted):** #1: (3.5/3.5); 0

| Cooler Security | Y | or | N | | Y | or | N |
|---|---|---|---|---|---|---|---|
| 1. Custody Seals Present: | ☑ | | ☐ | 3. COC Present: | ☑ | | ☐ |
| 2. Custody Seals Intact: | ☑ | | ☐ | 4. Smpl Dates/Time OK | ☑ | | ☐ |

| Cooler Temperature | Y | or | N |
|---|---|---|---|
| 1. Temp criteria achieved: | ☑ | | ☐ |
| 2. Cooler temp verification: | IR Gun | | |
| 3. Cooler media: | Ice (Bag) | | |
| 4. No. Coolers: | 1 | | |

| Quality Control _Preservatio | Y | or | N | N/A |
|---|---|---|---|---|
| 1. Trip Blank present / cooler: | ☑ | | ☐ | ☐ |
| 2. Trip Blank listed on COC: | ☑ | | ☐ | ☐ |
| 3. Samples preserved properly: | ☑ | | ☐ | |
| 4. VOCs headspace free: | ☑ | | ☐ | ☐ |

| Sample Integrity - Documentation | Y | or | N |
|---|---|---|---|
| 1. Sample labels present on bottles: | ☑ | | ☐ |
| 2. Container labeling complete: | ☑ | | ☐ |
| 3. Sample container label / COC agree: | ☑ | | ☐ |

| Sample Integrity - Condition | Y | or | N |
|---|---|---|---|
| 1. Sample recvd within HT: | ☑ | | ☐ |
| 2. All containers accounted for: | ☑ | | ☐ |
| 3. Condition of sample: | Intact | | |

| Sample Integrity - Instructions | Y | or | N | N/A |
|---|---|---|---|---|
| 1. Analysis requested is clear: | ☑ | | ☐ | |
| 2. Bottles received for unspecified tests | ☐ | | ☑ | |
| 3. Sufficient volume recvd for analysis: | ☑ | | ☐ | |
| 4. Compositing instructions clear: | ☐ | | ☐ | ☑ |
| 5. Filtering instructions clear: | ☐ | | ☐ | ☑ |

Comments

Accutest Laboratories
V:732.329.0200

2235 US Highway 130
F: 732.329.3499

Dayton, New Jersey
www/accutest.com



**JB52301: Chain of Custody**
**Page 3 of 3**

# Internal Sample Tracking Chronicle

Stantec Consulting Services Inc.

**Job No:** JB52301

Sunoco, Philadelphia Refinery, Philadelphia, PA
Project No: AOI8

| Sample Number | Method | Analyzed | By | Prepped | By | Test Codes |
|---|---|---|---|---|---|---|
| JB52301-3 | Collected: 06-NOV-13 13:00 By: JD | | Received: 06-NOV-13 By: MB | | | |
| AOI-8-N-146-0-2 | | | | | | |
| JB52301-3 | SW846 8270D | 09-NOV-13 04:17 | AD | 08-NOV-13 | TM | AB8270SL |
| JB52301-3 | ASTM 4643-00 | 09-NOV-13 12:16 | AR | | | %SOL |
| JB52301-3 | SW846 8260B | 12-NOV-13 16:03 | PS | | | V8260SL2 |
| JB52301-3 | SW846 8011 | 13-NOV-13 06:28 | AMA | 11-NOV-13 | AMA | V8011EDB |
| JB52301-3 | SW846 6010C | 20-NOV-13 00:01 | AMA | 19-NOV-13 | AMA | CO,NI,PB,V,ZN |
| JB52301-5 | Collected: 06-NOV-13 14:05 By: JD | | Received: 06-NOV-13 By: MB | | | |
| AOI-8-N-143-20.5-21 | | | | | | |
| JB52301-5 | SW846 8270D | 09-NOV-13 04:45 | AD | 08-NOV-13 | TM | AB8270SL |
| JB52301-5 | ASTM 4643-00 | 09-NOV-13 12:16 | AR | | | %SOL |
| JB52301-5 | SW846 8011 | 13-NOV-13 06:51 | AMA | 11-NOV-13 | AMA | V8011EDB |
| JB52301-5 | SW846 8260B | 14-NOV-13 06:33 | CM | | | V8260SL2 |
| JB52301-5 | SW846 6010C | 20-NOV-13 00:06 | AMA | 19-NOV-13 | AMA | CO,NI,PB,V,ZN |
| JB52301-6 | Collected: 06-NOV-13 14:05 By: JD | | Received: 06-NOV-13 By: MB | | | |
| TB | | | | | | |
| JB52301-6 | SW846 8011 | 12-NOV-13 15:33 | AMA | 09-NOV-13 | AMA | V8011EDB |
| JB52301-6 | SW846 8260B | 14-NOV-13 12:41 | TYG | | | V8260SL2 |

# Accutest Internal Chain of Custody



**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA
**Received:** 11/06/13

| Sample.Bottle Number | Transfer FROM | Transfer TO | Date/Time | Reason |
|---|---|---|---|---|
| JB52301-1.2 | Secured Storage | Fernando Martins | 11/07/13 12:44 | Retrieve from Storage |
| JB52301-1.2 | Fernando Martins | | 11/07/13 13:09 | Subcontract |
| JB52301-2.2 | Secured Storage | Fernando Martins | 11/07/13 12:44 | Retrieve from Storage |
| JB52301-2.2 | Fernando Martins | | 11/07/13 13:09 | Subcontract |
| JB52301-3.1 | Secured Storage | Eric Sommers | 11/07/13 18:53 | Retrieve from Storage |
| JB52301-3.1 | Eric Sommers | Secured Storage | 11/07/13 19:53 | Return to Storage |
| JB52301-3.1 | Secured Storage | Arayna Ramkelawan | 11/09/13 09:13 | Retrieve from Storage |
| JB52301-3.1 | Arayna Ramkelawan | Secured Storage | 11/09/13 15:01 | Return to Storage |
| JB52301-3.1.1 | Eric Sommers | Organics Prep | 11/07/13 19:35 | Extract from JB52301-3.1 |
| JB52301-3.1.1 | Organics Prep | Tin Marlar | 11/08/13 14:33 | Extract from JB52301-3.1 |
| JB52301-3.1.1 | Tin Marlar | Extract Storage | 11/08/13 14:33 | Return to Storage |
| JB52301-3.1.1 | Extract Storage | Ashley Dye | 11/08/13 22:18 | Retrieve from Storage |
| JB52301-3.1.1 | Ashley Dye | GCMS2M | 11/08/13 22:18 | Load on Instrument |
| JB52301-3.1.1 | GCMS2M | Kevin Schaefer | 11/11/13 14:06 | Unload from Instrument |
| JB52301-3.1.1 | Kevin Schaefer | Extract Freezer | 11/11/13 14:07 | Return to Storage |
| JB52301-3.2 | Secured Storage | Fernando Martins | 11/07/13 12:44 | Retrieve from Storage |
| JB52301-3.2 | Fernando Martins | | 11/07/13 13:09 | Subcontract |
| JB52301-3.5 | Secured Storage | Prashant Shukla | 11/12/13 14:22 | Retrieve from Storage |
| JB52301-3.5 | Prashant Shukla | GCMSY | 11/12/13 14:22 | Load on Instrument |
| JB52301-3.5 | GCMSY | Prashant Shukla | 11/13/13 09:25 | Unload from Instrument |
| JB52301-3.5 | Prashant Shukla | | 11/13/13 09:25 | Depleted |
| JB52301-4.2 | Secured Storage | Fernando Martins | 11/07/13 12:44 | Retrieve from Storage |
| JB52301-4.2 | Fernando Martins | | 11/07/13 13:09 | Subcontract |
| JB52301-5.1 | Secured Storage | Eric Sommers | 11/07/13 18:53 | Retrieve from Storage |
| JB52301-5.1 | Eric Sommers | Secured Storage | 11/07/13 19:53 | Return to Storage |
| JB52301-5.1 | Secured Storage | Arayna Ramkelawan | 11/09/13 09:13 | Retrieve from Storage |
| JB52301-5.1 | Arayna Ramkelawan | Secured Storage | 11/09/13 15:01 | Return to Storage |
| JB52301-5.1.1 | Eric Sommers | Organics Prep | 11/07/13 19:35 | Extract from JB52301-5.1 |
| JB52301-5.1.1 | Organics Prep | Tin Marlar | 11/08/13 14:33 | Extract from JB52301-5.1 |
| JB52301-5.1.1 | Tin Marlar | Extract Storage | 11/08/13 14:33 | Return to Storage |
| JB52301-5.1.1 | Extract Storage | Ashley Dye | 11/08/13 22:18 | Retrieve from Storage |
| JB52301-5.1.1 | Ashley Dye | GCMS2M | 11/08/13 22:18 | Load on Instrument |
| JB52301-5.1.1 | GCMS2M | Kevin Schaefer | 11/11/13 14:06 | Unload from Instrument |
| JB52301-5.1.1 | Kevin Schaefer | Extract Freezer | 11/11/13 14:07 | Return to Storage |
| JB52301-5.2 | Secured Storage | Fernando Martins | 11/07/13 12:44 | Retrieve from Storage |

# Accutest Internal Chain of Custody



**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA
**Received:** 11/06/13

| Sample.Bottle Number | Transfer FROM | Transfer TO | Date/Time | Reason |
|---|---|---|---|---|
| JB52301-5.2 | Fernando Martins | | 11/07/13 13:09 | Subcontract |
| JB52301-5.3 | Secured Storage | Divya Patel | 11/13/13 13:56 | Retrieve from Storage |
| JB52301-5.3 | Divya Patel | VOA Prep Storage | 11/13/13 16:11 | Return to Storage |
| JB52301-5.3 | VOA Prep Storage | Divya Patel | 11/14/13 14:02 | Retrieve from Storage |
| JB52301-5.3 | Divya Patel | Secured Storage | 11/14/13 14:03 | Return to Storage |
| JB52301-6.1 | Secured Storage | Fernando Martins | 11/07/13 12:44 | Retrieve from Storage |
| JB52301-6.1 | Fernando Martins | | 11/07/13 13:09 | Subcontract |
| JB52301-6.3 | Secured Storage | Fernando Martins | 11/07/13 12:44 | Retrieve from Storage |
| JB52301-6.3 | Fernando Martins | | 11/07/13 13:09 | Subcontract |
| JB52301-6.4 | Secured Storage | Tamika Yvonne Ginn | 11/14/13 12:20 | Retrieve from Storage |
| JB52301-6.4 | Tamika Yvonne Ginn | GCMS2E | 11/14/13 12:20 | Load on Instrument |
| JB52301-6.4 | GCMS2E | Tamika Yvonne Ginn | 11/15/13 14:17 | Unload from Instrument |
| JB52301-6.4 | Tamika Yvonne Ginn | Secured Storage | 11/15/13 14:17 | Return to Storage |

New Jersey ACCUTEST LABORATORIES



## GC/MS Volatiles

### QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries
- Instrument Performance Checks (BFB)
- Internal Standard Area Summaries
- Surrogate Recovery Summaries
- Initial and Continuing Calibration Summaries

# Method Blank Summary



**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| VY6078-MB | Y140516.D | 1 | 11/12/13 | PS | n/a | n/a | VY6078 |



**The QC reported here applies to the following samples:** **Method:** SW846 8260B

JB52301-3

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | ND | 1.0 | 0.13 | ug/kg | |
| 135-98-8 | sec-Butylbenzene | ND | 5.0 | 0.18 | ug/kg | |
| 98-06-6 | tert-Butylbenzene | ND | 5.0 | 0.16 | ug/kg | |
| 110-82-7 | Cyclohexane | ND | 5.0 | 0.26 | ug/kg | |
| 107-06-2 | 1,2-Dichloroethane | ND | 1.0 | 0.32 | ug/kg | |
| 100-41-4 | Ethylbenzene | ND | 1.0 | 0.18 | ug/kg | |
| 110-54-3 | Hexane | ND | 5.0 | 0.54 | ug/kg | |
| 98-82-8 | Isopropylbenzene | ND | 5.0 | 0.15 | ug/kg | |
| 1634-04-4 | Methyl Tert Butyl Ether | ND | 1.0 | 0.34 | ug/kg | |
| 108-88-3 | Toluene | ND | 1.0 | 0.14 | ug/kg | |
| 95-63-6 | 1,2,4-Trimethylbenzene | ND | 5.0 | 0.16 | ug/kg | |
| 108-67-8 | 1,3,5-Trimethylbenzene | ND | 5.0 | 0.22 | ug/kg | |
| 1330-20-7 | Xylene (total) | ND | 1.0 | 0.18 | ug/kg | |

| CAS No. | Surrogate Recoveries | | Limits |
|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 103% | 59-130% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 97% | 65-123% |
| 2037-26-5 | Toluene-D8 | 106% | 80-124% |
| 460-00-4 | 4-Bromofluorobenzene | 94% | 71-132% |

# Method Blank Summary



**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| VD8790-MB | D215227.D | 1 | 11/13/13 | CM | n/a | n/a | VD8790 |



**The QC reported here applies to the following samples:** **Method:** SW846 8260B

JB52301-5

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | ND | 50 | 6.3 | ug/kg | |
| 135-98-8 | sec-Butylbenzene | ND | 250 | 9.0 | ug/kg | |
| 98-06-6 | tert-Butylbenzene | ND | 250 | 8.2 | ug/kg | |
| 110-82-7 | Cyclohexane | ND | 250 | 13 | ug/kg | |
| 107-06-2 | 1,2-Dichloroethane | ND | 50 | 16 | ug/kg | |
| 100-41-4 | Ethylbenzene | ND | 50 | 8.8 | ug/kg | |
| 110-54-3 | Hexane | ND | 250 | 27 | ug/kg | |
| 98-82-8 | Isopropylbenzene | ND | 250 | 7.4 | ug/kg | |
| 1634-04-4 | Methyl Tert Butyl Ether | ND | 50 | 17 | ug/kg | |
| 108-88-3 | Toluene | ND | 50 | 7.1 | ug/kg | |
| 95-63-6 | 1,2,4-Trimethylbenzene | ND | 250 | 8.0 | ug/kg | |
| 108-67-8 | 1,3,5-Trimethylbenzene | ND | 250 | 11 | ug/kg | |
| 1330-20-7 | Xylene (total) | ND | 50 | 8.9 | ug/kg | |

| CAS No. | Surrogate Recoveries | | Limits |
|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 94% | 59-130% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 107% | 65-123% |
| 2037-26-5 | Toluene-D8 | 108% | 80-124% |
| 460-00-4 | 4-Bromofluorobenzene | 91% | 71-132% |

| CAS No. | Tentatively Identified Compounds | R.T. | Est. Conc. | Units | Q |
|---|---|---|---|---|---|
| | Total TIC, Volatile | | 0 | ug/kg | |

# Method Blank Summary



**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| V2E4366-MB | 2E96791.D | 1 | 11/14/13 | TYG | n/a | n/a | V2E4366 |

**The QC reported here applies to the following samples:** **Method:** SW846 8260B

JB52301-6

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | ND | 1.0 | 0.28 | ug/l | |
| 135-98-8 | sec-Butylbenzene | ND | 5.0 | 0.48 | ug/l | |
| 98-06-6 | tert-Butylbenzene | ND | 5.0 | 0.25 | ug/l | |
| 110-82-7 | Cyclohexane | ND | 5.0 | 0.18 | ug/l | |
| 107-06-2 | 1,2-Dichloroethane | ND | 1.0 | 0.22 | ug/l | |
| 100-41-4 | Ethylbenzene | ND | 1.0 | 0.21 | ug/l | |
| 110-54-3 | Hexane | ND | 5.0 | 1.1 | ug/l | |
| 98-82-8 | Isopropylbenzene | ND | 2.0 | 0.22 | ug/l | |
| 1634-04-4 | Methyl Tert Butyl Ether | ND | 1.0 | 0.29 | ug/l | |
| 108-88-3 | Toluene | ND | 1.0 | 0.44 | ug/l | |
| 95-63-6 | 1,2,4-Trimethylbenzene | ND | 2.0 | 0.23 | ug/l | |
| 108-67-8 | 1,3,5-Trimethylbenzene | ND | 2.0 | 0.43 | ug/l | |
| 1330-20-7 | Xylene (total) | ND | 1.0 | 0.19 | ug/l | |

| CAS No. | Surrogate Recoveries | | Limits |
|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 93% | 79-117% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 96% | 72-123% |
| 2037-26-5 | Toluene-D8 | 96% | 82-118% |
| 460-00-4 | 4-Bromofluorobenzene | 103% | 75-118% |

| CAS No. | Tentatively Identified Compounds | R.T. | Est. Conc. | Units | Q |
|---|---|---|---|---|---|
| | Total TIC, Volatile | | 0 | ug/l | |

# Blank Spike Summary



**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| VY6078-BS | Y140517.D | 1 | 11/12/13 | PS | n/a | n/a | VY6078 |

**The QC reported here applies to the following samples:** **Method:** SW846 8260B

JB52301-3

| CAS No. | Compound | Spike ug/kg | BSP ug/kg | BSP % | Limits |
|---|---|---|---|---|---|
| 71-43-2 | Benzene | 50 | 51.3 | 103 | 77-121 |
| 135-98-8 | sec-Butylbenzene | 50 | 43.2 | 86 | 71-123 |
| 98-06-6 | tert-Butylbenzene | 50 | 44.5 | 89 | 72-122 |
| 110-82-7 | Cyclohexane | 50 | 44.3 | 89 | 68-133 |
| 107-06-2 | 1,2-Dichloroethane | 50 | 55.8 | 112 | 68-139 |
| 100-41-4 | Ethylbenzene | 50 | 48.0 | 96 | 75-119 |
| 110-54-3 | Hexane | 50 | 39.8 | 80 | 41-144 |
| 98-82-8 | Isopropylbenzene | 50 | 45.3 | 91 | 72-123 |
| 1634-04-4 | Methyl Tert Butyl Ether | 100 | 97.4 | 97 | 69-127 |
| 108-88-3 | Toluene | 50 | 49.9 | 100 | 76-119 |
| 95-63-6 | 1,2,4-Trimethylbenzene | 50 | 45.6 | 91 | 73-121 |
| 108-67-8 | 1,3,5-Trimethylbenzene | 50 | 46.4 | 93 | 71-122 |
| 1330-20-7 | Xylene (total) | 150 | 145 | 97 | 76-118 |

| CAS No. | Surrogate Recoveries | BSP | Limits |
|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 102% | 59-130% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 96% | 65-123% |
| 2037-26-5 | Toluene-D8 | 108% | 80-124% |
| 460-00-4 | 4-Bromofluorobenzene | 91% | 71-132% |

* = Outside of Control Limits.

# Blank Spike Summary



**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| VD8790-BS | D215228.D | 1 | 11/13/13 | CM | n/a | n/a | VD8790 |



**The QC reported here applies to the following samples:** **Method:** SW846 8260B

JB52301-5

| CAS No. | Compound | Spike ug/kg | BSP ug/kg | BSP % | Limits |
|---|---|---|---|---|---|
| 71-43-2 | Benzene | 2500 | 2800 | 112 | 77-121 |
| 135-98-8 | sec-Butylbenzene | 2500 | 2690 | 108 | 71-123 |
| 98-06-6 | tert-Butylbenzene | 2500 | 2650 | 106 | 72-122 |
| 110-82-7 | Cyclohexane | 2500 | 2660 | 106 | 68-133 |
| 107-06-2 | 1,2-Dichloroethane | 2500 | 3020 | 121 | 68-139 |
| 100-41-4 | Ethylbenzene | 2500 | 2820 | 113 | 75-119 |
| 110-54-3 | Hexane | 2500 | 2990 | 120 | 41-144 |
| 98-82-8 | Isopropylbenzene | 2500 | 2580 | 103 | 72-123 |
| 1634-04-4 | Methyl Tert Butyl Ether | 5000 | 4950 | 99 | 69-127 |
| 108-88-3 | Toluene | 2500 | 2710 | 108 | 76-119 |
| 95-63-6 | 1,2,4-Trimethylbenzene | 2500 | 2640 | 106 | 73-121 |
| 108-67-8 | 1,3,5-Trimethylbenzene | 2500 | 2620 | 105 | 71-122 |
| 1330-20-7 | Xylene (total) | 7500 | 7950 | 106 | 76-118 |

| CAS No. | Surrogate Recoveries | BSP | Limits |
|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 97% | 59-130% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 104% | 65-123% |
| 2037-26-5 | Toluene-D8 | 109% | 80-124% |
| 460-00-4 | 4-Bromofluorobenzene | 90% | 71-132% |

* = Outside of Control Limits.

# Blank Spike Summary



**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| V2E4366-BS | 2E96792.D | 1 | 11/14/13 | TYG | n/a | n/a | V2E4366 |



**The QC reported here applies to the following samples:** **Method:** SW846 8260B

JB52301-6

| CAS No. | Compound | Spike ug/l | BSP ug/l | BSP % | Limits |
|---|---|---|---|---|---|
| 71-43-2 | Benzene | 50 | 50.4 | 101 | 80-119 |
| 135-98-8 | sec-Butylbenzene | 50 | 52.5 | 105 | 79-125 |
| 98-06-6 | tert-Butylbenzene | 50 | 53.2 | 106 | 78-128 |
| 110-82-7 | Cyclohexane | 50 | 48.2 | 96 | 69-134 |
| 107-06-2 | 1,2-Dichloroethane | 50 | 48.5 | 97 | 75-133 |
| 100-41-4 | Ethylbenzene | 50 | 50.3 | 101 | 82-119 |
| 110-54-3 | Hexane | 50 | 53.1 | 106 | 42-143 |
| 98-82-8 | Isopropylbenzene | 50 | 53.1 | 106 | 77-127 |
| 1634-04-4 | Methyl Tert Butyl Ether | 100 | 99.1 | 99 | 75-122 |
| 108-88-3 | Toluene | 50 | 50.9 | 102 | 82-120 |
| 95-63-6 | 1,2,4-Trimethylbenzene | 50 | 52.9 | 106 | 81-123 |
| 108-67-8 | 1,3,5-Trimethylbenzene | 50 | 52.1 | 104 | 79-124 |
| 1330-20-7 | Xylene (total) | 150 | 152 | 101 | 82-119 |

| CAS No. | Surrogate Recoveries | BSP | Limits |
|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 94% | 79-117% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 97% | 72-123% |
| 2037-26-5 | Toluene-D8 | 98% | 82-118% |
| 460-00-4 | 4-Bromofluorobenzene | 104% | 75-118% |

* = Outside of Control Limits.

# Matrix Spike Summary



**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| JB52588-2MS | Y140523.D | 1 | 11/12/13 | PS | n/a | n/a | VY6078 |
| JB52588-2 | Y140520.D | 1 | 11/12/13 | PS | n/a | n/a | VY6078 |

**The QC reported here applies to the following samples:** **Method:** SW846 8260B

JB52301-3

| CAS No. | Compound | JB52588-2 ug/kg | Q | Spike ug/kg | MS ug/kg | MS % | Limits |
|---|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | ND | | 53.9 | 53.0 | 98 | 40-133 |
| 135-98-8 | sec-Butylbenzene | ND | | 53.9 | 54.1 | 100 | 13-148 |
| 98-06-6 | tert-Butylbenzene | ND | | 53.9 | 55.0 | 102 | 19-144 |
| 110-82-7 | Cyclohexane | ND | | 53.9 | 49.8 | 92 | 17-152 |
| 107-06-2 | 1,2-Dichloroethane | ND | | 53.9 | 46.4 | 86 | 46-132 |
| 100-41-4 | Ethylbenzene | ND | | 53.9 | 54.7 | 101 | 27-139 |
| 110-54-3 | Hexane | ND | | 53.9 | 39.2 | 73 | 10-155 |
| 98-82-8 | Isopropylbenzene | ND | | 53.9 | 56.3 | 104 | 24-143 |
| 1634-04-4 | Methyl Tert Butyl Ether | ND | | 53.9 | 36.5 | 68 | 43-131 |
| 108-88-3 | Toluene | ND | | 53.9 | 53.7 | 100 | 32-137 |
| 95-63-6 | 1,2,4-Trimethylbenzene | ND | | 53.9 | 51.9 | 96 | 14-147 |
| 108-67-8 | 1,3,5-Trimethylbenzene | ND | | 53.9 | 56.3 | 104 | 18-145 |
| 1330-20-7 | Xylene (total) | ND | | 162 | 163 | 101 | 25-140 |

| CAS No. | Surrogate Recoveries | MS | JB52588-2 | Limits |
|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 93% | 99% | 59-130% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 75% | 89% | 65-123% |
| 2037-26-5 | Toluene-D8 | 106% | 105% | 80-124% |
| 460-00-4 | 4-Bromofluorobenzene | 93% | 95% | 71-132% |

* = Outside of Control Limits.

# Matrix Spike/Matrix Spike Duplicate Summary



**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| JB52442-1MS | D215229.D | 1 | 11/13/13 | CM | n/a | n/a | VD8790 |
| JB52442-1MSD | D215230.D | 1 | 11/14/13 | CM | n/a | n/a | VD8790 |
| JB52442-1 [a] | D215232.D | 1 | 11/14/13 | CM | n/a | n/a | VD8790 |

**The QC reported here applies to the following samples:** **Method:** SW846 8260B

JB52301-5

| CAS No. | Compound | JB52442-1 ug/kg | Q | Spike ug/kg | MS ug/kg | MS % | MSD ug/kg | MSD % | RPD | Limits Rec/RPD |
|---|---|---|---|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | 17.1 | J | 3930 | 4010 | 102 | 3970 | 101 | 1 | 40-133/26 |
| 135-98-8 | sec-Butylbenzene | 184 | J | 3930 | 3510 | 85 | 3470 | 84 | 1 | 13-148/33 |
| 98-06-6 | tert-Butylbenzene | ND | | 3930 | 3620 | 92 | 3460 | 88 | 5 | 19-144/31 |
| 110-82-7 | Cyclohexane | 201 | J | 3930 | 2820 | 67 | 2600 | 61 | 8 | 17-152/31 |
| 107-06-2 | 1,2-Dichloroethane | ND | | 3930 | 4870 | 124 | 4730 | 120 | 3 | 46-132/24 |
| 100-41-4 | Ethylbenzene | 4530 | | 3930 | 7470 | 75 | 7450 | 74 | 0 | 27-139/29 |
| 110-54-3 | Hexane | 1270 | | 3930 | 3860 | 66 | 3470 | 56 | 11 | 10-155/32 |
| 98-82-8 | Isopropylbenzene | 514 | | 3930 | 3790 | 83 | 3800 | 84 | 0 | 24-143/30 |
| 1634-04-4 | Methyl Tert Butyl Ether | ND | | 3930 | 4200 | 107 | 4200 | 107 | 0 | 43-131/24 |
| 108-88-3 | Toluene | 74.0 | J | 3930 | 3920 | 98 | 3950 | 99 | 1 | 32-137/28 |
| 95-63-6 | 1,2,4-Trimethylbenzene | 12200 | | 3930 | 13800 | 41 | 13700 | 38 | 1 | 14-147/33 |
| 108-67-8 | 1,3,5-Trimethylbenzene | 3460 | | 3930 | 6330 | 73 | 6390 | 75 | 1 | 18-145/32 |
| 1330-20-7 | Xylene (total) | 19400 | | 11800 | 26800 | 63 | 26900 | 64 | 0 | 25-140/29 |

| CAS No. | Surrogate Recoveries | MS | MSD | JB52442-1 | Limits |
|---|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 98% | 98% | | 59-130% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 106% | 107% | | 65-123% |
| 2037-26-5 | Toluene-D8 | 109% | 110% | | 80-124% |
| 460-00-4 | 4-Bromofluorobenzene | 90% | 90% | | 71-132% |

(a) Sample used for QC purposes only.

* = Outside of Control Limits.

# Matrix Spike/Matrix Spike Duplicate Summary



**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| JB52479-12MS | 2E96803.D | 1 | 11/14/13 | TYG | n/a | n/a | V2E4366 |
| JB52479-12MSD | 2E96804.D | 1 | 11/14/13 | TYG | n/a | n/a | V2E4366 |
| JB52479-12 | 2E96798.D | 1 | 11/14/13 | TYG | n/a | n/a | V2E4366 |



**The QC reported here applies to the following samples:** **Method:** SW846 8260B

JB52301-6

| CAS No. | Compound | JB52479-12 ug/l | Q | Spike ug/l | MS ug/l | MS % | MSD ug/l | MSD % | RPD | Limits Rec/RPD |
|---|---|---|---|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | ND | | 50 | 47.7 | 95 | 46.1 | 92 | 3 | 49-138/12 |
| 135-98-8 | sec-Butylbenzene | ND | | 50 | 48.6 | 97 | 46.0 | 92 | 5 | 61-137/14 |
| 98-06-6 | tert-Butylbenzene | ND | | 50 | 48.8 | 98 | 46.9 | 94 | 4 | 63-137/14 |
| 110-82-7 | Cyclohexane | ND | | 50 | 44.2 | 88 | 40.6 | 81 | 8 | 39-152/18 |
| 107-06-2 | 1,2-Dichloroethane | ND | | 50 | 49.9 | 100 | 49.8 | 100 | 0 | 69-138/12 |
| 100-41-4 | Ethylbenzene | ND | | 50 | 48.2 | 96 | 46.6 | 93 | 3 | 48-139/13 |
| 110-54-3 | Hexane | ND | | 50 | 41.9 | 84 | 38.4 | 77 | 9 | 31-155/20 |
| 98-82-8 | Isopropylbenzene | ND | | 50 | 49.7 | 99 | 47.4 | 95 | 5 | 61-138/14 |
| 1634-04-4 | Methyl Tert Butyl Ether | 3.7 | | 50 | 53.8 | 100 | 53.4 | 99 | 1 | 63-134/12 |
| 108-88-3 | Toluene | ND | | 50 | 48.7 | 97 | 46.5 | 93 | 5 | 54-138/13 |
| 95-63-6 | 1,2,4-Trimethylbenzene | ND | | 50 | 49.8 | 100 | 48.9 | 98 | 2 | 51-140/13 |
| 108-67-8 | 1,3,5-Trimethylbenzene | ND | | 50 | 49.6 | 99 | 48.3 | 97 | 3 | 58-138/14 |
| 1330-20-7 | Xylene (total) | ND | | 150 | 145 | 97 | 142 | 95 | 2 | 53-136/12 |

| CAS No. | Surrogate Recoveries | MS | MSD | JB52479-12 | Limits |
|---|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 95% | 96% | 94% | 79-117% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 98% | 97% | 94% | 72-123% |
| 2037-26-5 | Toluene-D8 | 99% | 99% | 99% | 82-118% |
| 460-00-4 | 4-Bromofluorobenzene | 106% | 105% | 103% | 75-118% |

* = Outside of Control Limits.

# Duplicate Summary



**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| JB52588-1DUP | Y140522.D | 1 | 11/12/13 | PS | n/a | n/a | VY6078 |
| JB52588-1 | Y140519.D | 1 | 11/12/13 | PS | n/a | n/a | VY6078 |

**The QC reported here applies to the following samples:** **Method:** SW846 8260B

JB52301-3

| CAS No. | Compound | JB52588-1 ug/kg | Q | DUP ug/kg | Q | RPD | Limits |
|---|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | ND | | ND | | nc | 23 |
| 135-98-8 | sec-Butylbenzene | ND | | ND | | nc | 30 |
| 98-06-6 | tert-Butylbenzene | ND | | ND | | nc | 30 |
| 110-82-7 | Cyclohexane | ND | | ND | | nc | 30 |
| 107-06-2 | 1,2-Dichloroethane | ND | | ND | | nc | 30 |
| 100-41-4 | Ethylbenzene | ND | | ND | | nc | 16 |
| 110-54-3 | Hexane | ND | | ND | | nc | 30 |
| 98-82-8 | Isopropylbenzene | ND | | ND | | nc | 12 |
| 1634-04-4 | Methyl Tert Butyl Ether | ND | | ND | | nc | 12 |
| 108-88-3 | Toluene | ND | | ND | | nc | 24 |
| 95-63-6 | 1,2,4-Trimethylbenzene | ND | | ND | | nc | 12 |
| 108-67-8 | 1,3,5-Trimethylbenzene | ND | | ND | | nc | 10 |
| 1330-20-7 | Xylene (total) | ND | | ND | | nc | 22 |

| CAS No. | Surrogate Recoveries | DUP | JB52588-1 | Limits |
|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 99% | 97% | 59-130% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 88% | 86% | 65-123% |
| 2037-26-5 | Toluene-D8 | 104% | 104% | 80-124% |
| 460-00-4 | 4-Bromofluorobenzene | 96% | 97% | 71-132% |

* = Outside of Control Limits.

# Instrument Performance Check (BFB)



**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| | | | |
|---|---|---|---|
| **Sample:** | V2E4361-BFB | **Injection Date:** | 11/11/13 |
| **Lab File ID:** | 2E96687.D | **Injection Time:** | 15:30 |
| **Instrument ID:** | GCMS2E | | |

| m/e | Ion Abundance Criteria | Raw Abundance | % Relative Abundance | | Pass/Fail |
|---|---|---|---|---|---|
| 50 | 15.0 - 40.0% of mass 95 | 11682 | 17.0 | | Pass |
| 75 | 30.0 - 60.0% of mass 95 | 31890 | 46.4 | | Pass |
| 95 | Base peak, 100% relative abundance | 68658 | 100.0 | | Pass |
| 96 | 5.0 - 9.0% of mass 95 | 4612 | 6.72 | | Pass |
| 173 | Less than 2.0% of mass 174 | 381 | 0.55 | (0.69) [a] | Pass |
| 174 | 50.0 - 120.0% of mass 95 | 55018 | 80.1 | | Pass |
| 175 | 5.0 - 9.0% of mass 174 | 4276 | 6.23 | (7.77) [a] | Pass |
| 176 | 95.0 - 101.0% of mass 174 | 53368 | 77.7 | (97.0) [a] | Pass |
| 177 | 5.0 - 9.0% of mass 176 | 3366 | 4.90 | (6.31) [b] | Pass |

(a) Value is % of mass 174
(b) Value is % of mass 176

**This check applies to the following Samples, MS, MSD, Blanks, and Standards:**

| Lab Sample ID | Lab File ID | Date Analyzed | Time Analyzed | Hours Lapsed | Client Sample ID |
|---|---|---|---|---|---|
| V2E4361-IC4361 | 2E96688.D | 11/11/13 | 16:16 | 00:46 | Initial cal 0.5 |
| V2E4361-IC4361 | 2E96689.D | 11/11/13 | 16:45 | 01:15 | Initial cal 1 |
| V2E4361-IC4361 | 2E96690.D | 11/11/13 | 17:13 | 01:43 | Initial cal 2 |
| V2E4361-IC4361 | 2E96691.D | 11/11/13 | 17:42 | 02:12 | Initial cal 5 |
| V2E4361-IC4361 | 2E96692.D | 11/11/13 | 18:11 | 02:41 | Initial cal 10 |
| V2E4361-IC4361 | 2E96693.D | 11/11/13 | 18:40 | 03:10 | Initial cal 20 |
| V2E4361-ICC4361 | 2E96694.D | 11/11/13 | 19:08 | 03:38 | Initial cal 50 |
| V2E4361-IC4361 | 2E96695.D | 11/11/13 | 19:37 | 04:07 | Initial cal 100 |
| V2E4361-IC4361 | 2E96696.D | 11/11/13 | 20:06 | 04:36 | Initial cal 200 |
| V2E4361-ICV4361 | 2E96699.D | 11/11/13 | 21:32 | 06:02 | Initial cal verification 50 |

# Instrument Performance Check (BFB)



**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

**Sample:** V2E4366-BFB
**Lab File ID:** 2E96788.D
**Instrument ID:** GCMS2E
**Injection Date:** 11/14/13
**Injection Time:** 09:56

| m/e | Ion Abundance Criteria | Raw Abundance | % Relative Abundance | | Pass/Fail |
|---|---|---|---|---|---|
| 50 | 15.0 - 40.0% of mass 95 | 16173 | 17.7 | | Pass |
| 75 | 30.0 - 60.0% of mass 95 | 41965 | 46.0 | | Pass |
| 95 | Base peak, 100% relative abundance | 91165 | 100.0 | | Pass |
| 96 | 5.0 - 9.0% of mass 95 | 6047 | 6.63 | | Pass |
| 173 | Less than 2.0% of mass 174 | 0 | 0.00 | (0.00) [a] | Pass |
| 174 | 50.0 - 120.0% of mass 95 | 71552 | 78.5 | | Pass |
| 175 | 5.0 - 9.0% of mass 174 | 5431 | 5.96 | (7.59) [a] | Pass |
| 176 | 95.0 - 101.0% of mass 174 | 69538 | 76.3 | (97.2) [a] | Pass |
| 177 | 5.0 - 9.0% of mass 176 | 4670 | 5.12 | (6.72) [b] | Pass |

(a) Value is % of mass 174
(b) Value is % of mass 176

**This check applies to the following Samples, MS, MSD, Blanks, and Standards:**

| Lab Sample ID | Lab File ID | Date Analyzed | Time Analyzed | Hours Lapsed | Client Sample ID |
|---|---|---|---|---|---|
| V2E4366-CC4361 | 2E96790.D | 11/14/13 | 10:58 | 01:02 | Continuing cal 20 |
| V2E4366-MB | 2E96791.D | 11/14/13 | 11:27 | 01:31 | Method Blank |
| V2E4366-BS | 2E96792.D | 11/14/13 | 12:05 | 02:09 | Blank Spike |
| JB52301-6 | 2E96793.D | 11/14/13 | 12:41 | 02:45 | TB |
| ZZZZZZ | 2E96794.D | 11/14/13 | 13:10 | 03:14 | (unrelated sample) |
| ZZZZZZ | 2E96795.D | 11/14/13 | 13:38 | 03:42 | (unrelated sample) |
| ZZZZZZ | 2E96797.D | 11/14/13 | 14:37 | 04:41 | (unrelated sample) |
| JB52479-12 | 2E96798.D | 11/14/13 | 15:06 | 05:10 | (used for QC only; not part of job JB52301) |
| ZZZZZZ | 2E96799.D | 11/14/13 | 15:34 | 05:38 | (unrelated sample) |
| ZZZZZZ | 2E96799A.D | 11/14/13 | 16:03 | 06:07 | (unrelated sample) |
| ZZZZZZ | 2E96800.D | 11/14/13 | 16:30 | 06:34 | (unrelated sample) |
| ZZZZZZ | 2E96801.D | 11/14/13 | 16:58 | 07:02 | (unrelated sample) |
| ZZZZZZ | 2E96802A.D | 11/14/13 | 17:56 | 08:00 | (unrelated sample) |
| JB52479-12MS | 2E96803.D | 11/14/13 | 18:25 | 08:29 | Matrix Spike |
| JB52479-12MSD | 2E96804.D | 11/14/13 | 18:53 | 08:57 | Matrix Spike Duplicate |
| ZZZZZZ | 2E96805.D | 11/14/13 | 19:22 | 09:26 | (unrelated sample) |
| ZZZZZZ | 2E96807.D | 11/14/13 | 19:51 | 09:55 | (unrelated sample) |
| ZZZZZZ | 2E96808.D | 11/14/13 | 20:20 | 10:24 | (unrelated sample) |
| ZZZZZZ | 2E96811.D | 11/14/13 | 21:46 | 11:50 | (unrelated sample) |

# Instrument Performance Check (BFB)



**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| | | | |
|---|---|---|---|
| **Sample:** | VD8771-BFB | **Injection Date:** | 10/31/13 |
| **Lab File ID:** | D214773.D | **Injection Time:** | 13:44 |
| **Instrument ID:** | GCMSD | | |

| m/e | Ion Abundance Criteria | Raw Abundance | % Relative Abundance | | Pass/Fail |
|---|---|---|---|---|---|
| 50 | 15.0 - 40.0% of mass 95 | 14622 | 18.8 | | Pass |
| 75 | 30.0 - 60.0% of mass 95 | 37957 | 48.7 | | Pass |
| 95 | Base peak, 100% relative abundance | 77888 | 100.0 | | Pass |
| 96 | 5.0 - 9.0% of mass 95 | 5321 | 6.83 | | Pass |
| 173 | Less than 2.0% of mass 174 | 482 | 0.62 | (0.73) [a] | Pass |
| 174 | 50.0 - 120.0% of mass 95 | 66384 | 85.2 | | Pass |
| 175 | 5.0 - 9.0% of mass 174 | 5065 | 6.50 | (7.63) [a] | Pass |
| 176 | 95.0 - 101.0% of mass 174 | 64672 | 83.0 | (97.4) [a] | Pass |
| 177 | 5.0 - 9.0% of mass 176 | 4255 | 5.46 | (6.58) [b] | Pass |

(a) Value is % of mass 174
(b) Value is % of mass 176

**This check applies to the following Samples, MS, MSD, Blanks, and Standards:**

| Lab Sample ID | Lab File ID | Date Analyzed | Time Analyzed | Hours Lapsed | Client Sample ID |
|---|---|---|---|---|---|
| ZZZZZZ | D214774.D | 10/31/13 | 14:55 | 01:11 | (unrelated sample) |
| VD8771-IC8771 | D214774.D | 10/31/13 | 14:55 | 01:11 | Initial cal 0.5 |
| VD8771-IC8771 | D214775.D | 10/31/13 | 15:24 | 01:40 | Initial cal 1.0 |
| ZZZZZZ | D214775.D | 10/31/13 | 15:24 | 01:40 | (unrelated sample) |
| VD8771-IC8771 | D214776.D | 10/31/13 | 15:53 | 02:09 | Initial cal 2.0 |
| VD8771-IC8771 | D214777.D | 10/31/13 | 16:22 | 02:38 | Initial cal 5.0 |
| VD8771-IC8771 | D214778.D | 10/31/13 | 16:52 | 03:08 | Initial cal 10 |
| VD8771-IC8771 | D214779.D | 10/31/13 | 17:21 | 03:37 | Initial cal 20 |
| VD8771-ICC8771 | D214780.D | 10/31/13 | 17:50 | 04:06 | Initial cal 50 |
| VD8771-IC8771 | D214781.D | 10/31/13 | 18:20 | 04:36 | Initial cal 100 |
| VD8771-IC8771 | D214782.D | 10/31/13 | 18:49 | 05:05 | Initial cal 200 |
| VD8771-ICV8771 | D214785.D | 10/31/13 | 20:17 | 06:33 | Initial cal verification 50 |

# Instrument Performance Check (BFB)



**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| | | | |
|---|---|---|---|
| **Sample:** | VD8790-BFB | **Injection Date:** | 11/13/13 |
| **Lab File ID:** | D215224.D | **Injection Time:** | 21:13 |
| **Instrument ID:** | GCMSD | | |

| m/e | Ion Abundance Criteria | Raw Abundance | % Relative Abundance | | Pass/Fail |
|---|---|---|---|---|---|
| 50 | 15.0 - 40.0% of mass 95 | 14696 | 21.5 | | Pass |
| 75 | 30.0 - 60.0% of mass 95 | 36653 | 53.6 | | Pass |
| 95 | Base peak, 100% relative abundance | 68426 | 100.0 | | Pass |
| 96 | 5.0 - 9.0% of mass 95 | 4732 | 6.92 | | Pass |
| 173 | Less than 2.0% of mass 174 | 0 | 0.00 | (0.00) [a] | Pass |
| 174 | 50.0 - 120.0% of mass 95 | 60466 | 88.4 | | Pass |
| 175 | 5.0 - 9.0% of mass 174 | 4514 | 6.60 | (7.47) [a] | Pass |
| 176 | 95.0 - 101.0% of mass 174 | 58133 | 85.0 | (96.1) [a] | Pass |
| 177 | 5.0 - 9.0% of mass 176 | 3938 | 5.76 | (6.77) [b] | Pass |

(a) Value is % of mass 174
(b) Value is % of mass 176

**This check applies to the following Samples, MS, MSD, Blanks, and Standards:**

| Lab Sample ID | Lab File ID | Date Analyzed | Time Analyzed | Hours Lapsed | Client Sample ID |
|---|---|---|---|---|---|
| VD8790-CC8771 | D215225.D | 11/13/13 | 21:42 | 00:29 | Continuing cal 50 |
| ZZZZZZ | D215227.D | 11/13/13 | 22:41 | 01:28 | (unrelated sample) |
| VD8790-MB | D215227.D | 11/13/13 | 22:41 | 01:28 | Method Blank |
| VD8790-BS | D215228.D | 11/13/13 | 23:11 | 01:58 | Blank Spike |
| JB52442-1MS | D215229.D | 11/13/13 | 23:41 | 02:28 | Matrix Spike |
| JB52442-1MSD | D215230.D | 11/14/13 | 00:10 | 02:57 | Matrix Spike Duplicate |
| JB52442-1 | D215232.D | 11/14/13 | 01:10 | 03:57 | (used for QC only; not part of job JB52301) |
| ZZZZZZ | D215240.D | 11/14/13 | 05:05 | 07:52 | (unrelated sample) |
| JB52301-5 | D215243.D | 11/14/13 | 06:33 | 09:20 | AOI-8-N-143-20.5-21 |
| ZZZZZZ | D215244.D | 11/14/13 | 07:02 | 09:49 | (unrelated sample) |

# Instrument Performance Check (BFB)



**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| | | | |
|---|---|---|---|
| **Sample:** | VY5974-BFB | **Injection Date:** | 09/19/13 |
| **Lab File ID:** | Y138252.D | **Injection Time:** | 13:06 |
| **Instrument ID:** | GCMSY | | |

| m/e | Ion Abundance Criteria | Raw Abundance | % Relative Abundance | | Pass/Fail |
|---|---|---|---|---|---|
| 50 | 15.0 - 40.0% of mass 95 | 11244 | 17.2 | | Pass |
| 75 | 30.0 - 60.0% of mass 95 | 29365 | 44.9 | | Pass |
| 95 | Base peak, 100% relative abundance | 65341 | 100.0 | | Pass |
| 96 | 5.0 - 9.0% of mass 95 | 4430 | 6.78 | | Pass |
| 173 | Less than 2.0% of mass 174 | 0 | 0.00 | (0.00) [a] | Pass |
| 174 | 50.0 - 120.0% of mass 95 | 58288 | 89.2 | | Pass |
| 175 | 5.0 - 9.0% of mass 174 | 4533 | 6.94 | (7.78) [a] | Pass |
| 176 | 95.0 - 101.0% of mass 174 | 56757 | 86.9 | (97.4) [a] | Pass |
| 177 | 5.0 - 9.0% of mass 176 | 3828 | 5.86 | (6.74) [b] | Pass |

(a) Value is % of mass 174
(b) Value is % of mass 176

**This check applies to the following Samples, MS, MSD, Blanks, and Standards:**

| Lab Sample ID | Lab File ID | Date Analyzed | Time Analyzed | Hours Lapsed | Client Sample ID |
|---|---|---|---|---|---|
| VY5974-IC5974 | Y138253.D | 09/19/13 | 13:43 | 00:37 | Initial cal 5 |
| VY5974-IC5974 | Y138254.D | 09/19/13 | 14:12 | 01:06 | Initial cal 2 |
| VY5974-IC5974 | Y138255.D | 09/19/13 | 14:40 | 01:34 | Initial cal 1 |
| VY5974-IC5974 | Y138256.D | 09/19/13 | 15:09 | 02:03 | Initial cal 0.5 |
| VY5974-IC5974 | Y138257.D | 09/19/13 | 15:37 | 02:31 | Initial cal 10 |
| VY5974-IC5974 | Y138258.D | 09/19/13 | 16:06 | 03:00 | Initial cal 20 |
| VY5974-ICC5974 | Y138259.D | 09/19/13 | 16:34 | 03:28 | Initial cal 50 |
| VY5974-IC5974 | Y138260.D | 09/19/13 | 17:03 | 03:57 | Initial cal 75 |
| VY5974-IC5974 | Y138261.D | 09/19/13 | 17:32 | 04:26 | Initial cal 100 |
| VY5974-IC5974 | Y138262.D | 09/19/13 | 18:01 | 04:55 | Initial cal 200 |
| VY5974-ICV5974 | Y138265.D | 09/19/13 | 19:27 | 06:21 | Initial cal verification 50 |

# Instrument Performance Check (BFB)



**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

**Sample:** VY6078-BFB
**Lab File ID:** Y140514.D
**Instrument ID:** GCMSY
**Injection Date:** 11/12/13
**Injection Time:** 12:09

| m/e | Ion Abundance Criteria | Raw Abundance | % Relative Abundance | | Pass/Fail |
|---|---|---|---|---|---|
| 50 | 15.0 - 40.0% of mass 95 | 9154 | 16.1 | | Pass |
| 75 | 30.0 - 60.0% of mass 95 | 25421 | 44.8 | | Pass |
| 95 | Base peak, 100% relative abundance | 56741 | 100.0 | | Pass |
| 96 | 5.0 - 9.0% of mass 95 | 3741 | 6.59 | | Pass |
| 173 | Less than 2.0% of mass 174 | 0 | 0.00 | (0.00) [a] | Pass |
| 174 | 50.0 - 120.0% of mass 95 | 52069 | 91.8 | | Pass |
| 175 | 5.0 - 9.0% of mass 174 | 3977 | 7.01 | (7.64) [a] | Pass |
| 176 | 95.0 - 101.0% of mass 174 | 50784 | 89.5 | (97.5) [a] | Pass |
| 177 | 5.0 - 9.0% of mass 176 | 3358 | 5.92 | (6.61) [b] | Pass |

(a) Value is % of mass 174
(b) Value is % of mass 176

**This check applies to the following Samples, MS, MSD, Blanks, and Standards:**

| Lab Sample ID | Lab File ID | Date Analyzed | Time Analyzed | Hours Lapsed | Client Sample ID |
|---|---|---|---|---|---|
| VY6078-CC5974 | Y140515.D | 11/12/13 | 12:41 | 00:32 | Continuing cal 20 |
| VY6078-MB | Y140516.D | 11/12/13 | 13:18 | 01:09 | Method Blank |
| VY6078-BS | Y140517.D | 11/12/13 | 13:52 | 01:43 | Blank Spike |
| JB52588-1 | Y140519.D | 11/12/13 | 15:05 | 02:56 | (used for QC only; not part of job JB52301) |
| JB52588-2 | Y140520.D | 11/12/13 | 15:34 | 03:25 | (used for QC only; not part of job JB52301) |
| JB52301-3 | Y140521.D | 11/12/13 | 16:03 | 03:54 | AOI-8-N-146-0-2 |
| JB52588-1DUP | Y140522.D | 11/12/13 | 16:31 | 04:22 | Duplicate |
| JB52588-2MS | Y140523.D | 11/12/13 | 17:00 | 04:51 | Matrix Spike |
| ZZZZZZ | Y140525.D | 11/12/13 | 17:58 | 05:49 | (unrelated sample) |
| ZZZZZZ | Y140526.D | 11/12/13 | 18:26 | 06:17 | (unrelated sample) |
| ZZZZZZ | Y140527.D | 11/12/13 | 18:55 | 06:46 | (unrelated sample) |
| ZZZZZZ | Y140528.D | 11/12/13 | 19:24 | 07:15 | (unrelated sample) |
| ZZZZZZ | Y140529.D | 11/12/13 | 19:53 | 07:44 | (unrelated sample) |
| ZZZZZZ | Y140530.D | 11/12/13 | 20:21 | 08:12 | (unrelated sample) |
| ZZZZZZ | Y140531.D | 11/12/13 | 20:50 | 08:41 | (unrelated sample) |
| ZZZZZZ | Y140532.D | 11/12/13 | 21:19 | 09:10 | (unrelated sample) |
| ZZZZZZ | Y140533.D | 11/12/13 | 21:47 | 09:38 | (unrelated sample) |
| ZZZZZZ | Y140534.D | 11/12/13 | 22:16 | 10:07 | (unrelated sample) |
| ZZZZZZ | Y140535.D | 11/12/13 | 22:45 | 10:36 | (unrelated sample) |

# Volatile Internal Standard Area Summary



**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| | | | |
|---|---|---|---|
| **Check Std:** | V2E4366-CC4361 | **Injection Date:** | 11/14/13 |
| **Lab File ID:** | 2E96790.D | **Injection Time:** | 10:58 |
| **Instrument ID:** | GCMS2E | **Method:** | SW846 8260B |

| | IS 1 AREA | RT | IS 2 AREA | RT | IS 3 AREA | RT | IS 4 AREA | RT | IS 5 AREA | RT |
|---|---|---|---|---|---|---|---|---|---|---|
| Check Std | 156395 | 6.83 | 319250 | 9.03 | 491487 | 9.94 | 386443 | 13.14 | 209438 | 15.46 |
| Upper Limit [a] | 312790 | 7.33 | 638500 | 9.53 | 982974 | 10.44 | 772886 | 13.64 | 418876 | 15.96 |
| Lower Limit [b] | 78198 | 6.33 | 159625 | 8.53 | 245744 | 9.44 | 193222 | 12.64 | 104719 | 14.96 |

| Lab Sample ID | IS 1 AREA | RT | IS 2 AREA | RT | IS 3 AREA | RT | IS 4 AREA | RT | IS 5 AREA | RT |
|---|---|---|---|---|---|---|---|---|---|---|
| V2E4366-MB | 156131 | 6.83 | 316395 | 9.04 | 481894 | 9.94 | 379052 | 13.14 | 206965 | 15.46 |
| V2E4366-BS | 152549 | 6.84 | 320708 | 9.04 | 497605 | 9.94 | 394372 | 13.14 | 209919 | 15.46 |
| JB52301-6 | 156165 | 6.84 | 320539 | 9.04 | 489581 | 9.94 | 389953 | 13.14 | 207017 | 15.46 |
| ZZZZZZ | 156928 | 6.83 | 308396 | 9.03 | 473611 | 9.94 | 384078 | 13.14 | 206876 | 15.46 |
| ZZZZZZ | 137962 | 6.83 | 315676 | 9.04 | 478189 | 9.94 | 380244 | 13.14 | 205191 | 15.46 |
| ZZZZZZ | 149160 | 6.83 | 310610 | 9.04 | 480172 | 9.94 | 389416 | 13.14 | 211781 | 15.46 |
| JB52479-12 | 138925 | 6.84 | 309201 | 9.04 | 472201 | 9.94 | 393565 | 13.14 | 214435 | 15.46 |
| ZZZZZZ | 146644 | 6.83 | 316400 | 9.04 | 482267 | 9.94 | 386024 | 13.14 | 208320 | 15.46 |
| ZZZZZZ | 152418 | 6.83 | 308580 | 9.04 | 469018 | 9.94 | 377470 | 13.14 | 205595 | 15.46 |
| ZZZZZZ | 149620 | 6.83 | 305148 | 9.04 | 463715 | 9.94 | 375035 | 13.14 | 205056 | 15.46 |
| ZZZZZZ | 179047 | 6.83 | 314524 | 9.04 | 479443 | 9.94 | 387572 | 13.14 | 208036 | 15.46 |
| ZZZZZZ | 176277 | 6.83 | 318415 | 9.04 | 489591 | 9.94 | 396892 | 13.14 | 210274 | 15.46 |
| JB52479-12MS | 184426 | 6.83 | 324173 | 9.03 | 508598 | 9.94 | 405366 | 13.14 | 215303 | 15.46 |
| JB52479-12MSD | 154483 | 6.84 | 330289 | 9.04 | 512612 | 9.94 | 404826 | 13.14 | 216726 | 15.46 |
| ZZZZZZ | 154066 | 6.83 | 331118 | 9.04 | 499628 | 9.94 | 392021 | 13.14 | 212903 | 15.46 |
| ZZZZZZ | 140680 | 6.83 | 325296 | 9.04 | 490356 | 9.94 | 388293 | 13.14 | 213449 | 15.46 |
| ZZZZZZ | 147559 | 6.83 | 326113 | 9.04 | 488161 | 9.94 | 393984 | 13.14 | 213279 | 15.46 |
| ZZZZZZ | 153679 | 6.83 | 324329 | 9.04 | 492577 | 9.94 | 395082 | 13.14 | 212350 | 15.46 |

**IS 1** = Tert Butyl Alcohol-D9
**IS 2** = Pentafluorobenzene
**IS 3** = 1,4-Difluorobenzene
**IS 4** = Chlorobenzene-D5
**IS 5** = 1,4-Dichlorobenzene-d4

(a) Upper Limit = + 100% of check standard area; Retention time + 0.5 minutes.
(b) Lower Limit = -50% of check standard area; Retention time -0.5 minutes.

# Volatile Internal Standard Area Summary



**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

**Check Std:** VD8790-CC8771 **Injection Date:** 11/13/13
**Lab File ID:** D215225.D **Injection Time:** 21:42
**Instrument ID:** GCMSD **Method:** SW846 8260B

| | IS 1 AREA | RT | IS 2 AREA | RT | IS 3 AREA | RT | IS 4 AREA | RT | IS 5 AREA | RT |
|---|---|---|---|---|---|---|---|---|---|---|
| Check Std | 128397 | 7.80 | 243452 | 10.03 | 339371 | 10.94 | 313125 | 14.28 | 190191 | 16.86 |
| Upper Limit [a] | 256794 | 8.30 | 486904 | 10.53 | 678742 | 11.44 | 626250 | 14.78 | 380382 | 17.36 |
| Lower Limit [b] | 64199 | 7.30 | 121726 | 9.53 | 169686 | 10.44 | 156563 | 13.78 | 95096 | 16.36 |

| Lab Sample ID | IS 1 AREA | RT | IS 2 AREA | RT | IS 3 AREA | RT | IS 4 AREA | RT | IS 5 AREA | RT |
|---|---|---|---|---|---|---|---|---|---|---|
| VD8790-MB | 129263 | 7.82 | 245558 | 10.03 | 340956 | 10.94 | 322540 | 14.28 | 194576 | 16.86 |
| ZZZZZZ | 129263 | 7.82 | 245558 | 10.03 | 340956 | 10.94 | 322540 | 14.28 | 194576 | 16.86 |
| VD8790-BS | 134231 | 7.80 | 248368 | 10.03 | 346655 | 10.94 | 321235 | 14.28 | 193040 | 16.86 |
| JB52442-1MS | 141203 | 7.83 | 243733 | 10.03 | 340268 | 10.94 | 313633 | 14.28 | 189829 | 16.86 |
| JB52442-1MSD | 137796 | 7.83 | 238677 | 10.03 | 339970 | 10.94 | 314831 | 14.28 | 187899 | 16.86 |
| JB52442-1 | 134528 | 7.82 | 248697 | 10.03 | 346412 | 10.94 | 328413 | 14.28 | 194765 | 16.86 |
| ZZZZZZ | 139844 | 7.82 | 255999 | 10.03 | 363155 | 10.94 | 340867 | 14.28 | 203285 | 16.86 |
| JB52301-5 [c] | 134520 | 7.82 | 246160 | 10.03 | 345505 | 10.94 | 320096 | 14.28 | 196653 | 16.86 |
| ZZZZZZ | 135306 | 7.82 | 246778 | 10.03 | 349506 | 10.94 | 329470 | 14.28 | 208682 | 16.86 |

**IS 1** = Tert Butyl Alcohol-D9
**IS 2** = Pentafluorobenzene
**IS 3** = 1,4-Difluorobenzene
**IS 4** = Chlorobenzene-D5
**IS 5** = 1,4-Dichlorobenzene-d4

(a) Upper Limit = + 100% of check standard area; Retention time + 0.5 minutes.
(b) Lower Limit = -50% of check standard area; Retention time -0.5 minutes.
(c) Dilution required due to sample matrix.

# Volatile Internal Standard Area Summary



**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| | | | |
|---|---|---|---|
| **Check Std:** | VY6078-CC5974 | **Injection Date:** | 11/12/13 |
| **Lab File ID:** | Y140515.D | **Injection Time:** | 12:41 |
| **Instrument ID:** | GCMSY | **Method:** | SW846 8260B |

| | IS 1 AREA | RT | IS 2 AREA | RT | IS 3 AREA | RT | IS 4 AREA | RT | IS 5 AREA | RT |
|---|---|---|---|---|---|---|---|---|---|---|
| Check Std | 88796 | 7.63 | 221743 | 9.81 | 333327 | 10.73 | 273852 | 13.81 | 135571 | 16.09 |
| Upper Limit [a] | 177592 | 8.13 | 443486 | 10.31 | 666654 | 11.23 | 547704 | 14.31 | 271142 | 16.59 |
| Lower Limit [b] | 44398 | 7.13 | 110872 | 9.31 | 166664 | 10.23 | 136926 | 13.31 | 67786 | 15.59 |

| Lab Sample ID | IS 1 AREA | RT | IS 2 AREA | RT | IS 3 AREA | RT | IS 4 AREA | RT | IS 5 AREA | RT |
|---|---|---|---|---|---|---|---|---|---|---|
| VY6078-MB | 87121 | 7.64 | 204494 | 9.80 | 310150 | 10.72 | 260809 | 13.81 | 119855 | 16.09 |
| VY6078-BS | 92638 | 7.63 | 214199 | 9.80 | 320438 | 10.72 | 273633 | 13.81 | 139734 | 16.09 |
| JB52588-1 | 81741 | 7.63 | 254208 | 9.81 | 377724 | 10.73 | 302735 | 13.81 | 131745 | 16.09 |
| JB52588-2 | 91387 | 7.64 | 248312 | 9.81 | 372347 | 10.73 | 299553 | 13.81 | 134106 | 16.09 |
| JB52301-3 | 76762 | 7.64 | 235235 | 9.81 | 349323 | 10.73 | 278957 | 13.81 | 120025 | 16.09 |
| JB52588-1DUP | 82035 | 7.64 | 252073 | 9.82 | 377538 | 10.73 | 300289 | 13.81 | 132831 | 16.09 |
| JB52588-2MS | 51439 | 7.64 | 259391 | 9.81 | 380133 | 10.73 | 298801 | 13.81 | 143802 | 16.09 |
| ZZZZZZ | 78464 | 7.64 | 243487 | 9.81 | 360225 | 10.73 | 287422 | 13.81 | 130178 | 16.09 |
| ZZZZZZ | 83891 | 7.63 | 240868 | 9.81 | 360862 | 10.73 | 290339 | 13.81 | 129775 | 16.09 |
| ZZZZZZ | 91101 | 7.63 | 246952 | 9.81 | 369709 | 10.73 | 296428 | 13.81 | 128833 | 16.09 |
| ZZZZZZ | 80602 | 7.64 | 253036 | 9.81 | 376032 | 10.73 | 296886 | 13.81 | 134352 | 16.09 |
| ZZZZZZ | 85208 | 7.64 | 252574 | 9.81 | 375151 | 10.73 | 299461 | 13.81 | 138272 | 16.09 |
| ZZZZZZ | 83119 | 7.64 | 232364 | 9.81 | 345481 | 10.73 | 279445 | 13.81 | 127348 | 16.09 |
| ZZZZZZ | 82920 | 7.64 | 235613 | 9.81 | 355010 | 10.73 | 288258 | 13.81 | 138311 | 16.09 |
| ZZZZZZ | 79693 | 7.63 | 239082 | 9.81 | 356951 | 10.73 | 288713 | 13.81 | 128202 | 16.09 |
| ZZZZZZ | 80773 | 7.64 | 225441 | 9.81 | 338340 | 10.73 | 272061 | 13.81 | 122038 | 16.09 |
| ZZZZZZ | 78252 | 7.63 | 249879 | 9.81 | 369695 | 10.73 | 290796 | 13.81 | 126677 | 16.09 |
| ZZZZZZ | 76020 | 7.63 | 244390 | 9.81 | 362974 | 10.73 | 283868 | 13.81 | 122783 | 16.09 |

**IS 1** = Tert Butyl Alcohol-D9
**IS 2** = Pentafluorobenzene
**IS 3** = 1,4-Difluorobenzene
**IS 4** = Chlorobenzene-D5
**IS 5** = 1,4-Dichlorobenzene-d4

(a) Upper Limit = + 100% of check standard area; Retention time + 0.5 minutes.
(b) Lower Limit = -50% of check standard area; Retention time -0.5 minutes.

# Volatile Surrogate Recovery Summary



**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

**Method:** SW846 8260B **Matrix:** AQ

**Samples and QC shown here apply to the above method**

| Lab Sample ID | Lab File ID | S1 | S2 | S3 | S4 |
|---|---|---|---|---|---|
| JB52301-6 | 2E96793.D | 93.0 | 95.0 | 97.0 | 104.0 |
| JB52479-12MS | 2E96803.D | 95.0 | 98.0 | 99.0 | 106.0 |
| JB52479-12MSD | 2E96804.D | 96.0 | 97.0 | 99.0 | 105.0 |
| V2E4366-BS | 2E96792.D | 94.0 | 97.0 | 98.0 | 104.0 |
| V2E4366-MB | 2E96791.D | 93.0 | 96.0 | 96.0 | 103.0 |

| Surrogate Compounds | Recovery Limits |
|---|---|
| **S1** = Dibromofluoromethane | 79-117% |
| **S2** = 1,2-Dichloroethane-D4 | 72-123% |
| **S3** = Toluene-D8 | 82-118% |
| **S4** = 4-Bromofluorobenzene | 75-118% |

# Volatile Surrogate Recovery Summary



**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

**Method:** SW846 8260B **Matrix:** SO

**Samples and QC shown here apply to the above method**

| Lab Sample ID | Lab File ID | S1 | S2 | S3 | S4 |
|---|---|---|---|---|---|
| JB52301-3 | Y140521.D | 100.0 | 90.0 | 105.0 | 99.0 |
| JB52301-5 | D215243.D | 95.0 | 108.0 | 109.0 | 88.0 |
| JB52442-1MS | D215229.D | 98.0 | 106.0 | 109.0 | 90.0 |
| JB52442-1MSD | D215230.D | 98.0 | 107.0 | 110.0 | 90.0 |
| JB52588-1DUP | Y140522.D | 99.0 | 88.0 | 104.0 | 96.0 |
| JB52588-2MS | Y140523.D | 93.0 | 75.0 | 106.0 | 93.0 |
| VD8790-BS | D215228.D | 97.0 | 104.0 | 109.0 | 90.0 |
| VD8790-MB | D215227.D | 94.0 | 107.0 | 108.0 | 91.0 |
| VY6078-BS | Y140517.D | 102.0 | 96.0 | 108.0 | 91.0 |
| VY6078-MB | Y140516.D | 103.0 | 97.0 | 106.0 | 94.0 |

| Surrogate Compounds | Recovery Limits |
|---|---|
| **S1** = Dibromofluoromethane | 59-130% |
| **S2** = 1,2-Dichloroethane-D4 | 65-123% |
| **S3** = Toluene-D8 | 80-124% |
| **S4** = 4-Bromofluorobenzene | 71-132% |

# Initial Calibration Verification

**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

**Sample:** V2E4268-ICV4361
**Lab FileID:** 2E94772B.D



Evaluate Continuing Calibration Report

Data File : C:\msdchem\1\DATA\2E94772B.D Vial: 2
Acq On : 18 Sep 2013 10:18 am Operator: tamikag
Sample : icv4361-4.30 Inst : ms2e
Misc : MS54697,V2E4268,5,,,,1 Multiplr: 1.00
MS Integration Params: rteint.p

Method : C:\MSDCHEM\1\METHODS\M2E4361.M (RTE Integrator)
Title : SW-846 Method 8260B, ZB624 60Mx0.25MMx1.4UM
Last Update : Thu Nov 14 09:30:03 2013
Response via : Multiple Level Calibration

Min. RRF : 0.010 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 200%

| | Compound | AvgRF | CCRF | %Dev | Area% | Dev(min) | R.T. |
|---|---|---|---|---|---|---|---|
| 1 I | Tert Butyl Alcohol-d9 | 1.000 | 1.000 | 0.0 | 156 | 0.09 | 6.93 |
| 2 M | 1,4-dioxane | | ---------- | NA | ---------- | | |
| 3 M | tertiary butyl alcohol | | ---------- | NA | ---------- | | |
| | ---------- | True | Calc. | % Drift | ---------- | | |
| 4 | ethanol | | ---------- | NA | ---------- | | |
| | ---------- | AvgRF | CCRF | % Dev | ---------- | | |
| 5 | acetonitrile | | ---------- | NA | ---------- | | |
| 6 | iso-butyl alcohol | | ---------- | NA | ---------- | | |
| 7 I | pentafluorobenzene | 1.000 | 1.000 | 0.0 | 91 | 0.10 | 9.13 |
| 8 | freon 143a | | ---------- | NA | ---------- | | |
| 9 | freon 142b | | ---------- | NA | ---------- | | |
| 10 | freon 141b | | ---------- | NA | ---------- | | |
| | ---------- | True | Calc. | % Drift | ---------- | | |
| 11 | Propylene | 4.300 | 4.263 | 0.9 | 97 | 0.06 | 3.67 |
| | ---------- | AvgRF | CCRF | % Dev | ---------- | | |
| 12 M | chlorodifluoromethane | | ---------- | NA | ---------- | | |
| 13 M | dichlorodifluoromethane | | ---------- | NA | ---------- | | |
| 14 M | chloromethane | | ---------- | NA | ---------- | | |
| 15 M | vinyl chloride | | ---------- | NA | ---------- | | |
| 16 M | bromomethane | | ---------- | NA | ---------- | | |
| 17 M | chloroethane | | ---------- | NA | ---------- | | |
| 18 M | trichlorofluoromethane | | ---------- | NA | ---------- | | |
| 19 | Pentane | | ---------- | NA | ---------- | | |
| 20 M | ethyl ether | | ---------- | NA | ---------- | | |
| 21 | 2-chloropropane | | ---------- | NA | ---------- | | |
| 22 M | acrolein | | ---------- | NA | ---------- | | |
| 23 M | 1,1-dichloroethene | | ---------- | NA | ---------- | | |
| 24 M | acetone | | ---------- | NA | ---------- | | |
| 25 M | allyl chloride | | ---------- | NA | ---------- | | |
| 26 M | iodomethane | | ---------- | NA | ---------- | | |
| 27 M | carbon disulfide | | ---------- | NA | ---------- | | |
| 28 M | methylene chloride | | ---------- | NA | ---------- | | |
| 29 M | methyl acetate | | ---------- | NA | ---------- | | |
| 30 | 1-chloropropane | | ---------- | NA | ---------- | | |
| 31 M | methyl tert butyl ether | | ---------- | NA | ---------- | | |
| 32 M | trans-1,2-dichloroethene | | ---------- | NA | ---------- | | |

# Initial Calibration Verification

**Job Number:** JB52301 **Sample:** V2E4268-ICV4361
**Account:** SECORPAE Stantec Consulting Services Inc. **Lab FileID:** 2E94772B.D
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 33 | M | di-isopropyl ether | | ----------NA---------- | | | | | |
| 34 | M | ethyl tert-butyl ether | | ----------NA---------- | | | | | |
| | | ---------- | True | Calc. | % Drift | ---------- | | | |
| 35 | M | 2-butanone | | ----------NA---------- | | | | | |
| | | ---------- | AvgRF | CCRF | % Dev | ---------- | | | |
| 36 | M | 1,1-dichloroethane | | ----------NA---------- | | | | | |
| 37 | M | chloroprene | | ----------NA---------- | | | | | |
| 38 | M | acrylonitrile | | ----------NA---------- | | | | | |
| | | ---------- | True | Calc. | % Drift | ---------- | | | |
| 39 | M | vinyl acetate | | ----------NA---------- | | | | | |
| | | ---------- | AvgRF | CCRF | % Dev | ---------- | | | |
| 40 | M | ethyl acetate | | ----------NA---------- | | | | | |
| 41 | M | 2,2-dichloropropane | | ----------NA---------- | | | | | |
| 42 | M | cis-1,2-dichloroethene | | ----------NA---------- | | | | | |
| 43 | M | propionitrile | | ----------NA---------- | | | | | |
| 44 | M | bromochloromethane | | ----------NA---------- | | | | | |
| 45 | M | tetrahydrofuran | | ----------NA---------- | | | | | |
| 46 | M | chloroform | | ----------NA---------- | | | | | |
| 47 | | t-butyl formate | | ----------NA---------- | | | | | |
| 48 | S | dibromofluoromethane (s) | 0.446 | 0.434 | 2.7 | 92 | 0.10 | 9.18 | |
| 49 | S | 1,2-dichloroethane-d4 (s) | 0.496 | 0.463 | 6.7 | 88 | 0.10 | 9.59 | |
| 50 | M | freon 113 | | ----------NA---------- | | | | | |
| | | ---------- | True | Calc. | % Drift | ---------- | | | |
| 51 | M | methacrylonitrile | | ----------NA---------- | | | | | |
| | | ---------- | AvgRF | CCRF | % Dev | ---------- | | | |
| 52 | M | 1,1,1-trichloroethane | | ----------NA---------- | | | | | |
| 53 | | Cyclohexane | | ----------NA---------- | | | | | |
| 54 | | 2,2,4-trimethylpentane | | ----------NA---------- | | | | | |
| 55 | M | tert-amyl methyl ether | | ----------NA---------- | | | | | |
| 56 | I | 1,4-difluorobenzene | 1.000 | 1.000 | 0.0 | 86 | 0.10 | 10.04 | |
| 57 | M | Di-isobutylene | | ----------NA---------- | | | | | |
| 58 | M | epichlorohydrin | | ----------NA---------- | | | | | |
| 59 | M | n-butyl alcohol | | ----------NA---------- | | | | | |
| 60 | M | carbon tetrachloride | | ----------NA---------- | | | | | |
| 61 | M | 1,1-dichloropropene | | ----------NA---------- | | | | | |
| 62 | M | hexane | | ----------NA---------- | | | | | |
| 63 | M | benzene | | ----------NA---------- | | | | | |
| 64 | M | heptane | | ----------NA---------- | | | | | |
| 65 | M | isopropyl acetate | | ----------NA---------- | | | | | |
| 66 | M | 1,2-dichloroethane | | ----------NA---------- | | | | | |
| | | ---------- | True | Calc. | % Drift | ---------- | | | |
| 67 | | ethyl acrylate | | ----------NA---------- | | | | | |
| | | ---------- | AvgRF | CCRF | % Dev | ---------- | | | |
| 68 | M | trichloroethene | | ----------NA---------- | | | | | |
| 69 | M | 2-nitropropane | | ----------NA---------- | | | | | |
| 70 | M | 2-chloroethyl vinyl ether | | ----------NA---------- | | | | | |
| | | ---------- | True | Calc. | % Drift | ---------- | | | |
| 71 | M | methyl methacrylate | | ----------NA---------- | | | | | |
| | | ---------- | AvgRF | CCRF | % Dev | ---------- | | | |

# Initial Calibration Verification

**Job Number:** JB52301 **Sample:** V2E4268-ICV4361
**Account:** SECORPAE Stantec Consulting Services Inc. **Lab FileID:** 2E94772B.D
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 72 | M | 1,2-dichloropropane | | ----------NA---------- | | | | |
| 73 | M | methylcyclohexane | | ----------NA---------- | | | | |
| 74 | M | dibromomethane | | ----------NA---------- | | | | |
| 75 | M | bromodichloromethane | | ----------NA---------- | | | | |
| 76 | M | cis-1,3-dichloropropene | | ----------NA---------- | | | | |
| 77 | S | toluene-d8 (s) | 1.081 | 1.113 | -3.0 | 93 | 0.10 | 11.70 |
| 78 | M | 4-methyl-2-pentanone | | ----------NA---------- | | | | |
| 79 | M | toluene | | ----------NA---------- | | | | |
| 80 | M | 3-methyl-1-butanol | | ----------NA---------- | | | | |
| 81 | M | trans-1,3-dichloropropene | | ----------NA---------- | | | | |
| 82 | M | ethyl methacrylate | | ----------NA---------- | | | | |
| 83 | M | 1,1,2-trichloroethane | | ----------NA---------- | | | | |
| | | ---------- | True | Calc. | % Drift | ---------- | | |
| 84 | M | 2-hexanone | | ----------NA---------- | | | | |
| | | ---------- | AvgRF | CCRF | % Dev | ---------- | | |
| 85 | I | chlorobenzene-d5 | 1.000 | 1.000 | 0.0 | 90 | 0.09 | 13.23 |
| 86 | M | tetrachloroethene | | ----------NA---------- | | | | |
| 87 | M | 1,3-dichloropropane | | ----------NA---------- | | | | |
| 88 | M | butyl acetate | | ----------NA---------- | | | | |
| 89 | | 3,3-dimethyl-1-butanol | | ----------NA---------- | | | | |
| 90 | M | dibromochloromethane | | ----------NA---------- | | | | |
| 91 | M | 1,2-dibromoethane | | ----------NA---------- | | | | |
| 92 | M | chlorobenzene | | ----------NA---------- | | | | |
| 93 | M | 1,1,1,2-tetrachloroethane | | ----------NA---------- | | | | |
| 94 | M | ethylbenzene | | ----------NA---------- | | | | |
| 95 | M | m,p-xylene | | ----------NA---------- | | | | |
| 96 | M | o-xylene | | ----------NA---------- | | | | |
| 97 | M | styrene | | ----------NA---------- | | | | |
| 98 | M | bromoform | | ----------NA---------- | | | | |
| 99 | I | 1,4-dichlorobenzene-d4 | 1.000 | 1.000 | 0.0 | 87 | 0.09 | 15.55 |
| 100 | M | isopropylbenzene | | ----------NA---------- | | | | |
| 101 | S | 4-bromofluorobenzene (s) | 0.811 | 0.855 | -5.4 | 93 | 0.09 | 14.39 |
| 102 | M | bromobenzene | | ----------NA---------- | | | | |
| 103 | M | cyclohexanone | | ----------NA---------- | | | | |
| 104 | M | 1,1,2,2-tetrachloroethane | | ----------NA---------- | | | | |
| 105 | M | trans-1,4-dichloro-2-bute | | ----------NA---------- | | | | |
| 106 | M | 1,2,3-trichloropropane | | ----------NA---------- | | | | |
| 107 | M | n-propylbenzene | | ----------NA---------- | | | | |
| 108 | M | 2-chlorotoluene | | ----------NA---------- | | | | |
| 109 | M | 4-chlorotoluene | | ----------NA---------- | | | | |
| 110 | M | 1,3,5-trimethylbenzene | | ----------NA---------- | | | | |
| 111 | M | tert-butylbenzene | | ----------NA---------- | | | | |
| 112 | M | pentachloroethane | | ----------NA---------- | | | | |
| 113 | M | 1,2,4-trimethylbenzene | | ----------NA---------- | | | | |
| 114 | M | sec-butylbenzene | | ----------NA---------- | | | | |
| 115 | M | 1,3-dichlorobenzene | | ----------NA---------- | | | | |
| 116 | M | p-isopropyltoluene | | ----------NA---------- | | | | |
| 117 | m | 1,2,3-TRIMETHYLBENZENE | | ----------NA---------- | | | | |
| 118 | M | 1,4-dichlorobenzene | | ----------NA---------- | | | | |
| 119 | M | 1,2-dichlorobenzene | | ----------NA---------- | | | | |
| 120 | M | n-butylbenzene | | ----------NA---------- | | | | |
| 121 | M | 1,2-dibromo-3-chloropropa | | ----------NA---------- | | | | |
| 122 | | 1,3,5-trichlorobenzene | | ----------NA---------- | | | | |
| 123 | M | 1,2,4-trichlorobenzene | | ----------NA---------- | | | | |
| 124 | M | hexachlorobutadiene | | ----------NA---------- | | | | |
| 125 | M | naphthalene | | ----------NA---------- | | | | |

# Initial Calibration Verification

**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

**Sample:** V2E4268-ICV4361
**Lab FileID:** 2E94772B.D

```
126 M   1,2,3-trichlorobenzene              ----------NA----------
127 M   hexachloroethane                    ----------NA----------
128     Benzyl chloride                     ----------NA----------
 ------------------------------------------------------------------------------
 ------------------------------------------------------------------------------

    (#) = Out of Range              SPCC's out = 0  CCC's out = 0
     2E96693.D  M2E4361.M        Thu Nov 14 10:08:41 2013   MS2E
```

# Initial Calibration Summary

**Job Number:** JB52301 **Sample:** V2E4361-ICC4361
**Account:** SECORPAE Stantec Consulting Services Inc. **Lab FileID:** 2E96694.D
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA



Response Factor Report ms2e

Method : C:\MSDCHEM\1\METHODS\M2E4361.M (RTE Integrator)
Title : SW-846 Method 8260B, ZB624 60Mx0.25MMx1.4UM
Last Update : Thu Nov 14 09:30:03 2013
Response via : Initial Calibration

Calibration Files
5 =2E96691.D 2 =2E96690.D 0.5 =2E96688.D 50 =2E96694.D
100 =2E96695.D 1 =2E96689.D 200 =2E96696.D 20 =2E96693.D
10 =2E96692.D =

| Compound | 5 | 2 | 0.5 | 50 | 100 | 1 | 200 | 20 | 10 | Avg | %RSD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1) I Tert Butyl Alcohol-d9 | ----------ISTD---------- | | | | | | | | | | |
| 2) 1,4-dioxane | 0.088 | | 0.082 | 0.081 | | 0.076 | 0.085 | 0.085 | | 0.083 | 4.90 |
| 3) tertiary butyl alcohol | 1.098 | 1.081 | | 0.914 | 0.938 | 1.204 | 0.876 | 1.004 | 0.998 | 1.014 | 10.74 |
| 4) ethanol | 0.064 | 0.070 | | 0.049 | 0.047 | 0.049 | | 0.053 | 0.055 | 0.055 | 15.58 |
| ----- Linear regression ----- Coefficient = 0.9953 | | | | | | | | | | | |
| Response Ratio = 0.00494 + 0.04849 *A | | | | | | | | | | | |
| 5) acetonitrile | 0.914 | 0.859 | | 0.833 | 0.871 | 0.895 | 0.815 | 0.872 | 0.913 | 0.872 | 4.08 |
| 6) iso-butyl alcohol | 0.200 | 0.266 | | 0.242 | 0.255 | | 0.247 | 0.226 | 0.209 | 0.235 | 10.24 |
| 7) I pentafluorobenzene | ----------ISTD---------- | | | | | | | | | | |
| 8) freon 143a | | | | | | | | | | 0.000# | -1.00 |
| 9) freon 142b | | | | | | | | | | 0.000# | -1.00 |
| 10) freon 141b | | | | | | | | | | 0.000# | -1.00 |
| 11) Propylene | 0.602 | 0.626 | 0.645 | 0.923 | 0.887 | 0.674 | 0.857 | 0.831 | 0.821 | 0.763 | 16.35 |
| ----- Linear regression ----- Coefficient = 0.9993 | | | | | | | | | | | |
| Response Ratio = 0.00022 + 0.86536 *A | | | | | | | | | | | |
| 12) chlorodifluoromethane | 0.581 | 0.532 | 0.479 | 0.518 | 0.510 | 0.664 | 0.475 | 0.523 | 0.530 | 0.535 | 10.81 |
| 13) dichlorodifluoromethane | 0.549 | 0.670 | | 0.584 | 0.556 | 0.704 | 0.558 | 0.572 | 0.536 | 0.591 | 10.41 |
| 14) chloromethane | 0.786 | 0.923 | 0.920 | 0.795 | 0.789 | 1.054 | 0.755 | 0.790 | 0.762 | 0.842 | 12.06 |
| 15) vinyl chloride | 0.739 | 0.860 | | 0.774 | 0.763 | 1.018 | 0.747 | 0.753 | 0.716 | 0.796 | 12.46 |
| 16) bromomethane | 0.468 | 0.543 | 0.441 | 0.448 | 0.415 | 0.581 | | 0.455 | 0.457 | 0.476 | 11.79 |
| 17) chloroethane | 0.394 | 0.466 | 0.393 | 0.386 | 0.369 | 0.528 | | 0.391 | 0.382 | 0.414 | 13.24 |
| 18) trichlorofluoromethane | 0.742 | 0.854 | | 0.749 | 0.727 | 0.974 | 0.721 | 0.737 | 0.704 | 0.776 | 11.84 |
| 19) Pentane | | | | | | | | | | 0.000# | -1.00 |
| 20) ethyl ether | | | | | | | | | | | |

# Initial Calibration Summary

**Job Number:** JB52301 **Sample:** V2E4361-ICC4361
**Account:** SECORPAE Stantec Consulting Services Inc. **Lab FileID:** 2E96694.D
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

```
          0.298 0.273 0.235 0.283 0.283 0.264 0.275 0.271 0.257   0.271    6.69
21)  2-chloropropane
          1.012 1.013       0.913 0.904 0.975 0.875 0.893 0.853   0.930    6.66
22)  acrolein
          0.099 0.104 0.075 0.093 0.091 0.095 0.091 0.094 0.089   0.092    8.55
23)  1,1-dichloroethene
          0.475 0.447       0.439 0.439 0.436 0.429 0.418 0.388   0.434    5.74
24)  acetone
          0.040             0.042 0.039       0.038 0.039 0.032   0.038    8.46
25)  allyl chloride
          0.276 0.299       0.275 0.284 0.264 0.275 0.253 0.239   0.271    6.84
26)  iodomethane
          0.820 0.770 0.587 0.760 0.759 0.747 0.738 0.729 0.689   0.733    8.87
27)  carbon disulfide
          1.799 1.762 1.253 1.688 1.688 1.690 1.609 1.626 1.531   1.627    9.93
28)  methylene chloride
          0.558 0.536 0.411 0.514 0.513 0.520 0.494 0.508 0.481   0.504    8.17
29)  methyl acetate
          0.371 0.344       0.335 0.332       0.336 0.342 0.325   0.341    4.31
30)  1-chloropropane
          0.245 0.227       0.251 0.257       0.242 0.229 0.202   0.236    7.93
31)  methyl tert butyl ether
          1.501 1.495 1.202 1.433 1.436 1.482 1.378 1.373 1.314   1.401    6.97
32)  trans-1,2-dichloroethene
          0.523 0.507       0.495 0.489 0.457 0.476 0.474 0.438   0.482    5.61
33)  di-isopropyl ether
          1.690 1.659 1.352 1.679 1.699 1.858 1.651 1.665 1.562   1.646    8.17
34)  ethyl tert-butyl ether
          1.449 1.347 1.054 1.404 1.435 1.530 1.389 1.384 1.344   1.371    9.61
35)  2-butanone
          0.025             0.049 0.048       0.048 0.043 0.028   0.040   27.17
           ----- Linear regression -----  Coefficient =  0.9996
             Response Ratio = -0.00231 + 0.04881 *A

36)  1,1-dichloroethane
          0.987 0.907 0.645 0.905 0.904 0.861 0.875 0.897 0.837   0.869   10.77
37)  chloroprene
          0.723 0.638       0.734 0.759 0.775 0.743 0.713 0.668   0.719    6.36
38)  acrylonitrile
          0.180 0.174       0.175 0.172       0.167 0.169 0.156   0.170    4.40
39)  vinyl acetate
          0.029             0.078 0.084       0.086 0.062 0.049   0.065   34.42
           ----- Linear regression -----  Coefficient =  0.9990
             Response Ratio = -0.00684 + 0.08677 *A

40)  ethyl acetate
          0.048             0.061 0.063       0.061 0.055 0.048   0.056   11.91
41)  2,2-dichloropropane
          0.814 0.770 0.560 0.761 0.752 0.756 0.722 0.718 0.671   0.725   10.15
42)  cis-1,2-dichloroethene
          0.550 0.537       0.530 0.527 0.458 0.516 0.503 0.463   0.511    6.64
43)  propionitrile
          0.059 0.050       0.063 0.062       0.061 0.058 0.051   0.058    8.88
44)  bromochloromethane
          0.243 0.233       0.243 0.246 0.212 0.240 0.235 0.220   0.234    5.26
45)  tetrahydrofuran
          0.170 0.163       0.146 0.145       0.142 0.134 0.125   0.146   10.61
46)  chloroform
          0.559 0.572       0.534 0.531 0.514 0.519 0.514 0.475   0.527    5.64
47)  t-butyl formate
```

```
          0.446 0.411       0.446 0.461 0.434 0.454 0.432 0.417   0.438    3.99
48)  dibromofluoromethane (s)
          0.440 0.444 0.488 0.419 0.408 0.555 0.417 0.429 0.416   0.446   10.61
49)  1,2-dichloroethane-d4 (s)
          0.485 0.551       0.479 0.466 0.568 0.481 0.480 0.456   0.496    8.20
50)  freon 113
          0.372 0.335       0.341 0.341 0.391 0.329 0.334 0.330   0.347    6.53
51)  methacrylonitrile
          0.162             0.230 0.241       0.243 0.191 0.160   0.204   18.93
           ----- Linear regression -----  Coefficient =  0.9985
             Response Ratio = -0.01258 + 0.24482 *A

52)  1,1,1-trichloroethane
          0.756 0.718       0.736 0.733 0.704 0.709 0.692 0.648   0.712    4.63
53)  Cyclohexane
          0.820 0.810 0.566 0.804 0.794 0.762 0.768 0.745 0.705   0.753   10.48
54)  2,2,4-trimethylpentane
          2.135 1.868 1.539 2.114 2.170 2.314 2.114 1.997 1.943   2.022   11.07
55)  tert-amyl methyl ether
          0.383 0.411       0.341 0.344 0.400 0.335 0.348 0.342   0.363    8.30

56) I   1,4-difluorobenzene   ----------------ISTD--------------------
57)  Di-isobutylene
                                                                   0.000#  -1.00
58)  epichlorohydrin
          0.028 0.021       0.026 0.026       0.026 0.024 0.023   0.025    9.97
59)  n-butyl alcohol
          0.008 0.006       0.007 0.007       0.007 0.007 0.007   0.007#   7.27
60)  carbon tetrachloride
          0.444 0.437 0.275 0.415 0.412 0.387 0.401 0.397 0.380   0.394   12.51
61)  1,1-dichloropropene
          0.460 0.425       0.430 0.427 0.397 0.421 0.403 0.379   0.418    5.90
62)  hexane
          0.481 0.417 0.298 0.444 0.437 0.473 0.424 0.439 0.433   0.427   12.38
63)  benzene
          1.314 1.185 0.836 1.263 1.256 1.089 1.228 1.201 1.099   1.164   12.30
64)  heptane
          0.284 0.235       0.257 0.260 0.274 0.254 0.249 0.251   0.258    5.85
65)  isopropyl acetate
          0.486 0.379       0.473 0.486 0.381 0.502 0.423 0.581   0.464   14.59
66)  1,2-dichloroethane
          0.419 0.416 0.263 0.399 0.394 0.368 0.386 0.387 0.360   0.377   12.44
67)  ethyl acrylate
          0.138             0.287 0.297       0.308 0.225 0.177   0.239   29.39
           ----- Linear regression -----  Coefficient =  0.9987
             Response Ratio = -0.02213 + 0.30975 *A

68)  trichloroethene
          0.326 0.299       0.303 0.301 0.263 0.295 0.283 0.262   0.292    7.40
69)  2-nitropropane
          0.109 0.105       0.096 0.096       0.096 0.088 0.096   0.098    7.14
70)  2-chloroethyl vinyl ether
          0.137 0.124       0.151 0.156 0.126 0.156 0.144 0.138   0.141    8.90
71)  methyl methacrylate
          0.049             0.066 0.069       0.069 0.057 0.049   0.060   15.81
           ----- Linear regression -----  Coefficient =  0.9991
             Response Ratio = -0.00301 + 0.06933 *A

72)  1,2-dichloropropane
          0.354 0.331 0.217 0.334 0.333 0.334 0.324 0.318 0.301   0.316   12.64
```

# Initial Calibration Summary

**Job Number:** JB52301 **Sample:** V2E4361-ICC4361
**Account:** SECORPAE Stantec Consulting Services Inc. **Lab FileID:** 2E96694.D
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

```
 73)  methylcyclohexane
           0.628 0.573       0.580 0.583 0.690 0.564 0.581 0.565   0.596    7.23
 74)  dibromomethane
           0.182 0.174 0.130 0.174 0.173 0.166 0.169 0.168 0.159   0.166    9.09
 75)  bromodichloromethane
           0.401 0.393 0.311 0.406 0.408 0.368 0.403 0.377 0.353   0.380    8.44
 76)  cis-1,3-dichloropropene
           0.511 0.473 0.338 0.510 0.518 0.443 0.507 0.472 0.437   0.468   12.23
 77)  toluene-d8 (s)
           1.066 1.105 1.180 1.044 1.009 1.267 1.032 1.029 0.994   1.081    8.30
 78)  4-methyl-2-pentanone
           0.097 0.086       0.109 0.107       0.104 0.100 0.092   0.099    8.27
 79)  toluene
           0.736 0.679 0.471 0.738 0.744 0.612 0.728 0.680 0.634   0.669   13.17
 80)  3-methyl-1-butanol
           0.007 0.005       0.007 0.007       0.007 0.007 0.007   0.007#  10.94
 81)  trans-1,3-dichloropropene
           0.415 0.390 0.300 0.438 0.445 0.386 0.436 0.397 0.361   0.396   11.52
 82)  ethyl methacrylate
           0.292 0.270       0.343 0.356       0.356 0.305 0.272   0.313   12.07
 83)  1,1,2-trichloroethane
           0.203 0.205 0.162 0.209 0.208 0.176 0.204 0.193 0.183   0.194    8.50
 84)  2-hexanone
           0.073             0.076 0.084       0.083 0.052 0.073   0.074   15.79
            ----- Linear regression -----  Coefficient =  0.9987
              Response Ratio = -0.00568 + 0.08480 *A


 85) I   chlorobenzene-d5      ----------------ISTD--------------------
 86)  tetrachloroethene
           0.375 0.371       0.367 0.358 0.337 0.343 0.348 0.319   0.352    5.40
 87)  1,3-dichloropropane
           0.560 0.527 0.354 0.524 0.521 0.490 0.498 0.503 0.476   0.495   11.75
 88)  butyl acetate
           0.150             0.194 0.199       0.191 0.180 0.164   0.180   10.56
 89)  3,3-dimethyl-1-butanol
           0.041 0.038 0.031 0.038 0.032 0.047 0.031 0.040 0.037   0.037   14.29
 90)  dibromochloromethane
           0.341 0.306 0.245 0.346 0.345 0.290 0.334 0.322 0.302   0.315   10.46
 91)  1,2-dibromoethane
           0.295 0.269 0.207 0.285 0.280 0.264 0.270 0.270 0.252   0.266    9.51
 92)  chlorobenzene
           0.982 0.941 0.672 0.928 0.911 0.869 0.880 0.886 0.833   0.878   10.11
 93)  1,1,1,2-tetrachloroethane
           0.394 0.392 0.279 0.375 0.364 0.305 0.344 0.366 0.337   0.351   11.10
 94)  ethylbenzene
           1.714 1.602 1.113 1.660 1.647 1.480 1.575 1.578 1.485   1.539   11.51
 95)  m,p-xylene
           0.675 0.610 0.441 0.633 0.624 0.564 0.592 0.606 0.574   0.591   11.04
 96)  o-xylene
           0.669 0.606 0.408 0.651 0.637 0.531 0.603 0.621 0.581   0.590   13.47
 97)  styrene
           0.940 0.831       0.998 0.993 0.750 0.964 0.929 0.834   0.905    9.92
 98)  bromoform
           0.210 0.204 0.179 0.213 0.214 0.192 0.208 0.205 0.190   0.202    6.00

 99) I   1,4-dichlorobenzene-d ----------------ISTD--------------------
100)  isopropylbenzene
           2.929 2.763       3.107 3.088 2.534 2.898 2.882 2.580   2.848    7.42
101)  4-bromofluorobenzene (s)
```

# Initial Calibration Summary

**Job Number:** JB52301 **Sample:** V2E4361-ICC4361
**Account:** SECORPAE Stantec Consulting Services Inc. **Lab FileID:** 2E96694.D
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA



```
           0.845 0.906       0.797 0.776       0.790 0.796 0.771   0.811    5.92
102)  bromobenzene
           0.693 0.682 0.473 0.694 0.691 0.594 0.667 0.654 0.597   0.638   11.47
103)  cyclohexanone
           0.094 0.089       0.081 0.065             0.073 0.068   0.078   14.78
104)  1,1,2,2-tetrachloroethane
           0.780 0.804 0.690 0.740 0.725 0.825 0.690 0.706 0.643   0.734    8.11
105)  trans-1,4-dichloro-2-butene
           0.160 0.186       0.187 0.184 0.163 0.179 0.177 0.153   0.174    7.58
106)  1,2,3-trichloropropane
           0.190 0.205       0.190 0.184 0.196 0.177 0.184 0.175   0.188    5.33
107)  n-propylbenzene
           3.371 3.211       3.381 3.372 2.871 3.207 3.151 2.841   3.176    6.80
108)  2-chlorotoluene
           0.690 0.662       0.687 0.684 0.602 0.656 0.639 0.588   0.651    5.97
109)  4-chlorotoluene
           2.206 2.117 1.609 2.091 2.096 1.932 2.029 1.981 1.874   1.993    8.84
110)  1,3,5-trimethylbenzene
           2.519 2.343       2.623 2.638 2.088 2.482 2.413 2.187   2.412    8.17
111)  tert-butylbenzene
           2.057 1.971       2.235 2.234 1.770 2.114 2.023 1.794   2.025    8.71
112)  pentachloroethane
           0.443 0.449 0.366 0.506 0.502 0.410 0.484 0.454 0.403   0.446   10.57
113)  1,2,4-trimethylbenzene
           2.450 2.351       2.494 2.522 1.963 2.403 2.358 2.126   2.333    8.29
114)  sec-butylbenzene
           3.280 2.997       3.435 3.423 2.777 3.214 3.134 2.841   3.137    7.93
115)  1,3-dichlorobenzene
           1.395 1.377 1.099 1.361 1.350 1.228 1.322 1.282 1.183   1.288    7.77
116)  p-isopropyltoluene
           2.654 2.506       2.801 2.804 2.285 2.652 2.580 2.337   2.577    7.49
117)  1,2,3-TRIMETHYLBENZENE
           2.763 2.873 1.929 2.754 2.702 2.820 2.571 2.603 2.567   2.620   10.73
118)  1,4-dichlorobenzene
           1.493 1.541 1.385 1.385 1.383 1.511 1.323 1.339 1.253   1.401    6.81
119)  1,2-dichlorobenzene
           1.431 1.417 1.124 1.385 1.367 1.370 1.313 1.321 1.222   1.328    7.46
120)  n-butylbenzene
           1.391 1.293       1.452 1.455 1.202 1.388 1.337 1.208   1.341    7.43
121)  1,2-dibromo-3-chloropropane
           0.134 0.137       0.136 0.133 0.148 0.130 0.123 0.116   0.132    7.28
122)  1,3,5-trichlorobenzene
           1.236 1.219 0.984 1.219 1.208 1.172 1.121 1.146 1.044   1.150    7.55
123)  1,2,4-trichlorobenzene
           1.123 1.101 0.986 1.145 1.115 1.190 1.011 1.084 0.986   1.082    6.71
124)  hexachlorobutadiene
           0.559 0.537 0.426 0.574 0.566 0.555 0.520 0.521 0.485   0.527    8.92
125)  naphthalene
           2.342 2.325 2.066 2.483 2.363 2.523 2.128 2.328 2.142   2.300    6.87
126)  1,2,3-trichlorobenzene
           1.046 1.074 0.959 1.048 0.979 1.092 0.878 0.986 0.916   0.998    7.33
127)  hexachloroethane
           0.483 0.448       0.553 0.562 0.404 0.544 0.495 0.438   0.491   11.93
128)  Benzyl chloride
           1.494 1.423 1.268 1.418 1.426 1.658 1.402 1.433 1.372   1.433    7.25
 ----------------------------------------------------------------------------
 (#) = Out of Range  ###  Number of calibration levels exceeded format  ###

          M2E4361.M         Thu Nov 14 09:58:40 2013   MS2E
```

# Initial Calibration Verification

**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

**Sample:** V2E4361-ICV4361
**Lab FileID:** 2E96699.D

Evaluate Continuing Calibration Report

Data File : C:\msdchem\1\DATA\2E96699.D Vial: 13
Acq On : 11 Nov 2013 9:32 pm Operator: tamikag
Sample : icv4361-50 Inst : ms2e
Misc : MS57636,V2E4361,W,,,,1 Multiplr: 1.00
MS Integration Params: rteint.p

Method : C:\MSDCHEM\1\METHODS\M2E4361.M (RTE Integrator)
Title : SW-846 Method 8260B, ZB624 60Mx0.25MMx1.4UM
Last Update : Thu Nov 14 09:30:03 2013
Response via : Multiple Level Calibration

Min. RRF : 0.010 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 200%

| | | Compound | AvgRF | CCRF | %Dev | Area% | Dev(min) | R.T. |
|---|---|---|---|---|---|---|---|---|
| 1 | I | Tert Butyl Alcohol-d9 | 1.000 | 1.000 | 0.0 | 106 | 0.00 | 6.84 |
| 2 | M | 1,4-dioxane | 0.083 | 0.084 | -1.2 | 108 | -0.01 | 10.67 |
| 3 | M | tertiary butyl alcohol | 1.014 | 0.962 | 5.1 | 112 | -0.01 | 6.95 |
| | | ---------- | True | Calc. | % Drift | ---------- | | |
| 4 | | ethanol | 5000.000 | 4854.683 | 2.9 | 104 | 0.00 | 5.65 |
| | | ---------- | AvgRF | CCRF | % Dev | ---------- | | |
| 5 | | acetonitrile | 0.872 | 0.842 | 3.4 | 107 | -0.02 | 6.65 |
| 6 | | iso-butyl alcohol | 0.235 | 0.236 | -0.4 | 103 | 0.00 | 9.34 |
| 7 | I | pentafluorobenzene | 1.000 | 1.000 | 0.0 | 108 | 0.00 | 9.03 |
| 8 | | freon 143a | | ----------NA---------- | | | | |
| 9 | | freon 142b | | ----------NA---------- | | | | |
| 10 | | freon 141b | | ----------NA---------- | | | | |
| | | ---------- | True | Calc. | % Drift | ---------- | | |
| 11 | | Propylene | | ----------NA---------- | | | | |
| | | ---------- | AvgRF | CCRF | % Dev | ---------- | | |
| 12 | M | chlorodifluoromethane | 0.535 | 0.512 | 4.3 | 107 | -0.01 | 3.73 |
| 13 | M | dichlorodifluoromethane | 0.591 | 0.573 | 3.0 | 106 | -0.01 | 3.73 |
| 14 | M | chloromethane | 0.842 | 0.784 | 6.9 | 107 | 0.00 | 4.02 |
| 15 | M | vinyl chloride | 0.796 | 0.766 | 3.8 | 107 | 0.00 | 4.24 |
| 16 | M | bromomethane | 0.476 | 0.456 | 4.2 | 110 | 0.00 | 4.83 |
| 17 | M | chloroethane | 0.414 | 0.398 | 3.9 | 112 | 0.00 | 4.98 |
| 18 | M | trichlorofluoromethane | 0.776 | 0.756 | 2.6 | 109 | -0.01 | 5.39 |
| 19 | | Pentane | | ----------NA---------- | | | | |
| 20 | M | ethyl ether | 0.271 | 0.282 | -4.1 | 108 | 0.00 | 5.78 |
| 21 | | 2-chloropropane | 0.930 | 0.893 | 4.0 | 106 | 0.00 | 5.95 |
| 22 | M | acrolein | 0.092 | 0.090 | 2.2 | 105 | 0.00 | 6.02 |
| 23 | M | 1,1-dichloroethene | 0.434 | 0.435 | -0.2 | 107 | 0.00 | 6.17 |
| 24 | M | acetone | 0.038 | 0.037 | 2.6 | 97 | 0.00 | 6.24 |
| 25 | M | allyl chloride | 0.271 | 0.267 | 1.5 | 105 | 0.00 | 6.68 |
| 26 | M | iodomethane | 0.733 | 0.767 | -4.6 | 109 | 0.00 | 6.43 |
| 27 | M | carbon disulfide | 1.627 | 1.674 | -2.9 | 108 | 0.00 | 6.55 |
| 28 | M | methylene chloride | 0.504 | 0.508 | -0.8 | 107 | 0.00 | 6.86 |
| 29 | M | methyl acetate | 0.341 | 0.320 | 6.2 | 103 | 0.00 | 6.68 |
| 30 | | 1-chloropropane | 0.236 | 0.249 | -5.5 | 107 | 0.00 | 6.89 |
| 31 | M | methyl tert butyl ether | 1.401 | 1.423 | -1.6 | 108 | 0.00 | 7.17 |
| 32 | M | trans-1,2-dichloroethene | 0.482 | 0.487 | -1.0 | 107 | 0.00 | 7.22 |
| 33 | M | di-isopropyl ether | 1.646 | 1.691 | -2.7 | 109 | 0.00 | 7.76 |

# Initial Calibration Verification

**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

**Sample:** V2E4361-ICV4361
**Lab FileID:** 2E96699.D

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 34 | M | ethyl tert-butyl ether | 1.371 | 1.596 | -16.4 | 123 | 0.00 | 8.22 |
| | | | True | Calc. | % Drift | | | |
| 35 | M | 2-butanone | 50.000 | 48.622 | 2.8 | 100 | 0.00 | 8.51 |
| | | | AvgRF | CCRF | % Dev | | | |
| 36 | M | 1,1-dichloroethane | 0.869 | 0.891 | -2.5 | 107 | 0.00 | 7.78 |
| 37 | M | chloroprene | 0.719 | 0.730 | -1.5 | 108 | 0.00 | 7.88 |
| 38 | M | acrylonitrile | 0.170 | 0.171 | -0.6 | 106 | 0.00 | 7.18 |
| | | | True | Calc. | % Drift | | | |
| 39 | M | vinyl acetate | 50.000 | 52.612 | -5.2 | 117 | 0.00 | 7.78 |
| | | | AvgRF | CCRF | % Dev | | | |
| 40 | M | ethyl acetate | 0.056 | 0.060 | -7.1 | 106 | -0.01 | 8.51 |
| 41 | M | 2,2-dichloropropane | 0.725 | 0.730 | -0.7 | 104 | 0.00 | 8.50 |
| 42 | M | cis-1,2-dichloroethene | 0.511 | 0.520 | -1.8 | 106 | 0.00 | 8.51 |
| 43 | M | propionitrile | 0.058 | 0.060 | -3.4 | 103 | 0.00 | 8.57 |
| 44 | M | bromochloromethane | 0.234 | 0.245 | -4.7 | 110 | 0.00 | 8.82 |
| 45 | M | tetrahydrofuran | 0.146 | 0.139 | 4.8 | 103 | 0.00 | 8.87 |
| 46 | M | chloroform | 0.527 | 0.520 | 1.3 | 105 | 0.00 | 8.87 |
| 47 | | t-butyl formate | 0.438 | 0.454 | -3.7 | 110 | 0.00 | 8.89 |
| 48 | S | dibromofluoromethane (s) | 0.446 | 0.419 | 6.1 | 108 | 0.00 | 9.07 |
| 49 | S | 1,2-dichloroethane-d4 (s) | 0.496 | 0.472 | 4.8 | 107 | 0.00 | 9.49 |
| 50 | M | freon 113 | 0.347 | 0.353 | -1.7 | 112 | 0.00 | 6.14 |
| | | | True | Calc. | % Drift | | | |
| 51 | M | methacrylonitrile | 50.000 | 47.507 | 5.0 | 104 | 0.00 | 8.76 |
| | | | AvgRF | CCRF | % Dev | | | |
| 52 | M | 1,1,1-trichloroethane | 0.712 | 0.722 | -1.4 | 106 | 0.00 | 9.11 |
| 53 | | Cyclohexane | 0.753 | 0.783 | -4.0 | 106 | 0.00 | 9.18 |
| 54 | | 2,2,4-trimethylpentane | 2.022 | 1.868 | 7.6 | 96 | 0.00 | 9.56 |
| 55 | M | tert-amyl methyl ether | 0.363 | 0.356 | 1.9 | 113 | 0.00 | 9.59 |
| 56 | I | 1,4-difluorobenzene | 1.000 | 1.000 | 0.0 | 108 | 0.00 | 9.94 |
| 57 | M | Di-isobutylene | | ----------NA---------- | | | | |
| 58 | M | epichlorohydrin | 0.025 | 0.024 | 4.0 | 102 | 0.00 | 11.23 |
| 59 | M | n-butyl alcohol | 0.007 | 0.007# | 0.0 | 107 | 0.00 | 10.10 |
| 60 | M | carbon tetrachloride | 0.394 | 0.414 | -5.1 | 108 | 0.00 | 9.31 |
| 61 | M | 1,1-dichloropropene | 0.418 | 0.421 | -0.7 | 106 | 0.00 | 9.30 |
| 62 | M | hexane | 0.427 | 0.420 | 1.6 | 102 | 0.00 | 7.52 |
| 63 | M | benzene | 1.164 | 1.232 | -5.8 | 105 | 0.00 | 9.56 |
| 64 | M | heptane | 0.258 | 0.246 | 4.7 | 104 | 0.00 | 9.74 |
| 65 | M | isopropyl acetate | 0.464 | 0.508 | -9.5 | 116 | 0.00 | 9.50 |
| 66 | M | 1,2-dichloroethane | 0.377 | 0.386 | -2.4 | 105 | 0.00 | 9.58 |
| | | | True | Calc. | % Drift | | | |
| 67 | | ethyl acrylate | 50.000 | 46.031 | 7.9 | 99 | 0.00 | 10.31 |
| | | | AvgRF | CCRF | % Dev | | | |
| 68 | M | trichloroethene | 0.292 | 0.293 | -0.3 | 104 | 0.00 | 10.28 |
| 69 | M | 2-nitropropane | 0.098 | 0.094 | 4.1 | 106 | 0.00 | 11.08 |
| 70 | M | 2-chloroethyl vinyl ether | 0.141 | 0.144 | -2.1 | 103 | 0.00 | 11.10 |
| | | | True | Calc. | % Drift | | | |
| 71 | M | methyl methacrylate | 50.000 | 48.888 | 2.2 | 107 | 0.00 | 10.58 |
| | | | AvgRF | CCRF | % Dev | | | |
| 72 | M | 1,2-dichloropropane | 0.316 | 0.322 | -1.9 | 104 | 0.00 | 10.54 |

# Initial Calibration Verification

**Job Number:** JB52301 **Sample:** V2E4361-ICV4361
**Account:** SECORPAE Stantec Consulting Services Inc. **Lab FileID:** 2E96699.D
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 73 | M | methylcyclohexane | 0.596 | 0.608 | -2.0 | 113 | 0.00 | 10.49 |
| 74 | M | dibromomethane | 0.166 | 0.170 | -2.4 | 106 | 0.00 | 10.71 |
| 75 | M | bromodichloromethane | 0.380 | 0.398 | -4.7 | 106 | 0.00 | 10.85 |
| 76 | M | cis-1,3-dichloropropene | 0.468 | 0.494 | -5.6 | 105 | 0.00 | 11.32 |
| 77 | S | toluene-d8 (s) | 1.081 | 1.029 | 4.8 | 106 | 0.00 | 11.61 |
| 78 | M | 4-methyl-2-pentanone | 0.099 | 0.107 | -8.1 | 106 | 0.00 | 11.42 |
| 79 | M | toluene | 0.669 | 0.722 | -7.9 | 106 | 0.00 | 11.68 |
| 80 | M | 3-methyl-1-butanol | 0.007 | 0.008# | -14.3 | 109 | 0.00 | 11.46 |
| 81 | M | trans-1,3-dichloropropene | 0.396 | 0.418 | -5.6 | 103 | 0.00 | 11.89 |
| 82 | M | ethyl methacrylate | 0.313 | 0.336 | -7.3 | 106 | 0.00 | 11.90 |
| 83 | M | 1,1,2-trichloroethane | 0.194 | 0.200 | -3.1 | 103 | 0.00 | 12.10 |
| | | ---------- | True | Calc. | % Drift | ---------- | | |
| 84 | M | 2-hexanone | 50.000 | 45.639 | 8.7 | 102 | 0.00 | 12.30 |
| | | ---------- | AvgRF | CCRF | % Dev | ---------- | | |
| 85 | I | chlorobenzene-d5 | 1.000 | 1.000 | 0.0 | 107 | 0.00 | 13.14 |
| 86 | M | tetrachloroethene | 0.352 | 0.361 | -2.6 | 105 | 0.00 | 12.28 |
| 87 | M | 1,3-dichloropropane | 0.495 | 0.514 | -3.8 | 105 | 0.00 | 12.29 |
| 88 | M | butyl acetate | 0.180 | 0.194 | -7.8 | 107 | 0.00 | 12.38 |
| 89 | | 3,3-dimethyl-1-butanol | 0.037 | 0.037 | 0.0 | 105 | 0.00 | 12.47 |
| 90 | M | dibromochloromethane | 0.315 | 0.341 | -8.3 | 106 | 0.00 | 12.55 |
| 91 | M | 1,2-dibromoethane | 0.266 | 0.278 | -4.5 | 105 | 0.00 | 12.70 |
| 92 | M | chlorobenzene | 0.878 | 0.915 | -4.2 | 106 | 0.00 | 13.17 |
| 93 | M | 1,1,1,2-tetrachloroethane | 0.351 | 0.373 | -6.3 | 107 | 0.00 | 13.23 |
| 94 | M | ethylbenzene | 1.539 | 1.648 | -7.1 | 106 | 0.00 | 13.23 |
| 95 | M | m,p-xylene | 0.591 | 0.626 | -5.9 | 106 | 0.00 | 13.34 |
| 96 | M | o-xylene | 0.590 | 0.647 | -9.7 | 106 | 0.00 | 13.75 |
| 97 | M | styrene | 0.905 | 0.998 | -10.3 | 107 | 0.00 | 13.77 |
| 98 | M | bromoform | 0.202 | 0.215 | -6.4 | 108 | 0.00 | 14.03 |
| 99 | I | 1,4-dichlorobenzene-d4 | 1.000 | 1.000 | 0.0 | 106 | 0.00 | 15.46 |
| 100 | M | isopropylbenzene | 2.848 | 3.108 | -9.1 | 106 | 0.00 | 14.10 |
| 101 | S | 4-bromofluorobenzene (s) | 0.811 | 0.804 | 0.9 | 107 | 0.00 | 14.30 |
| 102 | M | bromobenzene | 0.638 | 0.684 | -7.2 | 105 | 0.00 | 14.49 |
| 103 | M | cyclohexanone | 0.078 | 0.059 | 24.4# | 78 | 0.00 | 14.25 |
| 104 | M | 1,1,2,2-tetrachloroethane | 0.734 | 0.729 | 0.7 | 105 | 0.00 | 14.41 |
| 105 | M | trans-1,4-dichloro-2-bute | 0.174 | 0.181 | -4.0 | 103 | 0.00 | 14.45 |
| 106 | M | 1,2,3-trichloropropane | 0.188 | 0.187 | 0.5 | 105 | 0.00 | 14.47 |
| 107 | M | n-propylbenzene | 3.176 | 3.373 | -6.2 | 106 | 0.00 | 14.50 |
| 108 | M | 2-chlorotoluene | 0.651 | 0.685 | -5.2 | 106 | 0.00 | 14.65 |
| 109 | M | 4-chlorotoluene | 1.993 | 2.088 | -4.8 | 106 | 0.00 | 14.75 |
| 110 | M | 1,3,5-trimethylbenzene | 2.412 | 2.607 | -8.1 | 106 | 0.00 | 14.66 |
| 111 | M | tert-butylbenzene | 2.025 | 2.239 | -10.6 | 106 | 0.00 | 15.00 |
| 112 | M | pentachloroethane | 0.446 | 0.499 | -11.9 | 105 | 0.00 | 15.08 |
| 113 | M | 1,2,4-trimethylbenzene | 2.333 | 2.503 | -7.3 | 107 | 0.00 | 15.05 |
| 114 | M | sec-butylbenzene | 3.137 | 3.426 | -9.2 | 106 | 0.00 | 15.22 |
| 115 | M | 1,3-dichlorobenzene | 1.288 | 1.351 | -4.9 | 105 | 0.00 | 15.40 |
| 116 | M | p-isopropyltoluene | 2.577 | 2.800 | -8.7 | 106 | 0.00 | 15.34 |
| 117 | m | 1,2,3-TRIMETHYLBENZENE | 2.620 | 2.719 | -3.8 | 105 | 0.00 | 15.49 |
| 118 | M | 1,4-dichlorobenzene | 1.401 | 1.390 | 0.8 | 107 | 0.00 | 15.49 |
| 119 | M | 1,2-dichlorobenzene | 1.328 | 1.369 | -3.1 | 105 | 0.00 | 15.87 |
| 120 | M | n-butylbenzene | 1.341 | 1.431 | -6.7 | 105 | 0.00 | 15.75 |
| 121 | M | 1,2-dibromo-3-chloropropa | 0.132 | 0.133 | -0.8 | 104 | 0.00 | 16.61 |
| 122 | | 1,3,5-trichlorobenzene | 1.150 | 1.212 | -5.4 | 106 | 0.00 | 16.78 |
| 123 | M | 1,2,4-trichlorobenzene | 1.082 | 1.147 | -6.0 | 106 | 0.00 | 17.35 |
| 124 | M | hexachlorobutadiene | 0.527 | 0.575 | -9.1 | 107 | 0.00 | 17.46 |
| 125 | M | naphthalene | 2.300 | 2.441 | -6.1 | 104 | 0.00 | 17.59 |
| 126 | M | 1,2,3-trichlorobenzene | 0.998 | 1.020 | -2.2 | 103 | 0.00 | 17.81 |

# Initial Calibration Verification

**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

**Sample:** V2E4361-ICV4361
**Lab FileID:** 2E96699.D

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 127 | M | hexachloroethane | 0.491 | 0.553 | -12.6 | 106 | 0.00 | 16.11 |
| 128 | | Benzyl chloride | 1.433 | 1.487 | -3.8 | 111 | 0.00 | 15.60 |

(#) = Out of Range SPCC's out = 0 CCC's out = 0

2E96694.D M2E4361.M Thu Nov 14 09:58:11 2013 MS2E

# Continuing Calibration Summary

**Job Number:** JB52301 **Sample:** V2E4366-CC4361
**Account:** SECORPAE Stantec Consulting Services Inc. **Lab FileID:** 2E96790.D
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : C:\msdchem\1\DATA\2E96790.D Vial: 3
Acq On : 14 Nov 2013 10:58 am Operator: tamikag
Sample : cc4361-20 Inst : ms2e
Misc : MS57797,V2E4366,W,,,,1 Multiplr: 1.00
MS Integration Params: rteint.p

Method : C:\MSDCHEM\1\METHODS\M2E4361.M (RTE Integrator)
Title : SW-846 Method 8260B, ZB624 60Mx0.25MMx1.4UM
Last Update : Thu Nov 14 09:30:03 2013
Response via : Multiple Level Calibration

Min. RRF : 0.010 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 200%

| | | Compound | AvgRF | CCRF | %Dev | Area% | Dev(min) | R.T. |
|---|---|---|---|---|---|---|---|---|
| 1 | I | Tert Butyl Alcohol-d9 | 1.000 | 1.000 | 0.0 | 126 | -0.01 | 6.83 |
| 2 | M | 1,4-dioxane | 0.083 | 0.101 | -21.7# | 150 | 0.00 | 10.68 |
| 3 | M | tertiary butyl alcohol | 1.014 | 0.993 | 2.1 | 125 | 0.00 | 6.96 |
| | | ---------- | True | Calc. | % Drift | ---------- | | |
| 4 | | ethanol | 2000.000 | 2112.001 | -5.6 | 126 | 0.00 | 5.65 |
| | | ---------- | AvgRF | CCRF | % Dev | ---------- | | |
| 5 | | acetonitrile | 0.872 | 0.866 | 0.7 | 126 | 0.00 | 6.67 |
| 6 | | iso-butyl alcohol | 0.235 | 0.232 | 1.3 | 130 | 0.00 | 9.35 |
| 7 | I | pentafluorobenzene | 1.000 | 1.000 | 0.0 | 128 | 0.00 | 9.03 |
| 8 | | freon 143a | | ----------NA---------- | | | | |
| 9 | | freon 142b | | ----------NA---------- | | | | |
| 10 | | freon 141b | | ----------NA---------- | | | | |
| | | ---------- | True | Calc. | % Drift | ---------- | | |
| 11 | | Propylene | | ----------NA---------- | | | | |
| | | ---------- | AvgRF | CCRF | % Dev | ---------- | | |
| 12 | M | chlorodifluoromethane | 0.535 | 0.661 | -23.6# | 161 | 0.00 | 3.75 |
| 13 | M | dichlorodifluoromethane | 0.591 | 0.484 | 18.1 | 108 | 0.00 | 3.74 |
| 14 | M | chloromethane | 0.842 | 0.725 | 13.9 | 117 | 0.00 | 4.03 |
| 15 | M | vinyl chloride | 0.796 | 0.686 | 13.8 | 116 | 0.02 | 4.27 |
| 16 | M | bromomethane | 0.476 | 0.416 | 12.6 | 117 | 0.00 | 4.84 |
| 17 | M | chloroethane | 0.414 | 0.357 | 13.8 | 117 | 0.00 | 4.99 |
| 18 | M | trichlorofluoromethane | 0.776 | 0.654 | 15.7 | 113 | 0.00 | 5.40 |
| 19 | | Pentane | | ----------NA---------- | | | | |
| 20 | M | ethyl ether | 0.271 | 0.280 | -3.3 | 132 | 0.00 | 5.79 |
| 21 | | 2-chloropropane | 0.930 | 0.881 | 5.3 | 126 | 0.00 | 5.96 |
| 22 | M | acrolein | 0.092 | 0.088 | 4.3 | 121 | 0.00 | 6.03 |
| 23 | M | 1,1-dichloroethene | 0.434 | 0.422 | 2.8 | 129 | 0.00 | 6.17 |
| 24 | M | acetone | 0.038 | 0.089 | -134.2# | 292# | 0.00 | 6.25 |
| 25 | M | allyl chloride | 0.271 | 0.259 | 4.4 | 130 | 0.00 | 6.68 |
| 26 | M | iodomethane | 0.733 | 0.752 | -2.6 | 132 | 0.00 | 6.44 |
| 27 | M | carbon disulfide | 1.627 | 1.629 | -0.1 | 128 | 0.00 | 6.56 |
| 28 | M | methylene chloride | 0.504 | 0.509 | -1.0 | 128 | 0.00 | 6.86 |
| 29 | M | methyl acetate | 0.341 | 0.311 | 8.8 | 116 | 0.02 | 6.69 |
| 30 | | 1-chloropropane | 0.236 | 0.236 | 0.0 | 132 | 0.00 | 6.90 |
| 31 | M | methyl tert butyl ether | 1.401 | 1.418 | -1.2 | 132 | 0.00 | 7.18 |
| 32 | M | trans-1,2-dichloroethene | 0.482 | 0.470 | 2.5 | 126 | 0.00 | 7.23 |
| 33 | M | di-isopropyl ether | 1.646 | 1.564 | 5.0 | 120 | 0.00 | 7.76 |

# Continuing Calibration Summary

**Job Number:** JB52301 **Sample:** V2E4366-CC4361
**Account:** SECORPAE Stantec Consulting Services Inc. **Lab FileID:** 2E96790.D
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 34 | M | ethyl tert-butyl ether | 1.371 | 1.318 | 3.9 | 121 | 0.00 | 8.22 |
| | | | True | Calc. | % Drift | | | |
| 35 | M | 2-butanone | 20.000 | 32.060 | -60.3# | 214 | 0.02 | 8.52 |
| | | | AvgRF | CCRF | % Dev | | | |
| 36 | M | 1,1-dichloroethane | 0.869 | 0.877 | -0.9 | 125 | 0.00 | 7.78 |
| 37 | M | chloroprene | 0.719 | 0.659 | 8.3 | 118 | 0.00 | 7.89 |
| 38 | M | acrylonitrile | 0.170 | 0.174 | -2.4 | 131 | 0.01 | 7.20 |
| | | | True | Calc. | % Drift | | | |
| 39 | M | vinyl acetate | 20.000 | 16.407 | 18.0 | 111 | 0.02 | 7.81 |
| | | | AvgRF | CCRF | % Dev | | | |
| 40 | M | ethyl acetate | 0.056 | 0.059 | -5.4 | 137 | 0.01 | 8.53 |
| 41 | M | 2,2-dichloropropane | 0.725 | 0.741 | -2.2 | 132 | 0.00 | 8.50 |
| 42 | M | cis-1,2-dichloroethene | 0.511 | 0.501 | 2.0 | 127 | 0.00 | 8.52 |
| 43 | M | propionitrile | 0.058 | 0.063 | -8.6 | 139 | 0.01 | 8.59 |
| 44 | M | bromochloromethane | 0.234 | 0.236 | -0.9 | 128 | 0.00 | 8.82 |
| 45 | M | tetrahydrofuran | 0.146 | 0.146 | 0.0 | 138 | 0.01 | 8.87 |
| 46 | M | chloroform | 0.527 | 0.513 | 2.7 | 127 | 0.00 | 8.88 |
| 47 | | t-butyl formate | 0.438 | 0.396 | 9.6 | 117 | 0.00 | 8.91 |
| 48 | S | dibromofluoromethane (s) | 0.446 | 0.418 | 6.3 | 124 | 0.00 | 9.07 |
| 49 | S | 1,2-dichloroethane-d4 (s) | 0.496 | 0.471 | 5.0 | 125 | 0.00 | 9.49 |
| 50 | M | freon 113 | 0.347 | 0.319 | 8.1 | 121 | 0.00 | 6.14 |
| | | | True | Calc. | % Drift | | | |
| 51 | M | methacrylonitrile | 20.000 | 19.742 | 1.3 | 141 | 0.02 | 8.78 |
| | | | AvgRF | CCRF | % Dev | | | |
| 52 | M | 1,1,1-trichloroethane | 0.712 | 0.694 | 2.5 | 128 | 0.00 | 9.12 |
| 53 | | Cyclohexane | 0.753 | 0.760 | -0.9 | 130 | 0.00 | 9.18 |
| 54 | | 2,2,4-trimethylpentane | 2.022 | 1.908 | 5.6 | 122 | 0.00 | 9.56 |
| 55 | M | tert-amyl methyl ether | 0.363 | 0.329 | 9.4 | 120 | 0.00 | 9.60 |
| 56 | I | 1,4-difluorobenzene | 1.000 | 1.000 | 0.0 | 128 | 0.00 | 9.94 |
| 57 | M | Di-isobutylene | | ----------NA---------- | | | | |
| 58 | M | epichlorohydrin | 0.025 | 0.023 | 8.0 | 126 | 0.01 | 11.24 |
| 59 | M | n-butyl alcohol | 0.007 | 0.008# | -14.3 | 145 | 0.01 | 10.11 |
| 60 | M | carbon tetrachloride | 0.394 | 0.386 | 2.0 | 125 | 0.00 | 9.32 |
| 61 | M | 1,1-dichloropropene | 0.418 | 0.415 | 0.7 | 132 | 0.00 | 9.30 |
| 62 | M | hexane | 0.427 | 0.424 | 0.7 | 124 | 0.00 | 7.52 |
| 63 | M | benzene | 1.164 | 1.205 | -3.5 | 129 | 0.00 | 9.56 |
| 64 | M | heptane | 0.258 | 0.231 | 10.5 | 119 | 0.00 | 9.74 |
| 65 | M | isopropyl acetate | 0.464 | 0.384 | 17.2 | 117 | 0.00 | 9.51 |
| 66 | M | 1,2-dichloroethane | 0.377 | 0.376 | 0.3 | 125 | 0.00 | 9.58 |
| | | | True | Calc. | % Drift | | | |
| 67 | | ethyl acrylate | | ----------NA---------- | | | | |
| | | | AvgRF | CCRF | % Dev | | | |
| 68 | M | trichloroethene | 0.292 | 0.287 | 1.7 | 130 | 0.00 | 10.29 |
| 69 | M | 2-nitropropane | 0.098 | 0.088 | 10.2 | 129 | 0.02 | 11.10 |
| 70 | M | 2-chloroethyl vinyl ether | 0.141 | 0.157 | -11.3 | 140 | 0.00 | 11.10 |
| | | | True | Calc. | % Drift | | | |
| 71 | M | methyl methacrylate | 20.000 | 20.018 | -0.1 | 138 | 0.01 | 10.59 |
| | | | AvgRF | CCRF | % Dev | | | |
| 72 | M | 1,2-dichloropropane | 0.316 | 0.318 | -0.6 | 128 | 0.00 | 10.55 |

# Continuing Calibration Summary

**Job Number:** JB52301 **Sample:** V2E4366-CC4361
**Account:** SECORPAE Stantec Consulting Services Inc. **Lab FileID:** 2E96790.D
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 73 | M | methylcyclohexane | 0.596 | 0.533 | 10.6 | 118 | 0.00 | 10.49 |
| 74 | M | dibromomethane | 0.166 | 0.168 | -1.2 | 128 | 0.00 | 10.72 |
| 75 | M | bromodichloromethane | 0.380 | 0.365 | 3.9 | 124 | 0.00 | 10.85 |
| 76 | M | cis-1,3-dichloropropene | 0.468 | 0.480 | -2.6 | 131 | 0.00 | 11.32 |
| 77 | S | toluene-d8 (s) | 1.081 | 1.055 | 2.4 | 131 | 0.00 | 11.61 |
| 78 | M | 4-methyl-2-pentanone | 0.099 | 0.110 | -11.1 | 142 | 0.00 | 11.43 |
| 79 | M | toluene | 0.669 | 0.703 | -5.1 | 133 | 0.00 | 11.68 |
| 80 | M | 3-methyl-1-butanol | 0.007 | 0.007# | 0.0 | 124 | 0.00 | 11.46 |
| 81 | M | trans-1,3-dichloropropene | 0.396 | 0.400 | -1.0 | 130 | 0.00 | 11.90 |
| 82 | M | ethyl methacrylate | 0.313 | 0.325 | -3.8 | 137 | 0.00 | 11.90 |
| 83 | M | 1,1,2-trichloroethane | 0.194 | 0.196 | -1.0 | 131 | 0.00 | 12.11 |
| | | | True | Calc. | % Drift | | | |
| 84 | M | 2-hexanone | 20.000 | 33.491 | -67.5# | 317 | 0.01 | 12.31 |
| | | | AvgRF | CCRF | % Dev | | | |
| 85 | I | chlorobenzene-d5 | 1.000 | 1.000 | 0.0 | 128 | 0.00 | 13.14 |
| 86 | M | tetrachloroethene | 0.352 | 0.371 | -5.4 | 136 | 0.00 | 12.28 |
| 87 | M | 1,3-dichloropropane | 0.495 | 0.524 | -5.9 | 133 | 0.00 | 12.29 |
| 88 | M | butyl acetate | 0.180 | 0.184 | -2.2 | 130 | 0.01 | 12.39 |
| 89 | | 3,3-dimethyl-1-butanol | 0.037 | 0.038 | -2.7 | 120 | 0.00 | 12.47 |
| 90 | M | dibromochloromethane | 0.315 | 0.320 | -1.6 | 127 | 0.00 | 12.55 |
| 91 | M | 1,2-dibromoethane | 0.266 | 0.283 | -6.4 | 133 | 0.00 | 12.71 |
| 92 | M | chlorobenzene | 0.878 | 0.923 | -5.1 | 133 | 0.00 | 13.17 |
| 93 | M | 1,1,1,2-tetrachloroethane | 0.351 | 0.347 | 1.1 | 121 | 0.00 | 13.23 |
| 94 | M | ethylbenzene | 1.539 | 1.605 | -4.3 | 130 | 0.00 | 13.23 |
| 95 | M | m,p-xylene | 0.591 | 0.622 | -5.2 | 131 | 0.00 | 13.34 |
| 96 | M | o-xylene | 0.590 | 0.624 | -5.8 | 128 | 0.00 | 13.76 |
| 97 | M | styrene | 0.905 | 0.942 | -4.1 | 129 | 0.00 | 13.77 |
| 98 | M | bromoform | 0.202 | 0.190 | 5.9 | 119 | 0.00 | 14.03 |
| 99 | I | 1,4-dichlorobenzene-d4 | 1.000 | 1.000 | 0.0 | 120 | 0.00 | 15.46 |
| 100 | M | isopropylbenzene | 2.848 | 3.030 | -6.4 | 126 | 0.00 | 14.10 |
| 101 | S | 4-bromofluorobenzene (s) | 0.811 | 0.850 | -4.8 | 128 | 0.00 | 14.30 |
| 102 | M | bromobenzene | 0.638 | 0.691 | -8.3 | 127 | 0.00 | 14.49 |
| 103 | M | cyclohexanone | 0.078 | 0.136 | -74.4# | 223# | 0.00 | 14.25 |
| 104 | M | 1,1,2,2-tetrachloroethane | 0.734 | 0.730 | 0.5 | 124 | 0.00 | 14.41 |
| 105 | M | trans-1,4-dichloro-2-bute | 0.174 | 0.136 | 21.8# | 92 | 0.00 | 14.46 |
| 106 | M | 1,2,3-trichloropropane | 0.188 | 0.192 | -2.1 | 125 | 0.00 | 14.48 |
| 107 | M | n-propylbenzene | 3.176 | 3.449 | -8.6 | 132 | 0.00 | 14.50 |
| 108 | M | 2-chlorotoluene | 0.651 | 0.689 | -5.8 | 130 | 0.00 | 14.65 |
| 109 | M | 4-chlorotoluene | 1.993 | 2.124 | -6.6 | 129 | 0.00 | 14.75 |
| 110 | M | 1,3,5-trimethylbenzene | 2.412 | 2.552 | -5.8 | 127 | 0.00 | 14.66 |
| 111 | M | tert-butylbenzene | 2.025 | 2.124 | -4.9 | 126 | 0.00 | 15.00 |
| 112 | M | pentachloroethane | 0.446 | 0.459 | -2.9 | 122 | 0.00 | 15.08 |
| 113 | M | 1,2,4-trimethylbenzene | 2.333 | 2.491 | -6.8 | 127 | 0.00 | 15.05 |
| 114 | M | sec-butylbenzene | 3.137 | 3.308 | -5.5 | 127 | 0.00 | 15.22 |
| 115 | M | 1,3-dichlorobenzene | 1.288 | 1.351 | -4.9 | 127 | 0.00 | 15.41 |
| 116 | M | p-isopropyltoluene | 2.577 | 2.671 | -3.6 | 124 | 0.00 | 15.34 |
| 117 | m | 1,2,3-TRIMETHYLBENZENE | | ----------NA---------- | | | | |
| 118 | M | 1,4-dichlorobenzene | 1.401 | 1.422 | -1.5 | 128 | 0.00 | 15.49 |
| 119 | M | 1,2-dichlorobenzene | 1.328 | 1.378 | -3.8 | 125 | 0.00 | 15.87 |
| 120 | M | n-butylbenzene | 1.341 | 1.432 | -6.8 | 129 | 0.00 | 15.75 |
| 121 | M | 1,2-dibromo-3-chloropropa | 0.132 | 0.132 | 0.0 | 129 | 0.00 | 16.61 |
| 122 | | 1,3,5-trichlorobenzene | 1.150 | 1.244 | -8.2 | 130 | 0.00 | 16.78 |
| 123 | M | 1,2,4-trichlorobenzene | 1.082 | 1.171 | -8.2 | 130 | 0.00 | 17.36 |
| 124 | M | hexachlorobutadiene | 0.527 | 0.579 | -9.9 | 134 | 0.00 | 17.46 |
| 125 | M | naphthalene | 2.300 | 2.535 | -10.2 | 131 | 0.00 | 17.59 |
| 126 | M | 1,2,3-trichlorobenzene | 0.998 | 1.087 | -8.9 | 132 | 0.00 | 17.81 |

# Continuing Calibration Summary

**Job Number:** JB52301 **Sample:** V2E4366-CC4361
**Account:** SECORPAE Stantec Consulting Services Inc. **Lab FileID:** 2E96790.D
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 127 | M | hexachloroethane | 0.491 | 0.492 | -0.2 | 119 | 0.00 | 16.11 |
| 128 | | Benzyl chloride | 1.433 | 1.443 | -0.7 | 121 | 0.00 | 15.61 |

(#) = Out of Range SPCC's out = 0 CCC's out = 0
2E96693.D M2E4361.M Thu Nov 14 16:11:00 2013 MS2E

# Initial Calibration Summary

**Job Number:** JB52301 **Sample:** VD8771-ICC8771
**Account:** SECORPAE Stantec Consulting Services Inc. **Lab FileID:** D214780.D
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

Response Factor Report MSD

Method : C:\MSDCHEM\1\METHODS\MD8771.M (RTE Integrator)
Title : SW-846 Method 8260B
Last Update : Wed Nov 06 08:48:33 2013
Response via : Initial Calibration

Calibration Files
5 =d214777.D 2 =d214776.D 0.5 =d214774.D 50 =d214780.D
100 =d214781.D 1 =d214775.D 200 =d214782.D 20 =d214779.D
10 =d214778.D =

| Compound | 5 | 2 | 0.5 | 50 | 100 | 1 | 200 | 20 | 10 | Avg | %RSD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1) I Tert Butyl Alcohol-d9 | ----------ISTD---------- | | | | | | | | | | |
| 2) 1,4-dioxane | 0.099 | 0.079 | 0.106 | 0.109 | 0.085 | 0.107 | 0.103 | 0.101 | | 0.099 | 10.97 |
| 3) tertiary butyl alcohol | 1.205 | 1.202 | 1.155 | 1.131 | 1.181 | 1.087 | 1.151 | 1.187 | | 1.163 | 3.45 |
| 4) I pentafluorobenzene | ----------ISTD---------- | | | | | | | | | | |
| 5) 1,2-dichloro-1,2,2-trifluoroet | | | | | | | | | | 0.000# | -1.00 |
| 6) chlorodifluoromethane | 0.415 | 0.364 | 0.473 | 0.474 | 0.348 | 0.419 | 0.455 | 0.448 | | 0.424 | 11.27 |
| 7) dichlorodifluoromethane | 0.449 | | 0.584 | 0.641 | | 0.519 | 0.620 | 0.552 | | 0.561 | 12.54 |
| 8) chloromethane | 0.499 | | 0.604 | 0.642 | | 0.580 | 0.599 | 0.577 | | 0.584 | 8.13 |
| 9) vinyl chloride | 0.505 | | 0.617 | 0.645 | | 0.543 | 0.629 | 0.588 | | 0.588 | 9.22 |
| 10) bromomethane | 0.353 | | 0.423 | 0.365 | | | 0.427 | 0.394 | | 0.392 | 8.52 |
| 11) chloroethane | 0.283 | | 0.343 | 0.370 | | 0.257 | 0.348 | 0.332 | | 0.322 | 13.39 |
| 12) vinyl bromide | | | | | | | | | | 0.000# | -1.00 |
| 13) trichlorofluoromethane | 0.552 | | 0.691 | 0.743 | | 0.643 | 0.704 | 0.646 | | 0.663 | 9.99 |
| 14) pentane | | | | | | | | | | 0.000# | -1.00 |
| 15) ethyl ether | 0.283 | 0.284 | 0.237 | 0.305 | 0.307 | 0.265 | 0.303 | 0.292 | 0.307 | 0.287 | 8.18 |
| 16) acrolein | 0.123 | 0.122 | 0.118 | | 0.116 | | 0.116 | 0.122 | | 0.119 | 2.62 |
| 17) chlorotrifluoroethene | | | | | | | | | | 0.000# | -1.00 |
| 18) 2-chloropropane | 0.701 | 0.871 | 0.648 | 0.817 | 0.822 | 0.785 | 0.744 | 0.753 | 0.829 | 0.774 | 9.04 |
| 19) 1,1-dichloroethene | 0.382 | 0.444 | 0.452 | 0.456 | 0.391 | 0.439 | 0.426 | 0.473 | | 0.433 | 7.35 |
| 20) acetone | 0.040 | | 0.048 | 0.045 | | 0.050 | 0.037 | 0.044 | | 0.044 | 10.79 |
| 21) allyl chloride | 0.798 | 0.787 | 0.852 | 1.002 | 0.986 | 0.914 | 1.029 | 0.951 | 0.940 | 0.918 | 9.57 |
| 22) acetonitrile | | | 0.034 | 0.032 | | 0.025 | 0.035 | 0.034 | | 0.032 | 12.55 |
| 23) acetaldehyde | | | | | | | | | | | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | 0.000# | -1.00 |
| 24) | iodomethane | | | | | | | | | | |
| | 0.709 | 0.803 | 0.844 | 0.838 | 0.650 | 0.818 | 0.791 | 0.870 | 0.790 | 9.42 | |
| 25) | iso-butyl alcohol | | | | | | | | | | |
| | | | | | | | | | | 0.000# | -1.00 |
| 26) | carbon disulfide | | | | | | | | | | |
| | 1.324 | 1.484 | 1.643 | 1.615 | 1.200 | 1.499 | 1.504 | 1.670 | 1.492 | 10.84 | |
| 27) | methylene chloride | | | | | | | | | | |
| | 0.483 | 0.532 | 0.444 | 0.535 | 0.536 | 0.444 | 0.521 | 0.507 | 0.558 | 0.507 | 8.12 |
| 28) | 1-chloropropane | | | | | | | | | | |
| | 0.732 | 0.837 | 0.713 | 0.823 | 0.841 | 0.726 | 0.778 | 0.780 | 0.864 | 0.788 | 7.12 |
| 29) | methyl acetate | | | | | | | | | | |
| | 0.400 | 0.459 | 0.506 | 0.437 | 0.423 | 0.442 | 0.406 | 0.427 | 0.435 | 0.437 | 7.20 |
| 30) | methyl tert butyl ether | | | | | | | | | | |
| | 1.542 | 1.616 | 1.440 | 1.611 | 1.628 | 1.472 | 1.592 | 1.563 | 1.669 | 1.570 | 4.76 |
| 31) | trans-1,2-dichloroethene | | | | | | | | | | |
| | 0.438 | 0.483 | 0.488 | 0.489 | 0.454 | 0.459 | 0.462 | 0.512 | 0.473 | 5.01 | |
| 32) | di-isopropyl ether | | | | | | | | | | |
| | 1.521 | 1.481 | 1.208 | 1.636 | 1.613 | 1.371 | 1.530 | 1.606 | 1.587 | 1.506 | 9.19 |
| 33) | ethyl tert-butyl ether | | | | | | | | | | |
| | 1.598 | 1.537 | 1.207 | 1.672 | 1.658 | 1.453 | 1.598 | 1.657 | 1.630 | 1.557 | 9.53 |
| 34) | 2-butanone | | | | | | | | | | |
| | 0.053 | | 0.061 | 0.060 | | 0.064 | 0.054 | 0.056 | 0.058 | 7.50 | |
| 35) | 1,1-dichloroethane | | | | | | | | | | |
| | 0.757 | 0.791 | 0.849 | 0.840 | 0.624 | 0.801 | 0.792 | 0.883 | 0.792 | 9.95 | |
| 36) | chloroprene | | | | | | | | | | |
| | 0.630 | 0.543 | 0.701 | 0.694 | 0.518 | 0.635 | 0.675 | 0.644 | 0.630 | 10.65 | |
| 37) | acrylonitrile | | | | | | | | | | |
| | 0.207 | 0.207 | 0.195 | 0.210 | 0.212 | 0.199 | 0.204 | 0.204 | 0.217 | 0.206 | 3.11 |
| 38) | vinyl acetate | | | | | | | | | | |
| | 0.096 | 0.087 | 0.109 | 0.108 | | 0.110 | 0.093 | 0.095 | 0.100 | 9.13 | |
| 39) | ethyl acetate | | | | | | | | | | |
| | 0.071 | 0.064 | 0.072 | 0.069 | 0.054 | 0.069 | 0.071 | 0.071 | 0.068 | 8.94 | |
| 40) | 2,2-dichloropropane | | | | | | | | | | |
| | 0.619 | 0.683 | 0.711 | 0.703 | 0.527 | 0.658 | 0.671 | 0.749 | 0.665 | 10.21 | |
| 41) | cis-1,2-dichloroethene | | | | | | | | | | |
| | 0.471 | 0.503 | 0.369 | 0.528 | 0.520 | 0.460 | 0.500 | 0.487 | 0.540 | 0.486 | 10.51 |
| 42) | propionitrile | | | | | | | | | | |
| | 0.077 | 0.076 | 0.080 | 0.081 | 0.071 | 0.079 | 0.078 | 0.084 | 0.078 | 4.91 | |
| 43) | bromochloromethane | | | | | | | | | | |
| | 0.242 | 0.244 | 0.169 | 0.262 | 0.262 | 0.217 | 0.257 | 0.247 | 0.262 | 0.240 | 12.71 |
| 44) | tetrahydrofuran | | | | | | | | | | |
| | 0.065 | | 0.073 | 0.073 | | 0.073 | 0.069 | 0.070 | 0.070 | 4.32 | |
| 45) | chloroform | | | | | | | | | | |
| | 0.733 | 0.784 | 0.618 | 0.818 | 0.819 | 0.668 | 0.788 | 0.775 | 0.848 | 0.761 | 9.90 |
| 46) | dibromofluoromethane (s) | | | | | | | | | | |
| | 0.372 | 0.474 | 0.510 | 0.419 | 0.408 | 0.392 | 0.429 | 0.401 | 0.401 | 0.423 | 10.23 |
| 47) | 1,2-dichloroethane-d4 (s) | | | | | | | | | | |
| | 0.464 | 0.530 | 0.478 | 0.503 | 0.493 | 0.442 | 0.517 | 0.506 | 0.466 | 0.489 | 5.83 |
| 48) | freon 113 | | | | | | | | | | |
| | 0.298 | | 0.345 | 0.344 | | 0.322 | 0.332 | 0.301 | 0.324 | 6.29 | |
| 49) | methacrylonitrile | | | | | | | | | | |
| | 0.304 | 0.308 | 0.314 | 0.317 | | 0.306 | 0.303 | 0.330 | 0.312 | 3.06 | |
| 50) | t-butyl formate | | | | | | | | | | |
| | 0.536 | 0.489 | 0.556 | 0.539 | | 0.547 | 0.524 | 0.538 | 0.533 | 4.08 | |
| 51) | 1,1,1-trichloroethane | | | | | | | | | | |
| | 0.597 | 0.657 | 0.727 | 0.731 | 0.512 | 0.693 | 0.678 | 0.747 | 0.668 | 11.87 | |
| 52) | tert-amyl methyl ether | | | | | | | | | | |
| | 1.511 | 1.475 | 1.363 | 1.555 | 1.559 | 1.413 | 1.522 | 1.540 | 1.535 | 1.497 | 4.54 |

# Initial Calibration Summary

**Job Number:** JB52301 **Sample:** VD8771-ICC8771
**Account:** SECORPAE Stantec Consulting Services Inc. **Lab FileID:** D214780.D
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 53) I | 1,4-difluorobenzene | ---------- | ISTD | ---------- | | | | | | | |
| 54) | cyclohexane | | | | | | | | | | |
| | 0.368 | 0.376 | 0.462 | 0.473 | 0.446 | 0.439 | 0.479 | | 0.434 | 10.32 | |
| 55) | tert amyl alcohol | | | | | | | | | | |
| | | | | | | | | | 0.000# | -1.00 | |
| 56) | 2,2,4-trimethylpentane | | | | | | | | | | |
| | 1.023 | 0.894 | 1.182 | 1.210 | 0.867 | 1.143 | 1.148 | 1.029 | 1.062 | 12.29 | |
| 57) | epichlorohydrin | | | | | | | | | | |
| | 0.034 | 0.038 | 0.038 | 0.039 | 0.038 | 0.037 | 0.037 | 0.037 | 0.038 | 0.037 | 4.15 |
| 58) | n-butyl alcohol | | | | | | | | | | |
| | 0.009 | | 0.011 | 0.011 | 0.011 | 0.010 | 0.010 | | 0.011 | 8.68 | |
| 59) | carbon tetrachloride | | | | | | | | | | |
| | 0.344 | 0.371 | 0.422 | 0.429 | 0.304 | 0.408 | 0.388 | 0.436 | 0.388 | 11.83 | |
| 60) | 1,1-dichloropropene | | | | | | | | | | |
| | 0.347 | 0.375 | 0.410 | 0.420 | 0.300 | 0.392 | 0.380 | 0.432 | 0.382 | 11.22 | |
| 61) | hexane | | | | | | | | | | |
| | 0.327 | 0.245 | 0.360 | 0.368 | 0.265 | 0.324 | 0.356 | 0.322 | 0.321 | 13.87 | |
| 62) | benzene | | | | | | | | | | |
| | 1.100 | 1.194 | 0.818 | 1.267 | 1.256 | 0.986 | 1.190 | 1.190 | 1.283 | 1.143 | 13.39 |
| 63) | heptane | | | | | | | | | | |
| | 0.191 | 0.161 | 0.217 | 0.219 | 0.162 | 0.204 | 0.210 | 0.188 | 0.194 | 11.85 | |
| 64) | isopropyl acetate | | | | | | | | | | |
| | 0.639 | 0.636 | 0.585 | 0.654 | 0.639 | 0.600 | 0.629 | 0.628 | 0.631 | 0.627 | 3.40 |
| 65) | 1,2-dichloroethane | | | | | | | | | | |
| | 0.402 | 0.421 | 0.355 | 0.432 | 0.437 | 0.385 | 0.434 | 0.407 | 0.440 | 0.413 | 6.87 |
| 66) | Ethyl Acrylate | | | | | | | | | | |
| | 0.406 | 0.375 | 0.424 | 0.437 | 0.320 | 0.426 | 0.426 | 0.410 | 0.403 | 9.58 | |
| 67) | trichloroethene | | | | | | | | | | |
| | 0.261 | 0.279 | 0.201 | 0.311 | 0.312 | 0.232 | 0.300 | 0.288 | 0.316 | 0.278 | 14.22 |
| 68) | 2-nitropropane | | | | | | | | | | |
| | 0.864 | 0.866 | 0.770 | 0.901 | 0.899 | 0.866 | 0.870 | 0.863 | 0.872 | 0.863 | 4.41 |
| 69) | 2-chloroethyl vinyl ether | | | | | | | | | | |
| | 0.228 | 0.209 | 0.182 | 0.238 | 0.234 | 0.202 | 0.227 | 0.227 | 0.228 | 0.219 | 8.21 |
| 70) | methyl methacrylate | | | | | | | | | | |
| | 0.089 | 0.076 | 0.100 | 0.102 | 0.102 | 0.094 | 0.099 | | 0.095 | 10.09 | |
| 71) | tert-amyl ethyl ether | | | | | | | | | | |
| | | | | | | | | | 0.000# | -1.00 | |
| 72) | 1,2-dichloropropane | | | | | | | | | | |
| | 0.300 | 0.307 | 0.251 | 0.331 | 0.334 | 0.275 | 0.322 | 0.307 | 0.342 | 0.308 | 9.54 |
| 73) | methylcyclohexane | | | | | | | | | | |
| | 0.466 | 0.369 | 0.527 | 0.540 | 0.503 | 0.515 | 0.476 | | 0.485 | 11.84 | |
| 74) | dibromomethane | | | | | | | | | | |
| | 0.187 | 0.195 | 0.179 | 0.207 | 0.206 | 0.177 | 0.204 | 0.192 | 0.214 | 0.196 | 6.63 |
| 75) | bromodichloromethane | | | | | | | | | | |
| | 0.395 | 0.399 | 0.310 | 0.440 | 0.437 | 0.347 | 0.429 | 0.403 | 0.445 | 0.401 | 11.39 |
| 76) | cis-1,3-dichloropropene | | | | | | | | | | |
| | 0.485 | 0.520 | 0.471 | 0.551 | 0.542 | 0.449 | 0.528 | 0.514 | 0.570 | 0.514 | 7.69 |
| 77) | toluene-d8 (s) | | | | | | | | | | |
| | 0.877 | 1.115 | 0.857 | 1.068 | 1.019 | 0.793 | 1.077 | 1.014 | 1.016 | 0.982 | 11.39 |
| 78) | 4-methyl-2-pentanone | | | | | | | | | | |
| | 0.126 | 0.125 | 0.143 | 0.141 | 0.140 | 0.134 | 0.153 | | 0.137 | 7.10 | |
| 79) | toluene | | | | | | | | | | |
| | 0.672 | 0.708 | 0.798 | 0.791 | 0.578 | 0.761 | 0.728 | 0.820 | 0.732 | 10.87 | |
| 80) | 3-methyl-1-butanol | | | | | | | | | | |
| | 0.009 | 0.008 | 0.011 | 0.011 | 0.011 | 0.010 | 0.010 | | 0.010# | 12.70 | |
| 81) | trans-1,3-dichloropropene | | | | | | | | | | |
| | 0.472 | 0.449 | 0.432 | 0.516 | 0.516 | 0.431 | 0.508 | 0.470 | 0.536 | 0.481 | 8.17 |
| 82) | ethyl methacrylate | | | | | | | | | | |
| | 0.414 | 0.409 | 0.477 | 0.482 | 0.474 | 0.439 | 0.487 | | 0.455 | 7.33 | |
| 83) | 1,1,2-trichloroethane | | | | | | | | | | |

```
           0.238 0.227       0.248 0.247 0.219 0.243 0.234 0.261   0.239    5.52
 84)  2-hexanone
           0.109 0.100       0.126 0.132       0.128 0.123 0.127   0.121    9.80

 85) I   chlorobenzene-d5      ----------------ISTD--------------------
 86)  tetrachloroethene
           0.328 0.348       0.385 0.406 0.275 0.362 0.402 0.401   0.363   12.47
 87)  1,3-dichloropropane
           0.536 0.548 0.404 0.577 0.571 0.488 0.558 0.542 0.607   0.537   11.09
 88)  butyl acetate
           0.198             0.251 0.250       0.246 0.234 0.228   0.235    8.63
 89)  3,3-dimethyl-1-butanol
           0.038 0.037 0.046 0.041 0.041 0.033 0.041 0.040 0.036   0.039    8.98
 90)  dibromochloromethane
           0.352 0.346 0.312 0.395 0.398 0.332 0.395 0.370 0.409   0.368    9.21
 91)  1,2-dibromoethane
           0.317 0.336 0.291 0.350 0.349 0.312 0.344 0.331 0.363   0.333    6.79
 92)  chlorobenzene
           0.858 0.918 0.689 0.956 0.954 0.763 0.927 0.891 1.011   0.885   11.48
 93)  1,1,1,2-tetrachloroethane
           0.328 0.340 0.252 0.371 0.370 0.307 0.370 0.335 0.383   0.340   12.09
 94)  ethylbenzene
           1.424 1.486 1.119 1.664 1.657 1.201 1.578 1.551 1.736   1.491   14.14
 95)  m,p-xylene
           0.567 0.592 0.390 0.656 0.649 0.495 0.627 0.602 0.692   0.585   15.91
            ----- Linear regression -----  Coefficient =  0.9996
              Response Ratio = 0.00706 + 0.63100 *A

 96)  o-xylene
           0.562 0.589       0.658 0.649 0.477 0.650 0.609 0.684   0.610   11.00
 97)  styrene
           0.946 0.932       1.119 1.115 0.831 1.120 1.041 1.156   1.033   11.30
 98)  bromoform
           0.266 0.265 0.244 0.292 0.294 0.283 0.301 0.269 0.297   0.279    6.80

 99) I   1,4-dichlorobenzene-d ----------------ISTD--------------------
100)  isopropylbenzene
           2.603 2.643       3.016 2.980 2.238 2.783 2.771 3.185   2.777   10.57
101)  4-bromofluorobenzene (s)
           0.752 0.853 1.100 0.851 0.838 0.745 0.866 0.809 0.787   0.844   12.50
102)  bromobenzene
           0.713 0.712 0.588 0.788 0.780 0.639 0.757 0.730 0.826   0.726   10.30
103)  cyclohexanone
           0.032 0.029 0.031 0.033 0.032 0.035 0.027 0.033 0.036   0.032    8.73
104)  1,1,2,2-tetrachloroethane
           0.825 0.819 0.959 0.839 0.830 0.884 0.797 0.795 0.916   0.852    6.61
105)  trans-1,4-dichloro-2-butene
           0.228 0.201       0.251 0.255       0.252 0.236 0.258   0.240    8.58
106)  1,2,3-trichloropropane
           0.244 0.227 0.236 0.251 0.245 0.227 0.241 0.234 0.273   0.242    5.93
107)  n-propylbenzene
           2.994 3.053       3.417 3.344 2.604 3.157 3.157 3.592   3.165    9.52
108)  p-ethyltoluene
                                                                   0.000#  -1.00
109)  2-chlorotoluene
           0.623 0.622 0.477 0.707 0.704 0.526 0.685 0.650 0.747   0.638   13.82
110)  4-chlorotoluene
           1.893 1.966 1.462 2.213 2.188 1.931 2.114 2.052 2.293   2.013   12.27
111)  1,3,5-trimethylbenzene
           2.222 2.435 1.786 2.568 2.587 2.070 2.506 2.391 2.699   2.363   12.26
```

# Initial Calibration Summary

**Job Number:** JB52301 **Sample:** VD8771-ICC8771
**Account:** SECORPAE Stantec Consulting Services Inc. **Lab FileID:** D214780.D
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 112) | tert-butylbenzene | | | | | | | | | | |
| | 1.877 | 1.857 | 2.233 | 2.183 | 1.594 | 2.175 | 1.983 | 2.212 | 2.014 | | 11.30 |
| 113) | pentachloroethane | | | | | | | | | | |
| | 0.466 | 0.440 | 0.378 | 0.526 | 0.484 | 0.467 | 0.537 | 0.411 | 0.528 | 0.471 | 11.61 |
| 114) | 1,2,4-trimethylbenzene | | | | | | | | | | |
| | 2.325 | 2.350 | 1.822 | 2.647 | 2.633 | 2.109 | 2.599 | 2.440 | 2.751 | 2.408 | 12.34 |
| 115) | sec-butylbenzene | | | | | | | | | | |
| | 2.875 | 2.873 | 2.144 | 3.280 | 3.256 | 2.440 | 3.147 | 2.994 | 3.355 | 2.929 | 13.90 |
| 116) | 1,3-dichlorobenzene | | | | | | | | | | |
| | 1.342 | 1.332 | 1.321 | 1.473 | 1.477 | 1.244 | 1.462 | 1.364 | 1.529 | 1.394 | 6.77 |
| 117) | p-isopropyltoluene | | | | | | | | | | |
| | 2.319 | 2.417 | 1.811 | 2.715 | 2.726 | 2.062 | 2.665 | 2.491 | 2.820 | 2.447 | 13.77 |
| 118) | 1,4-dichlorobenzene | | | | | | | | | | |
| | 1.446 | 1.490 | 1.541 | 1.548 | 1.538 | 1.375 | 1.525 | 1.461 | 1.663 | 1.510 | 5.33 |
| 119) | Benzyl Chloride | | | | | | | | | | |
| | 1.708 | 1.673 | 2.011 | 1.807 | 1.733 | 1.569 | 1.710 | 1.712 | 1.722 | 1.738 | 6.89 |
| 120) | p-diethylbenzene | | | | | | | | | | |
| | | | | | | | | | | 0.000# | -1.00 |
| 121) | 1,2-dichlorobenzene | | | | | | | | | | |
| | 1.399 | 1.403 | 1.459 | 1.481 | 1.477 | 1.329 | 1.457 | 1.378 | 1.567 | 1.439 | 4.84 |
| 122) | n-butylbenzene | | | | | | | | | | |
| | 1.153 | 1.156 | 1.402 | 1.435 | 0.942 | 1.426 | 1.275 | 1.383 | 1.271 | | 13.83 |
| 123) | 1,2,4,5-tetramethylbenzene | | | | | | | | | | |
| | | | | | | | | | | 0.000# | -1.00 |
| 124) | 1,2-dibromo-3-chloropropane | | | | | | | | | | |
| | 0.156 | 0.178 | 0.168 | 0.167 | 0.197 | 0.163 | 0.155 | 0.176 | 0.170 | | 8.18 |
| 125) | 1,3,5-trichlorobenzene | | | | | | | | | | |
| | 1.045 | 1.029 | 1.280 | 1.180 | 1.191 | 0.959 | 1.151 | 1.092 | 1.214 | 1.127 | 9.11 |
| 126) | 1,2,4-trichlorobenzene | | | | | | | | | | |
| | 0.871 | 0.806 | 1.051 | 1.055 | 0.819 | 1.018 | 0.961 | 1.032 | 0.952 | | 11.03 |
| 127) | hexachlorobutadiene | | | | | | | | | | |
| | 0.472 | 0.480 | 0.675 | 0.543 | 0.555 | 0.447 | 0.549 | 0.489 | 0.534 | 0.527 | 12.82 |
| 128) | naphthalene | | | | | | | | | | |
| | 2.043 | 1.926 | 2.424 | 2.405 | 2.081 | 2.269 | 2.207 | 2.360 | 2.214 | | 8.29 |
| 129) | 1,2,3-trichlorobenzene | | | | | | | | | | |
| | 0.755 | 0.736 | 0.888 | 0.899 | 0.774 | 0.865 | 0.807 | 0.876 | 0.825 | | 7.86 |
| 130) | hexachloroethane | | | | | | | | | | |
| | 0.441 | 0.453 | 0.387 | 0.535 | 0.543 | 0.421 | 0.541 | 0.474 | 0.539 | 0.481 | 12.39 |

(#) = Out of Range ### Number of calibration levels exceeded format ###

MD8771.M Wed Nov 06 08:49:59 2013 RPT1

# Initial Calibration Verification

**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

**Sample:** VD8771-ICV8771
**Lab FileID:** D214785.D

Evaluate Continuing Calibration Report

Data File : C:\msdchem\1\DATA\vd8761-8780\d214785.D Vial: 13
Acq On : 31 Oct 2013 8:17 pm Operator: Courtnem
Sample : icv8771-50 Inst : MSD
Misc : ms57288,vd8771,5,,100,5,1 Multiplr: 1.00
MS Integration Params: RTEINT.P

Method : C:\MSDCHEM\1\METHODS\MD8771.M (RTE Integrator)
Title : SW-846 Method 8260B
Last Update : Wed Nov 06 08:48:33 2013
Response via : Multiple Level Calibration

Min. RRF : 0.010 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 200%

| | | Compound | AvgRF | CCRF | %Dev | Area% | Dev(min) | R.T. |
|---|---|---|---|---|---|---|---|---|
| 1 | I | Tert Butyl Alcohol-d9 | 1.000 | 1.000 | 0.0 | 98 | 0.00 | 7.81 |
| 2 | M | 1,4-dioxane | 0.099 | 0.110 | -11.1 | 102 | 0.00 | 11.66 |
| 3 | M | tertiary butyl alcohol | 1.163 | 1.147 | 1.4 | 97 | 0.00 | 7.92 |
| 4 | I | pentafluorobenzene | 1.000 | 1.000 | 0.0 | 103 | 0.00 | 10.03 |
| 5 | M | 1,2-dichloro-1,2,2-triflu | | ----------NA---------- | | | | |
| 6 | M | chlorodifluoromethane | 0.424 | 0.472 | -11.3 | 102 | 0.00 | 4.42 |
| 7 | M | dichlorodifluoromethane | 0.561 | 0.661 | -17.8 | 116 | 0.00 | 4.41 |
| 8 | M | chloromethane | 0.584 | 0.568 | 2.7 | 97 | 0.00 | 4.75 |
| 9 | M | vinyl chloride | 0.588 | 0.542 | 7.8 | 90 | 0.00 | 5.03 |
| 10 | M | bromomethane | 0.392 | 0.401 | -2.3 | 97 | 0.00 | 5.67 |
| 11 | M | chloroethane | 0.322 | 0.339 | -5.3 | 101 | 0.00 | 5.85 |
| 12 | M | vinyl bromide | | ----------NA---------- | | | | |
| 13 | M | trichlorofluoromethane | 0.663 | 0.651 | 1.8 | 97 | 0.00 | 6.36 |
| 14 | | pentane | | ----------NA---------- | | | | |
| 15 | M | ethyl ether | 0.287 | 0.315 | -9.8 | 106 | 0.00 | 6.75 |
| 16 | M | acrolein | 0.119 | 0.112 | 5.9 | 97 | 0.00 | 6.97 |
| 17 | M | chlorotrifluoroethene | | ----------NA---------- | | | | |
| 18 | M | 2-chloropropane | 0.774 | 0.811 | -4.8 | 102 | 0.00 | 6.94 |
| 19 | M | 1,1-dichloroethene | 0.433 | 0.464 | -7.2 | 105 | 0.00 | 7.17 |
| 20 | M | acetone | 0.044 | 0.052 | -18.2 | 110 | 0.00 | 7.19 |
| 21 | M | allyl chloride | 0.918 | 0.996 | -8.5 | 102 | 0.00 | 7.68 |
| 22 | M | acetonitrile | 0.032 | 0.031 | 3.1 | 93 | 0.00 | 7.61 |
| 23 | M | acetaldehyde | | ----------NA---------- | | | | |
| 24 | M | iodomethane | 0.790 | 0.851 | -7.7 | 104 | 0.00 | 7.44 |
| 25 | M | iso-butyl alcohol | | ----------NA---------- | | | | |
| 26 | M | carbon disulfide | 1.492 | 1.606 | -7.6 | 100 | 0.00 | 7.58 |
| 27 | M | methylene chloride | 0.507 | 0.532 | -4.9 | 102 | 0.00 | 7.85 |
| 28 | M | 1-chloropropane | 0.788 | 0.828 | -5.1 | 103 | 0.00 | 7.91 |
| 29 | M | methyl acetate | 0.437 | 0.390 | 10.8 | 92 | 0.00 | 7.65 |
| 30 | M | methyl tert butyl ether | 1.570 | 1.572 | 0.2 | 100 | 0.00 | 8.22 |
| 31 | M | trans-1,2-dichloroethene | 0.473 | 0.487 | -3.0 | 102 | 0.00 | 8.24 |
| 32 | M | di-isopropyl ether | 1.506 | 1.536 | -2.0 | 96 | 0.00 | 8.81 |
| 33 | M | ethyl tert-butyl ether | 1.557 | 1.599 | -2.7 | 98 | 0.00 | 9.27 |
| 34 | M | 2-butanone | 0.058 | 0.064 | -10.3 | 108 | 0.00 | 9.47 |
| 35 | M | 1,1-dichloroethane | 0.792 | 0.854 | -7.8 | 103 | 0.00 | 8.79 |
| 36 | M | chloroprene | 0.630 | 0.680 | -7.9 | 100 | 0.00 | 8.91 |
| 37 | M | acrylonitrile | 0.206 | 0.200 | 2.9 | 98 | 0.00 | 8.15 |
| 38 | M | vinyl acetate | 0.100 | 0.113 | -13.0 | 106 | 0.00 | 8.78 |
| 39 | M | ethyl acetate | 0.068 | 0.069 | -1.5 | 99 | 0.00 | 9.50 |
| 40 | M | 2,2-dichloropropane | 0.665 | 0.679 | -2.1 | 98 | 0.00 | 9.54 |
| 41 | M | cis-1,2-dichloroethene | 0.486 | 0.523 | -7.6 | 102 | 0.00 | 9.51 |

# Initial Calibration Verification

**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

**Sample:** VD8771-ICV8771
**Lab FileID:** D214785.D

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 42 | M | propionitrile | 0.078 | 0.079 | -1.3 | 100 | 0.00 | 9.54 |
| 43 | M | bromochloromethane | 0.240 | 0.260 | -8.3 | 102 | 0.00 | 9.81 |
| 44 | M | tetrahydrofuran | 0.070 | 0.072 | -2.9 | 102 | 0.00 | 9.87 |
| 45 | M | chloroform | 0.761 | 0.827 | -8.7 | 104 | 0.00 | 9.86 |
| 46 | S | dibromofluoromethane (s) | 0.423 | 0.435 | -2.8 | 106 | 0.00 | 10.06 |
| 47 | S | 1,2-dichloroethane-d4 (s) | 0.489 | 0.533 | -9.0 | 109 | 0.00 | 10.48 |
| 48 | M | freon 113 | 0.324 | 0.346 | -6.8 | 103 | 0.00 | 7.18 |
| 49 | M | methacrylonitrile | 0.312 | 0.303 | 2.9 | 99 | 0.00 | 9.74 |
| 50 | m | t-butyl formate | 0.533 | 0.533 | 0.0 | 98 | 0.00 | 9.94 |
| 51 | M | 1,1,1-trichloroethane | 0.668 | 0.741 | -10.9 | 105 | 0.00 | 10.15 |
| 52 | M | tert-amyl methyl ether | 1.497 | 1.602 | -7.0 | 106 | 0.00 | 10.64 |
| 53 | I | 1,4-difluorobenzene | 1.000 | 1.000 | 0.0 | 102 | 0.00 | 10.94 |
| 54 | M | cyclohexane | 0.434 | 0.477 | -9.9 | 105 | 0.00 | 10.26 |
| 55 | | tert amyl alcohol | | ----------NA---------- | | | | |
| 56 | M | 2,2,4-trimethylpentane | 1.062 | 1.069 | -0.7 | 92 | 0.00 | 10.64 |
| 57 | M | epichlorohydrin | 0.037 | 0.037 | 0.0 | 96 | 0.00 | 12.20 |
| 58 | M | n-butyl alcohol | 0.011 | 0.011 | 0.0 | 97 | 0.00 | 11.03 |
| 59 | M | carbon tetrachloride | 0.388 | 0.440 | -13.4 | 106 | 0.00 | 10.36 |
| 60 | M | 1,1-dichloropropene | 0.382 | 0.407 | -6.5 | 101 | 0.00 | 10.32 |
| 61 | M | hexane | 0.321 | 0.367 | -14.3 | 104 | 0.00 | 8.58 |
| 62 | M | benzene | 1.143 | 1.280 | -12.0 | 103 | 0.00 | 10.58 |
| 63 | M | heptane | 0.194 | 0.213 | -9.8 | 100 | 0.00 | 10.79 |
| 64 | M | isopropyl acetate | 0.627 | 0.627 | 0.0 | 98 | 0.00 | 10.50 |
| 65 | M | 1,2-dichloroethane | 0.413 | 0.443 | -7.3 | 104 | 0.00 | 10.57 |
| 66 | | Ethyl Acrylate | 0.403 | 0.409 | -1.5 | 98 | 0.00 | 11.29 |
| 67 | M | trichloroethene | 0.278 | 0.320 | -15.1 | 105 | 0.00 | 11.29 |
| 68 | M | 2-nitropropane | 0.863 | 0.866 | -0.3 | 98 | 0.00 | 12.09 |
| 69 | M | 2-chloroethyl vinyl ether | 0.219 | 0.223 | -1.8 | 96 | 0.00 | 12.09 |
| 70 | M | methyl methacrylate | 0.095 | 0.100 | -5.3 | 102 | 0.00 | 11.56 |
| 71 | M | tert-amyl ethyl ether | | ----------NA---------- | | | | |
| 72 | M | 1,2-dichloropropane | 0.308 | 0.336 | -9.1 | 103 | 0.00 | 11.55 |
| 73 | M | methylcyclohexane | 0.485 | 0.543 | -12.0 | 105 | 0.00 | 11.56 |
| 74 | M | dibromomethane | 0.196 | 0.210 | -7.1 | 103 | 0.00 | 11.69 |
| 75 | M | bromodichloromethane | 0.401 | 0.446 | -11.2 | 103 | 0.00 | 11.82 |
| 76 | M | cis-1,3-dichloropropene | 0.514 | 0.502 | 2.3 | 93 | 0.00 | 12.32 |
| 77 | S | toluene-d8 (s) | 0.982 | 1.105 | -12.5 | 105 | 0.00 | 12.65 |
| 78 | M | 4-methyl-2-pentanone | 0.137 | 0.141 | -2.9 | 101 | 0.00 | 12.43 |
| 79 | M | toluene | 0.732 | 0.795 | -8.6 | 102 | 0.00 | 12.72 |
| 80 | M | 3-methyl-1-butanol | 0.010 | 0.010 | 0.0 | 95 | 0.00 | 12.42 |
| 81 | M | trans-1,3-dichloropropene | 0.481 | 0.510 | -6.0 | 101 | 0.00 | 12.90 |
| 82 | M | ethyl methacrylate | 0.455 | 0.457 | -0.4 | 98 | 0.00 | 12.92 |
| 83 | M | 1,1,2-trichloroethane | 0.239 | 0.249 | -4.2 | 102 | 0.00 | 13.13 |
| 84 | M | 2-hexanone | 0.121 | 0.124 | -2.5 | 100 | 0.00 | 13.34 |
| 85 | I | chlorobenzene-d5 | 1.000 | 1.000 | 0.0 | 100 | 0.00 | 14.28 |
| 86 | M | tetrachloroethene | 0.363 | 0.405 | -11.6 | 105 | 0.00 | 13.36 |
| 87 | M | 1,3-dichloropropane | 0.537 | 0.574 | -6.9 | 99 | 0.00 | 13.33 |
| 88 | M | butyl acetate | 0.235 | 0.245 | -4.3 | 98 | 0.00 | 13.43 |
| 89 | m | 3,3-dimethyl-1-butanol | 0.039 | 0.039 | 0.0 | 95 | 0.00 | 13.51 |
| 90 | M | dibromochloromethane | 0.368 | 0.412 | -12.0 | 104 | 0.00 | 13.61 |
| 91 | M | 1,2-dibromoethane | 0.333 | 0.352 | -5.7 | 100 | 0.00 | 13.79 |
| 92 | M | chlorobenzene | 0.885 | 0.978 | -10.5 | 102 | 0.00 | 14.31 |
| 93 | M | 1,1,1,2-tetrachloroethane | 0.340 | 0.371 | -9.1 | 100 | 0.00 | 14.37 |
| 94 | M | ethylbenzene | 1.491 | 1.687 | -13.1 | 101 | 0.00 | 14.39 |
| | | ---------- | True | Calc. | % Drift | ---------- | | |
| 95 | M | m,p-xylene | 100.000 | 104.400 | -4.4 | 101 | 0.00 | 14.51 |
| | | ---------- | AvgRF | CCRF | % Dev | ---------- | | |

# Initial Calibration Verification

**Job Number:** JB52301 **Sample:** VD8771-ICV8771
**Account:** SECORPAE Stantec Consulting Services Inc. **Lab FileID:** D214785.D
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 96 | M | o-xylene | 0.610 | 0.665 | -9.0 | 101 | 0.00 | 14.97 |
| 97 | M | styrene | 1.033 | 1.141 | -10.5 | 102 | 0.00 | 14.97 |
| 98 | M | bromoform | 0.279 | 0.298 | -6.8 | 102 | 0.00 | 15.23 |
| 99 | I | 1,4-dichlorobenzene-d4 | 1.000 | 1.000 | 0.0 | 102 | 0.00 | 16.86 |
| 100 | M | isopropylbenzene | 2.777 | 3.003 | -8.1 | 101 | 0.00 | 15.35 |
| 101 | S | 4-bromofluorobenzene (s) | 0.844 | 0.865 | -2.5 | 103 | 0.00 | 15.56 |
| 102 | M | bromobenzene | 0.726 | 0.786 | -8.3 | 101 | 0.00 | 15.78 |
| 103 | M | cyclohexanone | 0.032 | 0.025 | 21.9# | 76 | 0.00 | 15.51 |
| 104 | M | 1,1,2,2-tetrachloroethane | 0.852 | 0.811 | 4.8 | 98 | 0.00 | 15.65 |
| 105 | M | trans-1,4-dichloro-2-bute | 0.240 | 0.251 | -4.6 | 101 | 0.00 | 15.70 |
| 106 | M | 1,2,3-trichloropropane | 0.242 | 0.244 | -0.8 | 99 | 0.00 | 15.74 |
| 107 | M | n-propylbenzene | 3.165 | 3.479 | -9.9 | 103 | 0.00 | 15.81 |
| 108 | M | p-ethyltoluene | | ----------NA---------- | | | | |
| 109 | M | 2-chlorotoluene | 0.638 | 0.700 | -9.7 | 101 | 0.00 | 15.96 |
| 110 | M | 4-chlorotoluene | 2.013 | 2.172 | -7.9 | 100 | 0.00 | 16.07 |
| 111 | M | 1,3,5-trimethylbenzene | 2.363 | 2.563 | -8.5 | 101 | 0.00 | 15.98 |
| 112 | M | tert-butylbenzene | 2.014 | 2.188 | -8.6 | 100 | 0.00 | 16.37 |
| 113 | M | pentachloroethane | 0.471 | 0.506 | -7.4 | 98 | 0.00 | 16.44 |
| 114 | M | 1,2,4-trimethylbenzene | 2.408 | 2.638 | -9.6 | 101 | 0.00 | 16.42 |
| 115 | M | sec-butylbenzene | 2.929 | 3.244 | -10.8 | 100 | 0.00 | 16.62 |
| 116 | M | 1,3-dichlorobenzene | 1.394 | 1.493 | -7.1 | 103 | 0.00 | 16.80 |
| 117 | M | p-isopropyltoluene | 2.447 | 2.811 | -14.9 | 105 | 0.00 | 16.75 |
| 118 | M | 1,4-dichlorobenzene | 1.510 | 1.522 | -0.8 | 100 | 0.00 | 16.89 |
| 119 | | Benzyl Chloride | 1.738 | 1.614 | 7.1 | 91 | 0.00 | 17.01 |
| 120 | M | p-diethylbenzene | | ----------NA---------- | | | | |
| 121 | M | 1,2-dichlorobenzene | 1.439 | 1.470 | -2.2 | 101 | 0.00 | 17.33 |
| 122 | M | n-butylbenzene | 1.271 | 1.392 | -9.5 | 101 | 0.00 | 17.21 |
| 123 | M | 1,2,4,5-tetramethylbenzen | | ----------NA---------- | | | | |
| 124 | M | 1,2-dibromo-3-chloropropa | 0.170 | 0.165 | 2.9 | 100 | 0.00 | 18.16 |
| 125 | M | 1,3,5-trichlorobenzene | 1.127 | 1.201 | -6.6 | 103 | 0.00 | 18.39 |
| 126 | M | 1,2,4-trichlorobenzene | 0.952 | 1.036 | -8.8 | 100 | 0.00 | 19.12 |
| 127 | M | hexachlorobutadiene | 0.527 | 0.535 | -1.5 | 100 | 0.00 | 19.27 |
| 128 | M | naphthalene | 2.214 | 2.327 | -5.1 | 97 | 0.00 | 19.43 |
| 129 | M | 1,2,3-trichlorobenzene | 0.825 | 0.876 | -6.2 | 100 | 0.00 | 19.71 |
| 130 | M | hexachloroethane | 0.481 | 0.518 | -7.7 | 99 | 0.00 | 17.63 |

(#) = Out of Range SPCC's out = 0 CCC's out = 0
d214780.D MD8771.M Wed Nov 06 08:49:45 2013 RPT1

# Continuing Calibration Summary

**Job Number:** JB52301 **Sample:** VD8790-CC8771
**Account:** SECORPAE Stantec Consulting Services Inc. **Lab FileID:** D215225.D
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : C:\msdchem\1\DATA\d215225.D Vial: 26
Acq On : 13 Nov 2013 9:42 pm Operator: CourtneM
Sample : cc8771-50 Inst : MSD
Misc : ms58207,vd8790,5,,100,5,1 Multiplr: 1.00
MS Integration Params: RTEINT.P

Method : C:\msdchem\1\METHODS\MD8771.M (RTE Integrator)
Title : SW-846 Method 8260B
Last Update : Fri Nov 01 10:07:55 2013
Response via : Multiple Level Calibration

Min. RRF : 0.010 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 200%

| | | Compound | AvgRF | CCRF | %Dev | Area% | Dev(min) | R.T. |
|---|---|---|---|---|---|---|---|---|
| 1 | I | Tert Butyl Alcohol-d9 | 1.000 | 1.000 | 0.0 | 86 | 0.00 | 7.80 |
| 2 | M | 1,4-dioxane | 0.099 | 0.103 | -4.0 | 84 | 0.00 | 11.66 |
| 3 | M | tertiary butyl alcohol | 1.163 | 1.157 | 0.5 | 86 | -0.01 | 7.91 |
| 4 | I | pentafluorobenzene | 1.000 | 1.000 | 0.0 | 96 | 0.00 | 10.03 |
| 5 | M | 1,2-dichloro-1,2,2-triflu | | ----------NA---------- | | | | |
| 6 | M | chlorodifluoromethane | 0.424 | 0.526 | -24.1# | 107 | 0.00 | 4.42 |
| 7 | M | dichlorodifluoromethane | 0.561 | 0.541 | 3.6 | 89 | 0.00 | 4.40 |
| 8 | M | chloromethane | 0.584 | 0.572 | 2.1 | 91 | 0.00 | 4.75 |
| 9 | M | vinyl chloride | 0.588 | 0.574 | 2.4 | 90 | 0.00 | 5.02 |
| 10 | M | bromomethane | 0.392 | 0.427 | -8.9 | 97 | 0.00 | 5.67 |
| 11 | M | chloroethane | 0.322 | 0.314 | 2.5 | 88 | 0.00 | 5.86 |
| 12 | M | vinyl bromide | | ----------NA---------- | | | | |
| 13 | M | trichlorofluoromethane | 0.663 | 0.629 | 5.1 | 88 | 0.00 | 6.36 |
| 14 | | pentane | | ----------NA---------- | | | | |
| 15 | M | ethyl ether | 0.287 | 0.281 | 2.1 | 89 | 0.00 | 6.75 |
| 16 | M | acrolein | 0.119 | 0.104 | 12.6 | 85 | 0.00 | 6.97 |
| 17 | M | chlorotrifluoroethene | | ----------NA---------- | | | | |
| 18 | M | 2-chloropropane | 0.774 | 0.865 | -11.8 | 102 | 0.00 | 6.94 |
| 19 | M | 1,1-dichloroethene | 0.433 | 0.450 | -3.9 | 96 | 0.00 | 7.17 |
| 20 | M | acetone | 0.044 | 0.050 | -13.6 | 100 | 0.00 | 7.19 |
| 21 | M | allyl chloride | 0.918 | 0.974 | -6.1 | 94 | 0.00 | 7.68 |
| 22 | M | acetonitrile | 0.032 | 0.030 | 6.3 | 85 | 0.00 | 7.60 |
| 23 | M | acetaldehyde | | ----------NA---------- | | | | |
| 24 | M | iodomethane | 0.790 | 0.850 | -7.6 | 97 | 0.00 | 7.44 |
| 25 | M | iso-butyl alcohol | | ----------NA---------- | | | | |
| 26 | M | carbon disulfide | 1.492 | 1.484 | 0.5 | 87 | 0.00 | 7.59 |
| 27 | M | methylene chloride | 0.507 | 0.496 | 2.2 | 89 | 0.00 | 7.85 |
| 28 | M | 1-chloropropane | 0.788 | 0.871 | -10.5 | 102 | 0.00 | 7.91 |
| 29 | M | methyl acetate | 0.437 | 0.401 | 8.2 | 88 | 0.00 | 7.66 |
| 30 | M | methyl tert butyl ether | 1.570 | 1.539 | 2.0 | 92 | 0.00 | 8.22 |
| 31 | M | trans-1,2-dichloroethene | 0.473 | 0.474 | -0.2 | 93 | 0.00 | 8.24 |
| 32 | M | di-isopropyl ether | 1.506 | 1.626 | -8.0 | 96 | 0.00 | 8.81 |
| 33 | M | ethyl tert-butyl ether | 1.557 | 1.448 | 7.0 | 83 | 0.00 | 9.27 |
| 34 | M | 2-butanone | 0.058 | 0.061 | -5.2 | 95 | 0.00 | 9.47 |
| 35 | M | 1,1-dichloroethane | 0.792 | 0.828 | -4.5 | 94 | 0.00 | 8.79 |
| 36 | M | chloroprene | 0.630 | 0.777 | -23.3# | 107 | 0.00 | 8.91 |
| 37 | M | acrylonitrile | 0.206 | 0.181 | 12.1 | 83 | 0.00 | 8.15 |
| 38 | M | vinyl acetate | 0.100 | 0.100 | 0.0 | 88 | 0.00 | 8.77 |
| 39 | M | ethyl acetate | 0.068 | 0.067 | 1.5 | 91 | 0.00 | 9.50 |
| 40 | M | 2,2-dichloropropane | 0.665 | 0.684 | -2.9 | 93 | 0.00 | 9.53 |
| 41 | M | cis-1,2-dichloroethene | 0.486 | 0.510 | -4.9 | 93 | 0.00 | 9.50 |

# Continuing Calibration Summary

**Job Number:** JB52301 **Sample:** VD8790-CC8771
**Account:** SECORPAE Stantec Consulting Services Inc. **Lab FileID:** D215225.D
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 42 | M | propionitrile | 0.078 | 0.070 | 10.3 | 83 | 0.00 | 9.54 |
| 43 | M | bromochloromethane | 0.240 | 0.260 | -8.3 | 96 | 0.00 | 9.81 |
| 44 | M | tetrahydrofuran | 0.070 | 0.064 | 8.6 | 85 | 0.00 | 9.87 |
| 45 | M | chloroform | 0.761 | 0.825 | -8.4 | 97 | 0.00 | 9.86 |
| 46 | S | dibromofluoromethane (s) | 0.423 | 0.410 | 3.1 | 94 | 0.00 | 10.06 |
| 47 | S | 1,2-dichloroethane-d4 (s) | 0.489 | 0.511 | -4.5 | 98 | 0.00 | 10.48 |
| 48 | M | freon 113 | 0.324 | 0.386 | -19.1 | 108 | 0.00 | 7.17 |
| 49 | M | methacrylonitrile | 0.312 | 0.293 | 6.1 | 90 | 0.00 | 9.74 |
| 50 | m | t-butyl formate | 0.533 | 0.514 | 3.6 | 89 | 0.00 | 9.93 |
| 51 | M | 1,1,1-trichloroethane | 0.668 | 0.764 | -14.4 | 101 | 0.00 | 10.15 |
| 52 | M | tert-amyl methyl ether | 1.497 | 1.564 | -4.5 | 97 | 0.00 | 10.64 |
| 53 | I | 1,4-difluorobenzene | 1.000 | 1.000 | 0.0 | 91 | 0.00 | 10.94 |
| 54 | M | cyclohexane | 0.434 | 0.493 | -13.6 | 97 | 0.00 | 10.25 |
| 55 | | tert amyl alcohol | | ---------- | NA | ---------- | | |
| 56 | M | 2,2,4-trimethylpentane | 1.062 | 1.393 | -31.2# | 107 | 0.00 | 10.64 |
| 57 | M | epichlorohydrin | 0.037 | 0.036 | 2.7 | 84 | 0.00 | 12.20 |
| 58 | M | n-butyl alcohol | 0.011 | 0.010# | 9.1 | 81 | 0.00 | 11.03 |
| 59 | M | carbon tetrachloride | 0.388 | 0.506 | -30.4# | 109 | 0.00 | 10.36 |
| 60 | M | 1,1-dichloropropene | 0.382 | 0.438 | -14.7 | 97 | 0.00 | 10.32 |
| 61 | M | hexane | 0.321 | 0.438 | -36.4# | 111 | 0.00 | 8.58 |
| 62 | M | benzene | 1.143 | 1.260 | -10.2 | 90 | 0.00 | 10.58 |
| 63 | M | heptane | 0.194 | 0.253 | -30.4# | 106 | 0.00 | 10.79 |
| 64 | M | isopropyl acetate | 0.627 | 0.689 | -9.9 | 96 | 0.00 | 10.50 |
| 65 | M | 1,2-dichloroethane | 0.413 | 0.494 | -19.6 | 104 | 0.00 | 10.57 |
| 66 | | Ethyl Acrylate | | ---------- | NA | ---------- | | |
| 67 | M | trichloroethene | 0.278 | 0.328 | -18.0 | 96 | 0.00 | 11.29 |
| 68 | M | 2-nitropropane | 0.863 | 0.952 | -10.3 | 96 | 0.00 | 12.09 |
| 69 | M | 2-chloroethyl vinyl ether | 0.219 | 0.225 | -2.7 | 86 | 0.00 | 12.09 |
| 70 | M | methyl methacrylate | 0.095 | 0.091 | 4.2 | 82 | 0.00 | 11.56 |
| 71 | M | tert-amyl ethyl ether | | ---------- | NA | ---------- | | |
| 72 | M | 1,2-dichloropropane | 0.308 | 0.329 | -6.8 | 90 | 0.00 | 11.55 |
| 73 | M | methylcyclohexane | 0.485 | 0.598 | -23.3# | 103 | 0.00 | 11.55 |
| 74 | M | dibromomethane | 0.196 | 0.215 | -9.7 | 95 | 0.00 | 11.69 |
| 75 | M | bromodichloromethane | 0.401 | 0.470 | -17.2 | 97 | 0.00 | 11.82 |
| 76 | M | cis-1,3-dichloropropene | 0.514 | 0.534 | -3.9 | 88 | 0.00 | 12.32 |
| 77 | S | toluene-d8 (s) | 0.982 | 1.071 | -9.1 | 91 | 0.00 | 12.65 |
| 78 | M | 4-methyl-2-pentanone | 0.137 | 0.129 | 5.8 | 82 | 0.00 | 12.43 |
| 79 | M | toluene | 0.732 | 0.781 | -6.7 | 89 | 0.00 | 12.72 |
| 80 | M | 3-methyl-1-butanol | 0.010 | 0.010# | 0.0 | 81 | 0.00 | 12.42 |
| 81 | M | trans-1,3-dichloropropene | 0.481 | 0.508 | -5.6 | 89 | 0.00 | 12.90 |
| 82 | M | ethyl methacrylate | 0.455 | 0.439 | 3.5 | 83 | 0.00 | 12.92 |
| 83 | M | 1,1,2-trichloroethane | 0.239 | 0.244 | -2.1 | 89 | 0.00 | 13.13 |
| 84 | M | 2-hexanone | 0.121 | 0.117 | 3.3 | 84 | 0.00 | 13.34 |
| 85 | I | chlorobenzene-d5 | 1.000 | 1.000 | 0.0 | 93 | 0.00 | 14.28 |
| 86 | M | tetrachloroethene | 0.363 | 0.429 | -18.2 | 103 | 0.00 | 13.36 |
| 87 | M | 1,3-dichloropropane | 0.537 | 0.546 | -1.7 | 88 | 0.00 | 13.33 |
| 88 | M | butyl acetate | 0.235 | 0.232 | 1.3 | 86 | 0.00 | 13.43 |
| 89 | m | 3,3-dimethyl-1-butanol | 0.039 | 0.038 | 2.6 | 86 | 0.00 | 13.51 |
| 90 | M | dibromochloromethane | 0.368 | 0.413 | -12.2 | 97 | 0.00 | 13.61 |
| 91 | M | 1,2-dibromoethane | 0.333 | 0.336 | -0.9 | 89 | 0.00 | 13.79 |
| 92 | M | chlorobenzene | 0.885 | 0.960 | -8.5 | 93 | 0.00 | 14.31 |
| 93 | M | 1,1,1,2-tetrachloroethane | 0.340 | 0.394 | -15.9 | 98 | 0.00 | 14.37 |
| 94 | M | ethylbenzene | 1.491 | 1.673 | -12.2 | 93 | 0.00 | 14.39 |
| | | ---------- | True | Calc. | % Drift | ---------- | | |
| 95 | M | m,p-xylene | 100.000 | 103.145 | -3.1 | 93 | 0.00 | 14.50 |
| | | ---------- | AvgRF | CCRF | % Dev | ---------- | | |

# Continuing Calibration Summary

**Job Number:** JB52301 **Sample:** VD8790-CC8771
**Account:** SECORPAE Stantec Consulting Services Inc. **Lab FileID:** D215225.D
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 96 | M | o-xylene | 0.610 | 0.668 | -9.5 | 94 | 0.00 | 14.96 |
| 97 | M | styrene | 1.033 | 1.102 | -6.7 | 91 | 0.00 | 14.97 |
| 98 | M | bromoform | 0.279 | 0.299 | -7.2 | 95 | 0.00 | 15.23 |
| 99 | I | 1,4-dichlorobenzene-d4 | 1.000 | 1.000 | 0.0 | 100 | 0.00 | 16.86 |
| 100 | M | isopropylbenzene | 2.777 | 2.843 | -2.4 | 94 | 0.00 | 15.35 |
| 101 | S | 4-bromofluorobenzene (s) | 0.844 | 0.752 | 10.9 | 88 | 0.00 | 15.55 |
| 102 | M | bromobenzene | 0.726 | 0.755 | -4.0 | 95 | 0.00 | 15.78 |
| 103 | M | cyclohexanone | 0.032 | 0.091 | -184.4# | 273# | 0.00 | 15.51 |
| 104 | M | 1,1,2,2-tetrachloroethane | 0.852 | 0.748 | 12.2 | 89 | 0.00 | 15.64 |
| 105 | M | trans-1,4-dichloro-2-bute | 0.240 | 0.230 | 4.2 | 91 | 0.00 | 15.70 |
| 106 | M | 1,2,3-trichloropropane | 0.242 | 0.227 | 6.2 | 90 | 0.00 | 15.74 |
| 107 | M | n-propylbenzene | 3.165 | 3.119 | 1.5 | 91 | 0.00 | 15.81 |
| 108 | M | p-ethyltoluene | | ----------NA---------- | | | | |
| 109 | M | 2-chlorotoluene | 0.642 | 0.681 | -6.1 | 96 | 0.00 | 15.96 |
| 110 | M | 4-chlorotoluene | 2.013 | 2.014 | -0.0 | 91 | 0.00 | 16.07 |
| 111 | M | 1,3,5-trimethylbenzene | 2.363 | 2.445 | -3.5 | 95 | 0.00 | 15.98 |
| 112 | M | tert-butylbenzene | 2.014 | 2.140 | -6.3 | 95 | 0.00 | 16.37 |
| 113 | M | pentachloroethane | 0.471 | 0.484 | -2.8 | 91 | 0.00 | 16.44 |
| 114 | M | 1,2,4-trimethylbenzene | 2.408 | 2.452 | -1.8 | 92 | 0.00 | 16.42 |
| 115 | M | sec-butylbenzene | 2.929 | 3.182 | -8.6 | 97 | 0.00 | 16.61 |
| 116 | M | 1,3-dichlorobenzene | 1.394 | 1.453 | -4.2 | 98 | 0.00 | 16.80 |
| 117 | M | p-isopropyltoluene | 2.447 | 2.703 | -10.5 | 99 | 0.00 | 16.75 |
| 118 | M | 1,4-dichlorobenzene | 1.510 | 1.473 | 2.5 | 95 | 0.00 | 16.89 |
| 119 | | Benzyl Chloride | 1.738 | 1.337 | 23.1# | 74 | 0.00 | 17.01 |
| 120 | M | p-diethylbenzene | | ----------NA---------- | | | | |
| 121 | M | 1,2-dichlorobenzene | 1.439 | 1.440 | -0.1 | 97 | 0.00 | 17.32 |
| 122 | M | n-butylbenzene | 1.271 | 1.334 | -5.0 | 95 | 0.00 | 17.20 |
| 123 | M | 1,2,4,5-tetramethylbenzen | | ----------NA---------- | | | | |
| 124 | M | 1,2-dibromo-3-chloropropa | 0.170 | 0.148 | 12.9 | 88 | 0.00 | 18.16 |
| 125 | M | 1,3,5-trichlorobenzene | 1.127 | 1.229 | -9.1 | 104 | 0.00 | 18.39 |
| 126 | M | 1,2,4-trichlorobenzene | 0.952 | 1.081 | -13.6 | 102 | 0.00 | 19.11 |
| 127 | M | hexachlorobutadiene | 0.527 | 0.601 | -14.0 | 110 | 0.00 | 19.27 |
| 128 | M | naphthalene | 2.214 | 2.261 | -2.1 | 93 | 0.00 | 19.43 |
| 129 | M | 1,2,3-trichlorobenzene | 0.825 | 0.906 | -9.8 | 102 | 0.00 | 19.71 |
| 130 | M | hexachloroethane | 0.481 | 0.537 | -11.6 | 100 | 0.00 | 17.63 |

(#) = Out of Range SPCC's out = 0 CCC's out = 0
d214780.D MD8771.M Fri Nov 15 10:21:08 2013 RPT1

# Initial Calibration Summary

**Job Number:** JB52301 **Sample:** VY5974-ICC5974
**Account:** SECORPAE Stantec Consulting Services Inc. **Lab FileID:** Y138259.D
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

Response Factor Report MSY

Method : C:\MSDCHEM\1\METHODS\MY5974.M (RTE Integrator)
Title : Method SW846 8260B, ZB624 60m x 0.25mm x 1.4um
Last Update : Wed Oct 30 17:14:38 2013
Response via : Initial Calibration

Calibration Files
5 =Y138253.D 10 =Y138257.D 0.5 =Y138256.D 50 =Y138259.D
100 =Y138261.D 1 =Y138255.D 200 =Y138262.D 20 =Y138258.D
2 =Y138254.D 75 =Y138260.D = =

| Compound | 5 | 10 | 0.5 | 50 | 100 | 1 | 200 | 20 | 2 | 75 | Avg | %RSD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1) I Tert Butyl Alcohol-d9 | ----------ISTD---------- | | | | | | | | | | | |
| 2) 1,4-dioxane | 0.086 | 0.101 | 0.101 | 0.106 | 0.081 | 0.100 | 0.100 | 0.090 | 0.101 | | 0.096 | 8.80 |
| 3) tertiary butyl alcohol | 1.242 | 1.257 | 1.200 | 1.203 | 1.216 | 1.195 | 1.249 | 1.309 | 1.190 | | 1.229 | 3.17 |
| 4) isobutyl alcohol | 0.357 | 0.360 | 0.346 | 0.365 | | 0.357 | 0.347 | 0.295 | 0.352 | | 0.347 | 6.31 |
| 5) I pentafluorobenzene | ----------ISTD---------- | | | | | | | | | | | |
| 6) propene | 0.585 | 0.528 | 0.531 | 0.537 | | 0.507 | 0.462 | 0.556 | 0.537 | | 0.530 | 6.72 |
| 7) freon 141b | | | | | | | | | | | 0.000 | -1.00 |
| 8) freon 142b | | | | | | | | | | | 0.000 | -1.00 |
| 9) freon 143a | | | | | | | | | | | 0.000 | -1.00 |
| 10) freon 114 | 0.395 | 0.331 | 0.324 | 0.320 | | 0.298 | 0.327 | 0.357 | 0.307 | | 0.332 | 9.23 |
| 11) chlorodifluoromethane | 0.332 | 0.235 | 0.258 | 0.257 | | 0.237 | 0.270 | | 0.253 | | 0.263 | 12.41 |
| 12) dichlorodifluoromethane | 0.628 | 0.539 | 0.493 | 0.487 | 0.505 | 0.473 | 0.524 | 0.548 | 0.480 | | 0.520 | 9.31 |
| 13) chloromethane | 0.810 | 0.742 | 0.732 | 0.738 | 0.729 | 0.738 | 0.685 | 0.774 | 0.703 | 0.708 | 0.736 | 4.83 |
| 14) vinyl chloride | 0.713 | 0.630 | 0.555 | 0.636 | 0.602 | 0.574 | 0.591 | 0.656 | 0.608 | 0.601 | 0.617 | 7.27 |
| 15) 1,3-butadiene | 0.414 | 0.312 | 0.369 | 0.339 | 0.332 | 0.413 | 0.329 | 0.354 | 0.383 | 0.328 | 0.357 | 10.12 |
| 16) bromomethane | 0.444 | 0.408 | 0.456 | 0.383 | 0.345 | 0.429 | | 0.425 | 0.415 | 0.355 | 0.407 | 9.43 |
| 17) chloroethane | 0.358 | 0.327 | 0.353 | 0.312 | 0.295 | 0.304 | 0.246 | 0.328 | 0.325 | 0.297 | 0.314 | 10.21 |
| 18) Vinyl Bromide | 0.334 | 0.294 | 0.302 | 0.289 | 0.338 | 0.275 | 0.311 | 0.286 | 0.290 | | 0.302 | 7.17 |
| 19) trichlorofluoromethane | 0.675 | 0.612 | 0.636 | 0.579 | 0.551 | 0.556 | 0.532 | 0.598 | 0.672 | 0.544 | 0.596 | 8.79 |
| 20) ethyl ether | 0.258 | 0.242 | 0.257 | 0.271 | 0.269 | 0.264 | 0.254 | 0.262 | 0.210 | 0.262 | 0.255 | 6.99 |
| 21) 2-chloropropane | 0.198 | 0.159 | 0.173 | 0.168 | 0.151 | 0.164 | 0.164 | 0.152 | 0.170 | | 0.167 | 8.39 |
| 22) acrolein | 0.095 | 0.094 | 0.096 | | 0.094 | | 0.093 | 0.087 | 0.089 | | 0.093 | 3.68 |
| 23) 1,1-dichloroethene | | | | | | | | | | | | |

```
      0.685 0.565       0.609 0.583 0.626 0.574 0.584 0.495 0.585  0.590    8.60
24)  acetone
      0.025 0.037       0.039 0.038       0.036 0.038       0.035  0.035   12.93
25)  allyl chloride
      0.290 0.228       0.252 0.247 0.278 0.243 0.241 0.209 0.252  0.249    9.76
26)  acetonitrile
      0.014 0.012       0.016 0.018       0.017 0.013       0.017  0.015   14.84
27)  iodomethane
      0.762 0.653 0.685 0.700 0.689 0.696 0.668 0.668 0.573 0.687  0.678    6.93
28)  carbon disulfide
      1.717 1.340 1.602 1.426 1.358 1.672 1.336 1.339 1.276 1.373  1.444   10.96
29)  1-chloropropane
      0.849 0.885       0.757 0.719       0.685 0.773       0.728  0.771    9.36
30)  methylene chloride
      0.804 0.724       0.730 0.722       0.680 0.722 0.852 0.714  0.744    7.53
31)  methyl acetate
      0.052 0.055       0.064 0.066       0.064 0.060       0.062  0.060    8.22
32)  methyl tert butyl ether
      1.423 1.314       1.411 1.392 1.531 1.337 1.379 1.207 1.352  1.372    6.42
33)  trans-1,2-dichloroethene
      0.688 0.594 0.623 0.638 0.618 0.653 0.593 0.611 0.523 0.622  0.616    7.01
34)  di-isopropyl ether
      1.737 1.643 1.475 1.741 1.774 1.818 1.660 1.744 1.539 1.713  1.684    6.36
35)  ethyl tert-butyl ether
      1.580 1.506 1.330 1.626 1.661 1.688 1.569 1.640 1.377 1.586  1.556    7.65
36)  2-butanone
      0.035 0.040       0.049 0.050       0.048 0.046       0.048  0.045   11.99
37)  1,1-dichloroethane
      0.905 0.776 0.873 0.837 0.828 0.852 0.793 0.807 0.669 0.827  0.817    7.86
38)  chloroprene
      0.678 0.558 0.500 0.591 0.587 0.653 0.560 0.601 0.507 0.578  0.581    9.63
39)  acrylonitrile
      0.158 0.144       0.160 0.159 0.139 0.154 0.161 0.121 0.152  0.150    8.85
40)  vinyl acetate
            0.052       0.073 0.075       0.072 0.067       0.071  0.068   12.07
41)  ethyl acetate
      0.040 0.052       0.066 0.062       0.060 0.081       0.061  0.060   20.75
           ----- Linear regression -----  Coefficient =  0.9976
             Response Ratio = 0.00282 + 0.05957 *A

42)  2,2-dichloropropane
      0.696 0.549       0.580 0.553 0.726 0.536 0.554 0.549 0.560  0.589   11.93
43)  cis-1,2-dichloroethene
      0.518 0.449 0.524 0.486 0.484 0.538 0.459 0.471 0.424 0.480  0.483    7.33
44)  propionitrile
      0.057 0.061 0.070 0.065 0.064 0.055 0.063 0.062 0.052 0.061  0.061    8.29
45)  bromochloromethane
      0.296 0.274 0.287 0.300 0.298 0.275 0.285 0.287 0.240 0.292  0.283    6.23
46)  tetrahydrofuran
      0.076 0.064       0.061 0.059       0.057 0.062       0.056  0.062   11.17
47)  chloroform
      0.826 0.714 0.963 0.774 0.769 0.862 0.736 0.748 0.685 0.763  0.784   10.34
48)  tert-Butyl Formate
      0.327 0.310       0.345 0.358 0.326 0.349 0.340 0.261 0.340  0.328    8.81
49)  dibromofluoromethane (s)
      0.536 0.409       0.406 0.413       0.383 0.423       0.400  0.424   12.00
50)  1,2-dichloroethane-d4 (s)
      0.572 0.460       0.456 0.458       0.428 0.459       0.439  0.468   10.21
51)  freon 113
      0.300 0.241       0.252 0.238 0.256 0.236 0.256 0.222 0.236  0.249    8.88
```

# Initial Calibration Summary

**Job Number:** JB52301 **Sample:** VY5974-ICC5974
**Account:** SECORPAE Stantec Consulting Services Inc. **Lab FileID:** Y138259.D
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

52) methacrylonitrile
0.183 0.161 0.183 0.178 0.174 0.175 0.153 0.171 0.172 6.04
53) 1,1,1-trichloroethane
0.678 0.551 0.633 0.589 0.568 0.642 0.554 0.562 0.513 0.571 0.586 8.55
54) Cyclohexane
0.736 0.575 0.605 0.567 0.692 0.566 0.569 0.534 0.569 0.601 11.16
55) 2,2,4-trimethylpentane
2.157 1.754 1.665 1.865 1.798 2.172 1.743 1.901 1.679 1.763 1.850 9.78
56) tert-amyl methyl ether
1.424 1.386 1.457 1.482 1.497 1.648 1.407 1.476 1.309 1.423 1.451 6.08

57) I 1,4-difluorobenzene ----------ISTD----------
58) epichlorohydrin
0.032 0.027 0.028 0.029 0.028 0.028 0.029 0.027 0.028 5.41
59) n-butyl alcohol
0.009 0.009 0.010 0.010 0.010 0.009 0.008 0.009 0.009 7.88
60) carbon tetrachloride
0.405 0.316 0.369 0.338 0.327 0.364 0.320 0.323 0.294 0.330 0.339 9.51
61) 1,1-dichloropropene
0.433 0.353 0.384 0.374 0.360 0.388 0.352 0.352 0.315 0.366 0.368 8.43
62) hexane
0.445 0.353 0.352 0.340 0.330 0.366 0.409 0.339 0.367 10.95
63) Tert Amyl Alcohol
0.021 0.017 0.017 0.017 0.017 0.017 0.016 0.023 0.016 0.018 13.47
64) benzene
1.359 1.155 1.436 1.227 1.211 1.354 1.150 1.170 1.069 1.215 1.235 9.20
65) heptane
0.257 0.212 0.252 0.215 0.210 0.285 0.202 0.223 0.218 0.210 0.228 11.79
66) isopropyl acetate
0.128 0.120 0.129 0.129 0.124 0.133 0.122 0.127 3.62
67) 1,2-dichloroethane
0.363 0.352 0.359 0.383 0.381 0.366 0.365 0.366 0.302 0.374 0.361 6.35
68) trichloroethene
0.308 0.252 0.286 0.273 0.268 0.293 0.259 0.257 0.245 0.272 0.271 7.23
69) ethyl acrylate
0.290 0.305 0.359 0.363 0.361 0.328 0.342 0.335 8.61
70) 2-nitropropane
0.083 0.078 0.088 0.085 0.082 0.087 0.094 0.082 0.085 5.74
71) 2-chloroethyl vinyl ether
0.101 0.096 0.111 0.115 0.101 0.111 0.105 0.090 0.108 0.104 7.55
72) methyl methacrylate
0.212 0.194 0.209 0.212 0.208 0.229 0.202 0.202 0.208 0.202 0.208 4.44
73) 1,2-dichloropropane
0.348 0.326 0.382 0.345 0.345 0.337 0.328 0.328 0.296 0.341 0.338 6.43
74) methylcyclohexane
0.545 0.430 0.440 0.427 0.509 0.414 0.452 0.407 0.421 0.449 10.40
75) Tert-amyl ethyl ether
1.032 0.992 0.892 1.040 1.068 1.048 1.014 1.038 0.929 1.022 1.008 5.53
76) dibromomethane
0.172 0.164 0.185 0.180 0.178 0.168 0.170 0.172 0.149 0.174 0.171 5.78
77) bromodichloromethane
0.412 0.370 0.476 0.410 0.410 0.397 0.392 0.392 0.341 0.403 0.400 8.59
78) cis-1,3-dichloropropene
0.525 0.484 0.567 0.536 0.535 0.524 0.509 0.507 0.450 0.527 0.516 6.19
79) toluene-d8 (s)
1.081 1.005 1.016 0.938 1.054 0.994 1.015 4.90
80) 4-methyl-2-pentanone
0.125 0.119 0.149 0.125 0.120 0.120 0.118 0.120 0.111 0.117 0.122 8.22
81) toluene
1.359 1.127 1.487 1.209 1.193 1.383 1.143 1.142 1.116 1.200 1.236 10.36

# Initial Calibration Summary

**Job Number:** JB52301 **Sample:** VY5974-ICC5974
**Account:** SECORPAE Stantec Consulting Services Inc. **Lab FileID:** Y138259.D
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

```
 82)  3-methyl-1-butanol
       0.008 0.008       0.009 0.009 0.009 0.009 0.008 0.006 0.008  0.008    9.74
 83)  trans-1,3-dichloropropene
       0.438 0.424 0.443 0.461 0.466 0.436 0.448 0.434 0.385 0.453  0.439    5.21
 84)  ethyl methacrylate
       0.385 0.359       0.392 0.393 0.425 0.384 0.367 0.393 0.379  0.386    4.87
 85)  1,1,2-trichloroethane
       0.222 0.208 0.276 0.224 0.223 0.236 0.214 0.215 0.206 0.217  0.224    9.09
 86)  2-hexanone
       0.116 0.110 0.085 0.121 0.119 0.105 0.107 0.110 0.105 0.113  0.109    9.26

 87) I   chlorobenzene-d5      ----------------ISTD--------------------
 88)  tetrachloroethene
       0.397 0.323 0.354 0.337 0.325 0.360 0.319 0.318 0.294 0.332  0.336    8.46
 89)  1,3-dichloropropane
       0.518 0.507 0.594 0.535 0.527 0.506 0.506 0.513 0.465 0.522  0.519    6.25
 90)  butyl acetate
       0.263 0.235       0.244 0.242       0.236 0.228 0.191 0.229  0.234    8.81
 91)  dibromochloromethane
       0.370 0.343 0.399 0.373 0.373 0.358 0.365 0.355 0.315 0.372  0.362    6.12
 92)  1,2-dibromoethane
       0.302 0.290 0.302 0.314 0.307 0.281 0.298 0.296 0.267 0.305  0.296    4.59
 93)  3,3-Dimethyl-1-Butanol
       0.041 0.040       0.042 0.040       0.040 0.038 0.042 0.038  0.040    3.91
 94)  chlorobenzene
       1.039 0.898 1.121 0.951 0.942 1.048 0.912 0.903 0.882 0.958  0.965    8.14
 95)  1,1,1,2-tetrachloroethane
       0.368 0.332 0.400 0.351 0.351 0.346 0.341 0.336 0.306 0.352  0.348    6.97
 96)  ethylbenzene
       1.741 1.479 1.772 1.562 1.522 1.701 1.490 1.480 1.373 1.560  1.568    8.27
 97)  m,p-xylene
       0.663 0.561 0.656 0.598 0.584 0.636 0.563 0.567 0.527 0.597  0.595    7.47
 98)  o-xylene
       1.389 1.215 1.514 1.299 1.279 1.396 1.245 1.232 1.155 1.300  1.302    8.07
 99)  styrene
       1.095 0.955 1.181 1.068 1.068 1.025 1.038 1.003 0.915 1.076  1.042    7.18
100)  bromoform
       0.235 0.229 0.269 0.246 0.248 0.226 0.248 0.228 0.216 0.240  0.238    6.33

101) I   1,4-dichlorobenzene-d ----------------ISTD--------------------
102)  isopropylbenzene
       3.354 2.729 3.494 2.841 2.794 3.196 2.776 2.709 2.678 2.835  2.941   10.00
103)  4-bromofluorobenzene (s)
       1.269 0.945       0.870 0.899       0.863 0.903       0.880  0.947   15.24
104)  cis-1,4-dichloro-2-butene
       0.264 0.257       0.284 0.294 0.230 0.298 0.270 0.218 0.277  0.266   10.34
105)  bromobenzene
       0.835 0.766 0.931 0.804 0.814 0.821 0.798 0.768 0.726 0.812  0.808    6.69
106)  cyclohexanone
       0.079 0.091       0.084 0.093       0.063 0.074       0.061  0.078   16.21
          ----- Quadratic regression -----                Coefficient =  0.9640
               Response Ratio = -0.05272 + 0.09752 *A + -0.00080 *A^2

107)  1,1,2,2-tetrachloroethane
       0.851 0.810       0.820 0.815       0.804 0.802 0.846 0.789  0.817    2.66
108)  trans-1,4-dichloro-2-butene
       0.216 0.205       0.220 0.220 0.204 0.222 0.214 0.213 0.216  0.215    3.03
109)  1,2,3-trichloropropane
       0.189 0.178 0.181 0.181 0.177 0.210 0.175 0.177 0.179 0.175  0.182    5.87
110)  n-propylbenzene
```

# Initial Calibration Summary

**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

**Sample:** VY5974-ICC5974
**Lab FileID:** Y138259.D

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 3.871 | 3.218 | 4.103 | 3.392 | 3.337 | 3.692 | 3.264 | 3.190 | 3.143 | 3.402 | 3.461 | 9.29 |
| 111) | 4-Ethyltoluene | | | | | | | | | | | |
| | 3.013 | 2.686 | 2.319 | 2.737 | 2.784 | 2.824 | 2.712 | 2.719 | 2.699 | 2.733 | 2.723 | 6.28 |
| 112) | 2-chlorotoluene | | | | | | | | | | | |
| | 0.782 | 0.664 | 0.861 | 0.708 | 0.706 | 0.774 | 0.686 | 0.685 | 0.675 | 0.713 | 0.725 | 8.51 |
| 113) | 4-chlorotoluene | | | | | | | | | | | |
| | 2.403 | 2.093 | | 2.197 | 2.217 | 2.465 | 2.177 | 2.066 | 2.103 | 2.218 | 2.215 | 6.16 |
| 114) | 1,3,5-trimethylbenzene | | | | | | | | | | | |
| | 2.749 | 2.327 | | 2.383 | 2.365 | 2.602 | 2.320 | 2.303 | 2.344 | 2.393 | 2.421 | 6.27 |
| 115) | tert-butylbenzene | | | | | | | | | | | |
| | 2.286 | 1.897 | 2.426 | 1.997 | 1.957 | 2.190 | 1.934 | 1.873 | 1.866 | 1.988 | 2.041 | 9.42 |
| 116) | pentachloroethane | | | | | | | | | | | |
| | 0.553 | 0.498 | 0.660 | 0.524 | 0.529 | 0.542 | 0.527 | 0.504 | 0.488 | 0.529 | 0.535 | 8.96 |
| 117) | 1,2,4-trimethylbenzene | | | | | | | | | | | |
| | 2.773 | 2.377 | 2.993 | 2.495 | 2.485 | 2.810 | 2.423 | 2.345 | 2.345 | 2.513 | 2.556 | 8.77 |
| 118) | sec-butylbenzene | | | | | | | | | | | |
| | 3.566 | 2.941 | 3.581 | 3.080 | 2.987 | 3.388 | 2.952 | 2.896 | 2.836 | 3.025 | 3.125 | 8.94 |
| 119) | 1,3-dichlorobenzene | | | | | | | | | | | |
| | 1.585 | 1.396 | 1.812 | 1.485 | 1.481 | 1.638 | 1.443 | 1.403 | 1.417 | 1.488 | 1.515 | 8.59 |
| 120) | p-isopropyltoluene | | | | | | | | | | | |
| | 2.881 | 2.395 | 2.926 | 2.547 | 2.477 | 2.609 | 2.411 | 2.369 | 2.347 | 2.510 | 2.547 | 8.06 |
| 121) | 1,4-dichlorobenzene | | | | | | | | | | | |
| | 1.621 | 1.444 | | 1.523 | 1.539 | 1.678 | 1.472 | 1.466 | 1.466 | 1.530 | 1.526 | 5.13 |
| 122) | 1,2-dichlorobenzene | | | | | | | | | | | |
| | 1.526 | 1.405 | 1.796 | 1.460 | 1.455 | 1.558 | 1.377 | 1.395 | 1.397 | 1.437 | 1.481 | 8.45 |
| 123) | n-butylbenzene | | | | | | | | | | | |
| | 0.637 | 0.530 | 0.555 | 0.542 | 0.534 | 0.629 | 0.529 | 0.522 | 0.554 | 0.550 | 0.558 | 7.37 |
| 124) | p-Diethylbenzene | | | | | | | | | | | |
| | 1.727 | 1.542 | 1.339 | 1.576 | 1.579 | 1.592 | 1.502 | 1.566 | 1.588 | 1.565 | 1.558 | 6.16 |
| 125) | 1,2-dibromo-3-chloropropane | | | | | | | | | | | |
| | 0.150 | 0.143 | | 0.144 | 0.135 | 0.158 | 0.131 | 0.143 | 0.154 | 0.131 | 0.143 | 6.59 |
| 126) | 1,3,5-Trichlorobenzene | | | | | | | | | | | |
| | 1.282 | 1.107 | | 1.146 | 1.069 | 1.262 | 1.000 | 1.110 | 1.110 | 1.086 | 1.130 | 7.95 |
| 127) | 1,2,4-trichlorobenzene | | | | | | | | | | | |
| | 1.073 | 0.970 | 1.210 | 0.984 | 0.903 | 1.083 | 0.838 | 0.959 | 0.946 | 0.921 | 0.989 | 10.82 |
| 128) | 1,2,4,5-tetramethylbenzene | | | | | | | | | | | |
| | 2.822 | 2.570 | 2.325 | 2.570 | 2.490 | 2.648 | 2.312 | 2.571 | 2.492 | 2.450 | 2.525 | 5.94 |
| 129) | hexachlorobutadiene | | | | | | | | | | | |
| | 0.691 | 0.563 | | 0.575 | 0.510 | 0.636 | 0.473 | 0.559 | 0.591 | 0.529 | 0.570 | 11.50 |
| 130) | naphthalene | | | | | | | | | | | |
| | 2.248 | 2.095 | | 2.052 | 1.840 | | 1.701 | 2.078 | 2.208 | 1.824 | 2.006 | 9.76 |
| 131) | 1,2,3-trichlorobenzene | | | | | | | | | | | |
| | 0.964 | 0.887 | | 0.865 | 0.746 | 0.952 | 0.654 | 0.879 | 0.885 | 0.758 | 0.843 | 12.19 |
| 132) | hexachloroethane | | | | | | | | | | | |
| | 0.563 | 0.472 | 0.620 | 0.508 | 0.504 | 0.536 | 0.481 | 0.482 | 0.446 | 0.495 | 0.511 | 9.89 |
| 133) | Benzyl chloride | | | | | | | | | | | |
| | 1.507 | 1.409 | 1.602 | 1.502 | 1.516 | 1.634 | 1.437 | 1.437 | 1.285 | 1.451 | 1.478 | 6.72 |

(#) = Out of Range ### Number of calibration levels exceeded format ###

MY5974.M Thu Oct 31 09:32:20 2013 RPT1

# Initial Calibration Verification

**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

**Sample:** VY5974-ICV5974
**Lab FileID:** Y138265.D

Evaluate Continuing Calibration Report

Data File : C:\MSDChem\1\DATA\Y138265.D Vial: 14
Acq On : 19 Sep 2013 7:27 pm Operator: prashans
Sample : ICV5974-50 Inst : MSY
Misc : MS54867,VY5974,5.0,,,,1 Multiplr: 1.00
MS Integration Params: rteint.p

Method : C:\MSDCHEM\1\METHODS\MY5974.M (RTE Integrator)
Title : Method SW846 8260B, ZB624 60m x 0.25mm x 1.4um
Last Update : Fri Sep 20 10:34:05 2013
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 200%

| | | Compound | AvgRF | CCRF | %Dev | Area% | Dev(min) | R.T. |
|---|---|---|---|---|---|---|---|---|
| 1 | I | Tert Butyl Alcohol-d9 | 1.000 | 1.000 | 0.0 | 97 | 0.00 | 7.63 |
| 2 | | 1,4-dioxane | 0.096 | 0.112 | -16.7 | 107 | 0.00 | 11.44 |
| 3 | | tertiary butyl alcohol | 1.229 | 1.225 | 0.3 | 99 | 0.00 | 7.75 |
| 4 | | isobutyl alcohol | 0.347 | 0.381 | -9.8 | 106 | 0.00 | 10.13 |
| 5 | I | pentafluorobenzene | 1.000 | 1.000 | 0.0 | 98 | 0.00 | 9.81 |
| 6 | | propene | | ----------NA---------- | | | | |
| 7 | | freon 141b | | ----------NA---------- | | | | |
| 8 | | freon 142b | | ----------NA---------- | | | | |
| 9 | | freon 143a | | ----------NA---------- | | | | |
| 10 | | freon 114 | 0.332 | 0.311 | 6.3 | 94 | 0.00 | 4.42 |
| 11 | | chlorodifluoromethane | 0.263 | 0.311 | -18.3 | 118 | 0.00 | 4.17 |
| 12 | | dichlorodifluoromethane | 0.520 | 0.485 | 6.7 | 97 | 0.00 | 4.15 |
| 13 | | chloromethane | 0.736 | 0.762 | -3.5 | 101 | 0.00 | 4.50 |
| 14 | | vinyl chloride | 0.617 | 0.634 | -2.8 | 98 | 0.00 | 4.76 |
| 15 | | 1,3-butadiene | 0.357 | 0.338 | 5.3 | 98 | 0.00 | 4.81 |
| 16 | | bromomethane | 0.407 | 0.392 | 3.7 | 101 | 0.00 | 5.44 |
| 17 | | chloroethane | 0.314 | 0.317 | -1.0 | 100 | 0.00 | 5.61 |
| 18 | | Vinyl Bromide | 0.302 | 0.297 | 1.7 | 97 | 0.00 | 5.97 |
| 19 | | trichlorofluoromethane | 0.596 | 0.559 | 6.2 | 95 | 0.00 | 6.07 |
| 20 | | ethyl ether | 0.255 | 0.275 | -7.8 | 100 | 0.00 | 6.47 |
| 21 | | 2-chloropropane | 0.167 | 0.171 | -2.4 | 97 | 0.00 | 6.69 |
| 22 | | acrolein | 0.093 | 0.097 | -4.3 | 100 | 0.00 | 6.79 |
| 23 | | 1,1-dichloroethene | 0.590 | 0.598 | -1.4 | 97 | 0.00 | 6.91 |
| 24 | | acetone | 0.035 | 0.039 | -11.4 | 98 | 0.00 | 7.01 |
| 25 | | allyl chloride | 0.249 | 0.255 | -2.4 | 100 | 0.00 | 7.45 |
| 26 | | acetonitrile | 0.015 | 0.018 | -20.0 | 110 | 0.00 | 7.49 |
| 27 | | iodomethane | 0.678 | 0.703 | -3.7 | 99 | 0.00 | 7.22 |
| 28 | | carbon disulfide | 1.444 | 1.372 | 5.0 | 95 | 0.00 | 7.34 |
| 29 | | 1-chloropropane | 0.771 | 0.756 | 1.9 | 98 | 0.00 | 7.67 |
| 30 | | methylene chloride | 0.744 | 0.760 | -2.2 | 102 | 0.00 | 7.66 |
| 31 | | methyl acetate | 0.060 | 0.064 | -6.7 | 99 | 0.00 | 7.45 |
| 32 | | methyl tert butyl ether | 1.372 | 1.389 | -1.2 | 97 | 0.00 | 7.94 |
| 33 | | trans-1,2-dichloroethene | 0.616 | 0.640 | -3.9 | 99 | 0.00 | 8.01 |
| 34 | | di-isopropyl ether | 1.684 | 1.821 | -8.1 | 103 | 0.00 | 8.51 |
| 35 | | ethyl tert-butyl ether | 1.556 | 1.644 | -5.7 | 99 | 0.00 | 8.97 |
| 36 | | 2-butanone | 0.045 | 0.049 | -8.9 | 97 | 0.00 | 9.30 |
| 37 | | 1,1-dichloroethane | 0.817 | 0.852 | -4.3 | 100 | 0.00 | 8.59 |
| 38 | | chloroprene | 0.581 | 0.552 | 5.0 | 92 | 0.00 | 8.67 |
| 39 | | acrylonitrile | 0.150 | 0.157 | -4.7 | 97 | 0.00 | 8.03 |
| 40 | | vinyl acetate | 0.068 | 0.078 | -14.7 | 104 | 0.00 | 8.57 |

# Initial Calibration Verification

**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

**Sample:** VY5974-ICV5974
**Lab FileID:** Y138265.D

| | | | True | Calc. | % Drift | | | |
|---|---|---|---|---|---|---|---|---|
| 41 | | ethyl acetate | 50.000 | 54.582 | -9.2 | 101 | 0.00 | 9.29 |
| | | | AvgRF | CCRF | % Dev | | | |
| 42 | | 2,2-dichloropropane | 0.589 | 0.556 | 5.6 | 94 | 0.00 | 9.30 |
| 43 | | cis-1,2-dichloroethene | 0.483 | 0.492 | -1.9 | 100 | 0.00 | 9.32 |
| 44 | | propionitrile | 0.061 | 0.066 | -8.2 | 100 | 0.00 | 9.44 |
| 45 | | bromochloromethane | 0.283 | 0.302 | -6.7 | 99 | 0.00 | 9.64 |
| 46 | | tetrahydrofuran | 0.062 | 0.060 | 3.2 | 97 | 0.00 | 9.66 |
| 47 | | chloroform | 0.784 | 0.792 | -1.0 | 101 | 0.00 | 9.69 |
| 48 | | tert-Butyl Formate | 0.328 | 0.355 | -8.2 | 101 | 0.00 | 9.70 |
| 49 | S | dibromofluoromethane (s) | 0.424 | 0.418 | 1.4 | 101 | 0.00 | 9.89 |
| 50 | S | 1,2-dichloroethane-d4 (s) | 0.468 | 0.466 | 0.4 | 101 | 0.00 | 10.31 |
| 51 | | freon 113 | 0.249 | 0.249 | 0.0 | 97 | 0.00 | 6.86 |
| 52 | | methacrylonitrile | 0.172 | 0.180 | -4.7 | 97 | 0.00 | 9.60 |
| 53 | | 1,1,1-trichloroethane | 0.586 | 0.575 | 1.9 | 96 | 0.00 | 9.91 |
| 54 | | Cyclohexane | 0.601 | 0.575 | 4.3 | 93 | 0.00 | 9.95 |
| 55 | | 2,2,4-trimethylpentane | 1.850 | 1.595 | 13.8 | 84 | 0.00 | 10.30 |
| 56 | | tert-amyl methyl ether | 1.451 | 1.540 | -6.1 | 102 | 0.00 | 10.36 |
| 57 | I | 1,4-difluorobenzene | 1.000 | 1.000 | 0.0 | 100 | 0.00 | 10.72 |
| 58 | | epichlorohydrin | 0.028 | 0.028 | 0.0 | 99 | 0.00 | 11.99 |
| 59 | | n-butyl alcohol | 0.009 | 0.010 | -11.1 | 104 | 0.00 | 10.87 |
| 60 | | carbon tetrachloride | 0.339 | 0.321 | 5.3 | 95 | 0.00 | 10.10 |
| 61 | | 1,1-dichloropropene | 0.368 | 0.361 | 1.9 | 96 | 0.00 | 10.08 |
| 62 | | hexane | 0.367 | 0.307 | 16.3 | 87 | 0.00 | 8.25 |
| 63 | | Tert Amyl Alcohol | 0.018 | 0.018 | 2.8 | 100 | 0.00 | 10.24 |
| 64 | | benzene | 1.235 | 1.222 | 1.1 | 99 | 0.00 | 10.36 |
| 65 | | heptane | 0.228 | 0.204 | 10.5 | 95 | 0.00 | 10.46 |
| 66 | | isopropyl acetate | 0.127 | 0.130 | -2.4 | 100 | 0.00 | 10.26 |
| 67 | | 1,2-dichloroethane | 0.361 | 0.386 | -6.9 | 101 | 0.00 | 10.40 |
| 68 | | trichloroethene | 0.271 | 0.267 | 1.5 | 98 | 0.00 | 11.05 |
| 69 | | ethyl acrylate | 0.335 | 0.358 | -6.9 | 99 | 0.00 | 11.06 |
| 70 | | 2-nitropropane | 0.085 | 0.087 | -2.4 | 98 | 0.00 | 11.86 |
| 71 | | 2-chloroethyl vinyl ether | 0.104 | 0.111 | -6.7 | 99 | 0.00 | 11.84 |
| 72 | | methyl methacrylate | 0.208 | 0.209 | -0.5 | 98 | 0.00 | 11.31 |
| 73 | | 1,2-dichloropropane | 0.338 | 0.347 | -2.7 | 100 | 0.00 | 11.33 |
| 74 | | methylcyclohexane | 0.449 | 0.429 | 4.5 | 97 | 0.00 | 11.23 |
| 75 | | Tert-amyl ethyl ether | 1.008 | 0.982 | 2.6 | 94 | 0.00 | 11.17 |
| 76 | | dibromomethane | 0.171 | 0.178 | -4.1 | 98 | 0.00 | 11.51 |
| 77 | | bromodichloromethane | 0.400 | 0.410 | -2.5 | 100 | 0.00 | 11.62 |
| 78 | | cis-1,3-dichloropropene | 0.516 | 0.534 | -3.5 | 99 | 0.00 | 12.06 |
| 79 | S | toluene-d8 (s) | 1.015 | 1.003 | 1.2 | 100 | 0.00 | 12.32 |
| 80 | | 4-methyl-2-pentanone | 0.122 | 0.122 | 0.0 | 97 | 0.00 | 12.14 |
| 81 | | toluene | 1.236 | 1.193 | 3.5 | 98 | 0.00 | 12.40 |
| 82 | | 3-methyl-1-butanol | 0.008 | 0.010 | -25.0# | 110 | 0.00 | 12.17 |
| 83 | | trans-1,3-dichloropropene | 0.439 | 0.461 | -5.0 | 100 | 0.00 | 12.61 |
| 84 | | ethyl methacrylate | 0.386 | 0.385 | 0.3 | 98 | 0.00 | 12.57 |
| 85 | | 1,1,2-trichloroethane | 0.224 | 0.225 | -0.4 | 100 | 0.00 | 12.83 |
| 86 | | 2-hexanone | 0.109 | 0.119 | -9.2 | 98 | 0.00 | 12.98 |
| 87 | I | chlorobenzene-d5 | 1.000 | 1.000 | 0.0 | 100 | 0.00 | 13.81 |
| 88 | | tetrachloroethene | 0.336 | 0.324 | 3.6 | 96 | 0.00 | 12.95 |
| 89 | | 1,3-dichloropropane | 0.519 | 0.537 | -3.5 | 100 | 0.00 | 13.00 |
| 90 | | butyl acetate | 0.234 | 0.253 | -8.1 | 103 | 0.00 | 13.03 |
| 91 | | dibromochloromethane | 0.362 | 0.368 | -1.7 | 98 | 0.00 | 13.26 |
| 92 | | 1,2-dibromoethane | 0.296 | 0.309 | -4.4 | 98 | 0.00 | 13.42 |
| 93 | | 3,3-Dimethyl-1-Butanol | 0.040 | 0.044 | -10.0 | 104 | 0.00 | 13.14 |
| 94 | | chlorobenzene | 0.965 | 0.955 | 1.0 | 100 | 0.00 | 13.84 |
| 95 | | 1,1,1,2-tetrachloroethane | 0.348 | 0.351 | -0.9 | 100 | 0.00 | 13.90 |

# Initial Calibration Verification

**Job Number:** JB52301 **Sample:** VY5974-ICV5974
**Account:** SECORPAE Stantec Consulting Services Inc. **Lab FileID:** Y138265.D
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 96 | | ethylbenzene | 1.568 | 1.537 | 2.0 | 98 | 0.00 | 13.88 |
| 97 | | m,p-xylene | 0.595 | 0.587 | 1.3 | 98 | 0.00 | 13.99 |
| 98 | | o-xylene | 1.302 | 1.292 | 0.8 | 99 | 0.00 | 14.40 |
| 99 | | styrene | 1.042 | 1.069 | -2.6 | 100 | 0.00 | 14.41 |
| 100 | | bromoform | 0.238 | 0.238 | 0.0 | 96 | 0.00 | 14.71 |
| 101 | I | 1,4-dichlorobenzene-d4 | 1.000 | 1.000 | 0.0 | 99 | 0.00 | 16.09 |
| 102 | | isopropylbenzene | 2.941 | 2.781 | 5.4 | 97 | 0.00 | 14.72 |
| 103 | S | 4-bromofluorobenzene (s) | 0.947 | 0.889 | 6.1 | 101 | 0.00 | 14.95 |
| 104 | | cis-1,4-dichloro-2-butene | 0.266 | 0.282 | -6.0 | 98 | 0.00 | 14.83 |
| 105 | | bromobenzene | 0.808 | 0.803 | 0.6 | 99 | 0.00 | 15.14 |
| | | | True | Calc. | % Drift | | | |
| 106 | | cyclohexanone | 500.000 | 308.755 | 38.2# | 61 | 0.00 | 14.94 |
| | | | AvgRF | CCRF | % Dev | | | |
| 107 | | 1,1,2,2-tetrachloroethane | 0.817 | 0.817 | 0.0 | 99 | 0.00 | 15.07 |
| 108 | | trans-1,4-dichloro-2-bute | 0.215 | 0.214 | 0.5 | 96 | 0.00 | 15.10 |
| 109 | | 1,2,3-trichloropropane | 0.182 | 0.181 | 0.5 | 99 | 0.00 | 15.14 |
| 110 | | n-propylbenzene | 3.461 | 3.317 | 4.2 | 97 | 0.00 | 15.13 |
| 111 | | 4-Ethyltoluene | 2.723 | 2.761 | -1.4 | 100 | 0.00 | 15.22 |
| 112 | | 2-chlorotoluene | 0.725 | 0.714 | 1.5 | 100 | 0.00 | 15.29 |
| 113 | | 4-chlorotoluene | 2.215 | 2.207 | 0.4 | 99 | 0.00 | 15.39 |
| 114 | | 1,3,5-trimethylbenzene | 2.421 | 2.361 | 2.5 | 98 | 0.00 | 15.27 |
| 115 | | tert-butylbenzene | 2.041 | 1.950 | 4.5 | 97 | 0.00 | 15.62 |
| 116 | | pentachloroethane | 0.535 | 0.529 | 1.1 | 100 | 0.00 | 15.72 |
| 117 | | 1,2,4-trimethylbenzene | 2.556 | 2.476 | 3.1 | 98 | 0.00 | 15.66 |
| 118 | | sec-butylbenzene | 3.125 | 2.975 | 4.8 | 96 | 0.00 | 15.83 |
| 119 | | 1,3-dichlorobenzene | 1.515 | 1.476 | 2.6 | 98 | 0.00 | 16.04 |
| 120 | | p-isopropyltoluene | 2.547 | 2.453 | 3.7 | 95 | 0.00 | 15.94 |
| 121 | | 1,4-dichlorobenzene | 1.526 | 1.517 | 0.6 | 99 | 0.00 | 16.12 |
| 122 | | 1,2-dichlorobenzene | 1.481 | 1.450 | 2.1 | 98 | 0.00 | 16.51 |
| 123 | | n-butylbenzene | 0.558 | 0.532 | 4.7 | 97 | 0.00 | 16.35 |
| 124 | | p-Diethylbenzene | 1.558 | 1.569 | -0.7 | 99 | 0.00 | 16.32 |
| 125 | | 1,2-dibromo-3-chloropropa | 0.143 | 0.140 | 2.1 | 96 | 0.00 | 17.30 |
| 126 | | 1,3,5-Trichlorobenzene | 1.130 | 1.111 | 1.7 | 96 | 0.00 | 17.45 |
| 127 | | 1,2,4-trichlorobenzene | 0.989 | 0.983 | 0.6 | 99 | 0.00 | 18.09 |
| 128 | | 1,2,4,5-tetramethylbenzen | 2.525 | 2.592 | -2.7 | 100 | 0.00 | 17.10 |
| 129 | | hexachlorobutadiene | 0.570 | 0.555 | 2.6 | 96 | 0.00 | 18.18 |
| 130 | | naphthalene | 2.006 | 2.025 | -0.9 | 98 | 0.00 | 18.38 |
| 131 | | 1,2,3-trichlorobenzene | 0.843 | 0.859 | -1.9 | 98 | 0.00 | 18.63 |
| 132 | | hexachloroethane | 0.511 | 0.493 | 3.5 | 96 | 0.00 | 16.75 |
| 133 | | Benzyl chloride | 1.478 | 1.343 | 9.1 | 88 | 0.00 | 16.24 |

(#) = Out of Range SPCC's out = 0 CCC's out = 0

Y138259.D MY5974.M Fri Sep 20 12:31:42 2013 RPT1

# Initial Calibration Verification

**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

**Sample:** VY6052-ICV5974
**Lab FileID:** Y140032.D



Evaluate Continuing Calibration Report

Data File : C:\MSDCHEM\1\DATA\Y140032.D Vial: 12
Acq On : 30 Oct 2013 4:42 pm Operator: prashans
Sample : ICV5974-50 Inst : MSY
Misc : MS57505,VY6052,5.0,,,,1 Multiplr: 1.00
MS Integration Params: rteint.p

Method : C:\MSDCHEM\1\METHODS\MY5974.M (RTE Integrator)
Title : Method SW846 8260B, ZB624 60m x 0.25mm x 1.4um
Last Update : Wed Oct 30 17:14:38 2013
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 200%

| | | Compound | AvgRF | CCRF | %Dev | Area% | Dev(min) | R.T. |
|---|---|---|---|---|---|---|---|---|
| 1 | I | Tert Butyl Alcohol-d9 | 1.000 | 1.000 | 0.0 | 52 | 0.00 | 7.63 |
| 2 | | 1,4-dioxane | | ----------NA---------- | | | | |
| 3 | | tertiary butyl alcohol | | ----------NA---------- | | | | |
| 4 | | isobutyl alcohol | | ----------NA---------- | | | | |
| 5 | I | pentafluorobenzene | 1.000 | 1.000 | 0.0 | 74 | 0.00 | 9.81 |
| 6 | | propene | 0.530 | 0.516 | 2.6 | 72 | 0.02 | 4.03 |
| 7 | | freon 141b | | ----------NA---------- | | | | |
| 8 | | freon 142b | | ----------NA---------- | | | | |
| 9 | | freon 143a | | ----------NA---------- | | | | |
| 10 | | freon 114 | | ----------NA---------- | | | | |
| 11 | | chlorodifluoromethane | | ----------NA---------- | | | | |
| 12 | | dichlorodifluoromethane | | ----------NA---------- | | | | |
| 13 | | chloromethane | | ----------NA---------- | | | | |
| 14 | | vinyl chloride | | ----------NA---------- | | | | |
| 15 | | 1,3-butadiene | | ----------NA---------- | | | | |
| 16 | | bromomethane | | ----------NA---------- | | | | |
| 17 | | chloroethane | | ----------NA---------- | | | | |
| 18 | | Vinyl Bromide | | ----------NA---------- | | | | |
| 19 | | trichlorofluoromethane | | ----------NA---------- | | | | |
| 20 | | ethyl ether | | ----------NA---------- | | | | |
| 21 | | 2-chloropropane | | ----------NA---------- | | | | |
| 22 | | acrolein | | ----------NA---------- | | | | |
| 23 | | 1,1-dichloroethene | | ----------NA---------- | | | | |
| 24 | | acetone | | ----------NA---------- | | | | |
| 25 | | allyl chloride | | ----------NA---------- | | | | |
| 26 | | acetonitrile | | ----------NA---------- | | | | |
| 27 | | iodomethane | | ----------NA---------- | | | | |
| 28 | | carbon disulfide | | ----------NA---------- | | | | |
| 29 | | 1-chloropropane | | ----------NA---------- | | | | |
| 30 | | methylene chloride | | ----------NA---------- | | | | |
| 31 | | methyl acetate | | ----------NA---------- | | | | |
| 32 | | methyl tert butyl ether | | ----------NA---------- | | | | |
| 33 | | trans-1,2-dichloroethene | | ----------NA---------- | | | | |
| 34 | | di-isopropyl ether | | ----------NA---------- | | | | |
| 35 | | ethyl tert-butyl ether | | ----------NA---------- | | | | |
| 36 | | 2-butanone | | ----------NA---------- | | | | |
| 37 | | 1,1-dichloroethane | | ----------NA---------- | | | | |
| 38 | | chloroprene | | ----------NA---------- | | | | |
| 39 | | acrylonitrile | | ----------NA---------- | | | | |
| 40 | | vinyl acetate | | ----------NA---------- | | | | |

# Initial Calibration Verification

**Job Number:** JB52301 **Sample:** VY6052-ICV5974
**Account:** SECORPAE Stantec Consulting Services Inc. **Lab FileID:** Y140032.D
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| | | | True | Calc. | % Drift | | | |
|---|---|---|---|---|---|---|---|---|
| 41 | | ethyl acetate | | NA | | | | |
| | | | AvgRF | CCRF | % Dev | | | |
| 42 | | 2,2-dichloropropane | | NA | | | | |
| 43 | | cis-1,2-dichloroethene | | NA | | | | |
| 44 | | propionitrile | | NA | | | | |
| 45 | | bromochloromethane | | NA | | | | |
| 46 | | tetrahydrofuran | | NA | | | | |
| 47 | | chloroform | | NA | | | | |
| 48 | | tert-Butyl Formate | | NA | | | | |
| 49 | S | dibromofluoromethane (s) | 0.424 | 0.449 | -5.9 | 82 | 0.00 | 9.89 |
| 50 | S | 1,2-dichloroethane-d4 (s) | 0.468 | 0.481 | -2.8 | 78 | 0.00 | 10.31 |
| 51 | | freon 113 | | NA | | | | |
| 52 | | methacrylonitrile | | NA | | | | |
| 53 | | 1,1,1-trichloroethane | | NA | | | | |
| 54 | | Cyclohexane | | NA | | | | |
| 55 | | 2,2,4-trimethylpentane | | NA | | | | |
| 56 | | tert-amyl methyl ether | | NA | | | | |
| 57 | I | 1,4-difluorobenzene | 1.000 | 1.000 | 0.0 | 74 | 0.00 | 10.73 |
| 58 | | epichlorohydrin | | NA | | | | |
| 59 | | n-butyl alcohol | | NA | | | | |
| 60 | | carbon tetrachloride | | NA | | | | |
| 61 | | 1,1-dichloropropene | | NA | | | | |
| 62 | | hexane | | NA | | | | |
| 63 | | Tert Amyl Alcohol | | NA | | | | |
| 64 | | benzene | | NA | | | | |
| 65 | | heptane | | NA | | | | |
| 66 | | isopropyl acetate | | NA | | | | |
| 67 | | 1,2-dichloroethane | | NA | | | | |
| 68 | | trichloroethene | | NA | | | | |
| 69 | | ethyl acrylate | | NA | | | | |
| 70 | | 2-nitropropane | | NA | | | | |
| 71 | | 2-chloroethyl vinyl ether | | NA | | | | |
| 72 | | methyl methacrylate | | NA | | | | |
| 73 | | 1,2-dichloropropane | | NA | | | | |
| 74 | | methylcyclohexane | | NA | | | | |
| 75 | | Tert-amyl ethyl ether | | NA | | | | |
| 76 | | dibromomethane | | NA | | | | |
| 77 | | bromodichloromethane | | NA | | | | |
| 78 | | cis-1,3-dichloropropene | | NA | | | | |
| 79 | S | toluene-d8 (s) | 1.015 | 1.163 | -14.6 | 85 | 0.00 | 12.32 |
| 80 | | 4-methyl-2-pentanone | | NA | | | | |
| 81 | | toluene | | NA | | | | |
| 82 | | 3-methyl-1-butanol | | NA | | | | |
| 83 | | trans-1,3-dichloropropene | | NA | | | | |
| 84 | | ethyl methacrylate | | NA | | | | |
| 85 | | 1,1,2-trichloroethane | | NA | | | | |
| 86 | | 2-hexanone | | NA | | | | |
| 87 | I | chlorobenzene-d5 | 1.000 | 1.000 | 0.0 | 73 | 0.00 | 13.81 |
| 88 | | tetrachloroethene | | NA | | | | |
| 89 | | 1,3-dichloropropane | | NA | | | | |
| 90 | | butyl acetate | | NA | | | | |
| 91 | | dibromochloromethane | | NA | | | | |
| 92 | | 1,2-dibromoethane | | NA | | | | |
| 93 | | 3,3-Dimethyl-1-Butanol | | NA | | | | |
| 94 | | chlorobenzene | | NA | | | | |
| 95 | | 1,1,1,2-tetrachloroethane | | NA | | | | |

# Initial Calibration Verification

**Job Number:** JB52301 **Sample:** VY6052-ICV5974
**Account:** SECORPAE Stantec Consulting Services Inc. **Lab FileID:** Y140032.D
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 96 | | ethylbenzene | | ----------NA---------- | | | | |
| 97 | | m,p-xylene | | ----------NA---------- | | | | |
| 98 | | o-xylene | | ----------NA---------- | | | | |
| 99 | | styrene | | ----------NA---------- | | | | |
| 100 | | bromoform | | ----------NA---------- | | | | |
| 101 | I | 1,4-dichlorobenzene-d4 | 1.000 | 1.000 | 0.0 | 64 | 0.00 | 16.09 |
| 102 | | isopropylbenzene | | ----------NA---------- | | | | |
| 103 | S | 4-bromofluorobenzene (s) | 0.947 | 0.986 | -4.1 | 73 | 0.00 | 14.95 |
| 104 | | cis-1,4-dichloro-2-butene | | ----------NA---------- | | | | |
| 105 | | bromobenzene | | ----------NA---------- | | | | |
| | | ---------- | True | Calc. | % Drift | ---------- | | |
| 106 | | cyclohexanone | | ----------NA---------- | | | | |
| | | ---------- | AvgRF | CCRF | % Dev | ---------- | | |
| 107 | | 1,1,2,2-tetrachloroethane | | ----------NA---------- | | | | |
| 108 | | trans-1,4-dichloro-2-bute | | ----------NA---------- | | | | |
| 109 | | 1,2,3-trichloropropane | | ----------NA---------- | | | | |
| 110 | | n-propylbenzene | | ----------NA---------- | | | | |
| 111 | | 4-Ethyltoluene | | ----------NA---------- | | | | |
| 112 | | 2-chlorotoluene | | ----------NA---------- | | | | |
| 113 | | 4-chlorotoluene | | ----------NA---------- | | | | |
| 114 | | 1,3,5-trimethylbenzene | | ----------NA---------- | | | | |
| 115 | | tert-butylbenzene | | ----------NA---------- | | | | |
| 116 | | pentachloroethane | | ----------NA---------- | | | | |
| 117 | | 1,2,4-trimethylbenzene | | ----------NA---------- | | | | |
| 118 | | sec-butylbenzene | | ----------NA---------- | | | | |
| 119 | | 1,3-dichlorobenzene | | ----------NA---------- | | | | |
| 120 | | p-isopropyltoluene | | ----------NA---------- | | | | |
| 121 | | 1,4-dichlorobenzene | | ----------NA---------- | | | | |
| 122 | | 1,2-dichlorobenzene | | ----------NA---------- | | | | |
| 123 | | n-butylbenzene | | ----------NA---------- | | | | |
| 124 | | p-Diethylbenzene | | ----------NA---------- | | | | |
| 125 | | 1,2-dibromo-3-chloropropa | | ----------NA---------- | | | | |
| 126 | | 1,3,5-Trichlorobenzene | | ----------NA---------- | | | | |
| 127 | | 1,2,4-trichlorobenzene | | ----------NA---------- | | | | |
| 128 | | 1,2,4,5-tetramethylbenzen | | ----------NA---------- | | | | |
| 129 | | hexachlorobutadiene | | ----------NA---------- | | | | |
| 130 | | naphthalene | | ----------NA---------- | | | | |
| 131 | | 1,2,3-trichlorobenzene | | ----------NA---------- | | | | |
| 132 | | hexachloroethane | | ----------NA---------- | | | | |
| 133 | | Benzyl chloride | | ----------NA---------- | | | | |

(#) = Out of Range SPCC's out = 0 CCC's out = 0
Y138259.D MY5974.M Thu Oct 31 09:46:11 2013 RPT1

# Continuing Calibration Summary

**Job Number:** JB52301 **Sample:** VY6078-CC5974
**Account:** SECORPAE Stantec Consulting Services Inc. **Lab FileID:** Y140515.D
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : C:\msdchem\1\DATA\Y-Core\vy6078-79\Y140515.D Vial: 2
Acq On : 12 Nov 2013 12:41 pm Operator: prashans
Sample : CC5974-20 Inst : MSY
Misc : MS58215,VY6078,5.0,,,,1 Multiplr: 1.00
MS Integration Params: rteint.p

Method : C:\MSDCHEM\1\METHODS\MY5974.M (RTE Integrator)
Title : Method SW846 8260B, ZB624 60m x 0.25mm x 1.4um
Last Update : Wed Oct 30 17:14:38 2013
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 200%

| | | Compound | AvgRF | CCRF | %Dev | Area% | Dev(min) | R.T. |
|---|---|---|---|---|---|---|---|---|
| 1 | I | Tert Butyl Alcohol-d9 | 1.000 | 1.000 | 0.0 | 110 | 0.00 | 7.63 |
| 2 | | 1,4-dioxane | 0.096 | 0.116 | -20.8# | 128 | 0.00 | 11.45 |
| 3 | | tertiary butyl alcohol | 1.229 | 1.228 | 0.1 | 108 | 0.00 | 7.75 |
| 4 | | isobutyl alcohol | 0.347 | 0.360 | -3.7 | 114 | 0.00 | 10.12 |
| 5 | I | pentafluorobenzene | 1.000 | 1.000 | 0.0 | 117 | 0.00 | 9.81 |
| 6 | | propene | | ----------NA---------- | | | | |
| 7 | | freon 141b | | ----------NA---------- | | | | |
| 8 | | freon 142b | | ----------NA---------- | | | | |
| 9 | | freon 143a | | ----------NA---------- | | | | |
| 10 | | freon 114 | | ----------NA---------- | | | | |
| 11 | | chlorodifluoromethane | 0.263 | 0.264 | -0.4 | 114 | 0.03 | 4.20 |
| 12 | | dichlorodifluoromethane | 0.520 | 0.348 | 33.1# | 77 | 0.04 | 4.19 |
| 13 | | chloromethane | 0.736 | 0.660 | 10.3 | 100 | 0.02 | 4.52 |
| 14 | | vinyl chloride | 0.617 | 0.546 | 11.5 | 97 | 0.02 | 4.79 |
| 15 | | 1,3-butadiene | | ----------NA---------- | | | | |
| 16 | | bromomethane | 0.407 | 0.425 | -4.4 | 117 | 0.02 | 5.46 |
| 17 | | chloroethane | 0.314 | 0.295 | 6.1 | 105 | 0.04 | 5.65 |
| 18 | | Vinyl Bromide | | ----------NA---------- | | | | |
| 19 | | trichlorofluoromethane | 0.596 | 0.545 | 8.6 | 106 | 0.01 | 6.09 |
| 20 | | ethyl ether | 0.255 | 0.288 | -12.9 | 128 | 0.02 | 6.50 |
| 21 | | 2-chloropropane | 0.167 | 0.172 | -3.0 | 122 | 0.03 | 6.72 |
| 22 | | acrolein | 0.093 | 0.071 | 23.7# | 89 | 0.03 | 6.82 |
| 23 | | 1,1-dichloroethene | 0.590 | 0.586 | 0.7 | 117 | 0.02 | 6.93 |
| 24 | | acetone | 0.035 | 0.038 | -8.6 | 119 | 0.03 | 7.05 |
| 25 | | allyl chloride | 0.249 | 0.240 | 3.6 | 116 | 0.02 | 7.47 |
| 26 | | acetonitrile | 0.015 | 0.012 | 20.0 | 109 | 0.01 | 7.51 |
| 27 | | iodomethane | 0.678 | 0.755 | -11.4 | 132 | 0.00 | 7.23 |
| 28 | | carbon disulfide | 1.444 | 1.356 | 6.1 | 118 | 0.00 | 7.35 |
| 29 | | 1-chloropropane | 0.771 | 0.812 | -5.3 | 123 | 0.01 | 7.69 |
| 30 | | methylene chloride | 0.744 | 0.749 | -0.7 | 121 | 0.02 | 7.68 |
| 31 | | methyl acetate | 0.060 | 0.066 | -10.0 | 129 | 0.01 | 7.47 |
| 32 | | methyl tert butyl ether | 1.372 | 1.385 | -0.9 | 117 | 0.00 | 7.95 |
| 33 | | trans-1,2-dichloroethene | 0.616 | 0.664 | -7.8 | 127 | 0.01 | 8.02 |
| 34 | | di-isopropyl ether | 1.684 | 1.622 | 3.7 | 109 | 0.00 | 8.52 |
| 35 | | ethyl tert-butyl ether | 1.556 | 1.481 | 4.8 | 105 | 0.00 | 8.98 |
| 36 | | 2-butanone | 0.045 | 0.051 | -13.3 | 129 | 0.00 | 9.31 |
| 37 | | 1,1-dichloroethane | 0.817 | 0.903 | -10.5 | 131 | 0.00 | 8.60 |
| 38 | | chloroprene | 0.581 | 0.524 | 9.8 | 102 | 0.00 | 8.68 |
| 39 | | acrylonitrile | 0.150 | 0.157 | -4.7 | 114 | 0.02 | 8.05 |
| 40 | | vinyl acetate | 0.068 | 0.067 | 1.5 | 116 | 0.00 | 8.58 |

# Continuing Calibration Summary

**Job Number:** JB52301 **Sample:** VY6078-CC5974
**Account:** SECORPAE Stantec Consulting Services Inc. **Lab FileID:** Y140515.D
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| | | | True | Calc. | % Drift | | | |
|---|---|---|---|---|---|---|---|---|
| 41 | | ethyl acetate | 20.000 | 17.343 | 13.3 | 85 | 0.00 | 9.30 |
| | | | AvgRF | CCRF | % Dev | | | |
| 42 | | 2,2-dichloropropane | 0.589 | 0.574 | 2.5 | 121 | 0.00 | 9.31 |
| 43 | | cis-1,2-dichloroethene | 0.483 | 0.556 | -15.1 | 138 | 0.00 | 9.33 |
| 44 | | propionitrile | 0.061 | 0.063 | -3.3 | 118 | 0.00 | 9.44 |
| 45 | | bromochloromethane | 0.283 | 0.357 | -26.1# | 145 | 0.00 | 9.64 |
| 46 | | tetrahydrofuran | 0.062 | 0.061 | 1.6 | 115 | 0.02 | 9.67 |
| 47 | | chloroform | 0.784 | 0.884 | -12.8 | 138 | 0.00 | 9.69 |
| 48 | | tert-Butyl Formate | 0.328 | 0.291 | 11.3 | 100 | 0.00 | 9.70 |
| 49 | S | dibromofluoromethane (s) | 0.424 | 0.424 | 0.0 | 117 | 0.00 | 9.89 |
| 50 | S | 1,2-dichloroethane-d4 (s) | 0.468 | 0.448 | 4.3 | 114 | 0.00 | 10.31 |
| 51 | | freon 113 | 0.249 | 0.221 | 11.2 | 101 | 0.02 | 6.88 |
| 52 | | methacrylonitrile | 0.172 | 0.179 | -4.1 | 120 | 0.00 | 9.61 |
| 53 | | 1,1,1-trichloroethane | 0.586 | 0.606 | -3.4 | 126 | 0.00 | 9.91 |
| 54 | | Cyclohexane | 0.601 | 0.565 | 6.0 | 116 | 0.00 | 9.96 |
| 55 | | 2,2,4-trimethylpentane | 1.850 | 1.438 | 22.3# | 88 | 0.00 | 10.30 |
| 56 | | tert-amyl methyl ether | 1.451 | 1.368 | 5.7 | 108 | 0.00 | 10.35 |
| 57 | I | 1,4-difluorobenzene | 1.000 | 1.000 | 0.0 | 118 | 0.00 | 10.73 |
| 58 | | epichlorohydrin | 0.028 | 0.026 | 7.1 | 107 | 0.00 | 11.99 |
| 59 | | n-butyl alcohol | 0.009 | 0.009 | 0.0 | 111 | 0.00 | 10.87 |
| 60 | | carbon tetrachloride | 0.339 | 0.347 | -2.4 | 127 | 0.00 | 10.10 |
| 61 | | 1,1-dichloropropene | 0.368 | 0.387 | -5.2 | 129 | 0.00 | 10.09 |
| 62 | | hexane | 0.367 | 0.296 | 19.3 | 95 | 0.01 | 8.26 |
| 63 | | Tert Amyl Alcohol | | ----------NA---------- | | | | |
| 64 | | benzene | 1.235 | 1.360 | -10.1 | 137 | 0.00 | 10.35 |
| 65 | | heptane | 0.228 | 0.198 | 13.2 | 104 | 0.00 | 10.46 |
| 66 | | isopropyl acetate | 0.127 | 0.120 | 5.5 | 106 | 0.00 | 10.27 |
| 67 | | 1,2-dichloroethane | 0.361 | 0.429 | -18.8 | 138 | 0.00 | 10.40 |
| 68 | | trichloroethene | 0.271 | 0.308 | -13.7 | 141 | 0.00 | 11.05 |
| 69 | | ethyl acrylate | | ----------NA---------- | | | | |
| 70 | | 2-nitropropane | 0.085 | 0.088 | -3.5 | 119 | 0.00 | 11.86 |
| 71 | | 2-chloroethyl vinyl ether | 0.104 | 0.098 | 5.8 | 109 | 0.00 | 11.84 |
| 72 | | methyl methacrylate | 0.208 | 0.202 | 2.9 | 117 | 0.00 | 11.32 |
| 73 | | 1,2-dichloropropane | 0.338 | 0.373 | -10.4 | 134 | 0.00 | 11.34 |
| 74 | | methylcyclohexane | 0.449 | 0.387 | 13.8 | 101 | 0.00 | 11.23 |
| 75 | | Tert-amyl ethyl ether | | ----------NA---------- | | | | |
| 76 | | dibromomethane | 0.171 | 0.205 | -19.9 | 140 | 0.00 | 11.50 |
| 77 | | bromodichloromethane | 0.400 | 0.470 | -17.5 | 141 | 0.00 | 11.62 |
| 78 | | cis-1,3-dichloropropene | 0.516 | 0.570 | -10.5 | 132 | 0.00 | 12.06 |
| 79 | S | toluene-d8 (s) | 1.015 | 1.080 | -6.4 | 121 | 0.00 | 12.32 |
| 80 | | 4-methyl-2-pentanone | 0.122 | 0.119 | 2.5 | 117 | 0.00 | 12.15 |
| 81 | | toluene | 1.236 | 1.325 | -7.2 | 136 | 0.00 | 12.39 |
| 82 | | 3-methyl-1-butanol | 0.008 | 0.008 | 0.0 | 107 | 0.00 | 12.17 |
| 83 | | trans-1,3-dichloropropene | 0.439 | 0.498 | -13.4 | 135 | 0.00 | 12.61 |
| 84 | | ethyl methacrylate | 0.386 | 0.369 | 4.4 | 118 | 0.00 | 12.57 |
| 85 | | 1,1,2-trichloroethane | 0.224 | 0.257 | -14.7 | 140 | 0.00 | 12.82 |
| 86 | | 2-hexanone | 0.109 | 0.107 | 1.8 | 114 | 0.00 | 12.98 |
| 87 | I | chlorobenzene-d5 | 1.000 | 1.000 | 0.0 | 119 | 0.00 | 13.81 |
| 88 | | tetrachloroethene | 0.336 | 0.369 | -9.8 | 138 | 0.00 | 12.95 |
| 89 | | 1,3-dichloropropane | 0.519 | 0.588 | -13.3 | 136 | 0.00 | 13.00 |
| 90 | | butyl acetate | 0.234 | 0.223 | 4.7 | 116 | 0.00 | 13.03 |
| 91 | | dibromochloromethane | 0.362 | 0.420 | -16.0 | 141 | 0.00 | 13.26 |
| 92 | | 1,2-dibromoethane | 0.296 | 0.344 | -16.2 | 138 | 0.00 | 13.41 |
| 93 | | 3,3-Dimethyl-1-Butanol | 0.040 | 0.031 | 22.5# | 95 | 0.00 | 13.14 |
| 94 | | chlorobenzene | 0.965 | 1.036 | -7.4 | 136 | 0.00 | 13.84 |
| 95 | | 1,1,1,2-tetrachloroethane | 0.348 | 0.380 | -9.2 | 134 | 0.00 | 13.90 |

# Continuing Calibration Summary

**Job Number:** JB52301 **Sample:** VY6078-CC5974
**Account:** SECORPAE Stantec Consulting Services Inc. **Lab FileID:** Y140515.D
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 96 | | ethylbenzene | 1.568 | 1.604 | -2.3 | 129 | 0.00 | 13.88 |
| 97 | | m,p-xylene | 0.595 | 0.628 | -5.5 | 132 | 0.00 | 13.98 |
| 98 | | o-xylene | 1.302 | 1.327 | -1.9 | 128 | 0.00 | 14.39 |
| 99 | | styrene | 1.042 | 1.083 | -3.9 | 128 | 0.00 | 14.41 |
| 100 | | bromoform | 0.238 | 0.260 | -9.2 | 135 | 0.00 | 14.70 |
| 101 | I | 1,4-dichlorobenzene-d4 | 1.000 | 1.000 | 0.0 | 113 | 0.00 | 16.09 |
| 102 | | isopropylbenzene | 2.941 | 2.925 | 0.5 | 122 | 0.00 | 14.72 |
| 103 | S | 4-bromofluorobenzene (s) | 0.947 | 0.876 | 7.5 | 110 | 0.00 | 14.95 |
| 104 | | cis-1,4-dichloro-2-butene | | ----------NA---------- | | | | |
| 105 | | bromobenzene | 0.808 | 0.930 | -15.1 | 137 | 0.00 | 15.14 |
| | | ---------- | True | Calc. | % Drift | ---------- | | |
| 106 | | cyclohexanone | 200.000 | 246.495 | -23.2# | 156 | 0.00 | 14.94 |
| | | ---------- | AvgRF | CCRF | % Dev | ---------- | | |
| 107 | | 1,1,2,2-tetrachloroethane | 0.817 | 0.901 | -10.3 | 127 | 0.00 | 15.06 |
| 108 | | trans-1,4-dichloro-2-bute | 0.215 | 0.188 | 12.6 | 99 | 0.00 | 15.10 |
| 109 | | 1,2,3-trichloropropane | 0.182 | 0.204 | -12.1 | 131 | 0.00 | 15.14 |
| 110 | | n-propylbenzene | 3.461 | 3.450 | 0.3 | 122 | 0.00 | 15.12 |
| 111 | | 4-Ethyltoluene | | ----------NA---------- | | | | |
| 112 | | 2-chlorotoluene | 0.725 | 0.801 | -10.5 | 132 | 0.00 | 15.28 |
| 113 | | 4-chlorotoluene | 2.215 | 2.324 | -4.9 | 127 | 0.00 | 15.38 |
| 114 | | 1,3,5-trimethylbenzene | 2.421 | 2.533 | -4.6 | 124 | 0.00 | 15.27 |
| 115 | | tert-butylbenzene | 2.041 | 1.995 | 2.3 | 120 | 0.00 | 15.61 |
| 116 | | pentachloroethane | 0.535 | 0.570 | -6.5 | 128 | 0.00 | 15.72 |
| 117 | | 1,2,4-trimethylbenzene | 2.556 | 2.566 | -0.4 | 124 | 0.00 | 15.66 |
| 118 | | sec-butylbenzene | 3.125 | 3.062 | 2.0 | 120 | 0.00 | 15.82 |
| 119 | | 1,3-dichlorobenzene | 1.515 | 1.632 | -7.7 | 131 | 0.00 | 16.03 |
| 120 | | p-isopropyltoluene | 2.547 | 2.498 | 1.9 | 119 | 0.00 | 15.94 |
| 121 | | 1,4-dichlorobenzene | 1.526 | 1.650 | -8.1 | 127 | 0.00 | 16.11 |
| 122 | | 1,2-dichlorobenzene | 1.481 | 1.574 | -6.3 | 128 | 0.00 | 16.51 |
| 123 | | n-butylbenzene | 0.558 | 0.542 | 2.9 | 117 | 0.00 | 16.35 |
| 124 | | p-Diethylbenzene | | ----------NA---------- | | | | |
| 125 | | 1,2-dibromo-3-chloropropa | 0.143 | 0.135 | 5.6 | 107 | 0.00 | 17.29 |
| 126 | | 1,3,5-Trichlorobenzene | 1.130 | 1.188 | -5.1 | 121 | 0.00 | 17.45 |
| 127 | | 1,2,4-trichlorobenzene | 0.989 | 0.978 | 1.1 | 115 | 0.00 | 18.09 |
| 128 | | 1,2,4,5-tetramethylbenzen | | ----------NA---------- | | | | |
| 129 | | hexachlorobutadiene | 0.570 | 0.611 | -7.2 | 124 | 0.00 | 18.18 |
| 130 | | naphthalene | 2.006 | 1.902 | 5.2 | 103 | 0.00 | 18.38 |
| 131 | | 1,2,3-trichlorobenzene | 0.843 | 0.926 | -9.8 | 119 | 0.00 | 18.63 |
| 132 | | hexachloroethane | 0.511 | 0.522 | -2.2 | 122 | 0.00 | 16.74 |
| 133 | | Benzyl chloride | 1.478 | 1.243 | 15.9 | 98 | 0.00 | 16.24 |

(#) = Out of Range SPCC's out = 0 CCC's out = 0
Y138258.D MY5974.M Wed Nov 13 11:03:56 2013

6.9.11

6

New Jersey ACCUTEST LABORATORIES

GC/MS Volatiles

Raw Data

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\Y-Core\vy6078-79\
Data File : Y140521.D
Acq On : 12 Nov 2013 4:03 pm
Operator : prashans
Sample : JB52301-3
Misc : MS58100,VY6078,5.9,,,,1
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Nov 13 11:08:26 2013
Quant Method : C:\MSDCHEM\1\METHODS\MY5974.M
Quant Title : Method SW846 8260B, ZB624 60m x 0.25mm x 1.4um
QLast Update : Wed Oct 30 17:14:38 2013
Response via : Initial Calibration

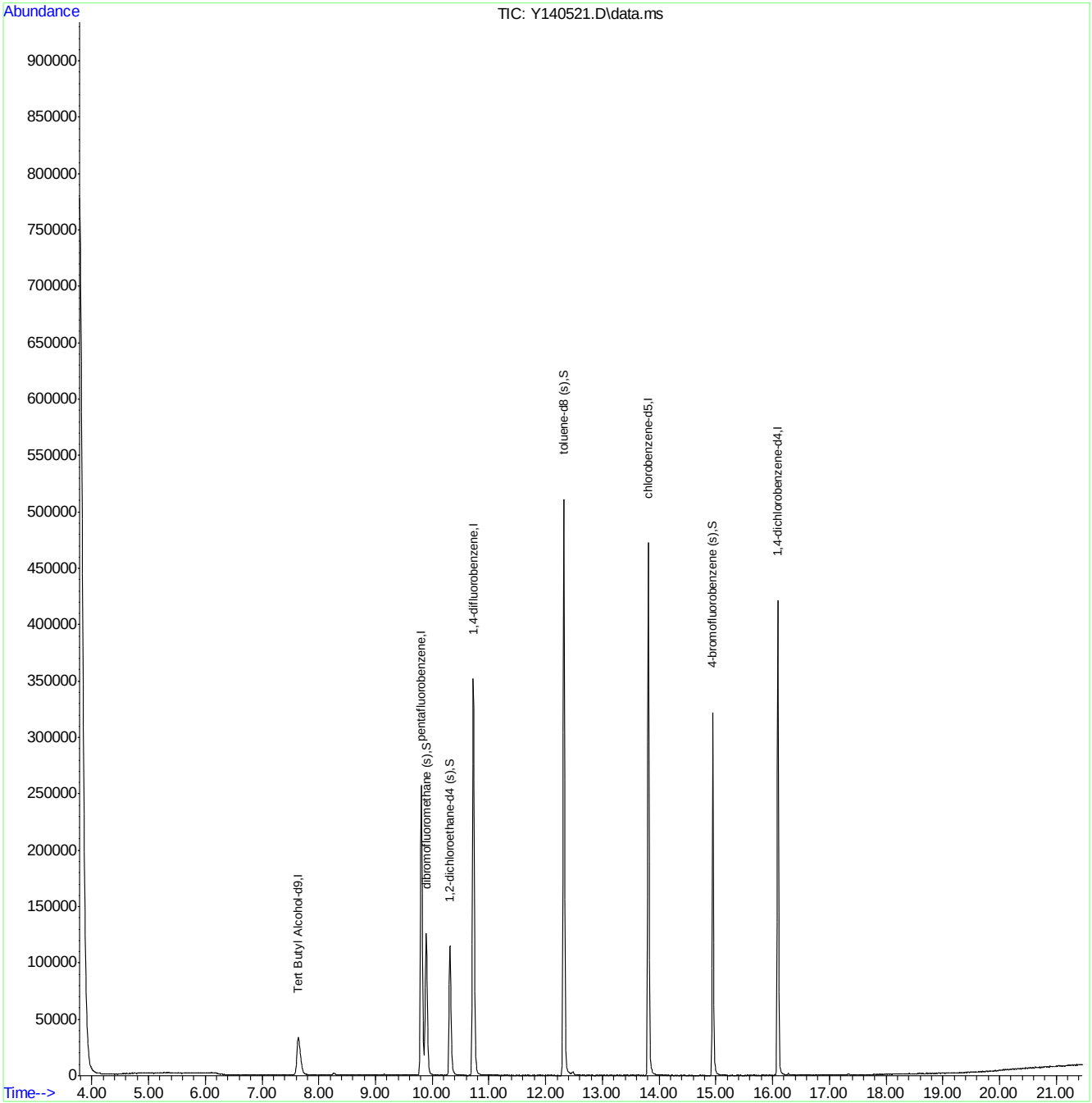
| Compound | R.T. | QIon | Response | Conc | Units | Dev(Min) |
|---|---|---|---|---|---|---|
| Internal Standards | | | | | | |
| 1) Tert Butyl Alcohol-d9 | 7.640 | 65 | 76762 | 500.00 | ug/L | 0.01 |
| 5) pentafluorobenzene | 9.810 | 168 | 235235 | 50.00 | ug/L | 0.00 |
| 57) 1,4-difluorobenzene | 10.725 | 114 | 349323 | 50.00 | ug/L | 0.00 |
| 87) chlorobenzene-d5 | 13.811 | 117 | 278957 | 50.00 | ug/L | 0.00 |
| 101) 1,4-dichlorobenzene-d4 | 16.092 | 152 | 120025 | 50.00 | ug/L | 0.00 |
| System Monitoring Compounds | | | | | | |
| 49) dibromofluoromethane (s) | 9.894 | 113 | 99666 | 49.93 | ug/L | 0.00 |
| Spiked Amount 50.000 | Range 59 - 130 | | Recovery = 99.86% | | | |
| 50) 1,2-dichloroethane-d4 (s) | 10.312 | 65 | 98521 | 44.78 | ug/L | 0.00 |
| Spiked Amount 50.000 | Range 65 - 123 | | Recovery = 89.56% | | | |
| 79) toluene-d8 (s) | 12.321 | 98 | 372041 | 52.49 | ug/L | 0.00 |
| Spiked Amount 50.000 | Range 80 - 124 | | Recovery = 104.98% | | | |
| 103) 4-bromofluorobenzene (s) | 14.946 | 95 | 112256 | 49.38 | ug/L | 0.00 |
| Spiked Amount 50.000 | Range 71 - 132 | | Recovery = 98.76% | | | |
| Target Compounds | | | | | | Qvalue |

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\Y-Core\vy6078-79\
Data File : Y140521.D
Acq On : 12 Nov 2013 4:03 pm
Operator : prashans
Sample : JB52301-3
Misc : MS58100,VY6078,5.9,,,,1
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Nov 13 11:08:26 2013
Quant Method : C:\MSDCHEM\1\METHODS\MY5974.M
Quant Title : Method SW846 8260B, ZB624 60m x 0.25mm x 1.4um
QLast Update : Wed Oct 30 17:14:38 2013
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\
Data File : d215243.D
Acq On : 14 Nov 2013 6:33 am
Operator : CourtneM
Sample : jb52301-5
Misc : ms58100,vd8790,5.9,,100,10,1
ALS Vial : 44 Sample Multiplier: 1

Quant Time: Nov 15 10:37:40 2013
Quant Method : C:\msdchem\1\METHODS\MD8771.M
Quant Title : SW-846 Method 8260B
QLast Update : Fri Nov 01 10:07:55 2013
Response via : Initial Calibration

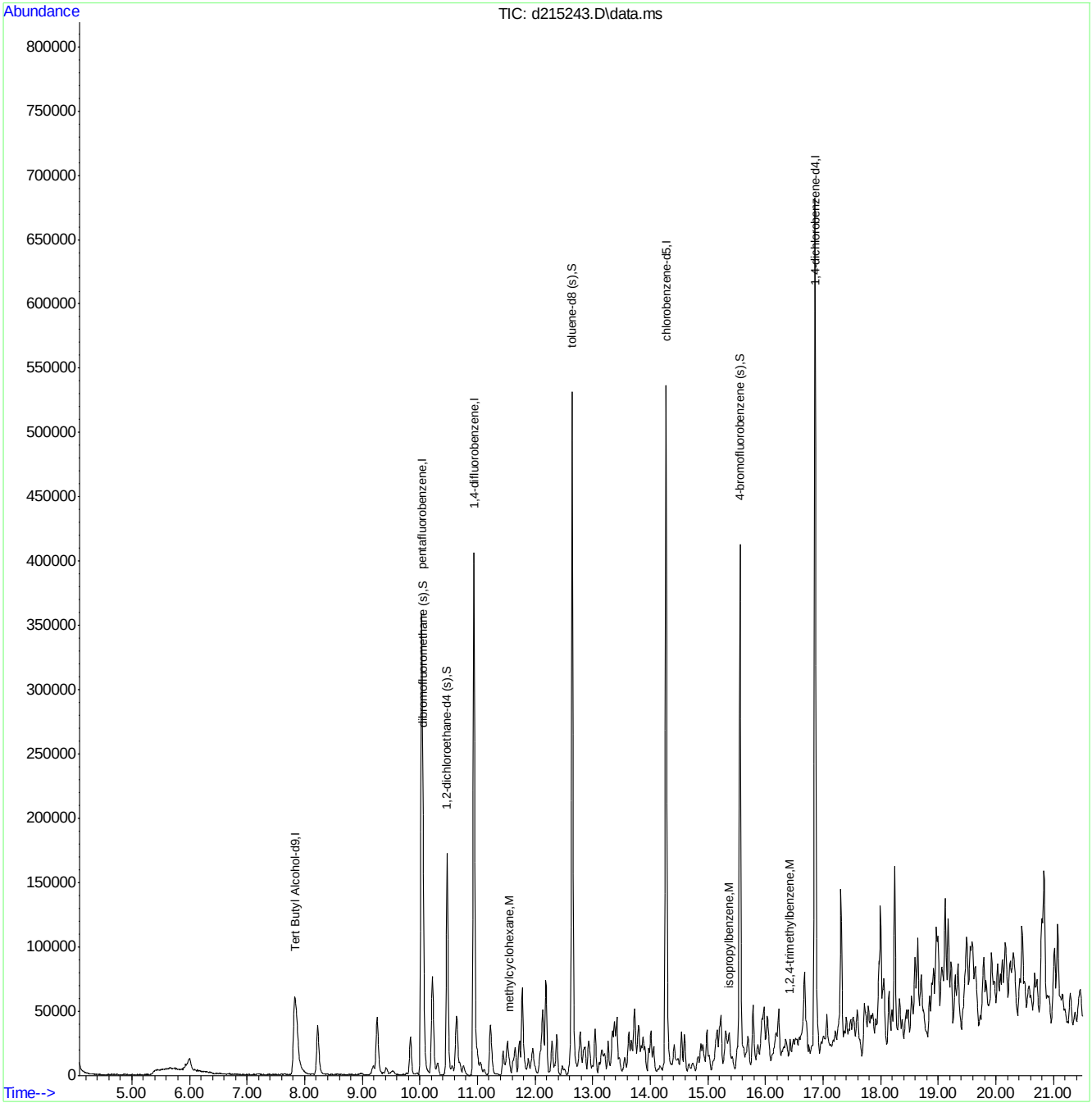
| Internal Standards | R.T. | QIon | Response | Conc | Units | Dev(Min) |
|---|---|---|---|---|---|---|
| 1) Tert Butyl Alcohol-d9 | 7.822 | 65 | 134520 | 500.00 | ug/L | 0.02 |
| 4) pentafluorobenzene | 10.029 | 168 | 246160 | 50.00 | ug/L | 0.00 |
| 53) 1,4-difluorobenzene | 10.939 | 114 | 345505 | 50.00 | ug/L | 0.00 |
| 85) chlorobenzene-d5 | 14.276 | 117 | 320096 | 50.00 | ug/L | 0.00 |
| 99) 1,4-dichlorobenzene-d4 | 16.860 | 152 | 196653 | 50.00 | ug/L | 0.00 |
| **System Monitoring Compounds** | | | | | | |
| 46) dibromofluoromethane (s) | 10.055 | 113 | 98772 | 47.43 | ug/L | 0.00 |
| Spiked Amount 50.000 | Range 59 - 130 | | Recovery = 94.86% | | | |
| 47) 1,2-dichloroethane-d4 (s) | 10.474 | 65 | 129672 | 53.89 | ug/L | 0.00 |
| Spiked Amount 50.000 | Range 65 - 123 | | Recovery = 107.78% | | | |
| 77) toluene-d8 (s) | 12.644 | 98 | 369374 | 54.44 | ug/L | 0.00 |
| Spiked Amount 50.000 | Range 80 - 124 | | Recovery = 108.88% | | | |
| 101) 4-bromofluorobenzene (s) | 15.557 | 95 | 146182 | 44.01 | ug/L | 0.00 |
| Spiked Amount 50.000 | Range 71 - 132 | | Recovery = 88.02% | | | |
| **Target Compounds** | | | | | | Qvalue |
| 73) methylcyclohexane | 11.551 | 83 | 4352 | 1.30 | ug/L | 90 |
| 100) isopropylbenzene | 15.359 | 105 | 3141 | 0.29 | ug/L | 89 |
| 114) 1,2,4-trimethylbenzene | 16.426 | 105 | 3962 | 0.42 | ug/L | 95 |

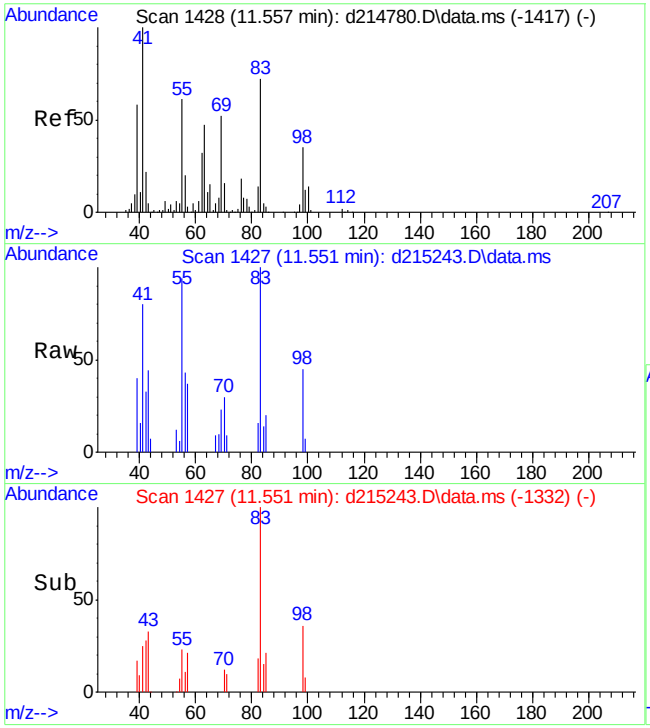
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\
Data File : d215243.D
Acq On : 14 Nov 2013 6:33 am
Operator : CourtneM
Sample : jb52301-5
Misc : ms58100,vd8790,5.9,,100,10,1
ALS Vial : 44 Sample Multiplier: 1

Quant Time: Nov 15 10:37:40 2013
Quant Method : C:\msdchem\1\METHODS\MD8771.M
Quant Title : SW-846 Method 8260B
QLast Update : Fri Nov 01 10:07:55 2013
Response via : Initial Calibration

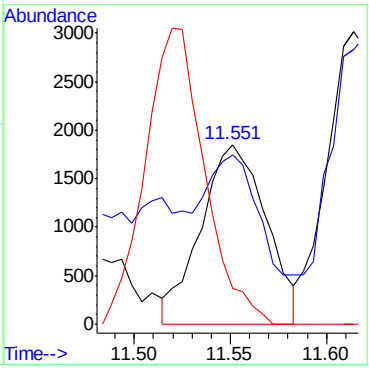


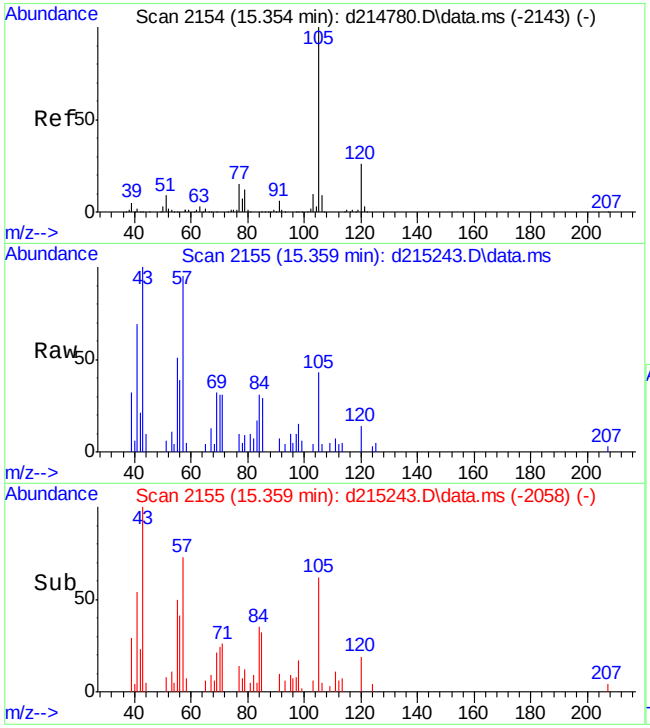



#73
methylcyclohexane
Concen: 1.30 ug/L
RT: 11.551 min Scan# 1427
Delta R.T. -0.005 min
Lab File: d215243.D
Acq: 14 Nov 2013 6:33 am

Tgt Ion: 83 Resp: 4352

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 83 | 100 | | |
| 55 | 78.0 | 54.9 | 114.9 |
| 85 | 23.2 | 0.0 | 34.6 |

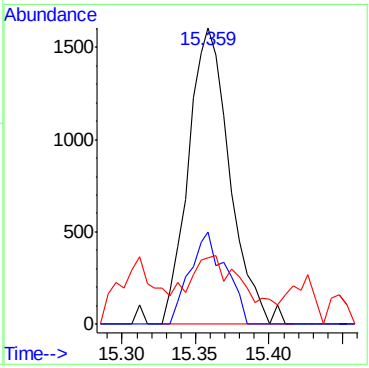


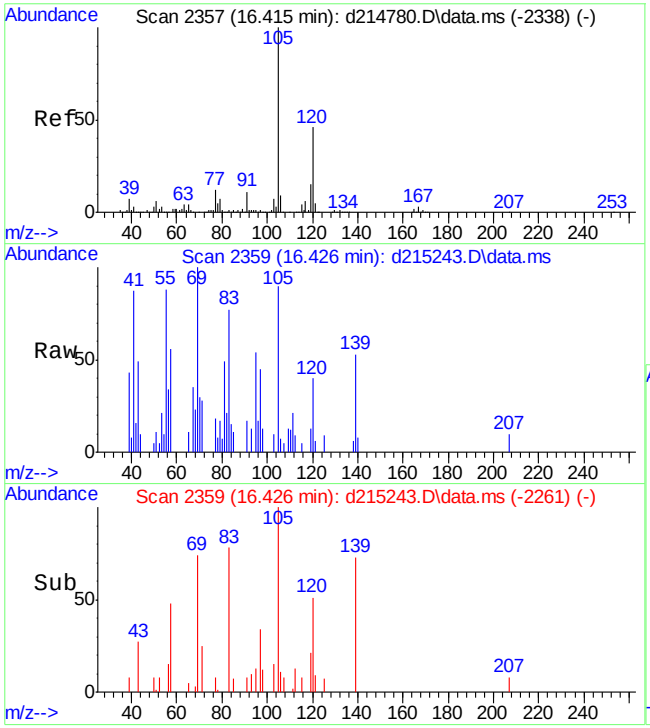




#100
isopropylbenzene
Concen: 0.29 ug/L
RT: 15.359 min Scan# 2155
Delta R.T. 0.005 min
Lab File: d215243.D
Acq: 14 Nov 2013 6:33 am

Tgt Ion:105 Resp: 3141

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 105 | 100 | | |
| 120 | 31.1 | 0.0 | 56.3 |
| 77 | 10.1 | 0.0 | 45.5 |

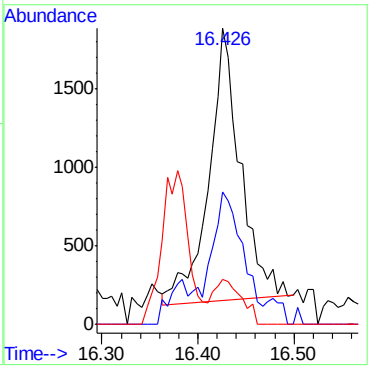





#114
1,2,4-trimethylbenzene
Concen: 0.42 ug/L
RT: 16.426 min Scan# 2359
Delta R.T. 0.010 min
Lab File: d215243.D
Acq: 14 Nov 2013 6:33 am

Tgt Ion:105 Resp: 3962

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 105 | 100 | | |
| 120 | 49.9 | 16.0 | 76.0 |
| 119 | 16.7 | 0.0 | 45.2 |



Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\
Data File : 2E96793.D
Acq On : 14 Nov 2013 12:41 pm
Operator : tamikag
Sample : jb52301-6
Misc : MS58101,V2E4366,W,,,,1
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Nov 14 16:14:32 2013
Quant Method : C:\MSDCHEM\1\METHODS\M2E4361.M
Quant Title : SW-846 Method 8260B, ZB624 60Mx0.25MMx1.4UM
QLast Update : Thu Nov 14 09:30:03 2013
Response via : Initial Calibration

| Internal Standards | R.T. | QIon | Response | Conc | Units | Dev(Min) |
|---|---|---|---|---|---|---|
| 1) Tert Butyl Alcohol-d9 | 6.839 | 65 | 156165 | 500.00 | ug/L | 0.00 |
| 7) pentafluorobenzene | 9.036 | 168 | 320539 | 50.00 | ug/L | 0.00 |
| 56) 1,4-difluorobenzene | 9.943 | 114 | 489581 | 50.00 | ug/L | 0.00 |
| 85) chlorobenzene-d5 | 13.136 | 117 | 389953 | 50.00 | ug/L | 0.00 |
| 99) 1,4-dichlorobenzene-d4 | 15.459 | 152 | 207017 | 50.00 | ug/L | 0.00 |
| **System Monitoring Compounds** | | | | | | |
| 48) dibromofluoromethane (s) | 9.078 | 113 | 132534 | 46.33 | ug/L | 0.00 |
| Spiked Amount 50.000 | Range 79 - 117 | | Recovery = 92.66% | | | |
| 49) 1,2-dichloroethane-d4 (s) | 9.492 | 65 | 150293 | 47.30 | ug/L | 0.00 |
| Spiked Amount 50.000 | Range 72 - 123 | | Recovery = 94.60% | | | |
| 77) toluene-d8 (s) | 11.611 | 98 | 511441 | 48.33 | ug/L | 0.00 |
| Spiked Amount 50.000 | Range 82 - 118 | | Recovery = 96.66% | | | |
| 101) 4-bromofluorobenzene (s) | 14.300 | 95 | 173884 | 51.76 | ug/L | 0.00 |
| Spiked Amount 50.000 | Range 75 - 118 | | Recovery = 103.52% | | | |

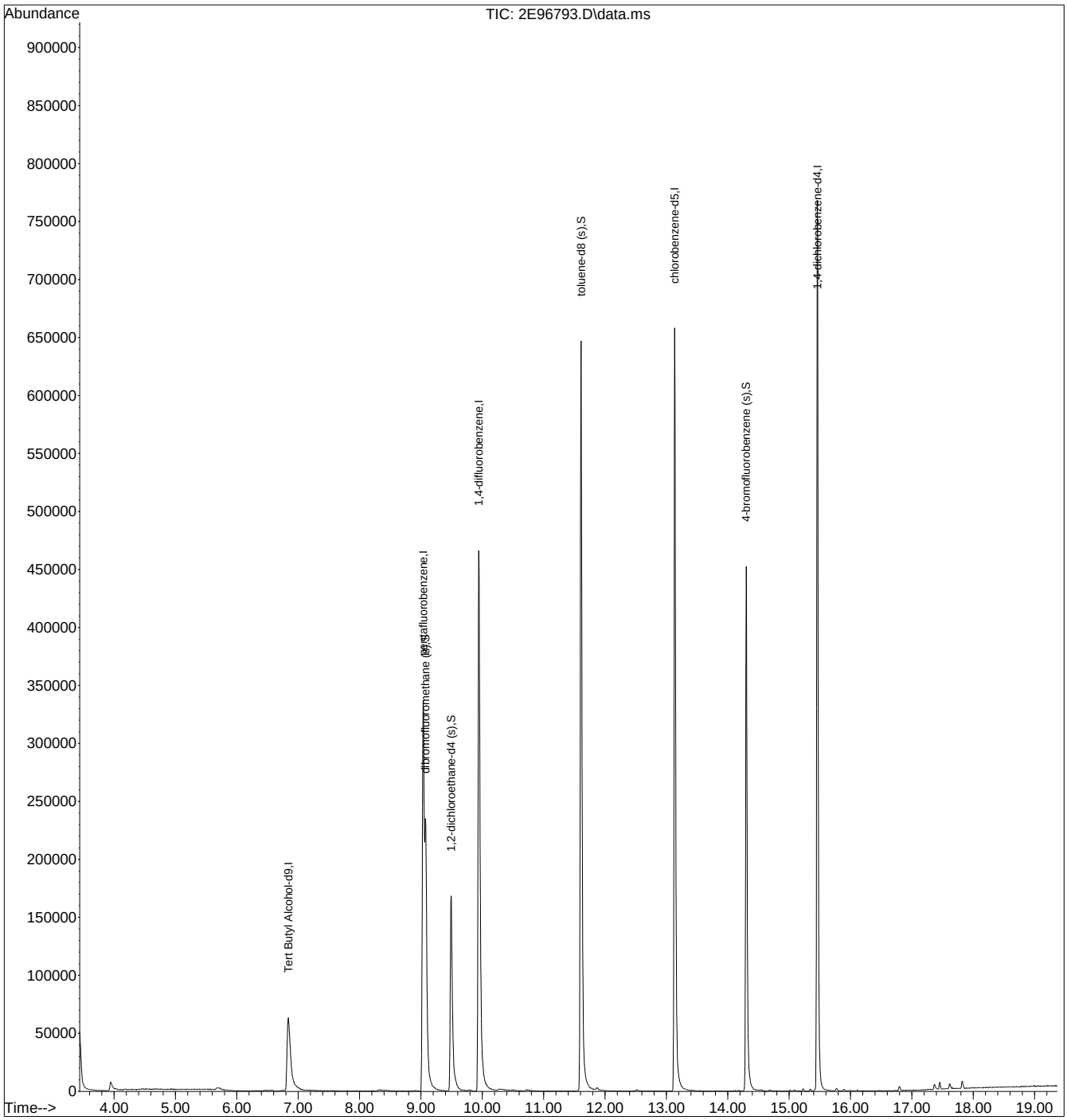
| Target Compounds | Qvalue |
|---|---|

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\
Data File : 2E96793.D
Acq On : 14 Nov 2013 12:41 pm
Operator : tamikag
Sample : jb52301-6
Misc : MS58101,V2E4366,W,,,,1
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Nov 14 16:14:32 2013
Quant Method : C:\MSDCHEM\1\METHODS\M2E4361.M
Quant Title : SW-846 Method 8260B, ZB624 60Mx0.25MMx1.4UM
QLast Update : Thu Nov 14 09:30:03 2013
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\
Data File : 2E96791.D
Acq On : 14 Nov 2013 11:27 am
Operator : tamikag
Sample : mb
Misc : MS58411,V2E4366,W,,,,1
ALS Vial : 4 Sample Multiplier: 1

Quant Time: Nov 14 16:11:25 2013
Quant Method : C:\MSDCHEM\1\METHODS\M2E4361.M
Quant Title : SW-846 Method 8260B, ZB624 60Mx0.25MMx1.4UM
QLast Update : Thu Nov 14 09:30:03 2013
Response via : Initial Calibration

| Internal Standards | R.T. | QIon | Response | Conc | Units | Dev(Min) |
|---|---|---|---|---|---|---|
| 1) Tert Butyl Alcohol-d9 | 6.834 | 65 | 156131 | 500.00 | ug/L | -0.01 |
| 7) pentafluorobenzene | 9.036 | 168 | 316395 | 50.00 | ug/L | 0.00 |
| 56) 1,4-difluorobenzene | 9.943 | 114 | 481894 | 50.00 | ug/L | 0.00 |
| 85) chlorobenzene-d5 | 13.136 | 117 | 379052 | 50.00 | ug/L | 0.00 |
| 99) 1,4-dichlorobenzene-d4 | 15.459 | 152 | 206965 | 50.00 | ug/L | 0.00 |
| **System Monitoring Compounds** | | | | | | |
| 48) dibromofluoromethane (s) | 9.078 | 113 | 131405 | 46.54 | ug/L | 0.00 |
| Spiked Amount 50.000 | Range 79 - 117 | | Recovery = 93.08% | | | |
| 49) 1,2-dichloroethane-d4 (s) | 9.492 | 65 | 149892 | 47.79 | ug/L | 0.00 |
| Spiked Amount 50.000 | Range 72 - 123 | | Recovery = 95.58% | | | |
| 77) toluene-d8 (s) | 11.605 | 98 | 498200 | 47.83 | ug/L | 0.00 |
| Spiked Amount 50.000 | Range 82 - 118 | | Recovery = 95.66% | | | |
| 101) 4-bromofluorobenzene (s) | 14.300 | 95 | 173413 | 51.63 | ug/L | 0.00 |
| Spiked Amount 50.000 | Range 75 - 118 | | Recovery = 103.26% | | | |

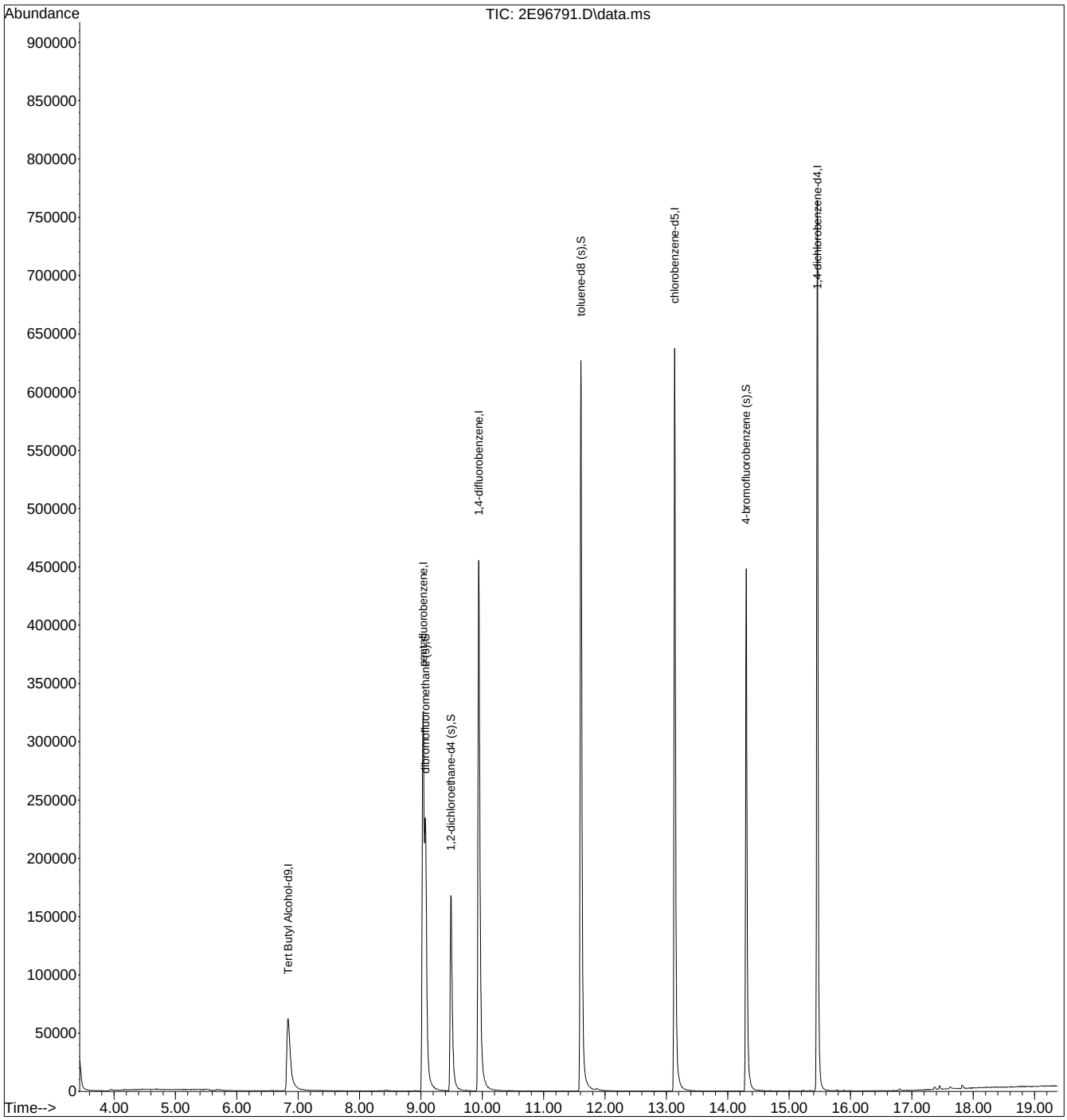
| Target Compounds | Qvalue |
|---|---|

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\
Data File : 2E96791.D
Acq On : 14 Nov 2013 11:27 am
Operator : tamikag
Sample : mb
Misc : MS58411,V2E4366,W,,,,1
ALS Vial : 4 Sample Multiplier: 1

Quant Time: Nov 14 16:11:25 2013
Quant Method : C:\MSDCHEM\1\METHODS\M2E4361.M
Quant Title : SW-846 Method 8260B, ZB624 60Mx0.25MMx1.4UM
QLast Update : Thu Nov 14 09:30:03 2013
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\
Data File : d215227.D
Acq On : 13 Nov 2013 10:41 pm
Operator : CourtneM
Sample : jb25319k-13a
Misc : ms57363,vd8790,5,,100,5,1
ALS Vial : 28 Sample Multiplier: 1

Quant Time: Nov 15 10:21:42 2013
Quant Method : C:\msdchem\1\METHODS\MD8771.M
Quant Title : SW-846 Method 8260B
QLast Update : Fri Nov 01 10:07:55 2013
Response via : Initial Calibration

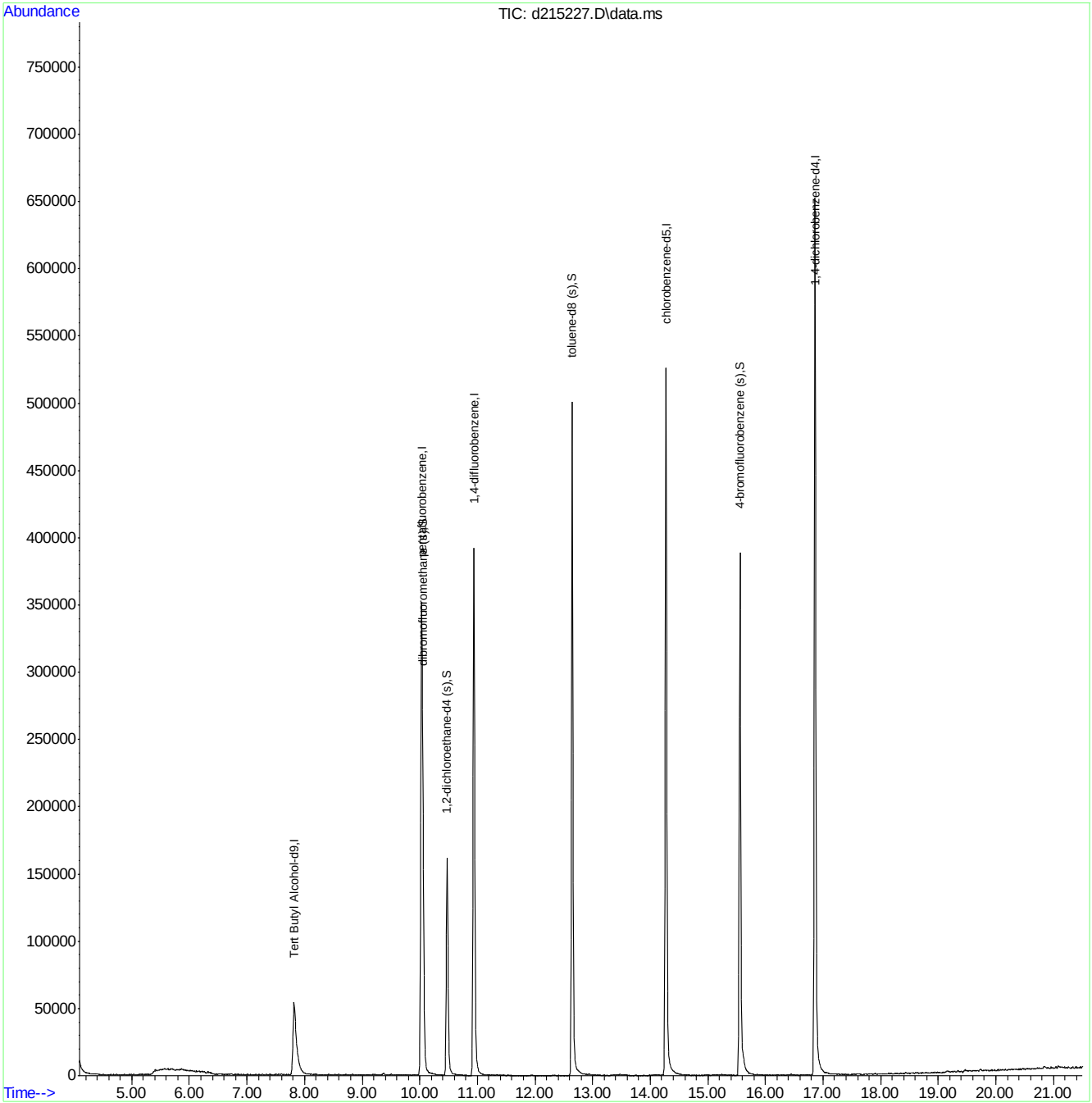
| Internal Standards | R.T. | QIon | Response | Conc | Units | Dev(Min) |
|---|---|---|---|---|---|---|
| 1) Tert Butyl Alcohol-d9 | 7.818 | 65 | 129263 | 500.00 | ug/L | 0.01 |
| 4) pentafluorobenzene | 10.030 | 168 | 245558 | 50.00 | ug/L | 0.00 |
| 53) 1,4-difluorobenzene | 10.940 | 114 | 340956 | 50.00 | ug/L | 0.00 |
| 85) chlorobenzene-d5 | 14.277 | 117 | 322540 | 50.00 | ug/L | 0.00 |
| 99) 1,4-dichlorobenzene-d4 | 16.861 | 152 | 194576 | 50.00 | ug/L | 0.00 |
| **System Monitoring Compounds** | | | | | | |
| 46) dibromofluoromethane (s) | 10.051 | 113 | 97987 | 47.17 | ug/L | 0.00 |
| Spiked Amount 50.000 | Range 59 - 130 | | Recovery = 94.34% | | | |
| 47) 1,2-dichloroethane-d4 (s) | 10.475 | 65 | 128432 | 53.51 | ug/L | 0.00 |
| Spiked Amount 50.000 | Range 65 - 123 | | Recovery = 107.02% | | | |
| 77) toluene-d8 (s) | 12.645 | 98 | 362717 | 54.17 | ug/L | 0.00 |
| Spiked Amount 50.000 | Range 80 - 124 | | Recovery = 108.34% | | | |
| 101) 4-bromofluorobenzene (s) | 15.558 | 95 | 149120 | 45.38 | ug/L | 0.00 |
| Spiked Amount 50.000 | Range 71 - 132 | | Recovery = 90.76% | | | |
| **Target Compounds** | | | | | | Qvalue |

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\
Data File : d215227.D
Acq On : 13 Nov 2013 10:41 pm
Operator : CourtneM
Sample : jb25319k-13a
Misc : ms57363,vd8790,5,,100,5,1
ALS Vial : 28 Sample Multiplier: 1

Quant Time: Nov 15 10:21:42 2013
Quant Method : C:\msdchem\1\METHODS\MD8771.M
Quant Title : SW-846 Method 8260B
QLast Update : Fri Nov 01 10:07:55 2013
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\Y-Core\vy6078-79\
Data File : Y140516.D
Acq On : 12 Nov 2013 1:18 pm
Operator : prashans
Sample : MB
Misc : MS57945,VY6078,5.0,,,,1
ALS Vial : 3 Sample Multiplier: 1

Quant Time: Nov 13 11:05:55 2013
Quant Method : C:\MSDCHEM\1\METHODS\MY5974.M
Quant Title : Method SW846 8260B, ZB624 60m x 0.25mm x 1.4um
QLast Update : Wed Oct 30 17:14:38 2013
Response via : Initial Calibration

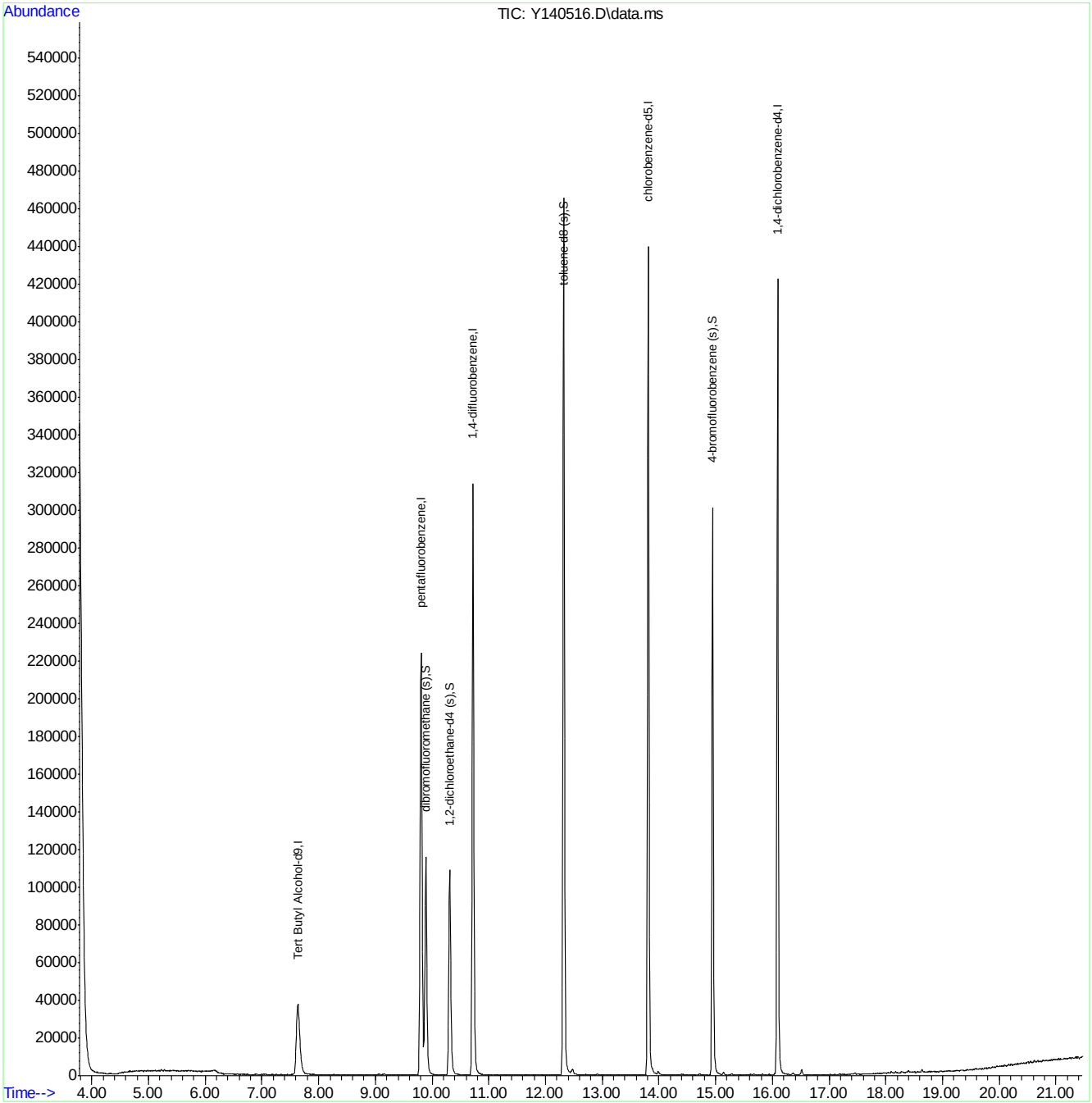
| Compound | R.T. | QIon | Response | Conc | Units | Dev(Min) |
|---|---|---|---|---|---|---|
| Internal Standards | | | | | | |
| 1) Tert Butyl Alcohol-d9 | 7.640 | 65 | 87121 | 500.00 | ug/L | 0.01 |
| 5) pentafluorobenzene | 9.805 | 168 | 204494 | 50.00 | ug/L | 0.00 |
| 57) 1,4-difluorobenzene | 10.720 | 114 | 310150 | 50.00 | ug/L | 0.00 |
| 87) chlorobenzene-d5 | 13.811 | 117 | 260809 | 50.00 | ug/L | 0.00 |
| 101) 1,4-dichlorobenzene-d4 | 16.092 | 152 | 119855 | 50.00 | ug/L | 0.00 |
| System Monitoring Compounds | | | | | | |
| 49) dibromofluoromethane (s) | 9.889 | 113 | 89487 | 51.57 | ug/L | 0.00 |
| Spiked Amount 50.000 | Range 59 - 130 | | Recovery = 103.14% | | | |
| 50) 1,2-dichloroethane-d4 (s) | 10.312 | 65 | 92731 | 48.49 | ug/L | 0.00 |
| Spiked Amount 50.000 | Range 65 - 123 | | Recovery = 96.98% | | | |
| 79) toluene-d8 (s) | 12.321 | 98 | 334076 | 53.08 | ug/L | 0.00 |
| Spiked Amount 50.000 | Range 80 - 124 | | Recovery = 106.16% | | | |
| 103) 4-bromofluorobenzene (s) | 14.946 | 95 | 106365 | 46.85 | ug/L | 0.00 |
| Spiked Amount 50.000 | Range 71 - 132 | | Recovery = 93.70% | | | |
| Target Compounds | | | | | | Qvalue |

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\Y-Core\vy6078-79\
Data File : Y140516.D
Acq On : 12 Nov 2013 1:18 pm
Operator : prashans
Sample : MB
Misc : MS57945,VY6078,5.0,,,,1
ALS Vial : 3 Sample Multiplier: 1

Quant Time: Nov 13 11:05:55 2013
Quant Method : C:\MSDCHEM\1\METHODS\MY5974.M
Quant Title : Method SW846 8260B, ZB624 60m x 0.25mm x 1.4um
QLast Update : Wed Oct 30 17:14:38 2013
Response via : Initial Calibration



New Jersey ACCUTEST LABORATORIES

## GC/MS Semi-volatiles

### QC Data Summaries



Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries
- Instrument Performance Checks (DFTPP)
- Internal Standard Area Summaries
- Surrogate Recovery Summaries
- Initial and Continuing Calibration Summaries

# Method Blank Summary



**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| OP70508-MB1 | 2M58215.D | 1 | 11/08/13 | AD | 11/08/13 | OP70508 | E2M2462 |

**The QC reported here applies to the following samples:** **Method:** SW846 8270D

JB52301-3, JB52301-5

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 105-67-9 | 2,4-Dimethylphenol | ND | 140 | 48 | ug/kg | |
| 51-28-5 | 2,4-Dinitrophenol | ND | 570 | 35 | ug/kg | |
| 95-48-7 | 2-Methylphenol | ND | 57 | 33 | ug/kg | |
| | 3&4-Methylphenol | ND | 57 | 36 | ug/kg | |
| 100-02-7 | 4-Nitrophenol | ND | 290 | 48 | ug/kg | |
| 108-95-2 | Phenol | ND | 57 | 30 | ug/kg | |
| 83-32-9 | Acenaphthene | ND | 29 | 8.3 | ug/kg | |
| 120-12-7 | Anthracene | ND | 29 | 10 | ug/kg | |
| 56-55-3 | Benzo(a)anthracene | ND | 29 | 9.3 | ug/kg | |
| 50-32-8 | Benzo(a)pyrene | ND | 29 | 8.7 | ug/kg | |
| 205-99-2 | Benzo(b)fluoranthene | ND | 29 | 9.5 | ug/kg | |
| 191-24-2 | Benzo(g,h,i)perylene | ND | 29 | 11 | ug/kg | |
| 207-08-9 | Benzo(k)fluoranthene | ND | 29 | 11 | ug/kg | |
| 92-52-4 | 1,1'-Biphenyl | ND | 57 | 3.3 | ug/kg | |
| 218-01-9 | Chrysene | ND | 29 | 9.7 | ug/kg | |
| 53-70-3 | Dibenzo(a,h)anthracene | ND | 29 | 9.7 | ug/kg | |
| 84-74-2 | Di-n-butyl phthalate | ND | 57 | 6.3 | ug/kg | |
| 84-66-2 | Diethyl phthalate | ND | 57 | 9.7 | ug/kg | |
| 117-81-7 | bis(2-Ethylhexyl)phthalate | ND | 57 | 25 | ug/kg | |
| 206-44-0 | Fluoranthene | ND | 29 | 13 | ug/kg | |
| 86-73-7 | Fluorene | ND | 29 | 9.4 | ug/kg | |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | ND | 29 | 9.9 | ug/kg | |
| 91-57-6 | 2-Methylnaphthalene | ND | 57 | 16 | ug/kg | |
| 91-20-3 | Naphthalene | ND | 29 | 7.8 | ug/kg | |
| 85-01-8 | Phenanthrene | ND | 29 | 13 | ug/kg | |
| 129-00-0 | Pyrene | ND | 29 | 11 | ug/kg | |
| 110-86-1 | Pyridine | ND | 57 | 11 | ug/kg | |
| 91-22-5 | Quinoline | ND | 140 | 27 | ug/kg | |

| CAS No. | Surrogate Recoveries | | Limits |
|---|---|---|---|
| 367-12-4 | 2-Fluorophenol | 104% | 13-110% |
| 4165-62-2 | Phenol-d5 | 101% | 15-110% |
| 118-79-6 | 2,4,6-Tribromophenol | 109% | 20-123% |
| 4165-60-0 | Nitrobenzene-d5 | 101% | 10-110% |

# Method Blank Summary



**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| OP70508-MB1 | 2M58215.D | 1 | 11/08/13 | AD | 11/08/13 | OP70508 | E2M2462 |

**The QC reported here applies to the following samples:** **Method:** SW846 8270D

JB52301-3, JB52301-5

| CAS No. | Surrogate Recoveries | | Limits |
|---|---|---|---|
| 321-60-8 | 2-Fluorobiphenyl | 101% | 17-110% |
| 1718-51-0 | Terphenyl-d14 | 114% | 30-124% |

| CAS No. | Tentatively Identified Compounds | R.T. | Est. Conc. | Units | Q |
|---|---|---|---|---|---|
| | system artifact/aldol-condensation | 3.31 | 4600 | ug/kg | J |
| | Total TIC, Semi-Volatile | | 0 | ug/kg | |

# Blank Spike Summary



**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| OP70508-BS1 | 2M58216.D | 1 | 11/08/13 | AD | 11/08/13 | OP70508 | E2M2462 |

**The QC reported here applies to the following samples:** **Method:** SW846 8270D

JB52301-3, JB52301-5

| CAS No. | Compound | Spike ug/kg | BSP ug/kg | BSP % | Limits |
|---|---|---|---|---|---|
| 105-67-9 | 2,4-Dimethylphenol | 1430 | 1370 | 96 | 43-137 |
| 51-28-5 | 2,4-Dinitrophenol | 2860 | 2540 | 89 | 21-147 |
| 95-48-7 | 2-Methylphenol | 1430 | 1280 | 90 | 40-110 |
| | 3&4-Methylphenol | 1430 | 1300 | 91 | 39-111 |
| 100-02-7 | 4-Nitrophenol | 1430 | 1220 | 85 | 26-143 |
| 108-95-2 | Phenol | 1430 | 1340 | 94 | 36-112 |
| 83-32-9 | Acenaphthene | 1430 | 1320 | 92 | 46-110 |
| 120-12-7 | Anthracene | 1430 | 1350 | 95 | 56-118 |
| 56-55-3 | Benzo(a)anthracene | 1430 | 1310 | 92 | 56-117 |
| 50-32-8 | Benzo(a)pyrene | 1430 | 1380 | 97 | 56-124 |
| 205-99-2 | Benzo(b)fluoranthene | 1430 | 1340 | 94 | 53-127 |
| 191-24-2 | Benzo(g,h,i)perylene | 1430 | 1390 | 97 | 52-126 |
| 207-08-9 | Benzo(k)fluoranthene | 1430 | 1330 | 93 | 51-122 |
| 92-52-4 | 1,1'-Biphenyl | 1430 | 1280 | 90 | 42-122 |
| 218-01-9 | Chrysene | 1430 | 1360 | 95 | 54-121 |
| 53-70-3 | Dibenzo(a,h)anthracene | 1430 | 1400 | 98 | 53-126 |
| 84-74-2 | Di-n-butyl phthalate | 1430 | 1380 | 97 | 56-125 |
| 84-66-2 | Diethyl phthalate | 1430 | 1270 | 89 | 52-118 |
| 117-81-7 | bis(2-Ethylhexyl)phthalate | 1430 | 1450 | 102 | 52-138 |
| 206-44-0 | Fluoranthene | 1430 | 1310 | 92 | 55-119 |
| 86-73-7 | Fluorene | 1430 | 1300 | 91 | 51-114 |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | 1430 | 1360 | 95 | 53-128 |
| 91-57-6 | 2-Methylnaphthalene | 1430 | 1220 | 85 | 34-114 |
| 91-20-3 | Naphthalene | 1430 | 1200 | 84 | 37-104 |
| 85-01-8 | Phenanthrene | 1430 | 1310 | 92 | 55-113 |
| 129-00-0 | Pyrene | 1430 | 1380 | 97 | 54-120 |
| 110-86-1 | Pyridine | 1430 | 1020 | 71 | 10-110 |
| 91-22-5 | Quinoline | 1430 | 1310 | 92 | 41-127 |

| CAS No. | Surrogate Recoveries | BSP | Limits |
|---|---|---|---|
| 367-12-4 | 2-Fluorophenol | 98% | 13-110% |
| 4165-62-2 | Phenol-d5 | 97% | 15-110% |
| 118-79-6 | 2,4,6-Tribromophenol | 111% | 20-123% |
| 4165-60-0 | Nitrobenzene-d5 | 94% | 10-110% |

* = Outside of Control Limits.

# Blank Spike Summary



**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| OP70508-BS1 | 2M58216.D | 1 | 11/08/13 | AD | 11/08/13 | OP70508 | E2M2462 |

**The QC reported here applies to the following samples:** **Method:** SW846 8270D

JB52301-3, JB52301-5

| CAS No. | Surrogate Recoveries | BSP | Limits |
|---|---|---|---|
| 321-60-8 | 2-Fluorobiphenyl | 97% | 17-110% |
| 1718-51-0 | Terphenyl-d14 | 108% | 30-124% |



* = Outside of Control Limits.

# Matrix Spike/Matrix Spike Duplicate Summary



**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| OP70508-MS | 2M58217.D | 1 | 11/08/13 | AD | 11/08/13 | OP70508 | E2M2462 |
| OP70508-MSD | 2M58218.D | 1 | 11/08/13 | AD | 11/08/13 | OP70508 | E2M2462 |
| JB52332-1 | 2M58219.D | 1 | 11/09/13 | AD | 11/08/13 | OP70508 | E2M2462 |
| JB52332-1 | 2M58310.D | 4 | 11/11/13 | KS | 11/08/13 | OP70508 | E2M2465 |

**The QC reported here applies to the following samples:** **Method:** SW846 8270D

JB52301-3, JB52301-5

| CAS No. | Compound | JB52332-1 ug/kg | Q | Spike ug/kg | MS ug/kg | MS % | MSD ug/kg | MSD % | RPD | Limits Rec/RPD |
|---|---|---|---|---|---|---|---|---|---|---|
| 105-67-9 | 2,4-Dimethylphenol | ND | | 1530 | 1430 | 93 | 1520 | 95 | 6 | 21-124/40 |
| 51-28-5 | 2,4-Dinitrophenol | ND | | 3060 | 852 | 28 | 1030 | 32 | 19 | 10-110/54 |
| 95-48-7 | 2-Methylphenol | ND | | 1530 | 1430 | 93 | 1510 | 95 | 5 | 19-105/42 |
| | 3&4-Methylphenol | ND | | 1530 | 1470 | 96 | 1560 | 98 | 6 | 17-108/43 |
| 100-02-7 | 4-Nitrophenol | ND | | 1530 | 1690 | 110 | 1610 | 101 | 5 | 10-141/48 |
| 108-95-2 | Phenol | ND | | 1530 | 1420 | 93 | 1460 | 92 | 3 | 16-105/42 |
| 83-32-9 | Acenaphthene | 526 | | 1530 | 1810 | 84 | 1900 | 86 | 5 | 25-106/38 |
| 120-12-7 | Anthracene | 704 | | 1530 | 1980 | 83 | 2080 | 86 | 5 | 27-123/40 |
| 56-55-3 | Benzo(a)anthracene | 159 | | 1530 | 1430 | 83 | 1480 | 83 | 3 | 22-127/44 |
| 50-32-8 | Benzo(a)pyrene | 64.5 | | 1530 | 1430 | 89 | 1520 | 91 | 6 | 22-132/42 |
| 205-99-2 | Benzo(b)fluoranthene | 62.6 | | 1530 | 1410 | 88 | 1530 | 92 | 8 | 17-141/45 |
| 191-24-2 | Benzo(g,h,i)perylene | 54.0 | | 1530 | 1360 | 85 | 1450 | 88 | 6 | 23-129/42 |
| 207-08-9 | Benzo(k)fluoranthene | 12.9 | J | 1530 | 1330 | 86 | 1380 | 86 | 4 | 20-124/44 |
| 92-52-4 | 1,1'-Biphenyl | 137 | | 1530 | 1590 | 95 | 1640 | 94 | 3 | 22-114/41 |
| 218-01-9 | Chrysene | 281 | | 1530 | 1560 | 84 | 1640 | 85 | 5 | 21-131/42 |
| 53-70-3 | Dibenzo(a,h)anthracene | 27.3 | J | 1530 | 1360 | 87 | 1460 | 90 | 7 | 26-129/42 |
| 84-74-2 | Di-n-butyl phthalate | ND | | 1530 | 1410 | 92 | 1500 | 94 | 6 | 29-127/39 |
| 84-66-2 | Diethyl phthalate | ND | | 1530 | 1350 | 88 | 1400 | 88 | 4 | 32-115/37 |
| 117-81-7 | bis(2-Ethylhexyl)phthalate | ND | | 1530 | 1300 | 85 | 1390 | 87 | 7 | 26-140/43 |
| 206-44-0 | Fluoranthene | 229 | | 1530 | 1620 | 91 | 1690 | 92 | 4 | 16-134/44 |
| 86-73-7 | Fluorene | 995 | | 1530 | 2290 | 85 | 2420 | 89 | 6 | 24-116/39 |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | 31.4 | J | 1530 | 1370 | 87 | 1470 | 90 | 7 | 23-132/43 |
| 91-57-6 | 2-Methylnaphthalene | 3980 [a] | | 1530 | 4460 | 59 | 4420 | 55 | 1 | 16-108/40 |
| 91-20-3 | Naphthalene | 307 | | 1530 | 1550 | 81 | 1560 | 79 | 1 | 13-103/41 |
| 85-01-8 | Phenanthrene | 2960 | | 1530 | 3900 | 61 | 4140 | 74 | 6 | 19-126/42 |
| 129-00-0 | Pyrene | 753 | | 1530 | 1940 | 78 | 2060 | 82 | 6 | 17-136/45 |
| 110-86-1 | Pyridine | ND | | 1530 | 815 | 53 | 1000 | 63 | 20 | 10-110/49 |
| 91-22-5 | Quinoline | ND | | 1530 | 1710 | 112 | 1780 | 112 | 4 | 19-117/41 |

| CAS No. | Surrogate Recoveries | MS | MSD | JB52332-1 | JB52332-1 | Limits |
|---|---|---|---|---|---|---|
| 367-12-4 | 2-Fluorophenol | 95% | 99% | 92% | 102% | 13-110% |
| 4165-62-2 | Phenol-d5 | 99% | 99% | 93% | 101% | 15-110% |
| 118-79-6 | 2,4,6-Tribromophenol | 107% | 110% | 98% | 100% | 20-123% |
| 4165-60-0 | Nitrobenzene-d5 | 91% | 88% | 84% | 96% | 10-110% |

* = Outside of Control Limits.

# Matrix Spike/Matrix Spike Duplicate Summary



**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| OP70508-MS | 2M58217.D | 1 | 11/08/13 | AD | 11/08/13 | OP70508 | E2M2462 |
| OP70508-MSD | 2M58218.D | 1 | 11/08/13 | AD | 11/08/13 | OP70508 | E2M2462 |
| JB52332-1 | 2M58219.D | 1 | 11/09/13 | AD | 11/08/13 | OP70508 | E2M2462 |
| JB52332-1 | 2M58310.D | 4 | 11/11/13 | KS | 11/08/13 | OP70508 | E2M2465 |

**The QC reported here applies to the following samples:** **Method:** SW846 8270D

JB52301-3, JB52301-5

| CAS No. | Surrogate Recoveries | MS | MSD | JB52332-1 | JB52332-1 | Limits |
|---|---|---|---|---|---|---|
| 321-60-8 | 2-Fluorobiphenyl | 92% | 90% | 88% | 101% | 17-110% |
| 1718-51-0 | Terphenyl-d14 | 102% | 103% | 101% | 114% | 30-124% |

(a) Result is from Run #2.

* = Outside of Control Limits.

# Instrument Performance Check (DFTPP)



**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

**Sample:** E2M2451-DFTPP
**Lab File ID:** 2M57932.D
**Instrument ID:** GCMS2M
**Injection Date:** 10/31/13
**Injection Time:** 12:27

| m/e | Ion Abundance Criteria | Raw Abundance | % Relative Abundance | | Pass/Fail |
|---|---|---|---|---|---|
| 51 | 30.0 - 60.0% of mass 198 | 63847 | 45.5 | | Pass |
| 68 | Less than 2.0% of mass 69 | 0 | 0.00 | (0.00) [a] | Pass |
| 69 | Mass 69 relative abundance | 66635 | 47.5 | | Pass |
| 70 | Less than 2.0% of mass 69 | 461 | 0.33 | (0.69) [a] | Pass |
| 127 | 40.0 - 60.0% of mass 198 | 73456 | 52.3 | | Pass |
| 197 | Less than 1.0% of mass 198 | 0 | 0.00 | | Pass |
| 198 | Base peak, 100% relative abundance | 140336 | 100.0 | | Pass |
| 199 | 5.0 - 9.0% of mass 198 | 9865 | 7.03 | | Pass |
| 275 | 10.0 - 30.0% of mass 198 | 33074 | 23.6 | | Pass |
| 365 | 1.0 - 100.0% of mass 198 | 2958 | 2.11 | | Pass |
| 441 | Present, but less than mass 443 | 14547 | 10.4 | (84.3) [b] | Pass |
| 442 | 40.0 - 100.0% of mass 198 | 86256 | 61.5 | | Pass |
| 443 | 17.0 - 23.0% of mass 442 | 17250 | 12.3 | (20.0) [c] | Pass |

(a) Value is % of mass 69
(b) Value is % of mass 443
(c) Value is % of mass 442

**This check applies to the following Samples, MS, MSD, Blanks, and Standards:**

| Lab Sample ID | Lab File ID | Date Analyzed | Time Analyzed | Hours Lapsed | Client Sample ID |
|---|---|---|---|---|---|
| E2M2451-IC2451 | 2M57933.D | 10/31/13 | 12:40 | 00:13 | Initial cal 100 |
| E2M2451-IC2451 | 2M57934.D | 10/31/13 | 13:08 | 00:41 | Initial cal 1 |
| E2M2451-IC2451 | 2M57935.D | 10/31/13 | 13:41 | 01:14 | Initial cal 80 |
| E2M2451-ICC2451 | 2M57936.D | 10/31/13 | 14:10 | 01:43 | Initial cal 50 |
| E2M2451-IC2451 | 2M57937.D | 10/31/13 | 14:39 | 02:12 | Initial cal 25 |
| E2M2451-IC2451 | 2M57938.D | 10/31/13 | 15:07 | 02:40 | Initial cal 10 |
| E2M2451-IC2451 | 2M57939.D | 10/31/13 | 15:36 | 03:09 | Initial cal 5 |
| E2M2451-IC2451 | 2M57940.D | 10/31/13 | 16:05 | 03:38 | Initial cal 2 |
| E2M2451-IC2451 | 2M57941.D | 10/31/13 | 16:34 | 04:07 | Initial cal 100 |
| E2M2451-IC2451 | 2M57942.D | 10/31/13 | 17:03 | 04:36 | Initial cal 80 |
| E2M2451-IC2451 | 2M57943.D | 10/31/13 | 17:32 | 05:05 | Initial cal 50 |
| E2M2451-IC2451 | 2M57944.D | 10/31/13 | 18:01 | 05:34 | Initial cal 25 |
| E2M2451-IC2451 | 2M57945.D | 10/31/13 | 18:29 | 06:02 | Initial cal 10 |
| E2M2451-IC2451 | 2M57946.D | 10/31/13 | 18:58 | 06:31 | Initial cal 5 |
| E2M2451-IC2451 | 2M57947.D | 10/31/13 | 19:27 | 07:00 | Initial cal 2 |
| E2M2451-IC2451 | 2M57948.D | 10/31/13 | 19:56 | 07:29 | Initial cal 1 |
| E2M2451-ICV2451 | 2M57949.D | 10/31/13 | 20:25 | 07:58 | Initial cal verification 50 |
| E2M2451-ICV2451 | 2M57951.D | 10/31/13 | 21:23 | 08:56 | Initial cal verification 50 |
| E2M2451-ICV2451 | 2M57952.D | 10/31/13 | 21:52 | 09:25 | Initial cal verification 50 |

# Instrument Performance Check (DFTPP)



**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| | | | |
|---|---|---|---|
| **Sample:** | E2M2451-DFTPP | **Injection Date:** | 10/31/13 |
| **Lab File ID:** | 2M57932.D | **Injection Time:** | 12:27 |
| **Instrument ID:** | GCMS2M | | |

| Lab Sample ID | Lab File ID | Date Analyzed | Time Analyzed | Hours Lapsed | Client Sample ID |
|---|---|---|---|---|---|
| E2M2451-ICV2451 | 2M57953.D | 10/31/13 | 22:21 | 09:54 | Initial cal verification 50 |
| E2M2451-ICV2451 | 2M57954.D | 10/31/13 | 22:50 | 10:23 | Initial cal verification 50 |

# Instrument Performance Check (DFTPP)



**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| | | | |
|---|---|---|---|
| **Sample:** | E2M2462-DFTPP | **Injection Date:** | 11/08/13 |
| **Lab File ID:** | 2M58212.D | **Injection Time:** | 21:04 |
| **Instrument ID:** | GCMS2M | | |

| m/e | Ion Abundance Criteria | Raw Abundance | % Relative Abundance | | Pass/Fail |
|---|---|---|---|---|---|
| 51 | 30.0 - 60.0% of mass 198 | 45177 | 45.5 | | Pass |
| 68 | Less than 2.0% of mass 69 | 0 | 0.00 | (0.00) [a] | Pass |
| 69 | Mass 69 relative abundance | 46474 | 46.8 | | Pass |
| 70 | Less than 2.0% of mass 69 | 139 | 0.14 | (0.30) [a] | Pass |
| 127 | 40.0 - 60.0% of mass 198 | 52900 | 53.2 | | Pass |
| 197 | Less than 1.0% of mass 198 | 0 | 0.00 | | Pass |
| 198 | Base peak, 100% relative abundance | 99391 | 100.0 | | Pass |
| 199 | 5.0 - 9.0% of mass 198 | 6650 | 6.69 | | Pass |
| 275 | 10.0 - 30.0% of mass 198 | 23644 | 23.8 | | Pass |
| 365 | 1.0 - 100.0% of mass 198 | 2180 | 2.19 | | Pass |
| 441 | Present, but less than mass 443 | 10173 | 10.2 | (76.5) [b] | Pass |
| 442 | 40.0 - 100.0% of mass 198 | 66592 | 67.0 | | Pass |
| 443 | 17.0 - 23.0% of mass 442 | 13306 | 13.4 | (20.0) [c] | Pass |

(a) Value is % of mass 69
(b) Value is % of mass 443
(c) Value is % of mass 442

**This check applies to the following Samples, MS, MSD, Blanks, and Standards:**

| Lab Sample ID | Lab File ID | Date Analyzed | Time Analyzed | Hours Lapsed | Client Sample ID |
|---|---|---|---|---|---|
| E2M2462-CC2451 | 2M58213.D | 11/08/13 | 21:16 | 00:12 | Continuing cal 25 |
| E2M2462-CC2451 | 2M58214.D | 11/08/13 | 21:44 | 00:40 | Continuing cal 25 |
| OP70508-MB1 | 2M58215.D | 11/08/13 | 22:13 | 01:09 | Method Blank |
| OP70508-BS1 | 2M58216.D | 11/08/13 | 22:41 | 01:37 | Blank Spike |
| OP70508-MS | 2M58217.D | 11/08/13 | 23:09 | 02:05 | Matrix Spike |
| OP70508-MSD | 2M58218.D | 11/08/13 | 23:37 | 02:33 | Matrix Spike Duplicate |
| JB52332-1 | 2M58219.D | 11/09/13 | 00:05 | 03:01 | (used for QC only; not part of job JB52301) |
| ZZZZZZ | 2M58220.D | 11/09/13 | 00:33 | 03:29 | (unrelated sample) |
| ZZZZZZ | 2M58221.D | 11/09/13 | 01:01 | 03:57 | (unrelated sample) |
| ZZZZZZ | 2M58222.D | 11/09/13 | 01:29 | 04:25 | (unrelated sample) |
| ZZZZZZ | 2M58223.D | 11/09/13 | 01:57 | 04:53 | (unrelated sample) |
| ZZZZZZ | 2M58224.D | 11/09/13 | 02:25 | 05:21 | (unrelated sample) |
| ZZZZZZ | 2M58225.D | 11/09/13 | 02:53 | 05:49 | (unrelated sample) |
| ZZZZZZ | 2M58226.D | 11/09/13 | 03:21 | 06:17 | (unrelated sample) |
| ZZZZZZ | 2M58227.D | 11/09/13 | 03:49 | 06:45 | (unrelated sample) |
| JB52301-3 | 2M58228.D | 11/09/13 | 04:17 | 07:13 | AOI-8-N-146-0-2 |
| JB52301-5 | 2M58229.D | 11/09/13 | 04:45 | 07:41 | AOI-8-N-143-20.5-21 |
| ZZZZZZ | 2M58231.D | 11/09/13 | 05:41 | 08:37 | (unrelated sample) |
| ZZZZZZ | 2M58232.D | 11/09/13 | 06:08 | 09:04 | (unrelated sample) |

# Semivolatile Internal Standard Area Summary



**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| | | | |
|---|---|---|---|
| **Check Std:** | E2M2462-CC2451 | **Injection Date:** | 11/08/13 |
| **Lab File ID:** | 2M58213.D | **Injection Time:** | 21:16 |
| **Instrument ID:** | GCMS2M | **Method:** | SW846 8270D |

| | IS 1 AREA | RT | IS 2 AREA | RT | IS 3 AREA | RT | IS 4 AREA | RT | IS 5 AREA | RT | IS 6 AREA | RT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Check Std | 198513 | 4.55 | 797005 | 5.65 | 439200 | 7.93 | 713193 | 10.52 | 678787 | 15.68 | 684061 | 18.29 |
| Upper Limit [a] | 397026 | 5.05 | 1594010 | 6.15 | 878400 | 8.43 | 1426386 | 11.02 | 1357574 | 16.18 | 1368122 | 18.79 |
| Lower Limit [b] | 99257 | 4.05 | 398503 | 5.15 | 219600 | 7.43 | 356597 | 10.02 | 339394 | 15.18 | 342031 | 17.79 |

| Lab Sample ID | IS 1 AREA | RT | IS 2 AREA | RT | IS 3 AREA | RT | IS 4 AREA | RT | IS 5 AREA | RT | IS 6 AREA | RT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OP70508-MB1 | 206512 | 4.55 | 808569 | 5.64 | 418943 | 7.92 | 643769 | 10.52 | 532272 | 15.66 | 511050 | 18.28 |
| OP70508-BS1 | 208512 | 4.55 | 811414 | 5.65 | 422546 | 7.93 | 648217 | 10.52 | 553173 | 15.67 | 526635 | 18.29 |
| OP70508-MS | 194631 | 4.55 | 819415 | 5.65 | 507768 | 7.95 | 841437 | 10.57 | 802851 | 15.71 | 749803 | 18.31 |
| OP70508-MSD | 204053 | 4.55 | 866553 | 5.65 | 543699 | 7.96 | 897409 | 10.58 | 849268 | 15.71 | 794321 | 18.32 |
| JB52332-1 | 199993 | 4.55 | 847933 | 5.65 | 537580 | 7.95 | 868444 | 10.58 | 841180 | 15.71 | 798596 | 18.32 |
| ZZZZZZ | 211411 | 4.55 | 827082 | 5.65 | 481233 | 7.94 | 767888 | 10.54 | 666737 | 15.67 | 627782 | 18.29 |
| ZZZZZZ | 209652 | 4.55 | 797123 | 5.64 | 431803 | 7.92 | 654184 | 10.52 | 614315 | 15.67 | 582856 | 18.29 |
| ZZZZZZ | 180427 | 4.55 | 779419 | 5.65 | 499111 | 7.97 | 756065 | 10.57 | 717411 | 15.70 | 686589 | 18.31 |
| ZZZZZZ | 203847 | 4.55 | 823819 | 5.65 | 468443 | 7.94 | 722633 | 10.53 | 640271 | 15.67 | 608100 | 18.29 |
| ZZZZZZ | 195208 | 4.55 | 786880 | 5.65 | 458131 | 7.94 | 688919 | 10.53 | 595529 | 15.67 | 563490 | 18.29 |
| ZZZZZZ | 196336 | 4.55 | 800030 | 5.65 | 478569 | 7.94 | 732016 | 10.54 | 625356 | 15.67 | 590608 | 18.29 |
| ZZZZZZ | 218333 | 4.55 | 829642 | 5.64 | 426070 | 7.92 | 650875 | 10.52 | 561301 | 15.66 | 559590 | 18.28 |
| ZZZZZZ | 200274 | 4.55 | 770650 | 5.64 | 399569 | 7.92 | 623380 | 10.52 | 610517 | 15.68 | 629287 | 18.30 |
| JB52301-3 | 185430 | 4.55 | 718316 | 5.64 | 376992 | 7.92 | 615031 | 10.52 | 658555 | 15.68 | 721373 | 18.32 |
| JB52301-5 | 190037 | 4.56 | 777856 | 5.65 | 493868 | 7.96 | 879465 | 10.59 | 952910 | 15.77 | 936710 | 18.39 |
| ZZZZZZ | 179395 | 4.56 | 696312 | 5.65 | 368580 | 7.94 | 590268 | 10.53 | 647504 | 15.69 | 660895 | 18.31 |
| ZZZZZZ | 204853 | 4.57 | 664674 | 5.67 | 576144 | 8.03 | 810090 | 10.67 | 1025258 | 15.84 | 1002142 | 18.45 |

**IS 1** = 1,4-Dichlorobenzene-d4
**IS 2** = Naphthalene-d8
**IS 3** = Acenaphthene-D10
**IS 4** = Phenanthrene-d10
**IS 5** = Chrysene-d12
**IS 6** = Perylene-d12

(a) Upper Limit = + 100% of check standard area; Retention time + 0.5 minutes.
(b) Lower Limit = -50% of check standard area; Retention time -0.5 minutes.

# Semivolatile Surrogate Recovery Summary



**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

**Method:** SW846 8270D **Matrix:** SO

**Samples and QC shown here apply to the above method**

| Lab Sample ID | Lab File ID | S1 | S2 | S3 | S4 | S5 | S6 |
|---|---|---|---|---|---|---|---|
| JB52301-3 | 2M58228.D | 96.0 | 95.0 | 100.0 | 89.0 | 97.0 | 94.0 |
| JB52301-5 | 2M58229.D | 88.0 | 92.0 | 88.0 | 86.0 | 86.0 | 95.0 |
| OP70508-BS1 | 2M58216.D | 98.0 | 97.0 | 111.0 | 94.0 | 97.0 | 108.0 |
| OP70508-MB1 | 2M58215.D | 104.0 | 101.0 | 109.0 | 101.0 | 101.0 | 114.0 |
| OP70508-MS | 2M58217.D | 95.0 | 99.0 | 107.0 | 91.0 | 92.0 | 102.0 |
| OP70508-MSD | 2M58218.D | 99.0 | 99.0 | 110.0 | 88.0 | 90.0 | 103.0 |

| Surrogate Compounds | Recovery Limits |
|---|---|
| **S1** = 2-Fluorophenol | 13-110% |
| **S2** = Phenol-d5 | 15-110% |
| **S3** = 2,4,6-Tribromophenol | 20-123% |
| **S4** = Nitrobenzene-d5 | 10-110% |
| **S5** = 2-Fluorobiphenyl | 17-110% |
| **S6** = Terphenyl-d14 | 30-124% |

# Initial Calibration Summary

**Job Number:** JB52301 **Sample:** E2M2451-ICC2451
**Account:** SECORPAE Stantec Consulting Services Inc. **Lab FileID:** 2M57936.D
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

Response Factor Report MS2M

Method : C:\msdchem\1\METHODS\M2M2451.M (RTE Integrator)
Title : Semi Volatile GC/MS, rxi-5sil ms 30mx .25mmx .25umFri Nov 01 13:13:31 2013
Last Update : Fri Nov 01 13:13:31 2013
Response via : Initial Calibration

Calibration Files
2 =2m57940.D 5 =2m57939.D 25 =2m57937.D 80 =2m57935.D
100 =2m57933.D 50 =2m57936.D 1 =2m57934.D 10 =2m57938.D

| Compound | 2 | 5 | 25 | 80 | 100 | 50 | 1 | 10 | Avg | %RSD |
|---|---|---|---|---|---|---|---|---|---|---|
| 1) I 1,4-Dichlorobenzene-d | ISTD | | | | | | | | | |
| 2) 1,4-Dioxane | 0.516 | 0.619 | 0.606 | 0.606 | 0.585 | 0.608 | 0.607 | 0.569 | 0.589 | 5.71 |
| 3) Pyridine | 1.402 | 1.571 | 1.530 | 1.536 | 1.471 | 1.536 | 1.562 | 1.432 | 1.505 | 4.15 |
| 4) N-Nitrosodim | 0.820 | 0.996 | 1.001 | 0.989 | 0.947 | 0.987 | 0.942 | 0.878 | 0.945 | 6.88 |
| 5) 2-Fluorophen | 1.069 | 1.275 | 1.268 | 1.294 | 1.255 | 1.268 | 1.184 | 1.117 | 1.216 | 6.86 |
| 6) Indene | 2.247 | 2.579 | 2.511 | 2.542 | 2.510 | 2.513 | 2.348 | 2.268 | 2.440 | 5.37 |
| 7) Cumene | 2.997 | 3.548 | 3.416 | 3.383 | 3.307 | 3.377 | 3.318 | 3.054 | 3.300 | 5.62 |
| 8) Phenol-d5 | 1.224 | 1.578 | 1.601 | 1.652 | 1.619 | 1.626 | 1.474 | 1.406 | 1.523 | 9.64 |
| 9) Phenol | 1.563 | 1.887 | 1.925 | 2.017 | 2.011 | 1.969 | 1.588 | 1.704 | 1.833 | 10.20 |
| 10) Aniline | 1.974 | 2.371 | 2.337 | 2.340 | 2.293 | 2.314 | 2.092 | 2.069 | 2.224 | 6.90 |
| 11) bis(2-Chloro | 1.211 | 1.379 | 1.340 | 1.359 | 1.320 | 1.349 | 1.287 | 1.215 | 1.308 | 4.91 |
| 12) 2-Chlorophen | 1.279 | 1.506 | 1.502 | 1.514 | 1.508 | 1.511 | 1.360 | 1.323 | 1.438 | 6.94 |
| 13) Decane | 1.375 | 1.549 | 1.509 | 1.498 | 1.451 | 1.494 | 1.395 | 1.342 | 1.452 | 5.06 |
| 14) 1,3-Dichloro | 1.448 | 1.657 | 1.590 | 1.602 | 1.582 | 1.598 | 1.470 | 1.452 | 1.550 | 5.21 |
| 15) 1,4-Dichloro | 1.471 | 1.706 | 1.628 | 1.636 | 1.609 | 1.635 | 1.612 | 1.485 | 1.598 | 5.00 |
| 16) Benzyl alcoh | 0.762 | 0.910 | 0.959 | 0.993 | 0.981 | 0.970 | 0.828 | 0.828 | 0.904 | 9.61 |
| 17) 1,2-Dichloro | 1.382 | 1.569 | 1.506 | 1.532 | 1.519 | 1.519 | 1.440 | 1.372 | 1.480 | 4.93 |
| 18) Acetophenone | 1.687 | 1.937 | 1.980 | 2.026 | 1.981 | 1.977 | 1.802 | 1.774 | 1.896 | 6.52 |
| 19) 2-Methylphen | 1.095 | 1.288 | 1.331 | 1.399 | 1.386 | 1.360 | 1.109 | 1.147 | 1.264 | 10.09 |
| 20) 2,2'-oxybis( | 1.733 | 1.941 | 1.917 | 1.921 | 1.899 | 1.896 | 1.781 | 1.700 | 1.848 | 5.14 |
| 21) 3&4-Methylph | 1.070 | 1.337 | 1.420 | 1.484 | 1.483 | 1.439 | 1.017 | 1.214 | 1.308 | 14.23 |
| 22) n-Nitroso-di | 0.958 | 1.105 | 1.082 | 1.112 | 1.090 | 1.085 | 0.999 | 1.001 | 1.054 | 5.55 |
| 23) Hexachloroet | 0.441 | 0.495 | 0.493 | 0.498 | 0.485 | 0.492 | 0.479 | 0.439 | 0.478 | 4.99 |
| 24) I Naphthalene-d8 | ISTD | | | | | | | | | |
| 25) Nitrobenzene | 0.305 | 0.369 | 0.354 | 0.361 | 0.357 | 0.364 | 0.363 | 0.323 | 0.349 | 6.51 |
| 26) Nitrobenzene | 0.323 | 0.389 | 0.383 | 0.382 | 0.378 | 0.383 | 0.343 | 0.345 | 0.366 | 6.83 |
| 27) Quinoline | 0.513 | 0.638 | 0.669 | 0.678 | 0.671 | 0.668 | 0.514 | 0.578 | 0.616 | 11.54 |
| 28) Isophorone | 0.574 | 0.656 | 0.641 | 0.644 | 0.632 | 0.639 | 0.616 | 0.583 | 0.623 | 4.82 |
| 29) 2-Nitropheno | 0.177 | 0.204 | 0.205 | 0.212 | 0.209 | 0.209 | 0.168 | 0.181 | 0.196 | 8.94 |
| 30) 2,4-Dimethyl | 0.274 | 0.339 | 0.355 | 0.361 | 0.360 | 0.360 | 0.266 | 0.312 | 0.328 | 12.11 |
| 31) Benzoic acid | | 0.188 | 0.260 | 0.298 | 0.296 | 0.283 | | 0.196 | 0.254 | 19.55 |
| 32) bis(2-Chloro | 0.319 | 0.378 | 0.379 | 0.382 | 0.379 | 0.384 | 0.358 | 0.344 | 0.366 | 6.38 |
| 33) 2,4-Dichloro | 0.182 | 0.231 | 0.264 | 0.277 | 0.277 | 0.274 | 0.166 | 0.223 | 0.237 | 18.62 |
| 34) 2,6-Dichloro | 0.212 | 0.263 | 0.269 | 0.280 | 0.276 | 0.275 | 0.201 | 0.242 | 0.252 | 12.20 |
| 35) 1,3,5-Trichl | 0.281 | 0.331 | 0.315 | 0.309 | 0.304 | 0.308 | 0.298 | 0.280 | 0.303 | 5.59 |
| 36) 1,2,4-Trichl | 0.269 | 0.307 | 0.300 | 0.296 | 0.294 | 0.300 | 0.282 | 0.276 | 0.290 | 4.63 |
| 37) 1,2,3-Trichl | 0.276 | 0.300 | 0.286 | 0.289 | 0.287 | 0.287 | 0.262 | 0.269 | 0.282 | 4.42 |
| 38) Naphthalene | 0.980 | 1.089 | 1.066 | 1.075 | 1.068 | 1.077 | 1.014 | 0.978 | 1.043 | 4.36 |
| 39) 4-Chloroanil | 0.327 | 0.415 | 0.432 | 0.446 | 0.441 | 0.447 | 0.337 | 0.377 | 0.403 | 12.29 |
| 40) 2,3-Dichloro | 0.263 | 0.317 | 0.320 | 0.326 | 0.324 | 0.324 | 0.258 | 0.286 | 0.302 | 9.48 |
| 41) Caprolactam | 0.106 | 0.126 | 0.145 | 0.150 | 0.148 | 0.150 | | 0.124 | 0.135 | 12.59 |
| 42) Hexachlorobu | 0.144 | 0.156 | 0.151 | 0.153 | 0.149 | 0.153 | 0.141 | 0.139 | 0.148 | 4.10 |
| 43) 4-Chloro-3-m | 0.226 | 0.297 | 0.316 | 0.326 | 0.325 | 0.323 | 0.219 | 0.286 | 0.290 | 15.12 |
| 44) 2-Methylnaph | 0.543 | 0.641 | 0.631 | 0.627 | 0.625 | 0.631 | 0.537 | 0.567 | 0.600 | 7.24 |
| 45) 1-Methylnaph | 0.578 | 0.668 | 0.649 | 0.657 | 0.652 | 0.656 | 0.579 | 0.610 | 0.631 | 5.79 |

# Initial Calibration Summary

**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

**Sample:** E2M2451-ICC2451
**Lab FileID:** 2M57936.D

```
46) Dimethylnaph 0.510 0.594 0.594 0.599 0.591 0.596 0.532 0.539 0.569   6.33

47) I   Acenaphthene-d10      ----------------ISTD---------------------
48) Hexachlorocy             0.223 0.266 0.267 0.254       0.161 0.234  19.10
49) 2,4,6-Trichl 0.268 0.316 0.345 0.367 0.357 0.357 0.244 0.303 0.319  14.11
50) 2,4,5-Trichl 0.261 0.358 0.366 0.388 0.382 0.380 0.381 0.317 0.354  12.39
51) 2-Fluorobiph 1.079 1.277 1.240 1.260 1.224 1.250 1.104 1.145 1.198   6.39
52) 2-Chloronaph 0.993 1.148 1.126 1.141 1.120 1.137 0.983 1.031 1.085   6.48
53) Biphenyl     1.268 1.473 1.449 1.465 1.442 1.459 1.277 1.338 1.396   6.25
54) 2-Nitroanili 0.280 0.388 0.396 0.386 0.383 0.384 0.360 0.353 0.366  10.31
55) Dimethylphth 1.106 1.309 1.287 1.306 1.272 1.289 1.129 1.174 1.234   6.78
56) Acenaphthyle 1.637 1.902 1.899 1.952 1.920 1.933 1.607 1.756 1.826   7.62
57) 2,6-Dinitrot 0.242 0.279 0.295 0.309 0.301 0.308 0.240 0.254 0.278  10.52
58) 3-Nitroanili 0.256 0.347 0.355 0.362 0.354 0.360 0.297 0.324 0.332  11.34
59) Acenaphthene 1.053 1.210 1.197 1.190 1.176 1.197 1.075 1.089 1.149   5.60
60) 2,4-Dinitrop             0.118 0.165 0.169 0.147       0.067 0.133  31.48
           ----- Linear regression -----  Coefficient =  0.9987
             Response Ratio = -0.07231 + 0.18215 *A

61) 4-Nitropheno             0.154 0.173 0.167 0.162       0.133 0.158   9.87
62) Dibenzofuran 1.412 1.648 1.600 1.608 1.581 1.596 1.465 1.480 1.549   5.43
63) 2,4-Dinitrot 0.296 0.384 0.403 0.423 0.413 0.415 0.318 0.356 0.376  12.73
64) 2,3,4,6-Tetr 0.219 0.279 0.297 0.304 0.303 0.300 0.239 0.270 0.277  11.51
65) Diethylphtha 1.113 1.289 1.268 1.292 1.263 1.288 1.166 1.173 1.231   5.67
66) Fluorene     1.153 1.300 1.282 1.294 1.273 1.296 1.157 1.185 1.243   5.26
67) 4-Chlorophen 0.515 0.619 0.595 0.608 0.599 0.600 0.548 0.550 0.579   6.34
68) 4-Nitroanili 0.245 0.332 0.346 0.369 0.358 0.363 0.287 0.311 0.326  13.20

69) I   Phenanthrene-d10      ----------------ISTD---------------------
70) 4,6-Dinitro-             0.131 0.156 0.158 0.146       0.096 0.137  18.47
71) n-Nitrosodip 0.503 0.596 0.581 0.583 0.578 0.578 0.522 0.532 0.559   6.17
72) 1,2-Diphenyl 0.693 0.811 0.794 0.799 0.797 0.789 0.734 0.711 0.766   5.99
73) 2,4,6-Tribro 0.061 0.077 0.073 0.077 0.076 0.074 0.053 0.067 0.070  12.57
74) 4-Bromopheny 0.166 0.196 0.189 0.190 0.188 0.188 0.182 0.171 0.184   5.58
75) Hexachlorobe 0.159 0.188 0.182 0.186 0.184 0.178 0.183 0.167 0.178   5.71
76) Pentachlorop 0.093 0.115 0.127 0.137 0.138 0.132 0.087 0.109 0.117  16.75
77) Phenanthrene 1.017 1.192 1.121 1.137 1.126 1.121 1.061 1.039 1.102   5.25
78) Anthracene   0.990 1.189 1.175 1.183 1.167 1.162 1.075 1.075 1.127   6.39
79) Carbazole    0.912 1.075 1.032 1.051 1.044 1.028 0.935 0.941 1.002   6.25
80) Di-n-butylph 1.075 1.295 1.306 1.339 1.322 1.305 1.112 1.181 1.242   8.34
81) Fluoranthene 0.935 1.147 1.118 1.138 1.130 1.118 1.015 1.014 1.077   7.26
82) Octadecane   0.452 0.517 0.509 0.518 0.510 0.506 0.484 0.461 0.495   5.26

83) I   Chrysene-d12          ----------------ISTD---------------------
84) Pyrene       1.147 1.355 1.291 1.303 1.281 1.274 1.191 1.243 1.260   5.23
85) Terphenyl-d1 0.726 0.852 0.820 0.840 0.832 0.821 0.757 0.769 0.802   5.65
86) Butylbenzylp 0.505 0.632 0.609 0.634 0.631 0.616 0.537 0.573 0.592   8.27
87) Butyl steara 0.314 0.386 0.401 0.419 0.412 0.406 0.334 0.365 0.380  10.14
88) Benzo[a]anth 1.044 1.222 1.151 1.185 1.178 1.145 1.190 1.088 1.151   5.08
89) 3,3'-Dichlor 0.339 0.422 0.423 0.433 0.427 0.418 0.404 0.391 0.407   7.55
90) Chrysene     0.987 1.149 1.114 1.164 1.143 1.117 1.092 1.044 1.101   5.41
91) bis(2-Ethylh 0.701 0.867 0.894 0.943 0.935 0.904 0.781 0.810 0.854   9.83

92) I   Perylene-d12          ----------------ISTD---------------------
93) Di-n-octylph 1.349 1.629 1.639 1.757 1.729 1.699 1.379 1.476 1.582  10.08
94) Benzo[b]fluo 1.060 1.301 1.241 1.346 1.303 1.277 1.128 1.169 1.228   8.08
95) Benzo[k]fluo 1.065 1.259 1.255 1.294 1.288 1.240 1.075 1.172 1.206   7.62
96) Benzo[a]pyre 0.988 1.146 1.105 1.181 1.161 1.134 1.031 1.023 1.096   6.60
97) Indeno[1,2,3 0.888 1.036 1.011 1.134 1.123 1.065 0.972 0.950 1.023   8.30
98) Dibenz(a,h)a 0.768 0.911 0.894 0.965 0.959 0.946 0.884 0.854 0.898   7.25
```

# Initial Calibration Summary

**Job Number:** JB52301 **Sample:** E2M2451-ICC2451
**Account:** SECORPAE Stantec Consulting Services Inc. **Lab FileID:** 2M57936.D
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

```
 99) Dibenz[a,h]a 0.915 1.049 1.086 1.192 1.201 1.135 1.000 0.998 1.072   9.42
100) 7,12-Dimethy 0.512 0.607 0.601 0.637 0.620 0.618 0.581 0.566 0.593   6.69
101) Benzo[g,h,i] 0.921 1.082 1.045 1.121 1.126 1.085 1.014 0.987 1.048   6.74

102)     1,4-Dichlorobenzene-d ----------------ISTD---------------------
103) Benzaldehyde 1.129 1.119 1.161 1.166 1.164 1.185 1.110 1.163 1.150   2.33

104)     Acenaphthene-d10a     ----------------ISTD---------------------
105) 1,2,4,5-Tetr 0.482 0.482 0.468 0.489 0.492 0.476 0.463 0.462 0.477   2.39
106) 2-bromonapht 0.575 0.601 0.602 0.618 0.604 0.618 0.569 0.597 0.598   3.00

107)     Chrysene-d12a         ----------------ISTD---------------------
108) Benzidine    0.535 0.654 0.697 0.769 0.756 0.732 0.452 0.686 0.660  16.91
109) 1-chloroocta 0.328 0.374 0.392 0.402 0.401 0.397 0.353 0.376 0.378   6.90

110)     Phenanthrene-d10a     ----------------ISTD---------------------
111) Atrazine     0.097 0.106 0.112 0.115 0.114 0.116 0.103 0.112 0.109   6.12
112) o-terphenyl  0.519 0.565 0.558 0.567 0.562 0.573 0.508 0.558 0.551   4.36

113) I   Naphthalene-d8a       ----------------ISTD---------------------
114) hydroquinone 0.364 0.238 0.309 0.343 0.288 0.323 0.392 0.254 0.314  16.86
 ------------------------------------------------------------------------------
 (#) = Out of Range  ###  Number of calibration levels exceeded format  ###

           M2M2451eph.M        Wed Nov 06 12:44:39 2013   MS2M
```

8.7.1

8

# Initial Calibration Verification



**Job Number:** JB52301 **Sample:** E2M2451-ICV2451
**Account:** SECORPAE Stantec Consulting Services Inc. **Lab FileID:** 2M57949.D
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : C:\msdchem\1\DATA\E2M2451\2m57949.D Vial: 18
Acq On : 31 Oct 2013 8:25 pm Operator: kevins
Sample : icv2451-50 Inst : MS2M
Misc : op69337,e2m2451 Multiplr: 1.00
MS Integration Params: lscint.p

Method : C:\MSDCHEM\1\METHODS\M2M2451.M (RTE Integrator)
Title : Semi Volatile GC/MS, rxi-5sil ms 30mx .25mmx .25umFri Nov 01 13:13:31 2013
Last Update : Fri Nov 01 13:13:31 2013
Response via : Multiple Level Calibration

Min. RRF : 0.050 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 30% Max. Rel. Area : 200%

| | | Compound | AvgRF | CCRF | %Dev | Area% | Dev(min) | R.T. |
|---|---|---|---|---|---|---|---|---|
| 1 | I | 1,4-Dichlorobenzene-d4 | 1.000 | 1.000 | 0.0 | 122 | 0.00 | 4.63 |
| 3 | t | Pyridine | 1.505 | 1.794 | -19.2 | 143 | 0.02 | 2.50 |
| 4 | t | N-Nitrosodimethylamine | 0.945 | 1.054 | -11.5 | 130 | 0.02 | 2.48 |
| 11 | t | bis(2-Chloroethyl)ether | 1.308 | 1.559 | -19.2 | 141 | 0.00 | 4.43 |
| 14 | t | 1,3-Dichlorobenzene | 1.550 | 1.786 | -15.2 | 136 | 0.00 | 4.58 |
| 15 | t | 1,4-Dichlorobenzene | 1.598 | 1.813 | -13.5 | 135 | 0.00 | 4.64 |
| 16 | t | Benzyl alcohol | 0.904 | 1.014 | -12.2 | 128 | 0.00 | 4.75 |
| 17 | t | 1,2-Dichlorobenzene | 1.480 | 1.716 | -15.9 | 138 | 0.00 | 4.76 |
| 20 | t | 2,2'-oxybis(1-Chloropropa | 1.848 | 2.072 | -12.1 | 133 | 0.00 | 4.84 |
| 22 | t | n-Nitroso-di-n-propylamin | 1.054 | 1.163 | -10.3 | 131 | -0.01 | 4.94 |
| 23 | t | Hexachloroethane | 0.478 | 0.552 | -15.5 | 137 | 0.00 | 5.03 |
| 24 | I | Naphthalene-d8 | 1.000 | 1.000 | 0.0 | 119 | 0.00 | 5.74 |
| 26 | t | Nitrobenzene | 0.366 | 0.421 | -15.0 | 131 | 0.00 | 5.09 |
| 28 | t | Isophorone | 0.623 | 0.719 | -15.4 | 134 | -0.01 | 5.29 |
| 32 | t | bis(2-Chloroethoxy)methan | 0.366 | 0.447 | -22.1 | 138 | 0.00 | 5.49 |
| 36 | t | 1,2,4-Trichlorobenzene | 0.290 | 0.333 | -14.8 | 132 | 0.00 | 5.68 |
| 38 | t | Naphthalene | 1.043 | 1.183 | -13.4 | 131 | 0.00 | 5.76 |
| 39 | t | 4-Chloroaniline | 0.403 | 0.301 | 25.3 | 80 | 0.00 | 5.83 |
| 42 | t | Hexachlorobutadiene | 0.148 | 0.173 | -16.9 | 135 | 0.00 | 5.89 |
| 44 | t | 2-Methylnaphthalene | 0.600 | 0.636 | -6.0 | 120 | 0.00 | 6.55 |
| 47 | I | Acenaphthene-d10 | 1.000 | 1.000 | 0.0 | 113 | 0.00 | 8.05 |
| 48 | t | Hexachlorocyclopentadiene | 0.234 | 0.232 | 0.9 | 51 | 0.00 | 6.76 |
| 52 | t | 2-Chloronaphthalene | 1.085 | 1.253 | -15.5 | 124 | -0.01 | 7.21 |
| 54 | t | 2-Nitroaniline | 0.366 | 0.395 | -7.9 | 116 | -0.02 | 7.38 |
| 55 | t | Dimethylphthalate | 1.234 | 1.374 | -11.3 | 120 | -0.01 | 7.67 |
| 56 | t | Acenaphthylene | 1.826 | 1.962 | -7.4 | 114 | -0.01 | 7.82 |
| 57 | t | 2,6-Dinitrotoluene | 0.278 | 0.318 | -14.4 | 116 | -0.01 | 7.76 |
| 58 | t | 3-Nitroaniline | 0.332 | 0.320 | 3.6 | 100 | -0.01 | 8.02 |
| 59 | t | Acenaphthene | 1.149 | 1.307 | -13.8 | 123 | 0.00 | 8.10 |
| 62 | t | Dibenzofuran | 1.549 | 1.729 | -11.6 | 122 | -0.01 | 8.39 |
| 63 | t | 2,4-Dinitrotoluene | 0.376 | 0.412 | -9.6 | 112 | -0.01 | 8.41 |
| 65 | t | Diethylphthalate | 1.231 | 1.352 | -9.8 | 118 | -0.02 | 8.85 |
| 66 | t | Fluorene | 1.243 | 1.421 | -14.3 | 124 | 0.00 | 8.97 |
| 67 | t | 4-Chlorophenyl-phenylethe | 0.579 | 0.659 | -13.8 | 124 | 0.00 | 9.00 |
| 68 | t | 4-Nitroaniline | 0.326 | 0.343 | -5.2 | 106 | -0.03 | 9.06 |
| 69 | I | Phenanthrene-d10 | 1.000 | 1.000 | 0.0 | 101 | 0.00 | 10.66 |
| 71 | t | n-Nitrosodiphenylamine | 0.559 | 0.653 | -16.8 | 114 | -0.01 | 9.22 |
| 72 | t | 1,2-Diphenylhydrazine | 0.766 | 0.989 | -29.1 | 127 | -0.01 | 9.28 |
| 74 | t | 4-Bromophenyl-phenylether | 0.184 | 0.222 | -20.7 | 119 | 0.00 | 9.87 |

# Initial Calibration Verification

**Job Number:** JB52301 **Sample:** E2M2451-ICV2451
**Account:** SECORPAE Stantec Consulting Services Inc. **Lab FileID:** 2M57949.D
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 75 | t | Hexachlorobenzene | 0.178 | 0.213 | -19.7 | 121 | -0.01 | 9.96 |
| 77 | t | Phenanthrene | 1.102 | 1.277 | -15.9 | 115 | -0.01 | 10.70 |
| 78 | t | Anthracene | 1.127 | 1.331 | -18.1 | 116 | -0.01 | 10.79 |
| 79 | t | Carbazole | 1.002 | 1.147 | -14.5 | 113 | -0.01 | 11.15 |
| 80 | t | Di-n-butylphthalate | 1.242 | 1.464 | -17.9 | 114 | -0.01 | 11.94 |
| 81 | t | Fluoranthene | 1.077 | 1.224 | -13.6 | 111 | -0.01 | 12.98 |
| 83 | I | Chrysene-d12 | 1.000 | 1.000 | 0.0 | 92 | -0.01 | 15.81 |
| 84 | t | Pyrene | 1.260 | 1.517 | -20.4 | 109 | -0.01 | 13.40 |
| 86 | t | Butylbenzylphthalate | 0.592 | 0.710 | -19.9 | 106 | -0.01 | 14.86 |
| 88 | t | Benzo[a]anthracene | 1.151 | 1.280 | -11.2 | 103 | -0.02 | 15.78 |
| 89 | t | 3,3'-Dichlorobenzidine | 0.407 | 0.355 | 0.13 | 156 | -0.02 | 15.82 |
| 90 | t | Chrysene | 1.101 | 1.270 | -15.3 | 104 | -0.02 | 15.85 |
| 91 | t | bis(2-Ethylhexyl)phthalat | 0.854 | 1.025 | -20.0 | 104 | 0.00 | 16.07 |
| 92 | I | Perylene-d12 | 1.000 | 1.000 | 0.0 | 90 | -0.01 | 18.41 |
| 93 | t | Di-n-octylphthalate | 1.582 | 1.956 | -23.6 | 103 | -0.01 | 17.29 |
| 94 | t | Benzo[b]fluoranthene | 1.228 | 1.351 | -10.0 | 95 | -0.03 | 17.77 |
| 95 | t | Benzo[k]fluoranthene | 1.206 | 1.427 | -18.3 | 103 | -0.03 | 17.82 |
| 96 | t | Benzo[a]pyrene | 1.096 | 1.301 | -18.7 | 103 | -0.02 | 18.31 |
| 97 | t | Indeno[1,2,3-cd]pyrene | 1.023 | 1.143 | -11.7 | 96 | -0.03 | 20.09 |
| 99 | t | Dibenz[a,h]anthracene | 1.072 | 1.242 | -15.9 | 98 | -0.02 | 20.14 |
| 101 | t | Benzo[g,h,i]perylene | 1.048 | 1.236 | -17.9 | 102 | -0.03 | 20.53 |
| 104 | | Acenaphthene-d10a | 1.000 | 1.000 | 0.0 | 113 | 0.00 | 8.05 |
| 105 | | 1,2,4,5-Tetrachlorobenzen | 0.477 | 0.546 | -14.5 | 130 | 0.00 | 6.78 |

(#) = Out of Range SPCC's out = 0 CCC's out = 0
2m57943.D M2M2451.M Fri Nov 01 13:21:24 2013 MS2M

8.7.2
8

# Initial Calibration Verification

**Job Number:** JB52301 **Sample:** E2M2451-ICV2451
**Account:** SECORPAE Stantec Consulting Services Inc. **Lab FileID:** 2M57951.D
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : C:\msdchem\1\DATA\E2M2451\2m57951.D Vial: 20
Acq On : 31 Oct 2013 9:23 pm Operator: kevins
Sample : icv2451-50 Inst : MS2M
Misc : op69337,e2m2451 Multiplr: 1.00
MS Integration Params: lscint.p

Method : C:\MSDCHEM\1\METHODS\M2M2451.M (RTE Integrator)
Title : Semi Volatile GC/MS, rxi-5sil ms 30mx .25mmx .25umFri Nov 01 13:13:31 2013
Last Update : Fri Nov 01 13:13:31 2013
Response via : Multiple Level Calibration

Min. RRF : 0.050 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 30% Max. Rel. Area : 200%

| | | Compound | AvgRF | CCRF | %Dev | Area% | Dev(min) | R.T. |
|---|---|---|---|---|---|---|---|---|
| 1 | I | 1,4-Dichlorobenzene-d4 | 1.000 | 1.000 | 0.0 | 120 | 0.00 | 4.63 |
| 5 | S | 2-Fluorophenol | 1.216 | 1.377 | -13.2 | 131 | 0.00 | 3.67 |
| 8 | S | Phenol-d5 | 1.523 | 1.577 | -3.5 | 117 | 0.00 | 4.39 |
| 24 | I | Naphthalene-d8 | 1.000 | 1.000 | 0.0 | 116 | 0.00 | 5.73 |
| 25 | S | Nitrobenzene-d5 | 0.349 | 0.382 | -9.5 | 122 | 0.00 | 5.07 |
| 47 | I | Acenaphthene-d10 | 1.000 | 1.000 | 0.0 | 110 | -0.01 | 8.05 |
| 51 | S | 2-Fluorobiphenyl | 1.198 | 1.331 | -11.1 | 117 | -0.01 | 7.05 |
| 69 | I | Phenanthrene-d10 | 1.000 | 1.000 | 0.0 | 98 | -0.01 | 10.65 |
| 73 | S | 2,4,6-Tribromophenol | 0.070 | 0.076 | -8.6 | 101 | -0.01 | 9.40 |
| 83 | I | Chrysene-d12 | 1.000 | 1.000 | 0.0 | 83 | -0.02 | 15.80 |
| 85 | S | Terphenyl-d14 | 0.802 | 0.982 | -22.4 | 99 | -0.01 | 13.82 |

(#) = Out of Range SPCC's out = 0 CCC's out = 0
2m57943.D M2M2451.M Fri Nov 01 13:21:25 2013 MS2M

# Initial Calibration Verification

**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

**Sample:** E2M2451-ICV2451
**Lab FileID:** 2M57952.D



Evaluate Continuing Calibration Report

Data File : C:\msdchem\1\DATA\E2M2451\2m57952.D Vial: 21
Acq On : 31 Oct 2013 9:52 pm Operator: kevins
Sample : icv2451-50 Inst : MS2M
Misc : op69337,e2m2451 Multiplr: 1.00
MS Integration Params: lscint.p

Method : C:\MSDCHEM\1\METHODS\M2M2451.M (RTE Integrator)
Title : Semi Volatile GC/MS, rxi-5sil ms 30mx .25mmx .25umFri Nov 01 13:13:31 2013
Last Update : Fri Nov 01 13:13:31 2013
Response via : Multiple Level Calibration

Min. RRF : 0.050 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 30% Max. Rel. Area : 200%

| | | Compound | AvgRF | CCRF | %Dev | Area% | Dev(min) | R.T. |
|---|---|---|---|---|---|---|---|---|
| 1 | I | 1,4-Dichlorobenzene-d4 | 1.000 | 1.000 | 0.0 | 117 | 0.00 | 4.63 |
| 9 | t | Phenol | 1.833 | 1.794 | 2.1 | 106 | 0.00 | 4.39 |
| 12 | t | 2-Chlorophenol | 1.438 | 1.497 | -4.1 | 116 | 0.00 | 4.48 |
| 19 | t | 2-Methylphenol | 1.264 | 1.319 | -4.4 | 113 | -0.01 | 4.84 |
| 21 | t | 3&4-Methylphenol | 1.308 | 1.365 | -4.4 | 111 | 0.00 | 4.96 |
| 24 | I | Naphthalene-d8 | 1.000 | 1.000 | 0.0 | 114 | 0.00 | 5.73 |
| 29 | t | 2-Nitrophenol | 0.196 | 0.213 | -8.7 | 116 | 0.00 | 5.37 |
| 30 | t | 2,4-Dimethylphenol | 0.328 | 0.366 | -11.6 | 116 | 0.00 | 5.42 |
| 31 | t | Benzoic acid | 0.254 | 0.232 | 8.7 | 93 | -0.03 | 5.54 |
| 33 | t | 2,4-Dichlorophenol | 0.237 | 0.275 | -16.0 | 114 | 0.00 | 5.61 |
| 34 | t | 2,6-Dichlorophenol | 0.252 | 0.272 | -7.9 | 112 | -0.01 | 5.83 |
| 43 | t | 4-Chloro-3-methylphenol | 0.290 | 0.313 | -7.9 | 110 | -0.02 | 6.39 |
| 47 | I | Acenaphthene-d10 | 1.000 | 1.000 | 0.0 | 105 | -0.01 | 8.05 |
| 49 | t | 2,4,6-Trichlorophenol | 0.319 | 0.370 | -16.0 | 109 | -0.01 | 6.94 |
| 50 | t | 2,4,5-Trichlorophenol | 0.354 | 0.395 | -11.6 | 109 | -0.02 | 7.00 |
| | | ---------- | True | Calc. | % Drift | ---------- | | |
| 60 | t | 2,4-Dinitrophenol | 100.000 | 86.750 | 13.25 | 72 | -0.02 | 8.19 |
| | | ---------- | AvgRF | CCRF | % Dev | ---------- | | |
| 61 | t | 4-Nitrophenol | 0.158 | 0.139 | 12.0 | 90 | -0.02 | 8.39 |
| 64 | | 2,3,4,6-Tetrachlorophenol | 0.277 | 0.289 | -4.3 | 101 | -0.02 | 8.62 |
| 69 | I | Phenanthrene-d10 | 1.000 | 1.000 | 0.0 | 96 | -0.01 | 10.65 |
| 70 | t | 4,6-Dinitro-2-methylpheno | 0.137 | 0.131 | 4.4 | 86 | -0.03 | 9.11 |
| 76 | t | Pentachlorophenol | 0.117 | 0.134 | -14.5 | 96 | -0.02 | 10.35 |

(#) = Out of Range SPCC's out = 0 CCC's out = 0
2m57943.D M2M2451.M Fri Nov 01 13:38:07 2013 MS2M

# Initial Calibration Verification



**Job Number:** JB52301 **Sample:** E2M2451-ICV2451
**Account:** SECORPAE Stantec Consulting Services Inc. **Lab FileID:** 2M57953.D
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : C:\msdchem\1\DATA\E2M2451\2m57953.D Vial: 22
Acq On : 31 Oct 2013 10:21 pm Operator: kevins
Sample : icv2451-50 Inst : MS2M
Misc : op69337,e2m2451 Multiplr: 1.00
MS Integration Params: lscint.p

Method : C:\MSDCHEM\1\METHODS\M2M2451.M (RTE Integrator)
Title : Semi Volatile GC/MS, rxi-5sil ms 30mx .25mmx .25umFri Nov 01 13:13:31 2013
Last Update : Fri Nov 01 13:13:31 2013
Response via : Multiple Level Calibration

Min. RRF : 0.050 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 30% Max. Rel. Area : 200%

| | Compound | AvgRF | CCRF | %Dev | Area% | Dev(min) | R.T. |
|---|---|---|---|---|---|---|---|
| 1 I | 1,4-Dichlorobenzene-d4 | 1.000 | 1.000 | 0.0 | 163 | 0.00 | 4.62 |
| 10 | Aniline | 2.224 | 2.244 | -0.9 | 158 | 0.00 | 4.39 |

(#) = Out of Range SPCC's out = 0 CCC's out = 0
2m57943.D M2M2451.M Fri Nov 01 13:37:22 2013 MS2M

8.7.5

8

# Initial Calibration Verification

**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

**Sample:** E2M2451-ICV2451
**Lab FileID:** 2M57954.D

Evaluate Continuing Calibration Report

Data File : C:\msdchem\1\DATA\E2M2451\2m57954.D Vial: 23
Acq On : 31 Oct 2013 10:50 pm Operator: kevins
Sample : icv2451-50 Inst : MS2M
Misc : op69337,e2m2451 Multiplr: 1.00
MS Integration Params: lscint.p

Method : C:\MSDCHEM\1\METHODS\M2M2451.M (RTE Integrator)
Title : Semi Volatile GC/MS, rxi-5sil ms 30mx .25mmx .25umFri Nov 01 13:13:31 2013
Last Update : Fri Nov 01 13:13:31 2013
Response via : Multiple Level Calibration

Min. RRF : 0.050 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 30% Max. Rel. Area : 200%

| | Compound | AvgRF | CCRF | %Dev | Area% | Dev(min) | R.T. |
|---|---|---|---|---|---|---|---|
| 107 | Chrysene-d12a | 1.000 | 1.000 | 0.0 | 226# | 0.01 | 15.81 |
| 108 | Benzidine | 0.660 | 0.673 | -2.0 | 208# | -0.01 | 13.34 |

(#) = Out of Range SPCC's out = 0 CCC's out = 0
2m57943.D M2M2451.M Fri Nov 01 13:37:23 2013 MS2M

8.7.6

8

# Initial Calibration Verification

**Job Number:** JB52301 **Sample:** E2M2452-ICV2451
**Account:** SECORPAE Stantec Consulting Services Inc. **Lab FileID:** 2M57957.D
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : C:\msdchem\1\DATA\E2M2452\2m57957.D Vial: 3
Acq On : 1 Nov 2013 11:05 am Operator: kevins
Sample : icv2451-50 Inst : MS2M
Misc : op69337,e2m2452 Multiplr: 1.00
MS Integration Params: lscint.p

Method : C:\MSDCHEM\1\METHODS\M2M2451.M (RTE Integrator)
Title : Semi Volatile GC/MS, rxi-5sil ms 30mx .25mmx .25umMon Nov 04 13:43:30 2013
Last Update : Mon Nov 04 13:43:30 2013
Response via : Multiple Level Calibration

Min. RRF : 0.050 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 30% Max. Rel. Area : 200%

| | | Compound | AvgRF | CCRF | %Dev | Area% | Dev(min) | R.T. |
|---|---|---|---|---|---|---|---|---|
| 1 | I | 1,4-Dichlorobenzene-d4 | 1.000 | 1.000 | 0.0 | 94 | 0.00 | 4.62 |
| 2 | t | 1,4-Dioxane | 0.589 | 0.651 | -10.5 | 101 | 0.00 | 2.15 |
| 6 | t | Indene | 2.440 | 2.564 | -5.1 | 96 | 0.00 | 4.82 |
| 7 | t | Cumene | 3.300 | 3.487 | -5.7 | 97 | 0.00 | 4.02 |
| 13 | t | Decane | 1.452 | 1.530 | -5.4 | 96 | 0.00 | 4.49 |
| 18 | t | Acetophenone | 1.896 | 1.955 | -3.1 | 93 | 0.00 | 4.93 |
| 24 | I | Naphthalene-d8 | 1.000 | 1.000 | 0.0 | 93 | 0.00 | 5.73 |
| 26 | t | Nitrobenzene | 0.366 | 0.389 | -6.3 | 95 | -0.14 | 4.93 |
| 27 | t | Quinoline | 0.616 | 0.669 | -8.6 | 93 | 0.00 | 6.11 |
| 40 | t | 2,3-Dichloroaniline | 0.302 | 0.277 | 8.3 | 80 | 0.00 | 6.92 |
| 41 | t | Caprolactam | 0.135 | 0.141 | -4.4 | 88 | 0.00 | 6.18 |
| 45 | t | 1-Methylnaphthalene | 0.631 | 0.641 | -1.6 | 91 | 0.00 | 6.67 |
| 46 | t | Dimethylnaphthalene | 0.569 | 0.579 | -1.8 | 91 | 0.00 | 7.40 |
| 47 | I | Acenaphthene-d10 | 1.000 | 1.000 | 0.0 | 90 | 0.00 | 8.03 |
| 53 | t | Biphenyl | 1.396 | 1.467 | -5.1 | 90 | 0.00 | 7.17 |
| 69 | I | Phenanthrene-d10 | 1.000 | 1.000 | 0.0 | 84 | 0.00 | 10.64 |
| 82 | t | Octadecane | 0.495 | 0.532 | -7.5 | 89 | 0.00 | 10.62 |
| 92 | I | Perylene-d12 | 1.000 | 1.000 | 0.0 | 73 | 0.00 | 18.40 |
| 100 | t | 7,12-Dimethylbenz(a)anthr | 0.593 | 0.628 | -5.9 | 74 | 0.00 | 17.76 |
| 102 | | 1,4-Dichlorobenzene-d4a | 1.000 | 1.000 | 0.0 | 95 | 0.00 | 4.62 |
| 103 | | Benzaldehyde | 1.150 | 1.125 | 2.2 | 90 | -0.17 | 4.30 |
| 110 | | Phenanthrene-d10a | 1.000 | 1.000 | 0.0 | 89 | 0.00 | 10.64 |
| 111 | | Atrazine | 0.109 | 0.104 | 4.6 | 80 | 0.01 | 10.25 |

(#) = Out of Range SPCC's out = 0 CCC's out = 0
2m57993.D M2M2451.M Mon Nov 04 14:56:58 2013 MS2M

8.7.7

# Continuing Calibration Summary

**Job Number:** JB52301 **Sample:** E2M2462-CC2451
**Account:** SECORPAE Stantec Consulting Services Inc. **Lab FileID:** 2M58213.D
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : C:\msdchem\1\DATA\E2M2462\2m58213.D Vial: 2
Acq On : 8 Nov 2013 9:16 pm Operator: ashleyd
Sample : cc2451-25 Inst : MS2M
Misc : op70482,e2m2462, Multiplr: 1.00
MS Integration Params: lscint.p

Method : C:\MSDCHEM\1\METHODS\M2M2451.M (RTE Integrator)
Title : Semi Volatile GC/MS, rxi-5sil ms 30mx .25mmx .25umFri Nov 08 12:14:03 2013
Last Update : Fri Nov 08 12:14:03 2013
Response via : Multiple Level Calibration

Min. RRF : 0.050 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 200%

| | | Compound | AvgRF | CCRF | %Dev | Area% | Dev(min) | R.T. |
|---|---|---|---|---|---|---|---|---|
| 1 | I | 1,4-Dichlorobenzene-d4 | 1.000 | 1.000 | 0.0 | 95 | -0.03 | 4.55 |
| 2 | t | 1,4-Dioxane | 0.589 | 0.607 | -3.1 | 95 | -0.09 | 2.06 |
| 3 | t | Pyridine | 1.505 | 1.551 | -3.1 | 97 | -0.02 | 2.41 |
| 4 | t | N-Nitrosodimethylamine | 0.945 | 0.974 | -3.1 | 93 | -0.02 | 2.38 |
| 5 | S | 2-Fluorophenol | 1.216 | 1.257 | -3.4 | 94 | -0.02 | 3.60 |
| 6 | t | Indene | 2.440 | 2.514 | -3.0 | 95 | -0.03 | 4.75 |
| 7 | t | Cumene | 3.300 | 3.424 | -3.8 | 95 | -0.02 | 3.96 |
| 8 | S | Phenol-d5 | 1.523 | 1.632 | -7.2 | 97 | -0.02 | 4.32 |
| 9 | t | Phenol | 1.833 | 2.054 | -12.1 | 102 | -0.02 | 4.33 |
| 10 | | Aniline | 2.224 | 2.100 | 5.6 | 86 | -0.03 | 4.31 |
| 11 | t | bis(2-Chloroethyl)ether | 1.308 | 1.363 | -4.2 | 97 | -0.03 | 4.36 |
| 12 | t | 2-Chlorophenol | 1.438 | 1.503 | -4.5 | 95 | -0.02 | 4.41 |
| 13 | t | Decane | 1.452 | 1.511 | -4.1 | 95 | -0.02 | 4.43 |
| 14 | t | 1,3-Dichlorobenzene | 1.550 | 1.595 | -2.9 | 95 | -0.03 | 4.51 |
| 15 | t | 1,4-Dichlorobenzene | 1.598 | 1.631 | -2.1 | 95 | -0.02 | 4.57 |
| 16 | t | Benzyl alcohol | 0.904 | 0.968 | -7.1 | 96 | -0.03 | 4.67 |
| 17 | t | 1,2-Dichlorobenzene | 1.480 | 1.534 | -3.6 | 97 | -0.03 | 4.68 |
| 18 | t | Acetophenone | 1.896 | 1.998 | -5.4 | 96 | -0.03 | 4.87 |
| 19 | t | 2-Methylphenol | 1.264 | 1.348 | -6.6 | 96 | -0.02 | 4.77 |
| 20 | t | 2,2'-oxybis(1-Chloropropa | 1.848 | 1.897 | -2.7 | 94 | -0.03 | 4.76 |
| 21 | t | 3&4-Methylphenol | 1.308 | 1.444 | -10.4 | 97 | -0.02 | 4.89 |
| 22 | t | n-Nitroso-di-n-propylamin | 1.054 | 1.106 | -4.9 | 97 | -0.03 | 4.87 |
| 23 | t | Hexachloroethane | 0.478 | 0.480 | -0.4 | 93 | -0.03 | 4.95 |
| 24 | I | Naphthalene-d8 | 1.000 | 1.000 | 0.0 | 94 | -0.03 | 5.65 |
| 25 | S | Nitrobenzene-d5 | 0.349 | 0.366 | -4.9 | 97 | -0.03 | 4.99 |
| 26 | t | Nitrobenzene | 0.366 | 0.384 | -4.9 | 95 | -0.03 | 5.00 |
| 27 | t | Quinoline | 0.616 | 0.667 | -8.3 | 94 | -0.04 | 6.03 |
| 28 | t | Isophorone | 0.623 | 0.640 | -2.7 | 94 | -0.03 | 5.21 |
| 29 | t | 2-Nitrophenol | 0.196 | 0.210 | -7.1 | 97 | -0.03 | 5.29 |
| 30 | t | 2,4-Dimethylphenol | 0.328 | 0.332 | -1.2 | 88 | -0.03 | 5.34 |
| 31 | t | Benzoic acid | 0.254 | 0.242 | 4.7 | 88 | -0.05 | 5.44 |
| 32 | t | bis(2-Chloroethoxy)methan | 0.366 | 0.384 | -4.9 | 96 | -0.03 | 5.41 |
| 33 | t | 2,4-Dichlorophenol | 0.237 | 0.280 | -18.1 | 100 | -0.03 | 5.52 |
| 34 | t | 2,6-Dichlorophenol | 0.252 | 0.281 | -11.5 | 99 | -0.03 | 5.74 |
| 35 | | 1,3,5-Trichlorobenzene | 0.303 | 0.310 | -2.3 | 93 | -0.03 | 5.29 |
| 36 | t | 1,2,4-Trichlorobenzene | 0.290 | 0.298 | -2.8 | 94 | -0.03 | 5.59 |
| 37 | | 1,2,3-Trichlorobenzene | 0.282 | 0.288 | -2.1 | 95 | -0.03 | 5.82 |
| 38 | t | Naphthalene | 1.043 | 1.076 | -3.2 | 95 | -0.03 | 5.67 |
| 39 | t | 4-Chloroaniline | 0.403 | 0.442 | -9.7 | 97 | -0.03 | 5.73 |
| 40 | t | 2,3-Dichloroaniline | 0.302 | 0.326 | -7.9 | 96 | -0.04 | 6.82 |
| 41 | t | Caprolactam | 0.135 | 0.151 | -11.9 | 98 | -0.05 | 6.12 |

# Continuing Calibration Summary

**Job Number:** JB52301 **Sample:** E2M2462-CC2451
**Account:** SECORPAE Stantec Consulting Services Inc. **Lab FileID:** 2M58213.D
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 42 | t | Hexachlorobutadiene | 0.148 | 0.152 | -2.7 | 95 | -0.04 | 5.79 |
| 43 | t | 4-Chloro-3-methylphenol | 0.290 | 0.323 | -11.4 | 97 | -0.03 | 6.31 |
| 44 | t | 2-Methylnaphthalene | 0.600 | 0.628 | -4.7 | 94 | -0.05 | 6.44 |
| 45 | t | 1-Methylnaphthalene | 0.631 | 0.658 | -4.3 | 96 | -0.04 | 6.57 |
| 46 | t | Dimethylnaphthalene | 0.569 | 0.597 | -4.9 | 95 | -0.05 | 7.30 |
| 47 | I | Acenaphthene-d10 | 1.000 | 1.000 | 0.0 | 95 | -0.05 | 7.93 |
| 48 | t | Hexachlorocyclopentadiene | 0.234 | 0.192 | 17.9 | 81 | -0.04 | 6.65 |
| 49 | t | 2,4,6-Trichlorophenol | 0.319 | 0.347 | -8.8 | 96 | -0.04 | 6.84 |
| 50 | t | 2,4,5-Trichlorophenol | 0.354 | 0.363 | -2.5 | 94 | -0.04 | 6.90 |
| 51 | S | 2-Fluorobiphenyl | 1.198 | 1.241 | -3.6 | 95 | -0.04 | 6.94 |
| 52 | t | 2-Chloronaphthalene | 1.085 | 1.127 | -3.9 | 95 | -0.04 | 7.10 |
| 53 | t | Biphenyl | 1.396 | 1.463 | -4.8 | 96 | -0.04 | 7.07 |
| 54 | t | 2-Nitroaniline | 0.366 | 0.409 | -11.7 | 98 | -0.05 | 7.27 |
| 55 | t | Dimethylphthalate | 1.234 | 1.276 | -3.4 | 94 | -0.05 | 7.55 |
| 56 | t | Acenaphthylene | 1.826 | 1.903 | -4.2 | 95 | -0.05 | 7.70 |
| 57 | t | 2,6-Dinitrotoluene | 0.278 | 0.295 | -6.1 | 95 | -0.05 | 7.64 |
| 58 | t | 3-Nitroaniline | 0.332 | 0.354 | -6.6 | 95 | -0.05 | 7.90 |
| 59 | t | Acenaphthene | 1.149 | 1.164 | -1.3 | 92 | -0.05 | 7.98 |
| | | ---------- | True | Calc. | % Drift | | ---------- | |
| 60 | t | 2,4-Dinitrophenol | 50.000 | 52.565 | -5.1 | 107 | -0.05 | 8.10 |
| | | ---------- | AvgRF | CCRF | % Dev | | ---------- | |
| 61 | t | 4-Nitrophenol | 0.158 | 0.143 | 9.5 | 88 | -0.04 | 8.29 |
| 62 | t | Dibenzofuran | 1.549 | 1.584 | -2.3 | 94 | -0.05 | 8.26 |
| 63 | t | 2,4-Dinitrotoluene | 0.376 | 0.412 | -9.6 | 97 | -0.05 | 8.30 |
| 64 | | 2,3,4,6-Tetrachlorophenol | 0.277 | 0.276 | 0.4 | 88 | -0.05 | 8.51 |
| 65 | t | Diethylphthalate | 1.231 | 1.280 | -4.0 | 96 | -0.05 | 8.73 |
| 66 | t | Fluorene | 1.243 | 1.272 | -2.3 | 94 | -0.05 | 8.84 |
| 67 | t | 4-Chlorophenyl-phenylethe | 0.579 | 0.591 | -2.1 | 94 | -0.05 | 8.87 |
| 68 | t | 4-Nitroaniline | 0.326 | 0.344 | -5.5 | 94 | -0.05 | 8.94 |
| 69 | I | Phenanthrene-d10 | 1.000 | 1.000 | 0.0 | 94 | -0.05 | 10.52 |
| 70 | t | 4,6-Dinitro-2-methylpheno | 0.137 | 0.138 | -0.7 | 99 | -0.05 | 9.01 |
| 71 | t | n-Nitrosodiphenylamine | 0.559 | 0.577 | -3.2 | 94 | -0.05 | 9.10 |
| 72 | t | 1,2-Diphenylhydrazine | 0.766 | 0.798 | -4.2 | 95 | -0.05 | 9.15 |
| 73 | S | 2,4,6-Tribromophenol | 0.070 | 0.075 | -7.1 | 96 | -0.05 | 9.28 |
| 74 | t | 4-Bromophenyl-phenylether | 0.184 | 0.188 | -2.2 | 94 | -0.05 | 9.74 |
| 75 | t | Hexachlorobenzene | 0.178 | 0.182 | -2.2 | 94 | -0.05 | 9.83 |
| 76 | t | Pentachlorophenol | 0.117 | 0.109 | 6.8 | 80 | -0.05 | 10.24 |
| 77 | t | Phenanthrene | 1.102 | 1.130 | -2.5 | 95 | -0.05 | 10.57 |
| 78 | t | Anthracene | 1.127 | 1.152 | -2.2 | 92 | -0.05 | 10.66 |
| 79 | t | Carbazole | 1.002 | 1.032 | -3.0 | 94 | -0.05 | 11.02 |
| 80 | t | Di-n-butylphthalate | 1.242 | 1.349 | -8.6 | 97 | -0.05 | 11.81 |
| 81 | t | Fluoranthene | 1.077 | 1.127 | -4.6 | 95 | -0.05 | 12.85 |
| 82 | t | Octadecane | 0.495 | 0.523 | -5.7 | 97 | -0.05 | 10.51 |
| 83 | I | Chrysene-d12 | 1.000 | 1.000 | 0.0 | 97 | -0.05 | 15.68 |
| 84 | t | Pyrene | 1.260 | 1.256 | 0.3 | 94 | -0.06 | 13.27 |
| 85 | S | Terphenyl-d14 | 0.802 | 0.817 | -1.9 | 96 | -0.05 | 13.68 |
| 86 | t | Butylbenzylphthalate | 0.592 | 0.631 | -6.6 | 100 | -0.05 | 14.73 |
| 87 | | Butyl stearate | 0.380 | 0.414 | -8.9 | 100 | -0.05 | 14.96 |
| 88 | t | Benzo[a]anthracene | 1.151 | 1.166 | -1.3 | 98 | -0.05 | 15.65 |
| 89 | t | 3,3'-Dichlorobenzidine | 0.407 | 0.422 | -3.7 | 97 | -0.05 | 15.69 |
| 90 | t | Chrysene | 1.101 | 1.110 | -0.8 | 96 | -0.06 | 15.72 |
| 91 | t | bis(2-Ethylhexyl)phthalat | 0.854 | 0.935 | -9.5 | 101 | -0.05 | 15.94 |
| 92 | I | Perylene-d12 | 1.000 | 1.000 | 0.0 | 106 | -0.05 | 18.29 |
| 93 | t | Di-n-octylphthalate | 1.582 | 1.691 | -6.9 | 110 | -0.05 | 17.16 |

# Continuing Calibration Summary

**Job Number:** JB52301 **Sample:** E2M2462-CC2451
**Account:** SECORPAE Stantec Consulting Services Inc. **Lab FileID:** 2M58213.D
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 94 | t | Benzo[b]fluoranthene | 1.228 | 1.257 | -2.4 | 108 | -0.06 | 17.64 |
| 95 | t | Benzo[k]fluoranthene | 1.206 | 1.185 | 1.7 | 101 | -0.06 | 17.69 |
| 96 | t | Benzo[a]pyrene | 1.096 | 1.114 | -1.6 | 107 | -0.06 | 18.18 |
| 97 | t | Indeno[1,2,3-cd]pyrene | 1.023 | 1.118 | -9.3 | 118 | -0.06 | 19.95 |
| 98 | t | Dibenz(a,h)acridine | 0.898 | 0.989 | -10.1 | 118 | -0.06 | 19.61 |
| 99 | t | Dibenz[a,h]anthracene | 1.072 | 1.176 | -9.7 | 115 | -0.07 | 19.99 |
| 100 | t | 7,12-Dimethylbenz(a)anthr | 0.593 | 0.560 | 5.6 | 99 | -0.06 | 17.65 |
| 101 | t | Benzo[g,h,i]perylene | 1.048 | 1.117 | -6.6 | 114 | -0.07 | 20.37 |

(#) = Out of Range SPCC's out = 0 CCC's out = 0
2m57944.D M2M2451.M Mon Nov 11 13:16:26 2013 MS2M

8.7.8

8

# Continuing Calibration Summary



**Job Number:** JB52301 **Sample:** E2M2462-CC2451
**Account:** SECORPAE Stantec Consulting Services Inc. **Lab FileID:** 2M58214.D
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : C:\msdchem\1\DATA\E2M2462\2m58214.D Vial: 3
Acq On : 8 Nov 2013 9:44 pm Operator: ashleyd
Sample : cc2451-25 Inst : MS2M
Misc : op70482,e2m2462, Multiplr: 1.00
MS Integration Params: lscint.p

Method : C:\MSDCHEM\1\METHODS\M2M2451.M (RTE Integrator)
Title : Semi Volatile GC/MS, rxi-5sil ms 30mx .25mmx .25umFri Nov 08 12:14:03 2013
Last Update : Fri Nov 08 12:14:03 2013
Response via : Multiple Level Calibration

Min. RRF : 0.050 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 200%

| | Compound | AvgRF | CCRF | %Dev | Area% | Dev(min) | R.T. |
|---|---|---|---|---|---|---|---|
| 102 | 1,4-Dichlorobenzene-d4a | 1.000 | 1.000 | 0.0 | 88 | -0.03 | 4.55 |
| 103 | Benzaldehyde | 1.150 | 1.210 | -5.2 | 92 | -0.03 | 4.23 |
| 104 | Acenaphthene-d10a | 1.000 | 1.000 | 0.0 | 88 | -0.05 | 7.93 |
| 105 | 1,2,4,5-Tetrachlorobenzen | 0.477 | 0.510 | -6.9 | 96 | -0.10 | 6.67 |
| 106 | Chrysene-d12a | 1.000 | 1.000 | 0.0 | 91 | -0.06 | 15.67 |
| 107 | Benzidine | 0.660 | 0.727 | -10.2 | 95 | -0.05 | 13.20 |
| 108 | Phenanthrene-d10a | 1.000 | 1.000 | 0.0 | 88 | -0.05 | 10.52 |
| 109 | Atrazine | 0.109 | 0.117 | -7.3 | 91 | -0.05 | 10.13 |

(#) = Out of Range SPCC's out = 0 CCC's out = 0
2m57944.D M2M2451.M Mon Nov 11 13:16:27 2013 MS2M

8.7.9

8

New Jersey ACCUTEST LABORATORIES

GC/MS Semi-volatiles

Raw Data

Manual Integrations APPROVED (compounds with "m" flag)
Kristi Schollenberger 11/20/13 11:33

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\E2M2462\
Data File : 2m58228.D
Acq On : 9 Nov 2013 4:17 am
Operator : ashleyd
Sample : jb52301-3
Misc : op70508,e2m2462,31.5
ALS Vial : 17 Sample Multiplier: 1

Quant Time: Nov 13 17:04:56 2013
Quant Method : C:\MSDCHEM\1\METHODS\M2M2451.M
Quant Title : Semi Volatile GC/MS, rxi-5sil ms 30mx .25mmx .25umFri Nov 08 12:14:03 2013
QLast Update : Fri Nov 08 12:14:03 2013
Response via : Initial Calibration

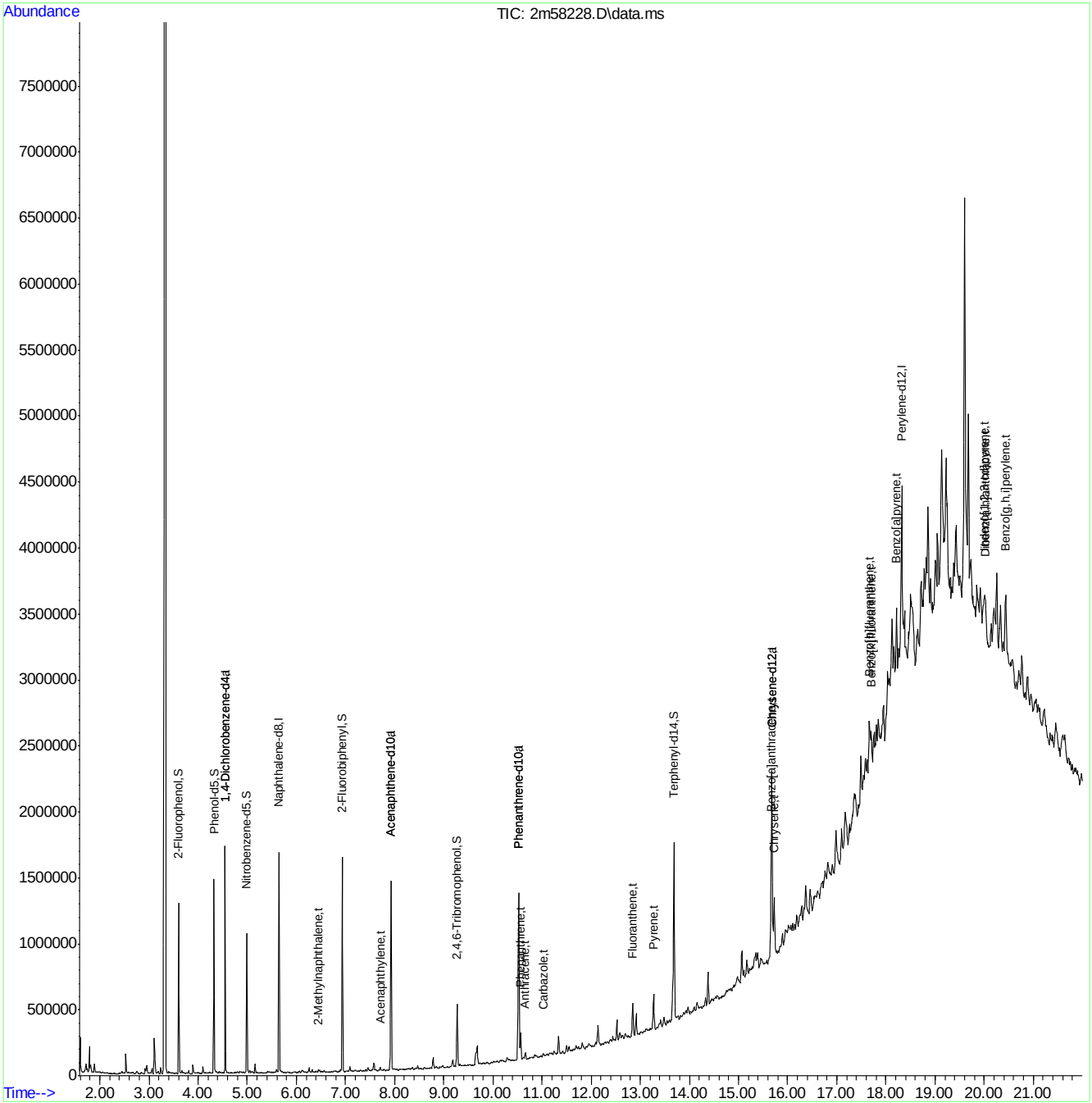
| Internal Standards | R.T. | QIon | Response | Conc | Units | Dev(Min) |
|---|---|---|---|---|---|---|
| 1) 1,4-Dichlorobenzene-d4 | 4.550 | 152 | 185430 | 40.00 | ppb | -0.03 |
| 24) Naphthalene-d8 | 5.641 | 136 | 718316 | 40.00 | ppb | -0.04 |
| 47) Acenaphthene-d10 | 7.925 | 164 | 376992 | 40.00 | ppb | -0.05 |
| 69) Phenanthrene-d10 | 10.524 | 188 | 615031 | 40.00 | ppb | -0.05 |
| 83) Chrysene-d12 | 15.681 | 240 | 658555 | 40.00 | ppb | -0.05 |
| 92) Perylene-d12 | 18.317 | 264 | 721373 | 40.00 | ppb | -0.02 |
| 102) 1,4-Dichlorobenzene-d4a | 4.550 | 152 | 185430 | 40.00 | ppb | -0.03 |
| 104) Acenaphthene-d10a | 7.925 | 164 | 376992 | 40.00 | ppb | -0.05 |
| 106) Chrysene-d12a | 15.681 | 240 | 658555 | 40.00 | ppb | -0.05 |
| 108) Phenanthrene-d10a | 10.524 | 188 | 615031 | 40.00 | ppb | -0.05 |
| **System Monitoring Compounds** | | | | | | |
| 5) 2-Fluorophenol | 3.603 | 112 | 271244 | 48.11 | ppb | -0.02 |
| Spiked Amount 50.000 | | | Recovery = | 96.22% | | |
| 8) Phenol-d5 | 4.320 | 99 | 336510 | 47.67 | ppb | -0.02 |
| Spiked Amount 50.000 | | | Recovery = | 95.34% | | |
| 25) Nitrobenzene-d5 | 4.989 | 82 | 280729 | 44.74 | ppb | -0.03 |
| Spiked Amount 50.000 | | | Recovery = | 89.48% | | |
| 51) 2-Fluorobiphenyl | 6.935 | 172 | 545846 | 48.36 | ppb | -0.04 |
| Spiked Amount 50.000 | | | Recovery = | 96.72% | | |
| 73) 2,4,6-Tribromophenol | 9.278 | 330 | 53670 | 49.97 | ppb | -0.05 |
| Spiked Amount 50.000 | | | Recovery = | 99.94% | | |
| 85) Terphenyl-d14 | 13.685 | 244 | 621378 | 47.05 | ppb | -0.05 |
| Spiked Amount 50.000 | | | Recovery = | 94.10% | | |
| **Target Compounds** | | | | | | Qvalue |
| 44) 2-Methylnaphthalene | 6.443 | 141 | 5803 | 0.54 | ppb | 97 |
| 56) Acenaphthylene | 7.700 | 152 | 10684 | 0.62 | ppb | 94 |
| 77) Phenanthrene | 10.567 | 178 | 61772 | 3.65 | ppb | 99 |
| 78) Anthracene | 10.658 | 178 | 23224 | 1.34 | ppb | 97 |
| 79) Carbazole | 11.022 | 167 | 8521 | 0.55 | ppb | 96 |
| 81) Fluoranthene | 12.846 | 202 | 142809 | 8.63 | ppb | 96 |
| 84) Pyrene | 13.274 | 202 | 144257 | 6.95 | ppb | 98 |
| 88) Benzo[a]anthracene | 15.659 | 228 | 98775 | 5.21 | ppb | 96 |
| 90) Chrysene | 15.723 | 228 | 140549 | 7.75 | ppb | 97 |
| 94) Benzo[b]fluoranthene | 17.665 | 252 | 198658m | 8.97 | ppb | |
| 95) Benzo[k]fluoranthene | 17.708 | 252 | 58342 | 2.68 | ppb | 89 |
| 96) Benzo[a]pyrene | 18.210 | 252 | 153921 | 7.79 | ppb | 91 |
| 97) Indeno[1,2,3-cd]pyrene | 20.002 | 276 | 133007 | 7.21 | ppb | 97 |
| 99) Dibenz[a,h]anthracene | 20.034 | 278 | 49721 | 2.57 | ppb | 85 |
| 101) Benzo[g,h,i]perylene | 20.441 | 276 | 269640 | 14.27 | ppb | 94 |

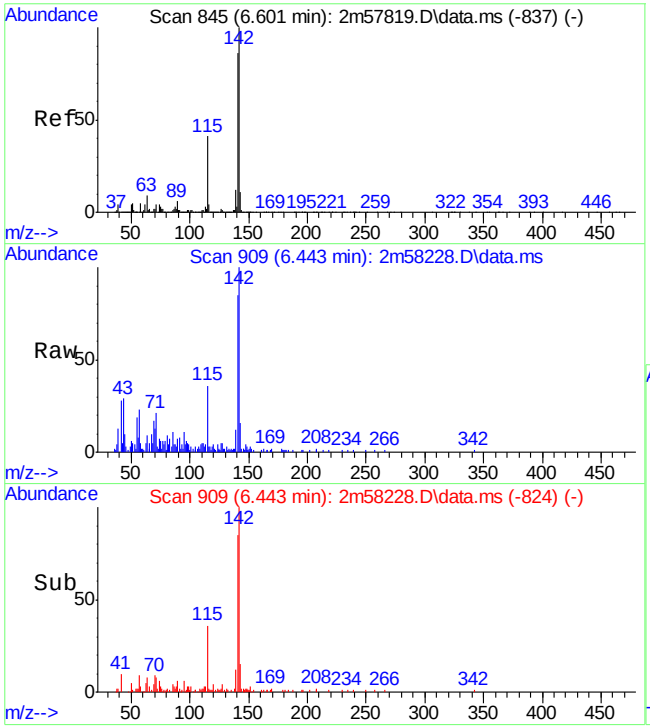
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\E2M2462\
Data File : 2m58228.D
Acq On : 9 Nov 2013 4:17 am
Operator : ashleyd
Sample : jb52301-3
Misc : op70508,e2m2462,31.5
ALS Vial : 17 Sample Multiplier: 1

Quant Time: Nov 13 17:04:56 2013
Quant Method : C:\MSDCHEM\1\METHODS\M2M2451.M
Quant Title : Semi Volatile GC/MS, rxi-5sil ms 30mx .25mmx .25umFri Nov 08 12:14:03 2013
QLast Update : Fri Nov 08 12:14:03 2013
Response via : Initial Calibration

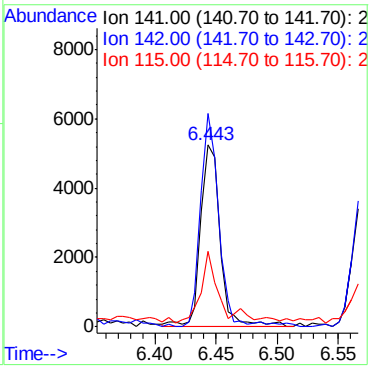


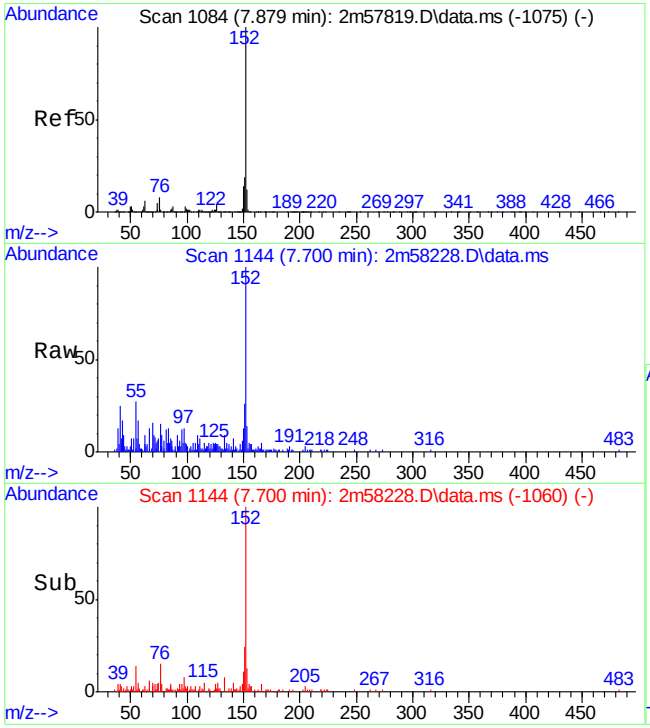



#44
2-Methylnaphthalene
Concen: 0.54 ppb
RT: 6.443 min Scan# 909
Delta R.T. -0.045 min
Lab File: 2m58228.D
Acq: 9 Nov 2013 4:17 am

Tgt Ion:141 Resp: 5803

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 141 | 100 | | |
| 142 | 117.7 | 84.7 | 144.7 |
| 115 | 39.1 | 6.2 | 66.2 |

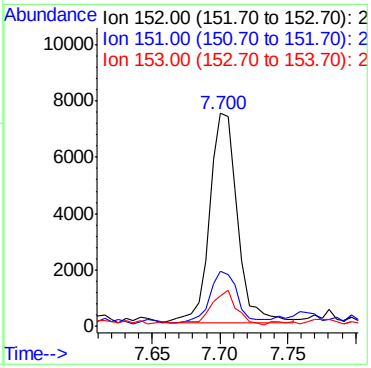


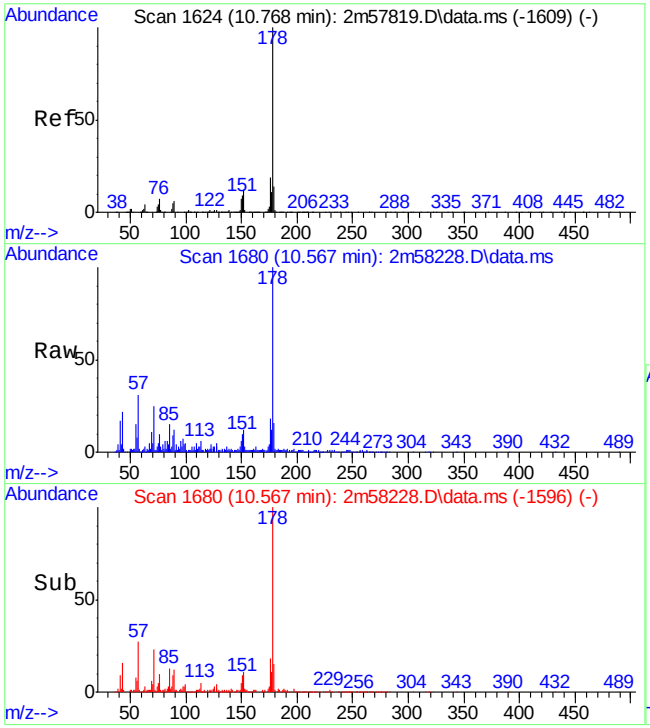




#56
Acenaphthylene
Concen: 0.62 ppb
RT: 7.700 min Scan# 1144
Delta R.T. -0.051 min
Lab File: 2m58228.D
Acq: 9 Nov 2013 4:17 am

Tgt Ion:152 Resp: 10684

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 152 | 100 | | |
| 151 | 23.1 | 0.0 | 49.4 |
| 153 | 12.1 | 0.0 | 42.8 |

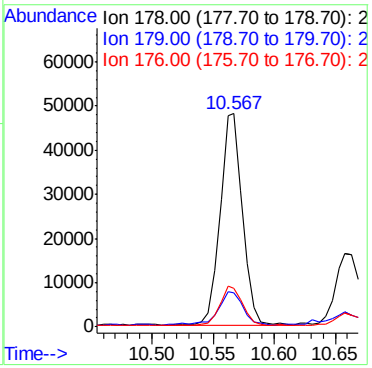


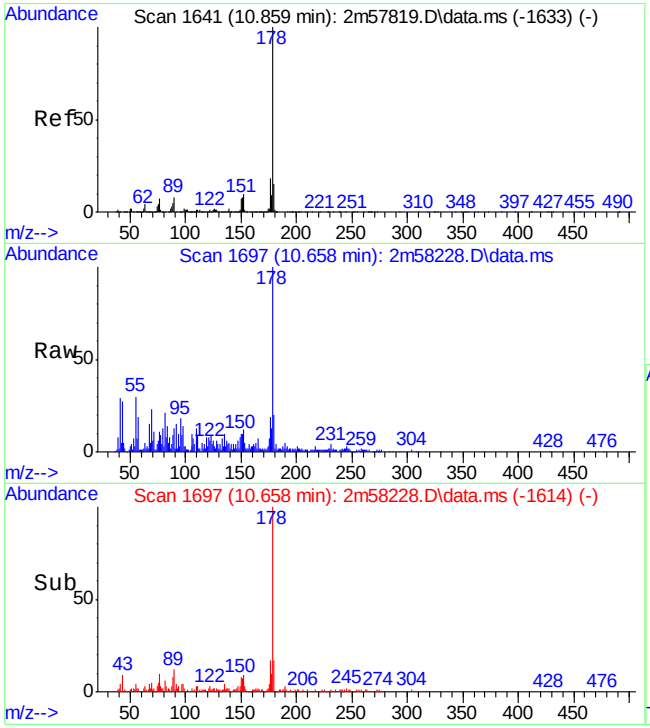



#77
Phenanthrene
Concen: 3.65 ppb
RT: 10.567 min Scan# 1680
Delta R.T. -0.051 min
Lab File: 2m58228.D
Acq: 9 Nov 2013 4:17 am

Tgt Ion:178 Resp: 61772

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 178 | 100 | | |
| 179 | 15.3 | 0.0 | 45.1 |
| 176 | 17.5 | 0.0 | 48.2 |

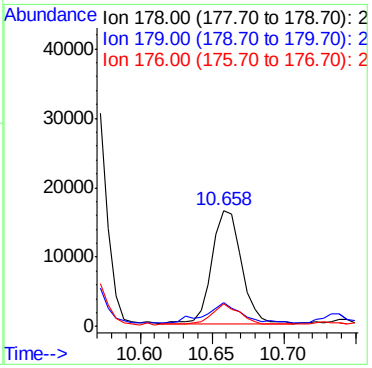


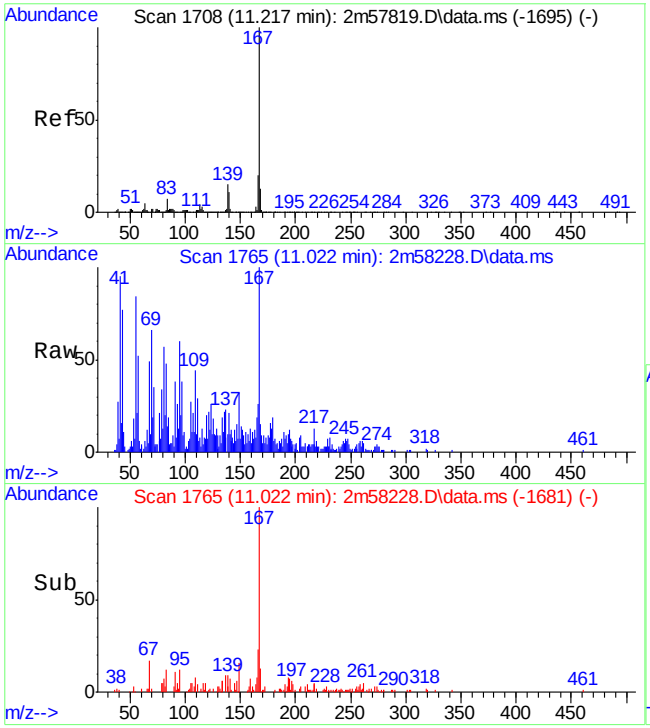




#78
Anthracene
Concen: 1.34 ppb
RT: 10.658 min Scan# 1697
Delta R.T. -0.056 min
Lab File: 2m58228.D
Acq: 9 Nov 2013 4:17 am

Tgt Ion:178 Resp: 23224

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 178 | 100 | | |
| 179 | 17.6 | 0.0 | 45.1 |
| 176 | 17.9 | 0.0 | 47.4 |

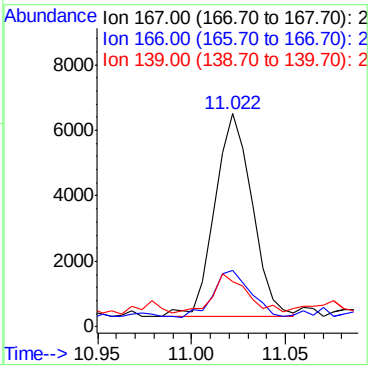


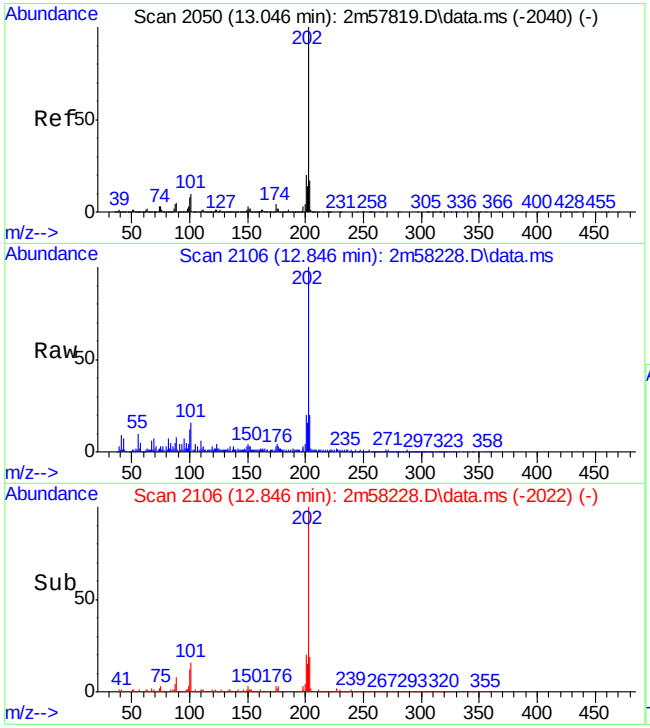



#79
Carbazole
Concen: 0.55 ppb
RT: 11.022 min Scan# 1765
Delta R.T. -0.051 min
Lab File: 2m58228.D
Acq: 9 Nov 2013 4:17 am

Tgt Ion:167 Resp: 8521

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 167 | 100 | | |
| 166 | 22.7 | 0.0 | 50.3 |
| 139 | 13.5 | 0.0 | 43.0 |

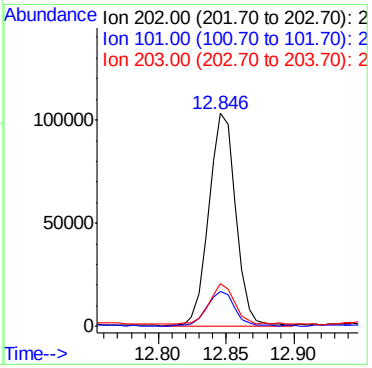


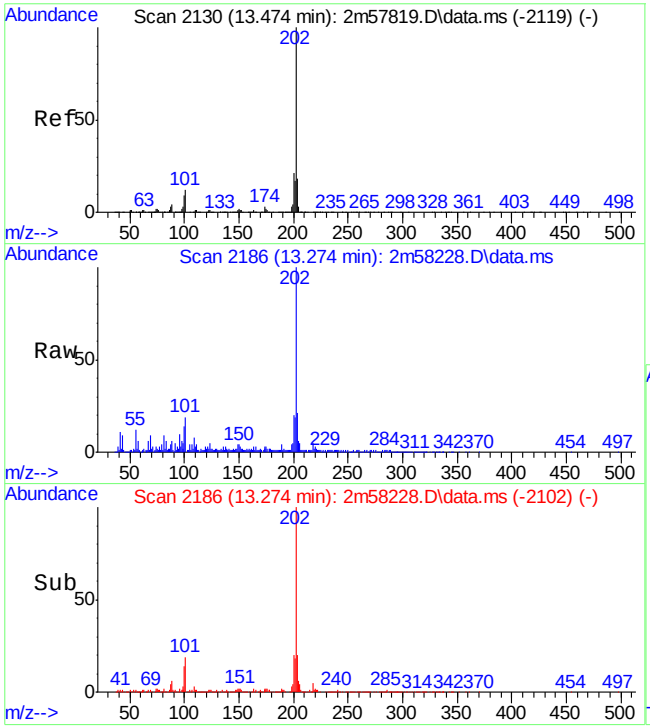




#81
Fluoranthene
Concen: 8.63 ppb
RT: 12.846 min Scan# 2106
Delta R.T. -0.051 min
Lab File: 2m58228.D
Acq: 9 Nov 2013 4:17 am

Tgt Ion:202 Resp: 142809

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 202 | 100 | | |
| 101 | 15.8 | 0.0 | 47.2 |
| 203 | 19.0 | 0.0 | 47.0 |

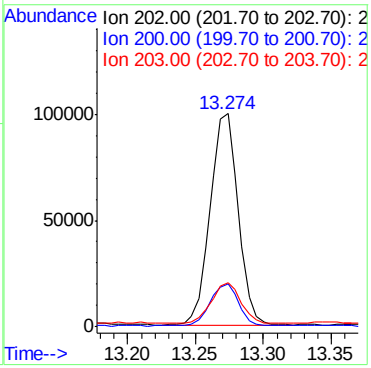


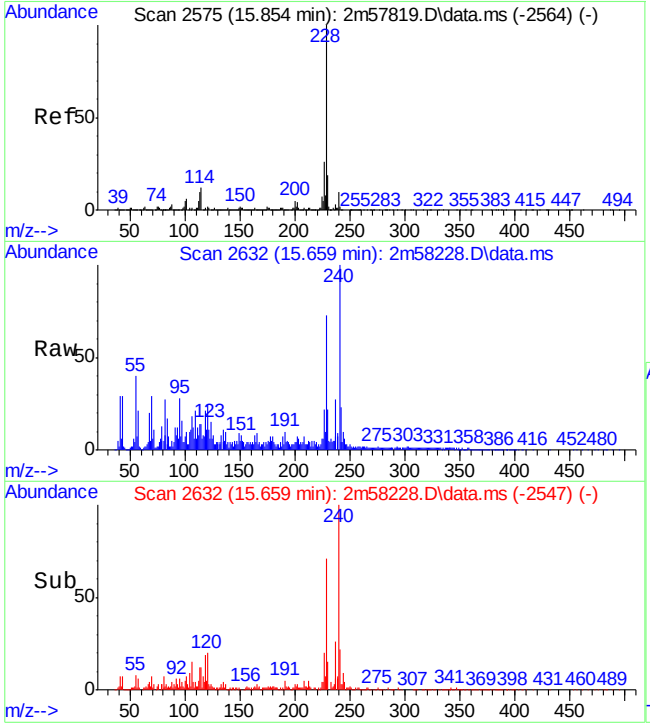



#84
Pyrene
Concen: 6.95 ppb
RT: 13.274 min Scan# 2186
Delta R.T. -0.051 min
Lab File: 2m58228.D
Acq: 9 Nov 2013 4:17 am

Tgt Ion:202 Resp: 144257

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 202 | 100 | | |
| 200 | 20.0 | 0.0 | 49.7 |
| 203 | 19.0 | 0.0 | 47.8 |

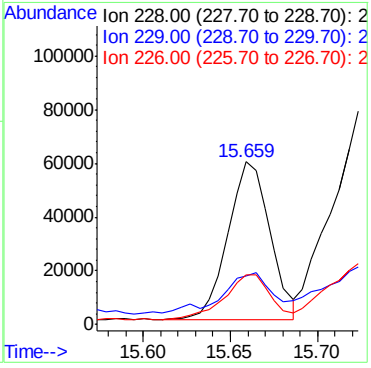


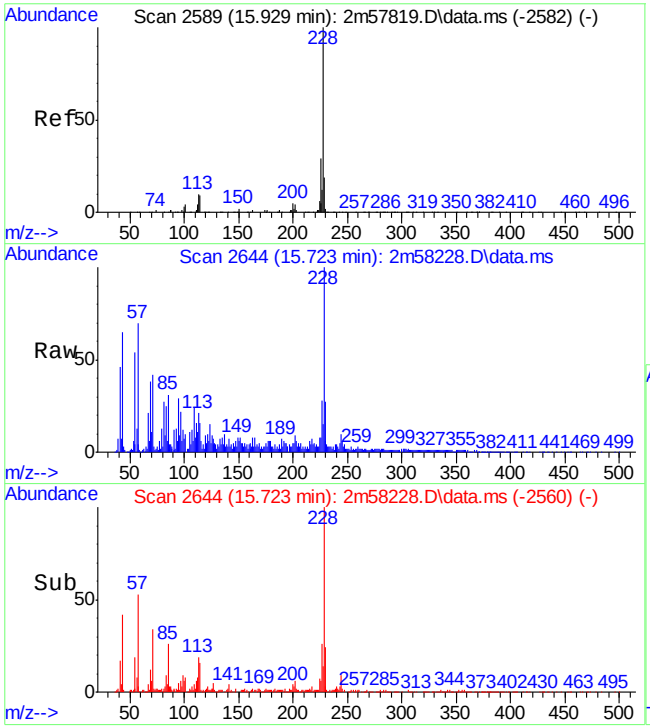




#88
Benzo[a]anthracene
Concen: 5.21 ppb
RT: 15.659 min Scan# 2632
Delta R.T. -0.045 min
Lab File: 2m58228.D
Acq: 9 Nov 2013 4:17 am

Tgt Ion:228 Resp: 98775

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 228 | 100 | | |
| 229 | 21.0 | 0.0 | 49.7 |
| 226 | 27.5 | 0.0 | 55.2 |

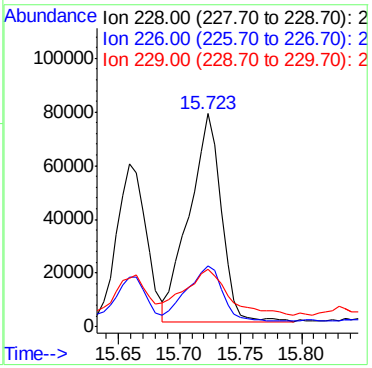


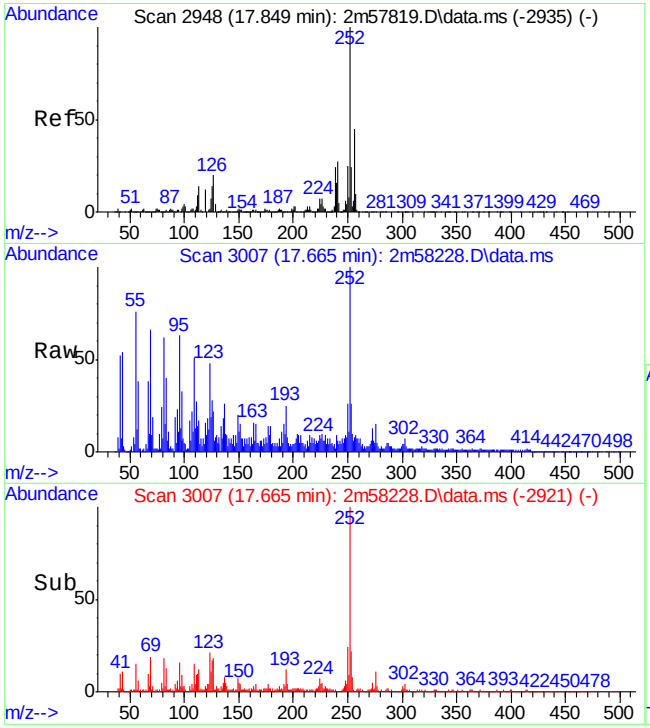



#90
Chrysene
Concen: 7.75 ppb
RT: 15.723 min Scan# 2644
Delta R.T. -0.051 min
Lab File: 2m58228.D
Acq: 9 Nov 2013 4:17 am

Tgt Ion:228 Resp: 140549

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 228 | 100 | | |
| 226 | 26.0 | 0.0 | 57.3 |
| 229 | 20.2 | 0.0 | 48.8 |

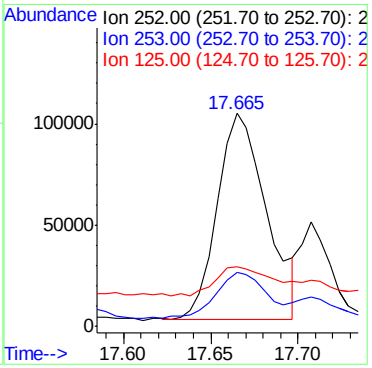


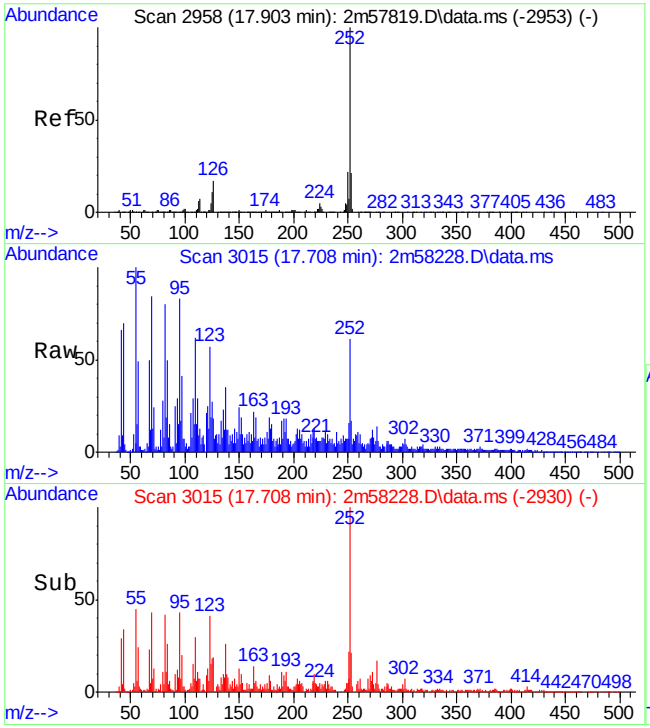




#94
Benzo[b]fluoranthene
Concen: 8.97 ppb m
RT: 17.665 min Scan# 3007
Delta R.T. -0.040 min
Lab File: 2m58228.D
Acq: 9 Nov 2013 4:17 am

Tgt Ion:252 Resp: 198658

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 252 | 100 | | |
| 253 | 25.6 | 0.0 | 53.1 |
| 125 | 28.3 | 0.0 | 49.3 |

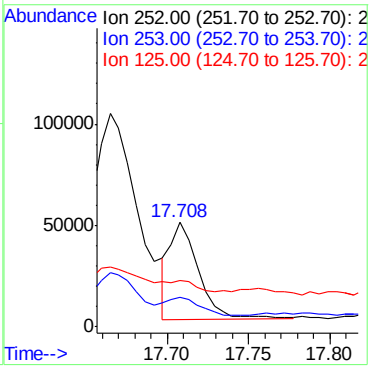


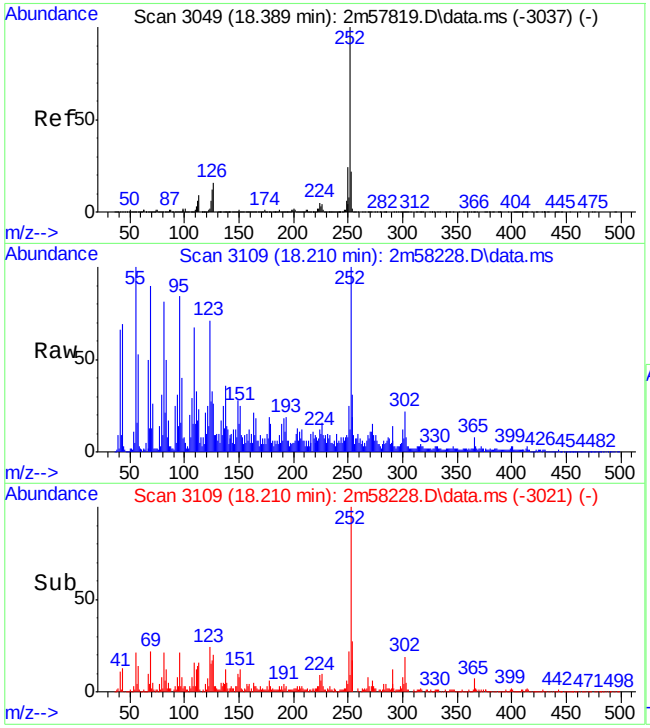



#95
Benzo[k]fluoranthene
Concen: 2.68 ppb
RT: 17.708 min Scan# 3015
Delta R.T. -0.045 min
Lab File: 2m58228.D
Acq: 9 Nov 2013 4:17 am

Tgt Ion:252 Resp: 58342

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 252 | 100 | | |
| 253 | 16.4 | 0.0 | 51.5 |
| 125 | 10.9 | 0.0 | 45.7 |

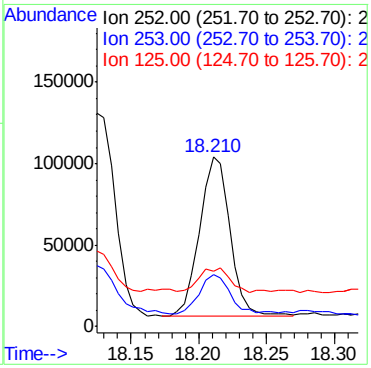


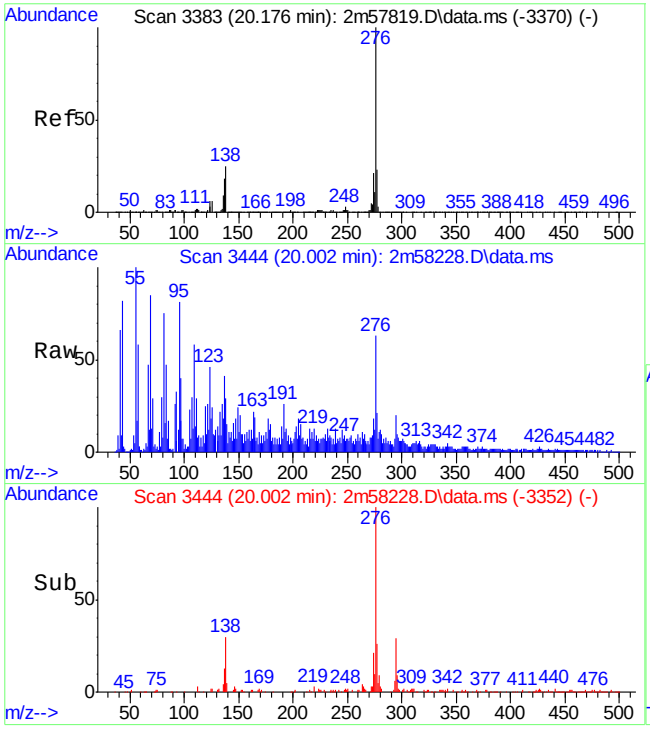




#96
Benzo[a]pyrene
Concen: 7.79 ppb
RT: 18.210 min Scan# 3109
Delta R.T. -0.029 min
Lab File: 2m58228.D
Acq: 9 Nov 2013 4:17 am

Tgt Ion:252 Resp: 153921

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 252 | 100 | | |
| 253 | 24.2 | 0.0 | 51.0 |
| 125 | 12.2 | 0.0 | 47.1 |

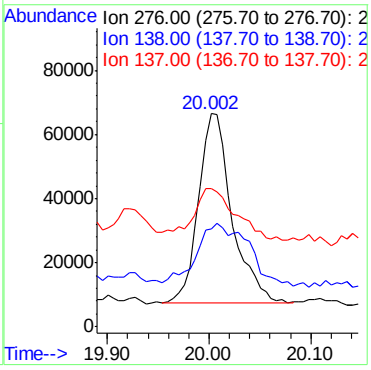


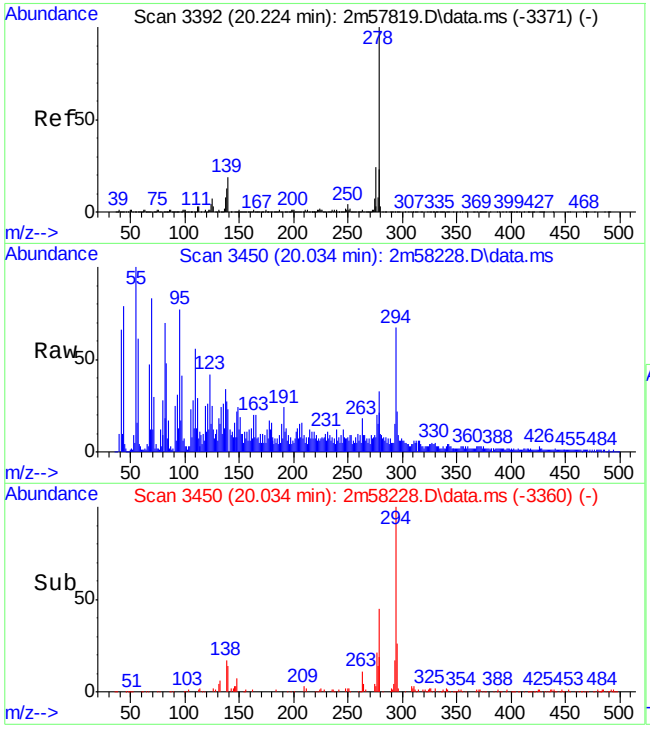



#97
Indeno[1,2,3-cd]pyrene
Concen: 7.21 ppb
RT: 20.002 min Scan# 3444
Delta R.T. -0.008 min
Lab File: 2m58228.D
Acq: 9 Nov 2013 4:17 am

Tgt Ion:276 Resp: 133007

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 276 | 100 | | |
| 138 | 29.6 | 1.5 | 61.5 |
| 137 | 24.4 | 0.0 | 53.8 |

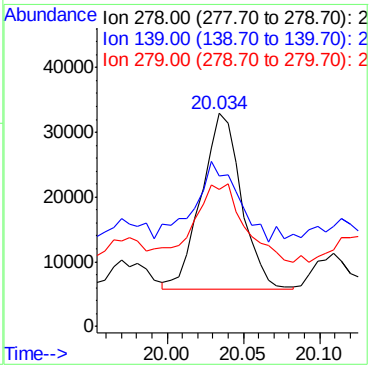


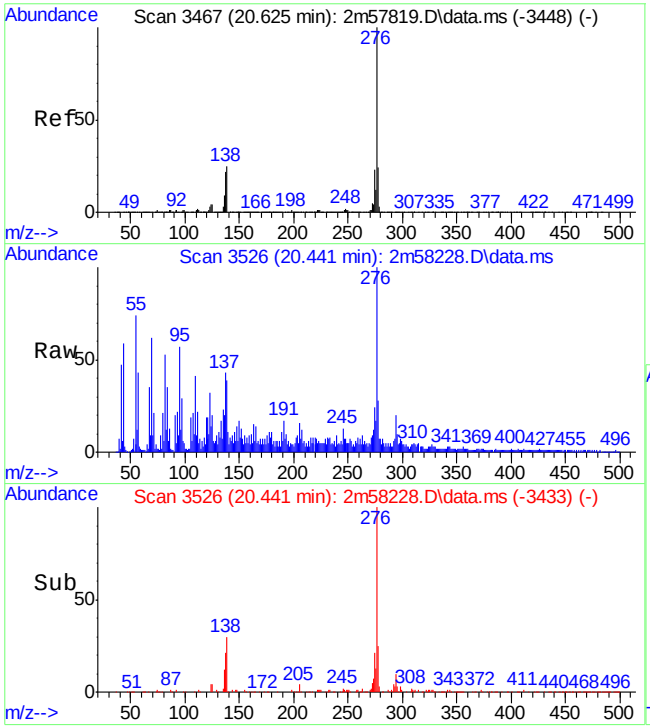




#99
Dibenz[a,h]anthracene
Concen: 2.57 ppb
RT: 20.034 min Scan# 3450
Delta R.T. -0.019 min
Lab File: 2m58228.D
Acq: 9 Nov 2013 4:17 am

Tgt Ion:278 Resp: 49721

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 278 | 100 | | |
| 139 | 30.9 | 0.0 | 58.6 |
| 279 | 38.3 | 0.0 | 54.5 |

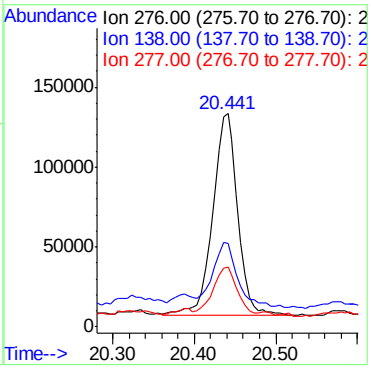





#101
Benzo[g,h,i]perylene
Concen: 14.27 ppb
RT: 20.441 min Scan# 3526
Delta R.T. -0.002 min
Lab File: 2m58228.D
Acq: 9 Nov 2013 4:17 am

Tgt Ion:276 Resp: 269640

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 276 | 100 | | |
| 138 | 30.2 | 5.9 | 65.9 |
| 277 | 24.0 | 0.0 | 54.3 |



Manual Integrations APPROVED (compounds with "m" flag)
Kristi Schollenberger 11/20/13 11:33

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\E2M2462\
Data File : 2m58229.D
Acq On : 9 Nov 2013 4:45 am
Operator : ashleyd
Sample : jb52301-5
Misc : op70508,e2m2462,32.0
ALS Vial : 18 Sample Multiplier: 1

Quant Time: Nov 13 17:22:08 2013
Quant Method : C:\MSDCHEM\1\METHODS\M2M2451.M
Quant Title : Semi Volatile GC/MS, rxi-5sil ms 30mx .25mmx .25umFri Nov 08 12:14:03 2013
QLast Update : Fri Nov 08 12:14:03 2013
Response via : Initial Calibration

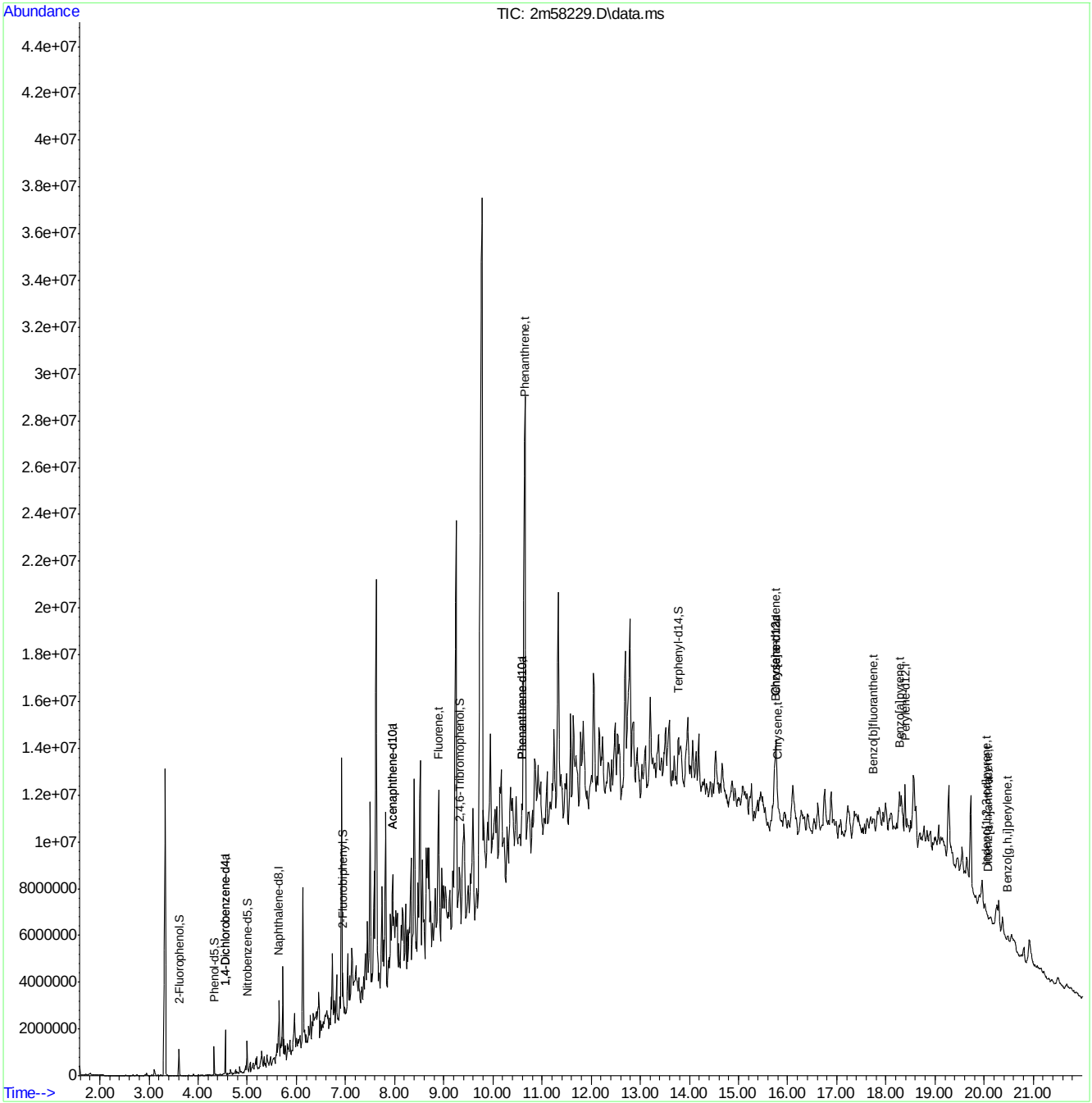
| Internal Standards | R.T. | QIon | Response | Conc | Units | Dev(Min) |
|---|---|---|---|---|---|---|
| 1) 1,4-Dichlorobenzene-d4 | 4.555 | 152 | 190037 | 40.00 | ppb | -0.02 |
| 24) Naphthalene-d8 | 5.652 | 136 | 777856 | 40.00 | ppb | -0.03 |
| 47) Acenaphthene-d10 | 7.957 | 164 | 493868 | 40.00 | ppb | -0.02 |
| 69) Phenanthrene-d10 | 10.589 | 188 | 879465 | 40.00 | ppb | 0.01 |
| 83) Chrysene-d12 | 15.766 | 240 | 952910 | 40.00 | ppb | 0.04 |
| 92) Perylene-d12 | 18.387 | 264 | 936710 | 40.00 | ppb | 0.05 |
| 102) 1,4-Dichlorobenzene-d4a | 4.555 | 152 | 190037 | 40.00 | ppb | -0.02 |
| 104) Acenaphthene-d10a | 7.957 | 164 | 493868 | 40.00 | ppb | -0.02 |
| 106) Chrysene-d12a | 15.766 | 240 | 952910 | 40.00 | ppb | 0.04 |
| 108) Phenanthrene-d10a | 10.589 | 188 | 879465 | 40.00 | ppb | 0.01 |
| **System Monitoring Compounds** | | | | | | |
| 5) 2-Fluorophenol | 3.609 | 112 | 254283 | 44.01 | ppb | -0.01 |
| Spiked Amount 50.000 | | | Recovery = | 88.02% | | |
| 8) Phenol-d5 | 4.325 | 99 | 333517 | 46.10 | ppb | -0.02 |
| Spiked Amount 50.000 | | | Recovery = | 92.20% | | |
| 25) Nitrobenzene-d5 | 4.994 | 82 | 290651 | 42.78 | ppb | -0.03 |
| Spiked Amount 50.000 | | | Recovery = | 85.56% | | |
| 51) 2-Fluorobiphenyl | 6.951 | 172 | 638124 | 43.16 | ppb | -0.02 |
| Spiked Amount 50.000 | | | Recovery = | 86.32% | | |
| 73) 2,4,6-Tribromophenol | 9.326 | 330 | 67416 | 43.89 | ppb | 0.00 |
| Spiked Amount 50.000 | | | Recovery = | 87.78% | | |
| 85) Terphenyl-d14 | 13.776 | 244 | 907572 | 47.49 | ppb | 0.05 |
| Spiked Amount 50.000 | | | Recovery = | 94.98% | | |
| **Target Compounds** | | | | | | Qvalue |
| 66) Fluorene | 8.882 | 166 | 438892 | 28.61 | ppb | 97 |
| 77) Phenanthrene | 10.637 | 178 | 1038944 | 42.89 | ppb | 98 |
| 88) Benzo[a]anthracene | 15.750 | 228 | 154152m | 5.62 | ppb | |
| 90) Chrysene | 15.809 | 228 | 360353m | 13.74 | ppb | |
| 94) Benzo[b]fluoranthene | 17.740 | 252 | 60763 | 2.11 | ppb | 97 |
| 96) Benzo[a]pyrene | 18.285 | 252 | 60239 | 2.35 | ppb | 84 |
| 97) Indeno[1,2,3-cd]pyrene | 20.045 | 276 | 42087 | 1.76 | ppb | 88 |
| 99) Dibenz[a,h]anthracene | 20.077 | 278 | 26500 | 1.06 | ppb | 65 |
| 101) Benzo[g,h,i]perylene | 20.473 | 276 | 56414 | 2.30 | ppb | 93 |

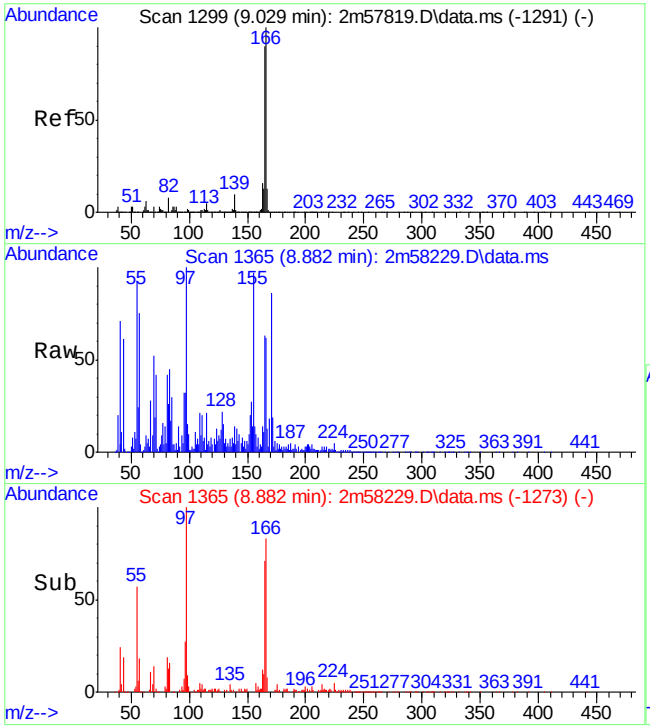
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\E2M2462\
Data File : 2m58229.D
Acq On : 9 Nov 2013 4:45 am
Operator : ashleyd
Sample : jb52301-5
Misc : op70508,e2m2462,32.0
ALS Vial : 18 Sample Multiplier: 1

Quant Time: Nov 13 17:22:08 2013
Quant Method : C:\MSDCHEM\1\METHODS\M2M2451.M
Quant Title : Semi Volatile GC/MS, rxi-5sil ms 30mx .25mmx .25umFri Nov 08 12:14:03 2013
QLast Update : Fri Nov 08 12:14:03 2013
Response via : Initial Calibration

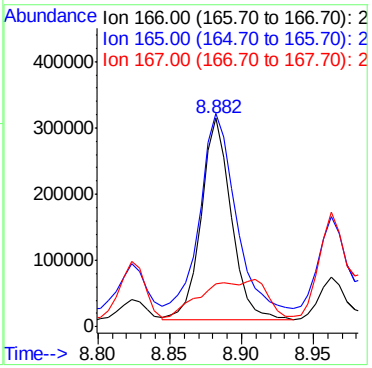


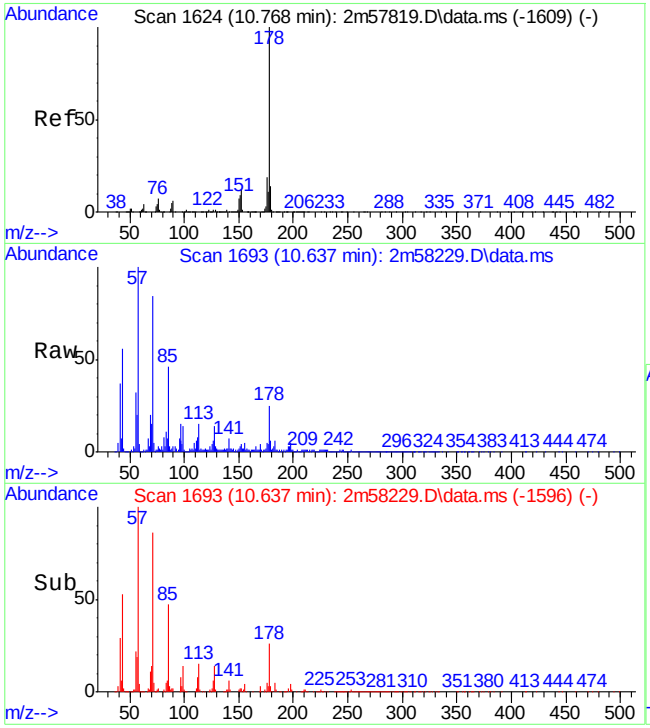



#66
Fluorene
Concen: 28.61 ppb
RT: 8.882 min Scan# 1365
Delta R.T. -0.008 min
Lab File: 2m58229.D
Acq: 9 Nov 2013 4:45 am

Tgt Ion:166 Resp: 438892

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 166 | 100 | | |
| 165 | 96.7 | 64.4 | 124.4 |
| 167 | 16.9 | 0.0 | 43.2 |

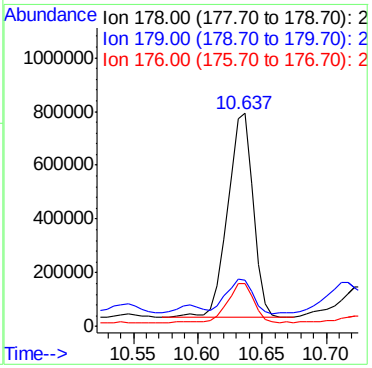


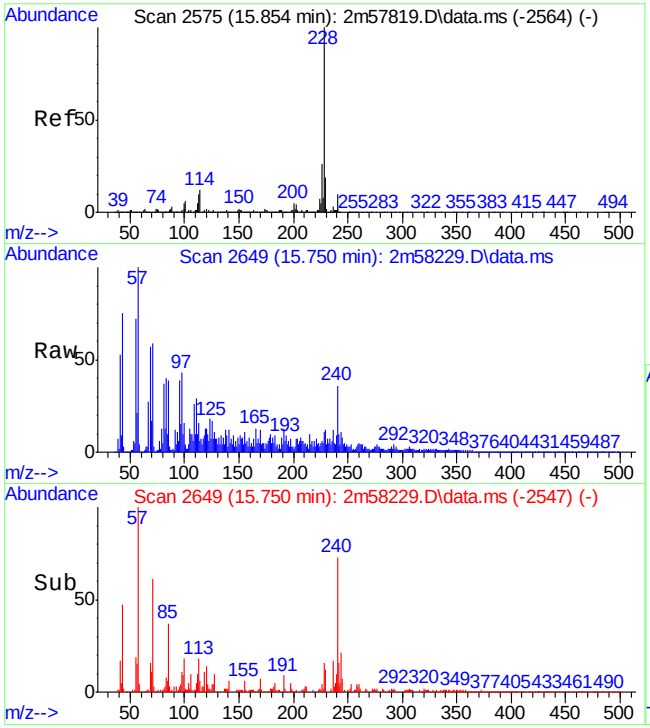




#77
Phenanthrene
Concen: 42.89 ppb
RT: 10.637 min Scan# 1693
Delta R.T. 0.019 min
Lab File: 2m58229.D
Acq: 9 Nov 2013 4:45 am

Tgt Ion:178 Resp: 1038944

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 178 | 100 | | |
| 179 | 16.2 | 0.0 | 45.1 |
| 176 | 19.1 | 0.0 | 48.2 |

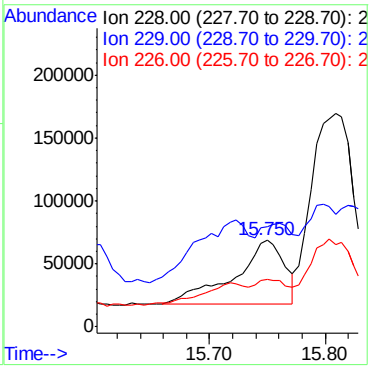


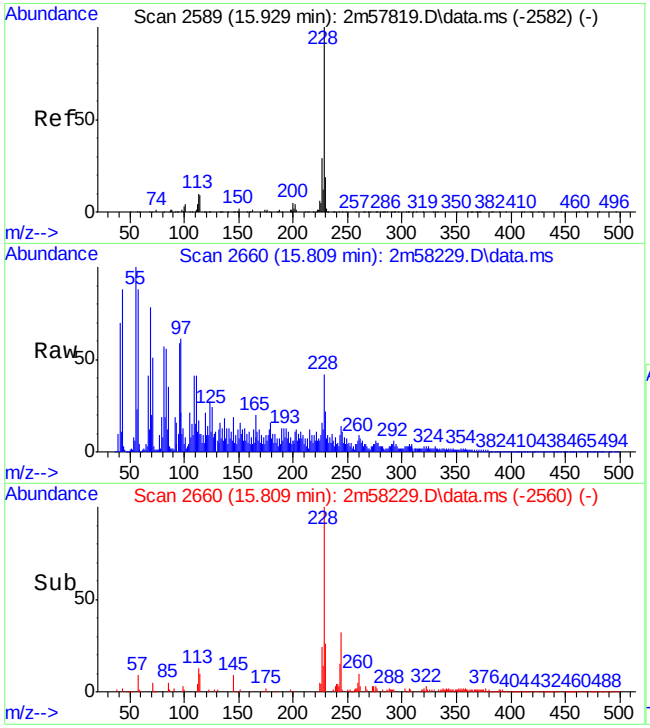



#88
Benzo[a]anthracene
Concen: 5.62 ppb m
RT: 15.750 min Scan# 2649
Delta R.T. 0.046 min
Lab File: 2m58229.D
Acq: 9 Nov 2013 4:45 am

Tgt Ion:228 Resp: 154152

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 228 | 100 | | |
| 229 | 114.7 | 0.0 | 49.7# |
| 226 | 54.3 | 0.0 | 55.2 |

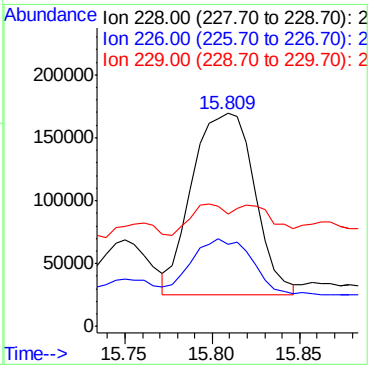


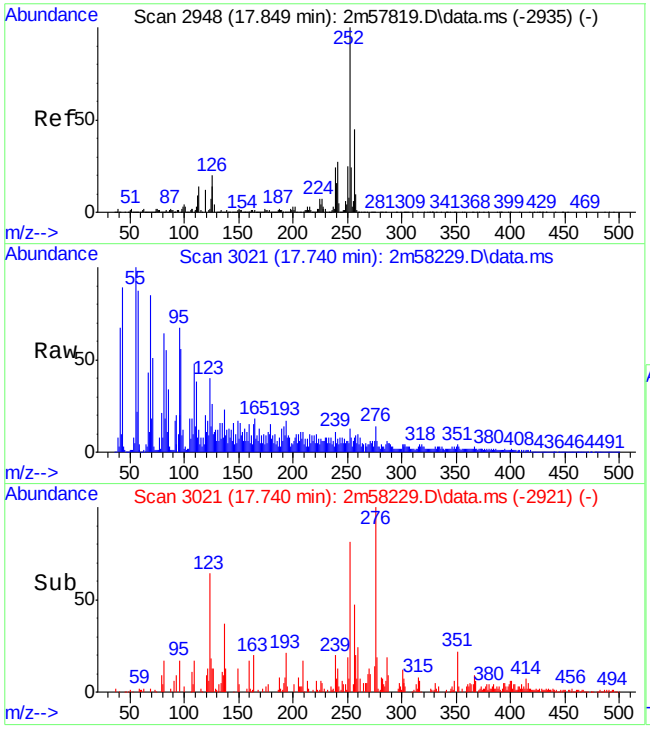




#90
Chrysene
Concen: 13.74 ppb m
RT: 15.809 min Scan# 2660
Delta R.T. 0.035 min
Lab File: 2m58229.D
Acq: 9 Nov 2013 4:45 am

Tgt Ion:228 Resp: 360353

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 228 | 100 | | |
| 226 | 38.7 | 0.0 | 57.3 |
| 229 | 52.7 | 0.0 | 48.8# |

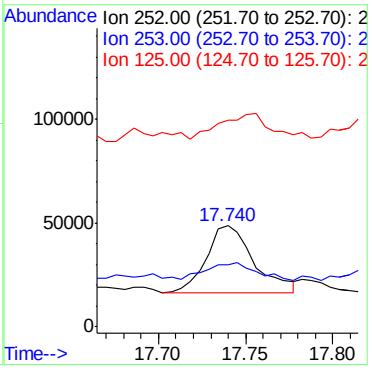


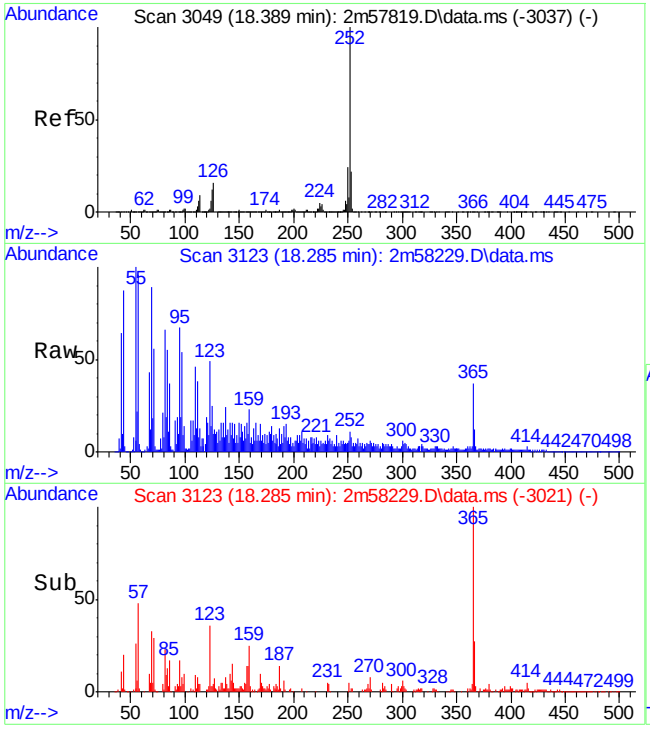



#94
Benzo[b]fluoranthene
Concen: 2.11 ppb
RT: 17.740 min Scan# 3021
Delta R.T. 0.035 min
Lab File: 2m58229.D
Acq: 9 Nov 2013 4:45 am

Tgt Ion:252 Resp: 60763

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 252 | 100 | | |
| 253 | 23.0 | 0.0 | 53.1 |
| 125 | 22.4 | 0.0 | 49.3 |

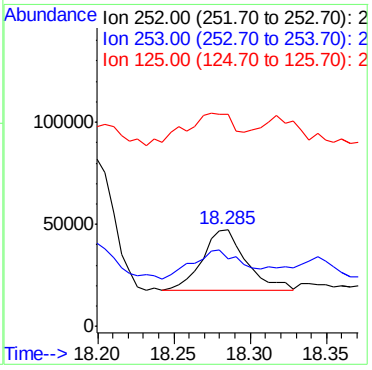


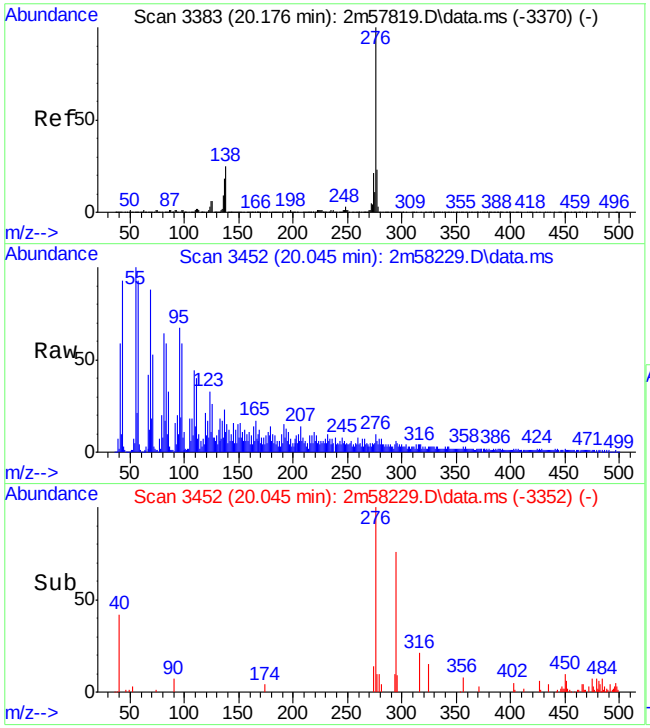




#96
Benzo[a]pyrene
Concen: 2.35 ppb
RT: 18.285 min Scan# 3123
Delta R.T. 0.046 min
Lab File: 2m58229.D
Acq: 9 Nov 2013 4:45 am

Tgt Ion:252 Resp: 60239

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 252 | 100 | | |
| 253 | 24.2 | 0.0 | 51.0 |
| 125 | 28.7 | 0.0 | 47.1 |

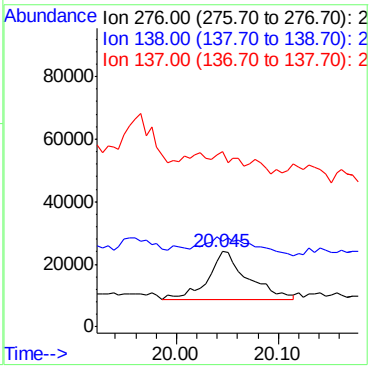


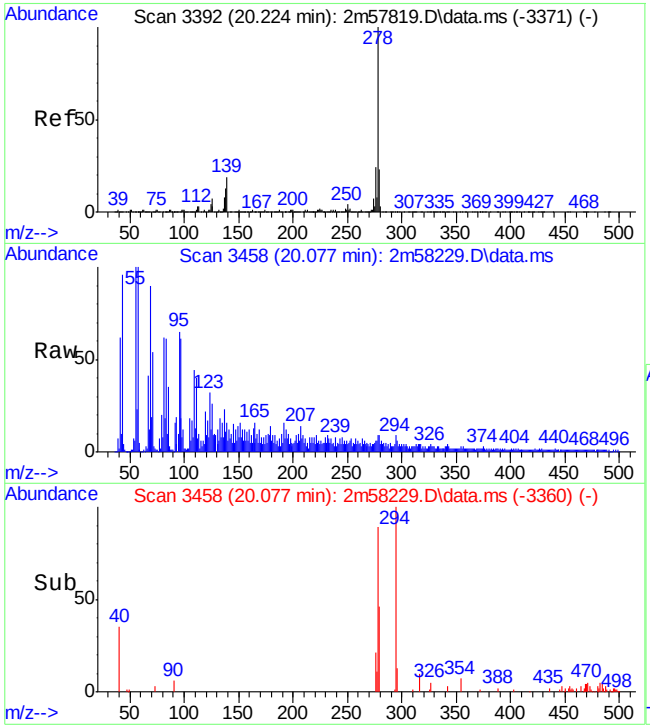



#97
Indeno[1,2,3-cd]pyrene
Concen: 1.76 ppb
RT: 20.045 min Scan# 3452
Delta R.T. 0.035 min
Lab File: 2m58229.D
Acq: 9 Nov 2013 4:45 am

Tgt Ion:276 Resp: 42087

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 276 | 100 | | |
| 138 | 24.0 | 1.5 | 61.5 |
| 137 | 19.0 | 0.0 | 53.8 |

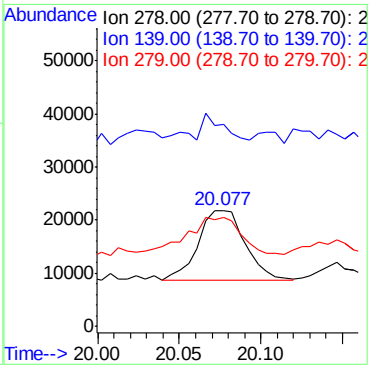


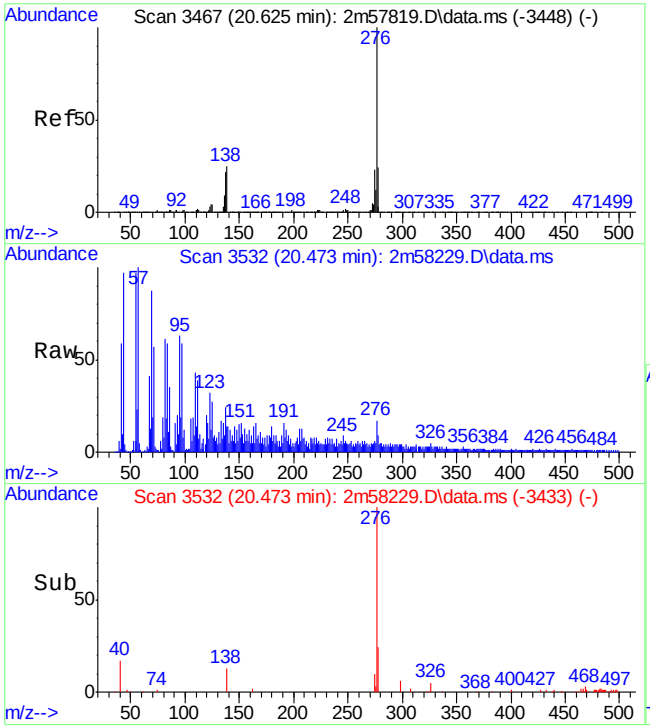




#99
Dibenz[a,h]anthracene
Concen: 1.06 ppb
RT: 20.077 min Scan# 3458
Delta R.T. 0.024 min
Lab File: 2m58229.D
Acq: 9 Nov 2013 4:45 am

Tgt Ion:278 Resp: 26500

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 278 | 100 | | |
| 139 | 12.1 | 0.0 | 58.6 |
| 279 | 44.4 | 0.0 | 54.5 |

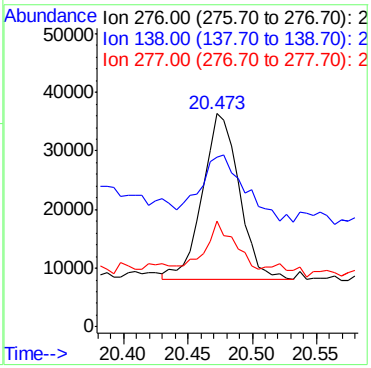





#101
Benzo[g,h,i]perylene
Concen: 2.30 ppb
RT: 20.473 min Scan# 3532
Delta R.T. 0.029 min
Lab File: 2m58229.D
Acq: 9 Nov 2013 4:45 am

Tgt Ion:276 Resp: 56414

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 276 | 100 | | |
| 138 | 32.5 | 5.9 | 65.9 |
| 277 | 28.2 | 0.0 | 54.3 |



Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\E2M2462\
Data File : 2m58215.D
Acq On : 8 Nov 2013 10:13 pm
Operator : ashleyd
Sample : op70508-mb1
Misc : op70508,e2m2462,35.0
ALS Vial : 4 Sample Multiplier: 1

Quant Time: Nov 11 13:17:01 2013
Quant Method : C:\MSDCHEM\1\METHODS\M2M2451.M
Quant Title : Semi Volatile GC/MS, rxi-5sil ms 30mx .25mmx .25umFri Nov 08 12:14:03 2013
QLast Update : Fri Nov 08 12:14:03 2013
Response via : Initial Calibration

| Internal Standards | R.T. | QIon | Response | Conc | Units | Dev(Min) |
|---|---|---|---|---|---|---|
| 1) 1,4-Dichlorobenzene-d4 | 4.550 | 152 | 206512 | 40.00 | ppb | -0.03 |
| 24) Naphthalene-d8 | 5.641 | 136 | 808569 | 40.00 | ppb | -0.04 |
| 47) Acenaphthene-d10 | 7.925 | 164 | 418943 | 40.00 | ppb | -0.05 |
| 69) Phenanthrene-d10 | 10.524 | 188 | 643769 | 40.00 | ppb | -0.05 |
| 83) Chrysene-d12 | 15.664 | 240 | 532272 | 40.00 | ppb | -0.06 |
| 92) Perylene-d12 | 18.280 | 264 | 511050 | 40.00 | ppb | -0.06 |
| 102) 1,4-Dichlorobenzene-d4a | 4.550 | 152 | 206512 | 40.00 | ppb | -0.03 |
| 104) Acenaphthene-d10a | 7.925 | 164 | 418943 | 40.00 | ppb | -0.05 |
| 106) Chrysene-d12a | 15.664 | 240 | 532272 | 40.00 | ppb | -0.06 |
| 108) Phenanthrene-d10a | 10.524 | 188 | 643769 | 40.00 | ppb | -0.05 |
| **System Monitoring Compounds** | | | | | | |
| 5) 2-Fluorophenol | 3.603 | 112 | 327076 | 52.09 | ppb | -0.02 |
| Spiked Amount 50.000 | | | Recovery = 104.18% | | | |
| 8) Phenol-d5 | 4.320 | 99 | 396697 | 50.46 | ppb | -0.02 |
| Spiked Amount 50.000 | | | Recovery = 100.92% | | | |
| 25) Nitrobenzene-d5 | 4.988 | 82 | 355340 | 50.31 | ppb | -0.03 |
| Spiked Amount 50.000 | | | Recovery = 100.62% | | | |
| 51) 2-Fluorobiphenyl | 6.935 | 172 | 635813 | 50.69 | ppb | -0.04 |
| Spiked Amount 50.000 | | | Recovery = 101.38% | | | |
| 73) 2,4,6-Tribromophenol | 9.273 | 330 | 61252 | 54.48 | ppb | -0.05 |
| Spiked Amount 50.000 | | | Recovery = 108.96% | | | |
| 85) Terphenyl-d14 | 13.680 | 244 | 607024 | 56.87 | ppb | -0.05 |
| Spiked Amount 50.000 | | | Recovery = 113.74% | | | |

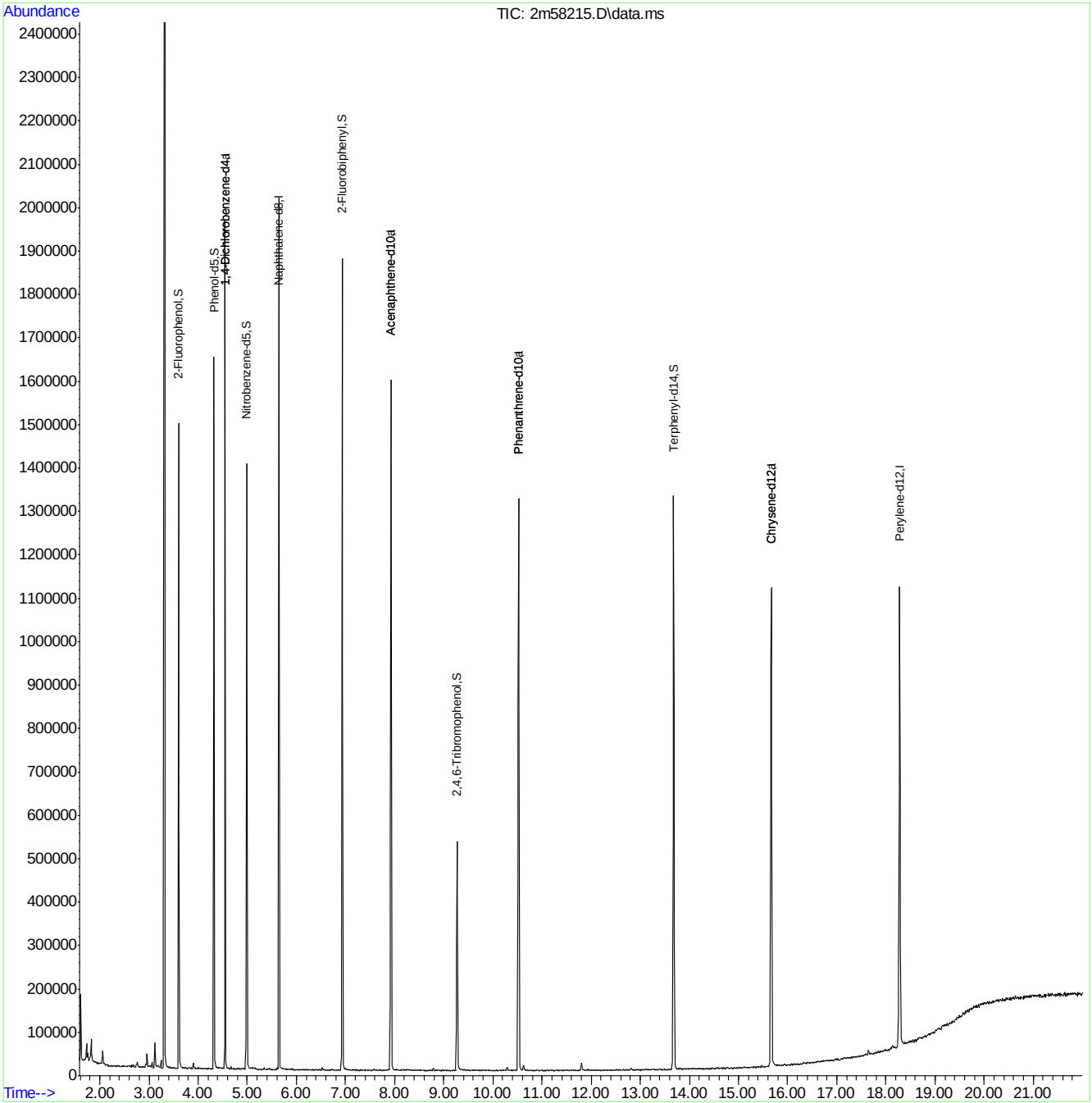
| Target Compounds | Qvalue |
|---|---|

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\E2M2462\
Data File : 2m58215.D
Acq On : 8 Nov 2013 10:13 pm
Operator : ashleyd
Sample : op70508-mb1
Misc : op70508,e2m2462,35.0
ALS Vial : 4 Sample Multiplier: 1

Quant Time: Nov 11 13:17:01 2013
Quant Method : C:\MSDCHEM\1\METHODS\M2M2451.M
Quant Title : Semi Volatile GC/MS, rxi-5sil ms 30mx .25mmx .25umFri Nov 08 12:14:03 2013
QLast Update : Fri Nov 08 12:14:03 2013
Response via : Initial Calibration



New Jersey ACCUTEST LABORATORIES

General Chemistry

# QC Data Summaries

Includes the following where applicable:

- Percent Solids Raw Data Summary

# Percent Solids Raw Data Summary



**Job Number:** JB52301
**Account:** SECORPAE Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

**Sample:** JB52301-3 **Analyzed:** 09-NOV-13 by AR **Method:** ASTM 4643-00
**ClientID:** AOI-8-N-146-0-2

| | | |
|---|---|---|
| Wet Weight (Total) | 35.08 | g |
| Tare Weight | 27.7 | g |
| Dry Weight (Total) | 34.07 | g |
| Solids, Percent | 86.3 | % |

**Sample:** JB52301-5 **Analyzed:** 09-NOV-13 by AR **Method:** ASTM 4643-00
**ClientID:** AOI-8-N-143-20.5-21

| | | |
|---|---|---|
| Wet Weight (Total) | 30.44 | g |
| Tare Weight | 24.31 | g |
| Dry Weight (Total) | 29.63 | g |
| Solids, Percent | 86.8 | % |

New Jersey ACCUTEST LABORATORIES

## Misc. Forms

### Custody Documents and Other Forms

(Accutest Labs of New England, Inc.)

Includes the following where applicable:

- Chain of Custody
- Sample Tracking Chronicle
- Internal Chain of Custody

ACCUTEST LABORATORIES

# CHAIN OF CUSTODY



2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX: 732-329-3499/3480
www.accutest.com

FED-EX Tracking #: | Bottle Order Control #:
Accutest Quote #: | Accutest Job #: JB52301

**Client / Reporting Information**

Company Name: Accutest Laboratories
Street Address: 2235 Route 130
City: Dayton State: NJ Zip: 08810
Project Contact: kristinb E-mail: kristinb@accutest.com
Phone #: 732-329-0200 Fax #:
Sampler(s) Name(s): JD Phone:

**Project Information**

Project Name: Sunoco, Philadelphia Refinery, Philadelphia, PA
Street:
City: State:
Project #:
Client Purchase Order #:
Project Manager:

**Billing Information ( if different from Report to)**

Company Name:
Street Address:
City: State: Zip:
Attention:

**Requested Analysis ( see TEST CODE sheet)**

| Matrix Codes |
|---|
| DW - Drinking Water |
| GW - Ground Water |
| WW - Water |
| SW - Surface Water |
| SO - Soil |
| SL- Sludge |
| SED-Sediment |
| OI - Oil |
| LIQ - Other Liquid |
| AIR - Air |
| SOL - Other Solid |
| WP - Wipe |
| FB-Field Blank |
| EB-Equipment Blank |
| RB- Rinse Blank |
| TB-Trip Blank |

| Accutest Sample # | Field ID / Point of Collection | MEOH/DI Vial # | Collection Date | Collection Time | Sampled by | Matrix | # of bottles | Number of preserved Bottles: HCl | NaOH | HNO3 | H2SO4 | NONE | DI Water | MEOH | ENCORE | CO ,NI ,PB ,V ,V8011EDB ,ZN , | V8011EDB , | HOLD | LAB USE ONLY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | AOI-8-BH-13-64-0-2 | | 11/6/13 | 10:35:00 AM | JD | SO | 1 | | | | | 1 | | | | | | H | M44 T1 |
| 2 | AOI-8-BH-13-64-2-4 | | 11/6/13 | 11:15:00 AM | JD | SO | 1 | | | | | 1 | | | | | | H | M44 T1 |
| 3 | AOI-8-N-146-0-2 | | 11/6/13 | 1:00:00 PM | JD | SO | 1 | | | | | 1 | | | | X | | | M44 T1 |
| 4 | AOI-8-N-146-4-6 | | 11/6/13 | 2:00:00 PM | JD | SO | 1 | | | | | 1 | | | | | | H | M44 T1 |
| 5 | AOI-8-N-143-20.5-21 | | 11/6/13 | 2:05:00 PM | JD | SO | 1 | | | | | 1 | | | | X | | | M44 T1 |
| 6 | TB | | 11/6/13 | 2:05:00 PM | JD | AQ | 2 | 2 | | | | | | | | | X | | 2173 |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | 2M2, 2C |
| | | | | | | | | | | | | | | | | | | | |

Turnaround Time ( Business days)

Approved By (Accutest PM): / Date:

- [ ] Std. 10 Business Days
- [ ] 5 Day RUSH
- [ ] 3 Day EMERGENCY
- [ ] 2 Day EMERGENCY
- [ ] 1 Day EMERGENCY
- [X] other Due 11/20/2013

Emergency & Rush T/A data available VIA Lablink

**Data Deliverable Information**

- [ ] Commercial "A" (Level 1)
- [ ] Commercial "B" ( Level 2)
- [ ] FULLT1 ( Level 3+4 )
- [ ] NJ Reduced
- [ ] Commercial "C"
- [ ] NYASP Category A
- [ ] NYASP Category B
- [ ] State Forms
- [ ] EDD Format
- [X] Other REDT2

Commercial "A" = Results Only
Commercial "B" = Results + QC Summary
NJ Reduced = Results + QC Summary + Partial Raw data

**Comments / Special Instructions**

Please send (1) 60ml bottle per soil sample; location M44 T1. -6 will be (2) 40ml vials with HCL; location 2173.

**Sample Custody must be documented below each time samples change possession, including courier delivery.**

| | Relinquished by Sampler: | Date Time: | Received By: | Relinquished By: | Date Time: | Received By: |
|---|---|---|---|---|---|---|
| 1 | Fernando | 17:00 11-7-13 | FEDEX | FX | 11-8-13 | Baccook |
| 2 | | | | | | |
| 3 | Relinquished by Sampler: | Date Time: | Received By: | Relinquished By: | Date Time: | Received By: |
| 4 | | | | | | |
| 5 | Relinquished by: | Date Time: | Received By: | Custody Seal # 295 [ ] Intact [ ] Not Intact | Preserved where applicable [ ] | On Ice [X] Cooler Temp. 3.7°C |

11.1 11

# Accutest Laboratories Sample Receipt Summary

**Accutest Job Number:** JB52301 **Client:** ACNJ **Immediate Client Services Action Required:** No

**Date / Time Received:** 11/8/2013 **Delivery Method:** **Client Service Action Required at Login:** No

**Project:** SUB **No. Coolers:** 1 **Airbill #'s:**

| Cooler Security | Y | or | N | | Y | or | N |
|---|---|---|---|---|---|---|---|
| 1. Custody Seals Present: | ☑ | | ☐ | 3. COC Present: | ☑ | | ☐ |
| 2. Custody Seals Intact: | ☑ | | ☐ | 4. Smpl Dates/Time OK | ☑ | | ☐ |

| Cooler Temperature | Y | or | N |
|---|---|---|---|
| 1. Temp criteria achieved: | ☑ | | ☐ |
| 2. Cooler temp verification: | Infared gun | | |
| 3. Cooler media: | Ice (bag) | | |

| Quality Control Preservation | Y | or | N | N/A |
|---|---|---|---|---|
| 1. Trip Blank present / cooler: | ☐ | | ☐ | ☑ |
| 2. Trip Blank listed on COC: | ☐ | | ☐ | ☑ |
| 3. Samples preserved properly: | ☑ | | ☐ | |
| 4. VOCs headspace free: | ☐ | | ☐ | ☑ |

| Sample Integrity - Documentation | Y | or | N |
|---|---|---|---|
| 1. Sample labels present on bottles: | ☑ | | ☐ |
| 2. Container labeling complete: | ☑ | | ☐ |
| 3. Sample container label / COC agree: | ☑ | | ☐ |

| Sample Integrity - Condition | Y | or | N |
|---|---|---|---|
| 1. Sample recvd within HT: | ☑ | | ☐ |
| 2. All containers accounted for: | ☑ | | ☐ |
| 3. Condition of sample: | Intact | | |

| Sample Integrity - Instructions | Y | or | N | N/A |
|---|---|---|---|---|
| 1. Analysis requested is clear: | ☑ | | ☐ | |
| 2. Bottles received for unspecified tests | ☐ | | ☑ | |
| 3. Sufficient volume recvd for analysis: | ☑ | | ☐ | |
| 4. Compositing instructions clear: | ☐ | | ☐ | ☑ |
| 5. Filtering instructions clear: | ☐ | | ☐ | ☑ |

Comments

Accutest Laboratories
V:508.481.6200

495 Technology Center West, Bldg One
F: 508.481.7753

Marlborough, MA
www/accutest.com

11.1

11

**JB52301: Chain of Custody**
**Page 2 of 2**

# Internal Sample Tracking Chronicle

Accutest New Jersey

**Job No:** JB52301

SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA
Project No: AOI8

| Sample Number | Method | Analyzed | By | Prepped | By | Test Codes |
|---|---|---|---|---|---|---|
| JB52301-3 | Collected: 06-NOV-13 13:00 By: JD | | | Received: 06-NOV-13 By: | | |
| AOI-8-N-146-0-2 | | | | | | |
| JB52301-3 | SW846 8011 | 13-NOV-13 06:28 | NK | 11-NOV-13 | MT | V8011EDB |
| JB52301-3 | SW846 6010C | 20-NOV-13 00:01 | EAL | 19-NOV-13 | EM | CO,NI,PB,V,ZN |
| JB52301-5 | Collected: 06-NOV-13 14:05 By: JD | | | Received: 06-NOV-13 By: | | |
| AOI-8-N-143-20.5-21 | | | | | | |
| JB52301-5 | SW846 8011 | 13-NOV-13 06:51 | NK | 11-NOV-13 | MT | V8011EDB |
| JB52301-5 | SW846 6010C | 20-NOV-13 00:06 | EAL | 19-NOV-13 | EM | CO,NI,PB,V,ZN |
| JB52301-6 | Collected: 06-NOV-13 14:05 By: JD | | | Received: 06-NOV-13 By: | | |
| TB | | | | | | |
| JB52301-6 | SW846 8011 | 12-NOV-13 15:33 | CZ | 09-NOV-13 | MT | V8011EDB |

# Accutest Internal Chain of Custody



**Job Number:** JB52301
**Account:** ALNJ Accutest New Jersey
**Project:** SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA
**Received:** 11/06/13

| Sample.Bottle Number | Transfer FROM | Transfer TO | Date/Time | Reason |
|---|---|---|---|---|
| JB52301-3.1 | Walk In Ref #5 | Meredith Tarr | 11/11/13 15:21 | Retrieve from Storage |
| JB52301-3.1 | Meredith Tarr | Walk In Ref #5 | 11/11/13 15:21 | Return to Storage |
| JB52301-5.1 | Walk In Ref #5 | Meredith Tarr | 11/11/13 15:21 | Retrieve from Storage |
| JB52301-5.1 | Meredith Tarr | Walk In Ref #5 | 11/11/13 15:21 | Return to Storage |
| JB52301-5.1 | Walk In Ref #5 | Eric Mensah | 11/19/13 09:53 | Retrieve from Storage |
| JB52301-5.1 | Eric Mensah | Walk In Ref #5 | 11/19/13 09:53 | Return to Storage |
| JB52301-6.2 | VOC Ref #1 | Michael Rolo | 11/09/13 07:12 | Retrieve from Storage |
| JB52301-6.2 | Michael Rolo | | 11/11/13 07:09 | Depleted |

New Jersey
ACCUTEST LABORATORIES

## GC Volatiles

### QC Data Summaries

(Accutest Labs of New England, Inc.)

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries
- Surrogate Recovery Summaries
- GC Surrogate Retention Time Summaries
- Initial and Continuing Calibration Summaries

# Method Blank Summary



**Job Number:** JB52301
**Account:** ALNJ Accutest New Jersey
**Project:** SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| OP35660-MB | BB52359.D | 1 | 11/12/13 | CZ | 11/09/13 | OP35660 | GBB3070 |

**The QC reported here applies to the following samples:** **Method:** SW846 8011

JB52301-6

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 106-93-4 | 1,2-Dibromoethane | ND | 0.015 | 0.011 | ug/l | |

| CAS No. | Surrogate Recoveries | | Limits |
|---|---|---|---|
| 460-00-4 | Bromofluorobenzene (S) | 119% | 36-173% |
| 460-00-4 | Bromofluorobenzene (S) | 114% | 36-173% |

# Method Blank Summary



**Job Number:** JB52301
**Account:** ALNJ Accutest New Jersey
**Project:** SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| OP35676-MB | BK31996.D | 1 | 11/12/13 | NK | 11/11/13 | OP35676 | GBK1055 |

**The QC reported here applies to the following samples:** **Method:** SW846 8011

JB52301-3, JB52301-5

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 106-93-4 | 1,2-Dibromoethane | ND | 2.5 | 0.91 | ug/kg | |

| CAS No. | Surrogate Recoveries | | Limits |
|---|---|---|---|
| 460-00-4 | Bromofluorobenzene (S) | 87% | 61-167% |
| 460-00-4 | Bromofluorobenzene (S) | 131% | 61-167% |

# Blank Spike Summary



**Job Number:** JB52301
**Account:** ALNJ Accutest New Jersey
**Project:** SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| OP35660-BS | BB52360.D | 1 | 11/12/13 | CZ | 11/09/13 | OP35660 | GBB3070 |

**The QC reported here applies to the following samples:** **Method:** SW846 8011

JB52301-6

| CAS No. | Compound | Spike ug/l | BSP ug/l | BSP % | Limits |
|---|---|---|---|---|---|
| 106-93-4 | 1,2-Dibromoethane | 0.071 | 0.076 | 107 | 60-140 |

| CAS No. | Surrogate Recoveries | BSP | Limits |
|---|---|---|---|
| 460-00-4 | Bromofluorobenzene (S) | 111% | 36-173% |
| 460-00-4 | Bromofluorobenzene (S) | 115% | 36-173% |

12.2.1
12

* = Outside of Control Limits.

# Blank Spike Summary



**Job Number:** JB52301
**Account:** ALNJ Accutest New Jersey
**Project:** SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| OP35676-BS | BK31997.D | 1 | 11/13/13 | NK | 11/11/13 | OP35676 | GBK1055 |

**The QC reported here applies to the following samples:** **Method:** SW846 8011

JB52301-3, JB52301-5

| CAS No. | Compound | Spike ug/kg | BSP ug/kg | BSP % | Limits |
|---|---|---|---|---|---|
| 106-93-4 | 1,2-Dibromoethane | 33.2 | 36.1 | 109 | 56-140 |

| CAS No. | Surrogate Recoveries | BSP | Limits |
|---|---|---|---|
| 460-00-4 | Bromofluorobenzene (S) | 108% | 61-167% |
| 460-00-4 | Bromofluorobenzene (S) | 112% | 61-167% |

12.2.2
12

* = Outside of Control Limits.

# Matrix Spike/Matrix Spike Duplicate Summary



**Job Number:** JB52301
**Account:** ALNJ Accutest New Jersey
**Project:** SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| OP35660-MS | BB52361.D | 1 | 11/12/13 | CZ | 11/09/13 | OP35660 | GBB3070 |
| OP35660-MSD | BB52362.D | 1 | 11/12/13 | CZ | 11/09/13 | OP35660 | GBB3070 |
| MC25769-10 | BB52373.D | 1 | 11/12/13 | CZ | 11/09/13 | OP35660 | GBB3070 |

**The QC reported here applies to the following samples:** **Method:** SW846 8011

JB52301-6

| CAS No. | Compound | MC25769-10 ug/l | Q | Spike ug/l | MS ug/l | MS % | MSD ug/l | MSD % | RPD | Limits Rec/RPD |
|---|---|---|---|---|---|---|---|---|---|---|
| 106-93-4 | 1,2-Dibromoethane | 0.014 | U | 0.0675 | 0.067 | 99 | 0.064 | 93 | 5 | 63-163/27 |

| CAS No. | Surrogate Recoveries | MS | MSD | MC25769-10 | Limits |
|---|---|---|---|---|---|
| 460-00-4 | Bromofluorobenzene (S) | 114% | 122% | 124% | 36-173% |
| 460-00-4 | Bromofluorobenzene (S) | 112% | 113% | 111% | 36-173% |

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* = Outside of Control Limits.

# Matrix Spike/Matrix Spike Duplicate Summary



**Job Number:** JB52301
**Account:** ALNJ Accutest New Jersey
**Project:** SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| OP35676-MS | BK31998.D | 1 | 11/13/13 | NK | 11/11/13 | OP35676 | GBK1055 |
| OP35676-MSD | BK31999.D | 1 | 11/13/13 | NK | 11/11/13 | OP35676 | GBK1055 |
| JB52158-5 | BK32000.D | 1 | 11/13/13 | NK | 11/11/13 | OP35676 | GBK1055 |

**The QC reported here applies to the following samples:** **Method:** SW846 8011

JB52301-3, JB52301-5

| CAS No. | Compound | JB52158-5 ug/kg | Q | Spike ug/kg | MS ug/kg | MS % | MSD ug/kg | MSD % | RPD | Limits Rec/RPD |
|---|---|---|---|---|---|---|---|---|---|---|
| 106-93-4 | 1,2-Dibromoethane | ND | | 40.2 | 41.9 | 104 | 21.5 | 108 | 3 | 48-141/27 |

| CAS No. | Surrogate Recoveries | MS | MSD | JB52158-5 | Limits |
|---|---|---|---|---|---|
| 460-00-4 | Bromofluorobenzene (S) | 85% | 109% | 90% | 61-167% |
| 460-00-4 | Bromofluorobenzene (S) | 132% | 144% | 135% | 61-167% |

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* = Outside of Control Limits.

# Volatile Surrogate Recovery Summary



**Job Number:** JB52301
**Account:** ALNJ Accutest New Jersey
**Project:** SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

**Method:** SW846 8011 **Matrix:** AQ

**Samples and QC shown here apply to the above method**

| Lab Sample ID | Lab File ID | S1 [a] | S1 [b] |
|---|---|---|---|
| JB52301-6 | BB52383.D | 113.0 | 103.0 |
| OP35660-BS | BB52360.D | 111.0 | 115.0 |
| OP35660-MB | BB52359.D | 119.0 | 114.0 |
| OP35660-MS | BB52361.D | 114.0 | 112.0 |
| OP35660-MSD | BB52362.D | 122.0 | 113.0 |

| Surrogate Compounds | Recovery Limits |
|---|---|
| **S1** = Bromofluorobenzene (S) | 36-173% |

(a) Recovery from GC signal #2
(b) Recovery from GC signal #1

# Volatile Surrogate Recovery Summary



**Job Number:** JB52301
**Account:** ALNJ Accutest New Jersey
**Project:** SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

**Method:** SW846 8011 **Matrix:** SO

**Samples and QC shown here apply to the above method**

| Lab Sample ID | Lab File ID | S1 [a] | S1 [b] |
|---|---|---|---|
| JB52301-3 | BK32014.D | 88.0 | 119.0 |
| JB52301-5 | BK32015.D | 107.0 | 146.0 |
| OP35676-BS | BK31997.D | 108.0 | 112.0 |
| OP35676-MB | BK31996.D | 87.0 | 131.0 |
| OP35676-MS | BK31998.D | 85.0 | 132.0 |
| OP35676-MSD | BK31999.D | 109.0 | 144.0 |

| Surrogate Compounds | Recovery Limits |
|---|---|
| **S1** = Bromofluorobenzene (S) | 61-167% |

(a) Recovery from GC signal #2
(b) Recovery from GC signal #1

# GC Surrogate Retention Time Summary



**Job Number:** JB52301
**Account:** ALNJ Accutest New Jersey
**Project:** SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

| | | | |
|---|---|---|---|
| **Check Std:** | GBB3070-CC3070 | **Injection Date:** | 11/12/13 |
| **Lab File ID:** | BB52355.D | **Injection Time:** | 02:35 |
| **Instrument ID:** | GCBB | **Method:** | SW846 8011 |

| | S1 [a] RT | S1 [b] RT |
|---|---|---|
| Check Std | 5.80 | 4.69 |

| Lab Sample ID | Lab File ID | Date Analyzed | Time Analyzed | S1 [a] RT | S1 [b] RT |
|---|---|---|---|---|---|
| ZZZZZZ | BB52356.D | 11/12/13 | 03:04 | 5.80 | 4.69 |
| ZZZZZZ | BB52357.D | 11/12/13 | 03:34 | 5.80 | 4.69 |
| ZZZZZZ | BB52358.D | 11/12/13 | 04:03 | 5.80 | 4.69 |
| OP35660-MB | BB52359.D | 11/12/13 | 04:33 | 5.81 | 4.69 |
| OP35660-BS | BB52360.D | 11/12/13 | 05:01 | 5.80 | 4.69 |
| OP35660-MS | BB52361.D | 11/12/13 | 05:29 | 5.80 | 4.69 |
| OP35660-MSD | BB52362.D | 11/12/13 | 05:57 | 5.80 | 4.69 |
| ZZZZZZ | BB52363.D | 11/12/13 | 06:24 | 5.80 | 4.69 |
| ZZZZZZ | BB52364.D | 11/12/13 | 06:52 | 5.80 | 4.69 |
| ZZZZZZ | BB52365.D | 11/12/13 | 07:19 | 5.80 | 4.69 |

**Surrogate Compounds**

**S1** = Bromofluorobenzene (S)

(a) Retention time from GC signal #2
(b) Retention time from GC signal #1

# GC Surrogate Retention Time Summary



**Job Number:** JB52301
**Account:** ALNJ Accutest New Jersey
**Project:** SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

| | | | |
|---|---|---|---|
| **Check Std:** | GBB3070-CC3070 | **Injection Date:** | 11/12/13 |
| **Lab File ID:** | BB52377.D | **Injection Time:** | 12:49 |
| **Instrument ID:** | GCBB | **Method:** | SW846 8011 |

| | S1 [a] RT | S1 [b] RT |
|---|---|---|
| Check Std | 5.80 | 4.69 |

| Lab Sample ID | Lab File ID | Date Analyzed | Time Analyzed | S1 [a] RT | S1 [b] RT |
|---|---|---|---|---|---|
| ZZZZZZ | BB52378.D | 11/12/13 | 13:17 | 5.80 | 4.69 |
| ZZZZZZ | BB52379.D | 11/12/13 | 13:44 | 5.80 | 4.69 |
| ZZZZZZ | BB52380.D | 11/12/13 | 14:11 | 5.79 | 4.69 |
| ZZZZZZ | BB52381.D | 11/12/13 | 14:39 | 5.80 | 4.69 |
| ZZZZZZ | BB52382.D | 11/12/13 | 15:06 | 5.80 | 4.69 |
| JB52301-6 | BB52383.D | 11/12/13 | 15:33 | 5.80 | 4.69 |
| GBB3070-ECC3070 | BB52384.D | 11/12/13 | 16:01 | 5.79 | 4.69 |

**Surrogate Compounds**

**S1** = Bromofluorobenzene (S)

(a) Retention time from GC signal #2
(b) Retention time from GC signal #1

# GC Surrogate Retention Time Summary



**Job Number:** JB52301
**Account:** ALNJ Accutest New Jersey
**Project:** SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

| | | | |
|---|---|---|---|
| **Check Std:** | GBK1055-CC1055 | **Injection Date:** | 11/12/13 |
| **Lab File ID:** | BK31991.D | **Injection Time:** | 21:42 |
| **Instrument ID:** | GCBK | **Method:** | SW846 8011 |

| | S1 [a] RT | S1 [b] RT |
|---|---|---|
| Check Std | 3.64 | 4.67 |

| Lab Sample ID | Lab File ID | Date Analyzed | Time Analyzed | S1 [a] RT | S1 [b] RT |
|---|---|---|---|---|---|
| ZZZZZZ | BK31992.D | 11/12/13 | 22:05 | 3.64 | 4.67 |
| ZZZZZZ | BK31993.D | 11/12/13 | 22:28 | 3.64 | 4.67 |
| ZZZZZZ | BK31994.D | 11/12/13 | 22:51 | 3.64 | 4.67 |
| ZZZZZZ | BK31995.D | 11/12/13 | 23:14 | 3.64 | 4.67 |
| OP35676-MB | BK31996.D | 11/12/13 | 23:37 | 3.64 | 4.67 |
| OP35676-BS | BK31997.D | 11/13/13 | 00:00 | 3.64 | 4.67 |
| OP35676-MS | BK31998.D | 11/13/13 | 00:23 | 3.64 | 4.67 |
| OP35676-MSD | BK31999.D | 11/13/13 | 00:45 | 3.64 | 4.67 |
| JB52158-5 | BK32000.D | 11/13/13 | 01:09 | 3.64 | 4.67 |
| ZZZZZZ | BK32001.D | 11/13/13 | 01:31 | 3.64 | 4.67 |

**Surrogate Compounds**

**S1** = Bromofluorobenzene (S)

(a) Retention time from GC signal #2
(b) Retention time from GC signal #1

# GC Surrogate Retention Time Summary



**Job Number:** JB52301
**Account:** ALNJ Accutest New Jersey
**Project:** SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

| | | | |
|---|---|---|---|
| **Check Std:** | GBK1055-CC1055 | **Injection Date:** | 11/13/13 |
| **Lab File ID:** | BK32013.D | **Injection Time:** | 06:05 |
| **Instrument ID:** | GCBK | **Method:** | SW846 8011 |

| | S1 [a] RT | S1 [b] RT |
|---|---|---|
| Check Std | 3.65 | 4.68 |

| Lab Sample ID | Lab File ID | Date Analyzed | Time Analyzed | S1 [a] RT | S1 [b] RT |
|---|---|---|---|---|---|
| JB52301-3 | BK32014.D | 11/13/13 | 06:28 | 3.65 | 4.69 |
| JB52301-5 | BK32015.D | 11/13/13 | 06:51 | 3.65 | 4.69 |
| GBK1055-ECC1055 | BK32016.D | 11/13/13 | 07:14 | 3.65 | 4.69 |

**Surrogate Compounds**

**S1** = Bromofluorobenzene (S)

(a) Retention time from GC signal #2
(b) Retention time from GC signal #1

# Initial Calibration Summary

**Job Number:** JB52301 **Sample:** GBB3070-ICC3070
**Account:** ALNJ Accutest New Jersey **Lab FileID:** BB52340.D
**Project:** SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

Response Factor Report GCBB

Method : S:\1\METHODS\ED131111.M (RTE Integrator)
Title : EDB on pest2/pest on gc23
Last Update : Tue Nov 12 16:44:27 2013
Response via : Initial Calibration

Calibration Files
1 =bb52338.d 2 =bb52339.d 3 =bb52340.d 4 =bb52341.d
5 =bb52342.d 6 =bb52343.d

| | Compound | 1 | 2 | 3 | 4 | 5 | 6 | Avg | %RSD |
|---|---|---|---|---|---|---|---|---|---|
| 1) | 1,2-Dibromoethane | 3.553 | 4.062 | 3.943 | 4.288 | 4.199 | 4.587 | 4.105 E5 | 8.49 |
| 2) s | 4-Bromofluorobenzen | 1.976 | 2.097 | 1.960 | 2.027 | 1.985 | 2.021 | 2.011 E3 | 2.46 |
| 3) | 1,2-Dibromo-3-chlor | 1.195 | 1.192 | 1.249 | 1.213 | 1.237 | 1.311 | 1.233 E6 | 3.62 |

Signal #2

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1) | 1,2-Dibromoethane | 2.695 | 2.785 | 2.817 | 2.774 | 2.680 | 2.725 | 2.746 E5 | 1.98 |
| 2) s | 4-Bromofluorobenzen | 1.165 | 1.190 | 1.105 | 1.200 | 1.157 | 1.162 | 1.163 E3 | 2.86 |
| 3) | 1,2-Dibromo-3-chlor | 6.743 | 6.638 | 6.719 | 6.929 | 6.868 | 7.788 | 6.947 E5 | 6.12 |

(#) = Out of Range

ED131111.M Tue Nov 12 16:56:27 2013

12.6.1

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# Initial Calibration Verification



**Job Number:** JB52301 **Sample:** GBB3070-ICV3070
**Account:** ALNJ Accutest New Jersey **Lab FileID:** BB52344.D
**Project:** SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

Evaluate Continuing Calibration Report

```
Data File : C:\msdchem\1\DATA\BB...1a\bb52344.d\ECD1A.CH Vial: 97
Acq On    : 11-Nov-13, 21:10:43                    Operator: caobinz
Sample    : icv3070-0.114,edb std-icv              Inst    : GCBB
Misc      : op35659,gbb3070,35,,,2,,w              Multiplr: 1.00
IntFile   : rteint.p

Data File : C:\msdchem\1\DATA\BB131111a\bb52344.d\ECD2B.CH Vial: 0
Acq On    : 11-Nov-13, 21:10:43                    Operator: caobinz
Sample    : edb std-icv                            Inst    : GCBB
Misc      : op35659,gbb3070,35,,,2,,w              Multiplr: 1.00
IntFile   : rteint2.p

Method       : C:\msdchem\1\METHODS\ED131111.M (RTE Integrator)
Title        : EDB on pest2/pest on gc23
Last Update  : Tue Nov 12 16:44:27 2013
Response via : Multiple Level Calibration

Min. RRF     :   0.000  Min. Rel. Area :  85%  Max. R.T. Dev  0.50min
Max. RRF Dev :  15%     Max. Rel. Area : 115%
```

| | Compound | AvgRF | CCRF | %Dev | Area% | Dev(min) | RT Window |
|---|---|---|---|---|---|---|---|
| 1 | 1,2-Dibromoethane | 410.531 | 406.491 E3 | 1.0 | 103 | 0.00 | 3.68- 3.74 |
| 2 s | 4-Bromofluorobenzene | 2.011 | 1.840 E3 | 8.5 | 94 | 0.00 | 4.66- 4.72 |
| 3 | 1,2-Dibromo-3-chloropr | 1.233 | 1.178 E6 | 4.5 | 94 | 0.00 | 6.31- 6.37 |

***** Signal #2 *****

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | 1,2-Dibromoethane | 274.605 | 269.491 E3 | 1.9 | 96 | 0.00 | 4.82- 4.88 |
| 2 s | 4-Bromofluorobenzene | 1.163 | 1.099 E3 | 5.5 | 99 | 0.00 | 5.79- 5.85 |
| 3 | 1,2-Dibromo-3-chloropr | 694.748 | 696.728 E3 | -0.3 | 104 | -0.01 | 6.95- 7.01 |

(#) = Out of Range SPCC's out = 0 CCC's out = 0
bb52340.d ED131111.M Tue Nov 12 16:57:51 2013

12.6.2 12

# Continuing Calibration Summary



**Job Number:** JB52301 **Sample:** GBB3070-CC3070
**Account:** ALNJ Accutest New Jersey **Lab FileID:** BB52355.D
**Project:** SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

Evaluate Continuing Calibration Report

```
Data File : C:\msdchem\1\DATA\BB...1a\bb52355.d\ECD1A.CH Vial: 93
Acq On    : 12-Nov-13, 02:35:23                    Operator: caobinz
Sample    : cc3070-0.114,edb std-3                 Inst    : GCBB
Misc      : op35659,gbb3070,35,,,2,,w              Multiplr: 1.00
IntFile   : rteint.p

Data File : C:\msdchem\1\DATA\BB131111a\bb52355.d\ECD2B.CH Vial: 0
Acq On    : 12-Nov-13, 02:35:23                    Operator: caobinz
Sample    : edb std-3                              Inst    : GCBB
Misc      : op35659,gbb3070,35,,,2,,w              Multiplr: 1.00
IntFile   : rteint2.p

Method       : C:\msdchem\1\METHODS\ED131111.M (RTE Integrator)
Title        : EDB on pest2/pest on gc23
Last Update  : Tue Nov 12 16:44:27 2013
Response via : Multiple Level Calibration

Min. RRF     :   0.000  Min. Rel. Area :  85%  Max. R.T. Dev  0.50min
Max. RRF Dev :  15%     Max. Rel. Area : 115%
```

| | Compound | AvgRF | CCRF | %Dev | Area% | Dev(min) | RT Window |
|---|---|---|---|---|---|---|---|
| 1 | 1,2-Dibromoethane | 410.531 | 415.684 E3 | -1.3 | 105 | 0.00 | 3.68- 3.74 |
| 2 s | 4-Bromofluorobenzene | 2.011 | 1.937 E3 | 3.7 | 99 | 0.00 | 4.66- 4.72 |
| 3 | 1,2-Dibromo-3-chloropr | 1.233 | 1.235 E6 | -0.2 | 99 | 0.00 | 6.31- 6.37 |
| ***** | Signal #2 ***** | | | | | | |
| 1 | 1,2-Dibromoethane | 274.605 | 268.596 E3 | 2.2 | 95 | -0.02 | 4.80- 4.86 |
| 2 s | 4-Bromofluorobenzene | 1.163 | 1.197 E3 | -2.9 | 108 | -0.02 | 5.77- 5.83 |
| 3 | 1,2-Dibromo-3-chloropr | 694.748 | 703.132 E3 | -1.2 | 105 | -0.02 | 6.94- 7.00 |

```
   (#) = Out of Range              SPCC's out = 0  CCC's out = 0
    bb52340.d  ED131111.M       Tue Nov 12 16:57:53 2013
```

12.6.3 12

# Continuing Calibration Summary



**Job Number:** JB52301 **Sample:** GBB3070-CC3070
**Account:** ALNJ Accutest New Jersey **Lab FileID:** BB52366.D
**Project:** SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

Evaluate Continuing Calibration Report

```
Data File : C:\msdchem\1\DATA\BB...1a\bb52366.d\ECD1A.CH Vial: 99
Acq On    : 12-Nov-13, 07:47:15                    Operator: caobinz
Sample    : cc3070-0.114,edb std-3                 Inst    : GCBB
Misc      : op35659,gbb3070,35,,,2,,w              Multiplr: 1.00
IntFile   : rteint.p

Data File : C:\msdchem\1\DATA\BB131111a\bb52366.d\ECD2B.CH Vial: 0
Acq On    : 12-Nov-13, 07:47:15                    Operator: caobinz
Sample    : edb std-3                              Inst    : GCBB
Misc      : op35659,gbb3070,35,,,2,,w              Multiplr: 1.00
IntFile   : rteint2.p

Method       : C:\msdchem\1\METHODS\ED131111.M (RTE Integrator)
Title        : EDB on pest2/pest on gc23
Last Update  : Tue Nov 12 16:44:27 2013
Response via : Multiple Level Calibration

Min. RRF     :   0.000  Min. Rel. Area :  85%  Max. R.T. Dev  0.50min
Max. RRF Dev :  15%     Max. Rel. Area : 115%
```

| | Compound | AvgRF | CCRF | %Dev | Area% | Dev(min) | RT Window |
|---|---|---|---|---|---|---|---|
| 1 | 1,2-Dibromoethane | 410.531 | 405.167 E3 | 1.3 | 103 | 0.00 | 3.67- 3.73 |
| 2 s | 4-Bromofluorobenzene | 2.011 | 2.109 E3 | -4.9 | 108 | 0.00 | 4.66- 4.72 |
| 3 | 1,2-Dibromo-3-chloropr | 1.233 | 1.219 E6 | 1.1 | 98 | 0.00 | 6.31- 6.37 |
| ***** | Signal #2 ***** | | | | | | |
| 1 | 1,2-Dibromoethane | 274.605 | 258.719 E3 | 5.8 | 92 | -0.02 | 4.80- 4.86 |
| 2 s | 4-Bromofluorobenzene | 1.163 | 1.122 E3 | 3.5 | 102 | -0.02 | 5.77- 5.83 |
| 3 | 1,2-Dibromo-3-chloropr | 694.748 | 708.719 E3 | -2.0 | 105 | -0.02 | 6.94- 7.00 |

```
   (#) = Out of Range              SPCC's out = 0  CCC's out = 0
    bb52340.d  ED131111.M       Tue Nov 12 16:57:55 2013
```

12.6.4 12

# Continuing Calibration Summary



**Job Number:** JB52301 **Sample:** GBB3070-CC3070
**Account:** ALNJ Accutest New Jersey **Lab FileID:** BB52377.D
**Project:** SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

Evaluate Continuing Calibration Report

```
Data File : C:\msdchem\1\DATA\BB...1a\bb52377.d\ECD1A.CH Vial: 99
Acq On    : 12-Nov-13, 12:49:37                    Operator: caobinz
Sample    : cc3070-0.114,edb std-3                 Inst    : GCBB
Misc      : op35659,gbb3070,35,,,2,,w              Multiplr: 1.00
IntFile   : rteint.p

Data File : C:\msdchem\1\DATA\BB131111a\bb52377.d\ECD2B.CH Vial: 0
Acq On    : 12-Nov-13, 12:49:37                    Operator: caobinz
Sample    : edb std-3                              Inst    : GCBB
Misc      : op35659,gbb3070,35,,,2,,w              Multiplr: 1.00
IntFile   : rteint2.p

Method       : C:\msdchem\1\METHODS\ED131111.M (RTE Integrator)
Title        : EDB on pest2/pest on gc23
Last Update  : Tue Nov 12 16:44:27 2013
Response via : Multiple Level Calibration

Min. RRF     :   0.000  Min. Rel. Area :  85%  Max. R.T. Dev  0.50min
Max. RRF Dev :  15%     Max. Rel. Area : 115%
```

| | Compound | AvgRF | CCRF | %Dev | Area% | Dev(min) | RT Window |
|---|---|---|---|---|---|---|---|
| 1 | 1,2-Dibromoethane | 410.531 | 386.368 E3 | 5.9 | 98 | 0.00 | 3.68- 3.74 |
| 2 s | 4-Bromofluorobenzene | 2.011 | 1.914 E3 | 4.8 | 98 | 0.00 | 4.66- 4.72 |
| 3 | 1,2-Dibromo-3-chloropr | 1.233 | 1.264 E6 | -2.5 | 101 | 0.01 | 6.32- 6.38 |

***** Signal #2 *****

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | 1,2-Dibromoethane | 274.605 | 269.965 E3 | 1.7 | 96 | -0.03 | 4.79- 4.85 |
| 2 s | 4-Bromofluorobenzene | 1.163 | 1.053 E3 | 9.5 | 95 | -0.02 | 5.77- 5.83 |
| 3 | 1,2-Dibromo-3-chloropr | 694.748 | 722.912 E3 | -4.1 | 108 | -0.02 | 6.94- 7.00 |

(#) = Out of Range SPCC's out = 0 CCC's out = 0
bb52340.d ED131111.M Tue Nov 12 16:57:57 2013

12.6.5 12

# Continuing Calibration Summary



**Job Number:** JB52301 **Sample:** GBB3070-ECC3070
**Account:** ALNJ Accutest New Jersey **Lab FileID:** BB52384.D
**Project:** SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

Evaluate Continuing Calibration Report

```
 Data File : S:\1\DATA\BB131111a\bb52384.d\ECD1A.CH      Vial: 100
 Acq On    : 12 Nov 2013  16:01 pm                   Operator: caobinz
 Sample    : ecc3070-0.228,edb std-2                 Inst    : GCBB
 Misc      : op35659,gbb3070,35,,,2,,w               Multiplr: 1.00
 IntFile   : rteint.p

 Data File : S:\1\DATA\BB131111a\bb52384.d\ECD2B.CH      Vial: 0
 Acq On    : 12 Nov 2013  16:01 pm                   Operator: caobinz
 Sample    : edb std-2                               Inst    : GCBB
 Misc      : op35659,gbb3070,35,,,2,,w               Multiplr: 1.00
 IntFile   : rteint2.p

 Method       : S:\1\METHODS\ED131111.M (RTE Integrator)
 Title        : EDB on pest2/pest on gc23
 Last Update  : Tue Nov 12 16:44:27 2013
 Response via : Multiple Level Calibration

 Min. RRF     :   0.000  Min. Rel. Area :  85%  Max. R.T. Dev  0.50min
 Max. RRF Dev :  15%     Max. Rel. Area : 115%
```

| | Compound | AvgRF | CCRF | %Dev | Area% | Dev(min) | RT Window |
|---|---|---|---|---|---|---|---|
| 1 | 1,2-Dibromoethane | 410.531 | 407.860 E3 | 0.7 | 100 | 0.00 | 3.67- 3.73 |
| 2 s | 4-Bromofluorobenzene | 2.011 | 1.909 E3 | 5.1 | 91 | 0.00 | 4.66- 4.72 |
| 3 | 1,2-Dibromo-3-chloropr | 1.233 | 1.267 E6 | -2.8 | 106 | 0.02 | 6.32- 6.38 |

***** Signal #2 *****

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | 1,2-Dibromoethane | 274.605 | 283.057 E3 | -3.1 | 102 | -0.03 | 4.79- 4.85 |
| 2 s | 4-Bromofluorobenzene | 1.163 | 1.208 E3 | -3.9 | 102 | -0.03 | 5.76- 5.82 |
| 3 | 1,2-Dibromo-3-chloropr | 694.748 | 745.921 E3 | -7.4 | 112 | -0.03 | 6.93- 6.99 |

```
   (#) = Out of Range              SPCC's out = 0  CCC's out = 0
    bb52339.d  ED131111.M       Tue Nov 12 16:56:15 2013
```

12.6.6 12

# Initial Calibration Summary

**Job Number:** JB52301 **Sample:** GBK1055-ICC1055
**Account:** ALNJ Accutest New Jersey **Lab FileID:** BK31964.D
**Project:** SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

Response Factor Report GCBK

Method : C:\msdchem\1\METHODS\EDS131112.M (ChemStation Integrator)
Title : EDB /Rtx35/DB1701
Last Update : Wed Nov 13 08:40:44 2013
Response via : Initial Calibration

Calibration Files
1 =BK31963.d 2 =BK31964.d 3 =BK31965.d 4 =BK31966.d
5 =BK31967.d 6 =BK31968.d

| | Compound | 1 | 2 | 3 | 4 | 5 | 6 | Avg | %RSD |
|---|---|---|---|---|---|---|---|---|---|
| 1) | 1,2-Dibromoethane | 9.329 | 8.844 | 9.602 | 9.202 | 9.345 | 9.366 | 9.281 E7 | 2.70 |
| 2) s | 4-Bromofluorobenzen | 4.836 | 5.394 | 4.631 | 4.716 | 5.032 | 4.954 | 4.927 E6 | 5.52 |
| 3) | 1,2-Dibromo-3-chlor | 1.822 | 1.751 | 1.748 | 1.705 | 1.804 | 1.820 | 1.775 E8 | 2.68 |

Signal #2

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1) | 1,2-Dibromoethane | 2.337 | 2.256 | 2.084 | 2.200 | 2.046 | 2.097 | 2.170 E6 | 5.24 |
| 2) s | 4-Bromofluorobenzen | 1.267 | 1.419 | 1.370 | 1.407 | 1.475 | | 1.388 E5 | 5.56 |
| 3) | 1,2-Dibromo-3-chlor | 4.041 | 4.179 | 4.221 | 4.037 | 4.188 | 4.287 | 4.159 E6 | 2.42 |

(#) = Out of Range

EDS131112.M Wed Nov 13 09:10:37 2013

12.6.7
12

# Initial Calibration Verification



**Job Number:** JB52301 **Sample:** GBK1055-ICV1055
**Account:** ALNJ Accutest New Jersey **Lab FileID:** BK31969.D
**Project:** SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

Evaluate Continuing Calibration Report

Signal #1 : C:\msdchem\1\DATA\BK...12\BK31969.d\ECD1A.ch Vial: 107
Signal #2 : C:\msdchem\1\DATA\BK131112\BK31969.d\ECD2B.ch
Acq On : 12 Nov 2013 1:25 pm Operator: nickk
Sample : icv1055-20,edb soil Inst : GCBK
Misc : op35674,gbk1055,30,,,50,,s Multiplr: 1.00
IntFile Signal #1: events.e IntFile Signal #2: events2.e

Method : C:\msdchem\1\METHODS\EDS131112.M (ChemStation Integrator)
Title : EDB /Rtx35/DB1701
Last Update : Wed Nov 13 08:40:44 2013
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 85% Max. R.T. Dev 0.50min
Max. RRF Dev : 15% Max. Rel. Area : 115%

| | Compound | AvgRF | CCRF | %Dev | Area% | Dev(min) | RT Window |
|---|---|---|---|---|---|---|---|
| 1 | 1,2-Dibromoethane | 92.814 | 89.217 E6 | 3.9 | 101 | 0.00 | 3.35- 3.41 |
| 2 s | 4-Bromofluorobenzene | 4.927 | 5.368 E6 | -9.0 | 100 | 0.00 | 4.62- 4.68 |
| 3 | 1,2-Dibromo-3-chloropr | 177.502 | 169.977 E6 | 4.2 | 97 | 0.00 | 6.07- 6.13 |

***** Signal #2 *****

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | 1,2-Dibromoethane | 2.170 | 2.003 E6 | 7.7 | 89 | 0.00 | 2.50- 2.56 |
| 2 s | 4-Bromofluorobenzene | 138.780 | 135.298 E3 | 2.5 | 95 | 0.00 | 3.60- 3.66 |
| 3 | 1,2-Dibromo-3-chloropr | 4.159 | 4.181 E6 | -0.5 | 100 | 0.00 | 5.26- 5.32 |

(#) = Out of Range SPCC's out = 0 CCC's out = 0
BK31964.d EDS131112.M Wed Nov 13 09:10:24 2013

12.6.8 12

# Continuing Calibration Summary



**Job Number:** JB52301 **Sample:** GBK1055-CC1055
**Account:** ALNJ Accutest New Jersey **Lab FileID:** BK31991.D
**Project:** SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

Evaluate Continuing Calibration Report

Signal #1 : C:\msdchem\1\DATA\BK...12\BK31991.d\ECD1A.ch Vial: 100
Signal #2 : C:\msdchem\1\DATA\BK131112\BK31991.d\ECD2B.ch
Acq On : 12 Nov 2013 9:42 pm Operator: nickk
Sample : cc1055-20,edb soil Inst : GCBK
Misc : op35674,gbk1055,30,,,50,,s Multiplr: 1.00
IntFile Signal #1: events.e IntFile Signal #2: events2.e

Method : C:\msdchem\1\METHODS\EDS131112.M (ChemStation Integrator)
Title : EDB /Rtx35/DB1701
Last Update : Wed Nov 13 08:40:44 2013
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 85% Max. R.T. Dev 0.50min
Max. RRF Dev : 15% Max. Rel. Area : 115%

| | Compound | AvgRF | CCRF | %Dev | Area% | Dev(min) | RT Window |
|---|---|---|---|---|---|---|---|
| 1 | 1,2-Dibromoethane | 92.814 | 90.214 E6 | 2.8 | 102 | 0.01 | 3.37- 3.43 |
| 2 s | 4-Bromofluorobenzene | 4.927 | 4.816 E6 | 2.3 | 89 | 0.01 | 4.64- 4.70 |
| 3 | 1,2-Dibromo-3-chloropr | 177.502 | 162.423 E6 | 8.5 | 93 | 0.02 | 6.08- 6.14 |

***** Signal #2 *****

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | 1,2-Dibromoethane | 2.170 | 2.150 E6 | 0.9 | 95 | 0.00 | 2.51- 2.57 |
| 2 s | 4-Bromofluorobenzene | 138.780 | 136.518 E3 | 1.6 | 96 | 0.00 | 3.61- 3.67 |
| 3 | 1,2-Dibromo-3-chloropr | 4.159 | 4.189 E6 | -0.7 | 100 | 0.01 | 5.27- 5.33 |

(#) = Out of Range SPCC's out = 0 CCC's out = 0
BK31964.d EDS131112.M Wed Nov 13 09:19:10 2013

12.6.9 12

# Continuing Calibration Summary



**Job Number:** JB52301 **Sample:** GBK1055-CC1055
**Account:** ALNJ Accutest New Jersey **Lab FileID:** BK32002.D
**Project:** SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

Evaluate Continuing Calibration Report

Signal #1 : C:\msdchem\1\DATA\BK...12\BK32002.d\ECD1A.ch Vial: 100
Signal #2 : C:\msdchem\1\DATA\BK131112\BK32002.d\ECD2B.ch
Acq On : 13 Nov 2013 1:54 am Operator: nickk
Sample : cc1055-20,edb soil Inst : GCBK
Misc : op35676,gbk1055,30,,,50,,s Multiplr: 1.00
IntFile Signal #1: events.e IntFile Signal #2: events2.e

Method : C:\msdchem\1\METHODS\EDS131112.M (ChemStation Integrator)
Title : EDB /Rtx35/DB1701
Last Update : Wed Nov 13 08:40:44 2013
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 85% Max. R.T. Dev 0.50min
Max. RRF Dev : 15% Max. Rel. Area : 115%

| | Compound | AvgRF | CCRF | %Dev | Area% | Dev(min) | RT Window |
|---|---|---|---|---|---|---|---|
| 1 | 1,2-Dibromoethane | 92.814 | 78.945 E6 | 14.9 | 89 | 0.01 | 3.37- 3.43 |
| 2 s | 4-Bromofluorobenzene | 4.927 | 4.767 E6 | 3.2 | 88 | 0.02 | 4.64- 4.70 |
| 3 | 1,2-Dibromo-3-chloropr | 177.502 | 145.703 E6 | 17.9# | 83# | 0.02 | 6.08- 6.14 |

***** Signal #2 *****

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | 1,2-Dibromoethane | 2.170 | 2.084 E6 | 4.0 | 92 | 0.00 | 2.51- 2.57 |
| 2 s | 4-Bromofluorobenzene | 138.780 | 131.604 E3 | 5.2 | 93 | 0.00 | 3.61- 3.67 |
| 3 | 1,2-Dibromo-3-chloropr | 4.159 | 3.896 E6 | 6.3 | 93 | 0.01 | 5.28- 5.34 |

(#) = Out of Range SPCC's out = 0 CCC's out = 0
BK31964.d EDS131112.M Wed Nov 13 09:18:18 2013

12.6.10
12

# Continuing Calibration Summary



**Job Number:** JB52301 **Sample:** GBK1055-CC1055
**Account:** ALNJ Accutest New Jersey **Lab FileID:** BK32013.D
**Project:** SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

Evaluate Continuing Calibration Report

Signal #1 : C:\msdchem\1\DATA\BK...12\BK32013.d\ECD1A.ch Vial: 99
Signal #2 : C:\msdchem\1\DATA\BK131112\BK32013.d\ECD2B.ch
Acq On : 13 Nov 2013 6:05 am Operator: nickk
Sample : cc1055-20,edb soil Inst : GCBK
Misc : op35676,gbk1055,30,,,50,,s Multiplr: 1.00
IntFile Signal #1: events.e IntFile Signal #2: events2.e

Method : C:\msdchem\1\METHODS\EDS131112.M (ChemStation Integrator)
Title : EDB /Rtx35/DB1701
Last Update : Wed Nov 13 08:40:44 2013
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 85% Max. R.T. Dev 0.50min
Max. RRF Dev : 15% Max. Rel. Area : 115%

| | Compound | AvgRF | CCRF | %Dev | Area% | Dev(min) | RT Window |
|---|---|---|---|---|---|---|---|
| 1 | 1,2-Dibromoethane | 92.814 | 84.419 E6 | 9.0 | 95 | 0.02 | 3.38- 3.44 |
| 2 s | 4-Bromofluorobenzene | 4.927 | 4.811 E6 | 2.4 | 89 | 0.03 | 4.65- 4.71 |
| 3 | 1,2-Dibromo-3-chloropr | 177.502 | 156.075 E6 | 12.1 | 89 | 0.03 | 6.10- 6.16 |

***** Signal #2 *****

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | 1,2-Dibromoethane | 2.170 | 2.064 E6 | 4.9 | 91 | 0.01 | 2.51- 2.57 |
| 2 s | 4-Bromofluorobenzene | 138.780 | 135.645 E3 | 2.3 | 96 | 0.02 | 3.62- 3.68 |
| 3 | 1,2-Dibromo-3-chloropr | 4.159 | 3.901 E6 | 6.2 | 93 | 0.02 | 5.28- 5.34 |

(#) = Out of Range SPCC's out = 0 CCC's out = 0
BK31964.d EDS131112.M Wed Nov 13 09:17:00 2013

12.6.11
12

# Continuing Calibration Summary



**Job Number:** JB52301 **Sample:** GBK1055-ECC1055
**Account:** ALNJ Accutest New Jersey **Lab FileID:** BK32016.D
**Project:** SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

Evaluate Continuing Calibration Report

Signal #1 : C:\msdchem\1\DATA\BK...12\BK32016.d\ECD1A.ch Vial: 99
Signal #2 : C:\msdchem\1\DATA\BK131112\BK32016.d\ECD2B.ch
Acq On : 13 Nov 2013 7:14 am Operator: nickk
Sample : ecc1055-20,edb soil Inst : GCBK
Misc : op35676,gbk1055,30,,,50,,s Multiplr: 1.00
IntFile Signal #1: events.e IntFile Signal #2: events2.e

Method : C:\msdchem\1\METHODS\EDS131112.M (ChemStation Integrator)
Title : EDB /Rtx35/DB1701
Last Update : Wed Nov 13 08:40:44 2013
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 85% Max. R.T. Dev 0.50min
Max. RRF Dev : 15% Max. Rel. Area : 115%

| | Compound | AvgRF | CCRF | %Dev | Area% | Dev(min) | RT Window |
|---|---|---|---|---|---|---|---|
| 1 | 1,2-Dibromoethane | 92.814 | 84.638 E6 | 8.8 | 96 | 0.03 | 3.38- 3.44 |
| 2 s | 4-Bromofluorobenzene | 4.927 | 4.989 E6 | -1.3 | 92 | 0.04 | 4.66- 4.72 |
| 3 | 1,2-Dibromo-3-chloropr | 177.502 | 152.234 E6 | 14.2 | 87 | 0.04 | 6.10- 6.16 |

***** Signal #2 *****

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | 1,2-Dibromoethane | 2.170 | 1.993 E6 | 8.2 | 88 | 0.02 | 2.52- 2.58 |
| 2 s | 4-Bromofluorobenzene | 138.780 | 131.263 E3 | 5.4 | 92 | 0.02 | 3.62- 3.68 |
| 3 | 1,2-Dibromo-3-chloropr | 4.159 | 3.773 E6 | 9.3 | 90 | 0.03 | 5.29- 5.35 |

(#) = Out of Range SPCC's out = 0 CCC's out = 0
BK31964.d EDS131112.M Wed Nov 13 09:15:51 2013

12.6.12

12

New Jersey
ACCUTEST LABORATORIES

## GC Volatiles

Raw Data

(Accutest Labs of New England, Inc.)

Manual Integrations APPROVED (compounds with "m" flag)
Andri Piluri
11/14/13 09:56

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\BK131112\
Data File : BK32014.d
Signal(s) : Signal #1: ECD1A.ch Signal #2: ECD2B.ch
Acq On : 13 Nov 2013 6:28 am
Operator : nickk
Sample : jb52301-3,op35676
Misc : op35676,gbk1055,30.50,,,50,,s
ALS Vial : 41 Sample Multiplier: 1

Integration File signal 1: events.e
Integration File signal 2: events2.e
Quant Time: Nov 13 16:53:40 2013
Quant Method : C:\msdchem\1\METHODS\EDS131112.M
Quant Title : EDB /Rtx35/DB1701
QLast Update : Wed Nov 13 08:40:44 2013
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

| | Compound | RT#1 | RT#2 | Resp#1 | Resp#2 | ug/L | ug/L |
|---|---|---|---|---|---|---|---|
| | System Monitoring Compounds | | | | | | |
| 2) s | 4-Bromofl... | 4.686f | 3.651f | 293.5E6 | 6107915 | 59.559m | 44.012m# |
| | Spiked Amount | 50.000 | Range 26 - 158 | Recovery = | 119.12% | 88.02% | |
| | Target Compounds | | | | | | |
| 1) | 1,2-Dibro... | 0.000 | 0.000 | 0 | 0 | N.D. | N.D. |
| 3) | 1,2-Dibro... | 0.000 | 0.000 | 0 | 0 | N.D. | N.D. |

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

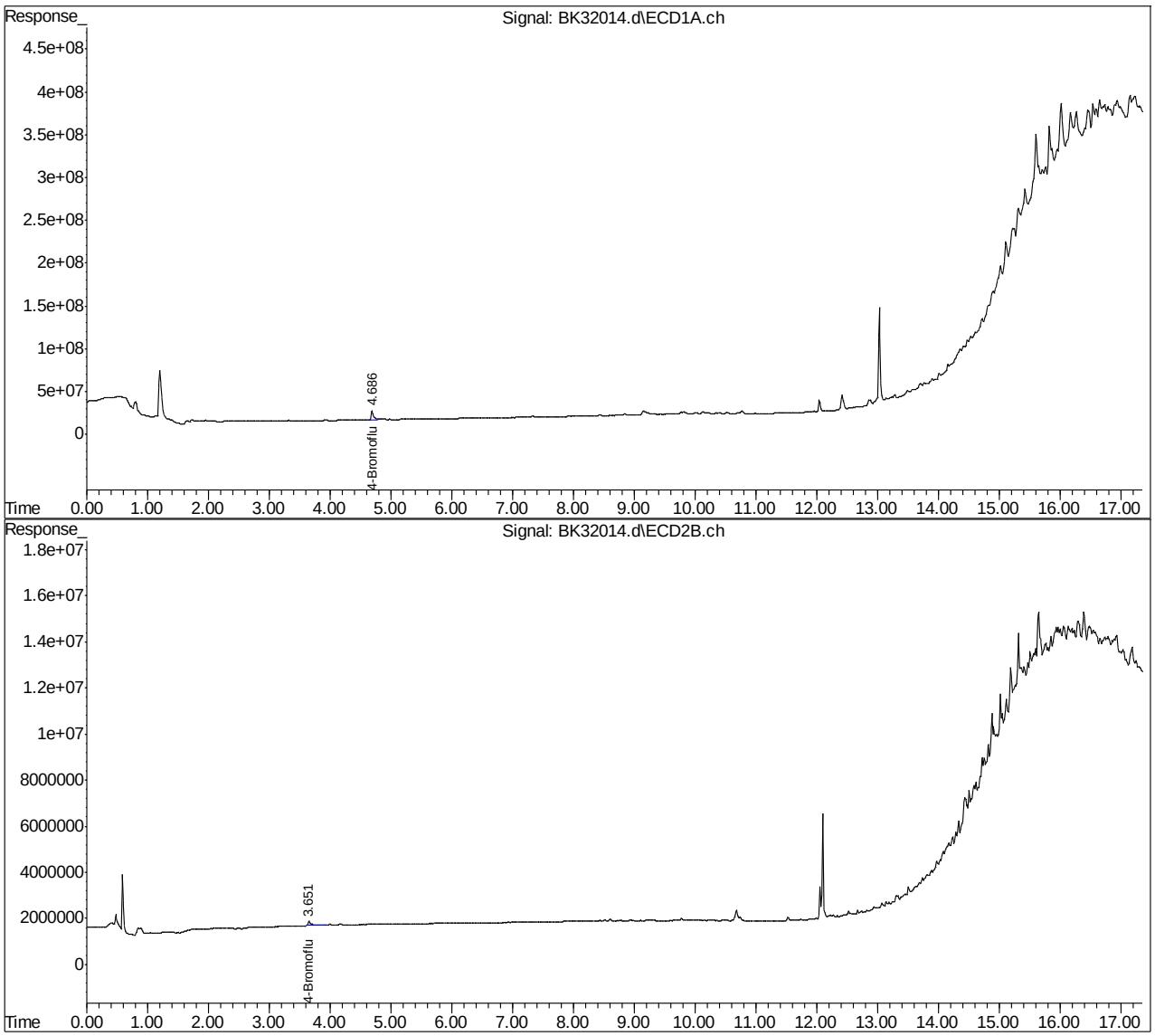
13.1.1
13

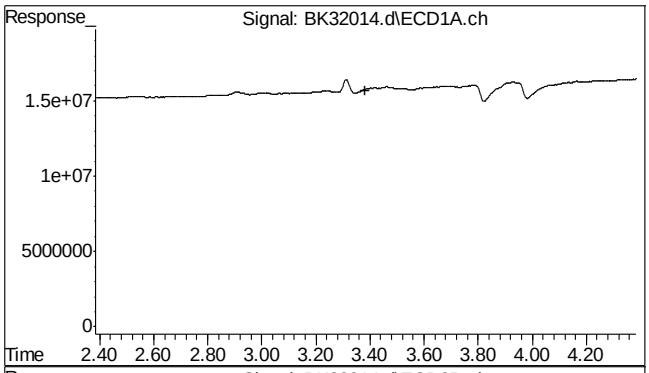
Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\BK131112\
Data File : BK32014.d
Signal(s) : Signal #1: ECD1A.ch Signal #2: ECD2B.ch
Acq On : 13 Nov 2013 6:28 am
Operator : nickk
Sample : jb52301-3,op35676
Misc : op35676,gbk1055,30.50,,,50,,s
ALS Vial : 41 Sample Multiplier: 1

Integration File signal 1: events.e
Integration File signal 2: events2.e
Quant Time: Nov 13 16:53:40 2013
Quant Method : C:\msdchem\1\METHODS\EDS131112.M
Quant Title : EDB /Rtx35/DB1701
QLast Update : Wed Nov 13 08:40:44 2013
Response via : Initial Calibration
Integrator: ChemStation

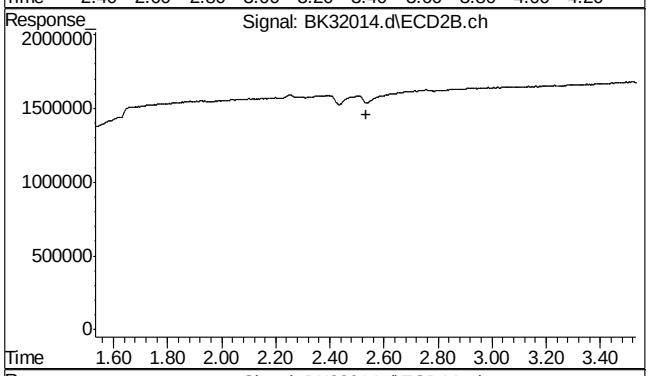
Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





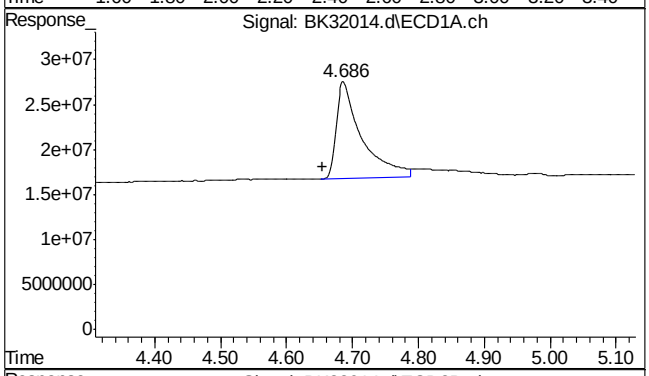

#1 1,2-Dibromoethane

R.T.: 0.000 min
Exp R.T. : 3.384 min
Response: 0
Conc: N.D.



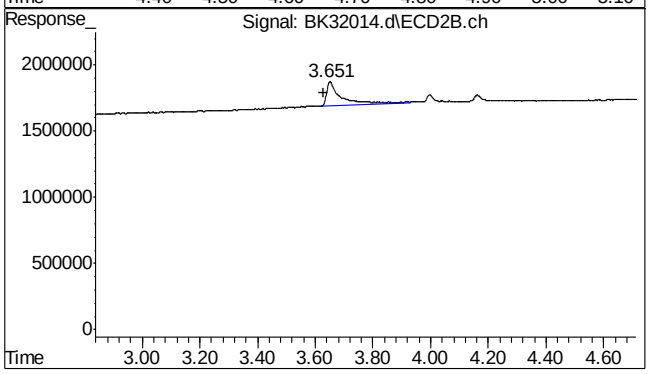

#1 1,2-Dibromoethane

R.T.: 0.000 min
Exp R.T. : 2.533 min
Response: 0
Conc: N.D.



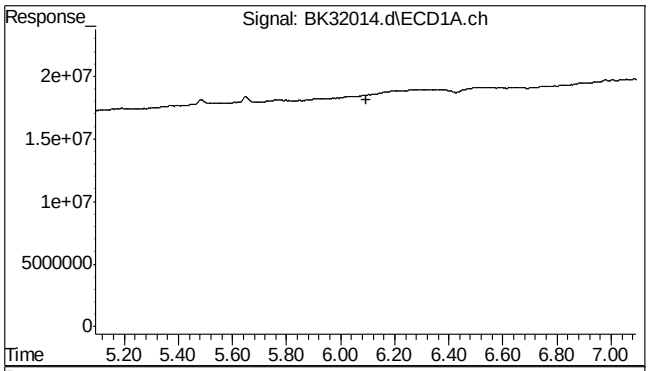

#2 4-Bromofluorobenzene

R.T.: 4.686 min
Delta R.T.: 0.032 min
Response: 293452834
Conc: 59.56 ug/L m



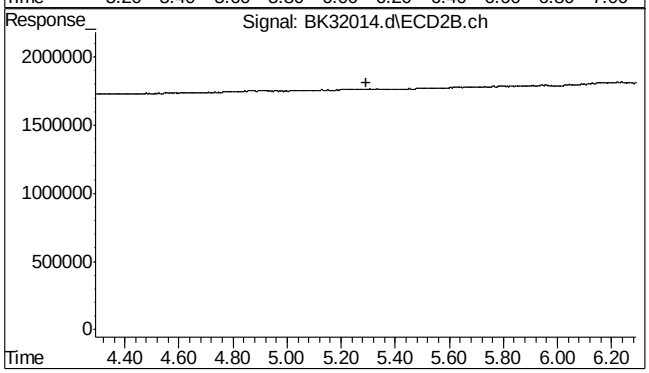

#2 4-Bromofluorobenzene

R.T.: 3.651 min
Delta R.T.: 0.020 min
Response: 6107915
Conc: 44.01 ug/L m




#3 1,2-Dibromo-3-chloropropane

R.T.: 0.000 min
Exp R.T. : 6.093 min
Response: 0
Conc: N.D.




#3 1,2-Dibromo-3-chloropropane

R.T.: 0.000 min
Exp R.T. : 5.291 min
Response: 0
Conc: N.D.

Manual Integrations APPROVED (compounds with "m" flag)
Andri Piluri
11/14/13 09:56

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\BK131112\
Data File : BK32015.d
Signal(s) : Signal #1: ECD1A.ch Signal #2: ECD2B.ch
Acq On : 13 Nov 2013 6:51 am
Operator : nickk
Sample : jb52301-5,op35676
Misc : op35676,gbk1055,30.01,,,50,,s
ALS Vial : 42 Sample Multiplier: 1

Integration File signal 1: events.e
Integration File signal 2: events2.e
Quant Time: Nov 13 16:53:56 2013
Quant Method : C:\msdchem\1\METHODS\EDS131112.M
Quant Title : EDB /Rtx35/DB1701
QLast Update : Wed Nov 13 08:40:44 2013
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

| | Compound | RT#1 | RT#2 | Resp#1 | Resp#2 | ug/L | ug/L |
|---|---|---|---|---|---|---|---|
| | System Monitoring Compounds | | | | | | |
| 2) s | 4-Bromofl... | 4.690f | 3.653f | 360.5E6 | 7417612 | 73.164m | 53.449m# |
| | Spiked Amount 50.000 | Range 26 - 158 | | Recovery = 146.33% | | 106.90% | |
| | Target Compounds | | | | | | |
| 1) | 1,2-Dibro... | 0.000 | 0.000 | 0 | 0 | N.D. | N.D. |
| 3) | 1,2-Dibro... | 0.000 | 0.000 | 0 | 0 | N.D. | N.D. |

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

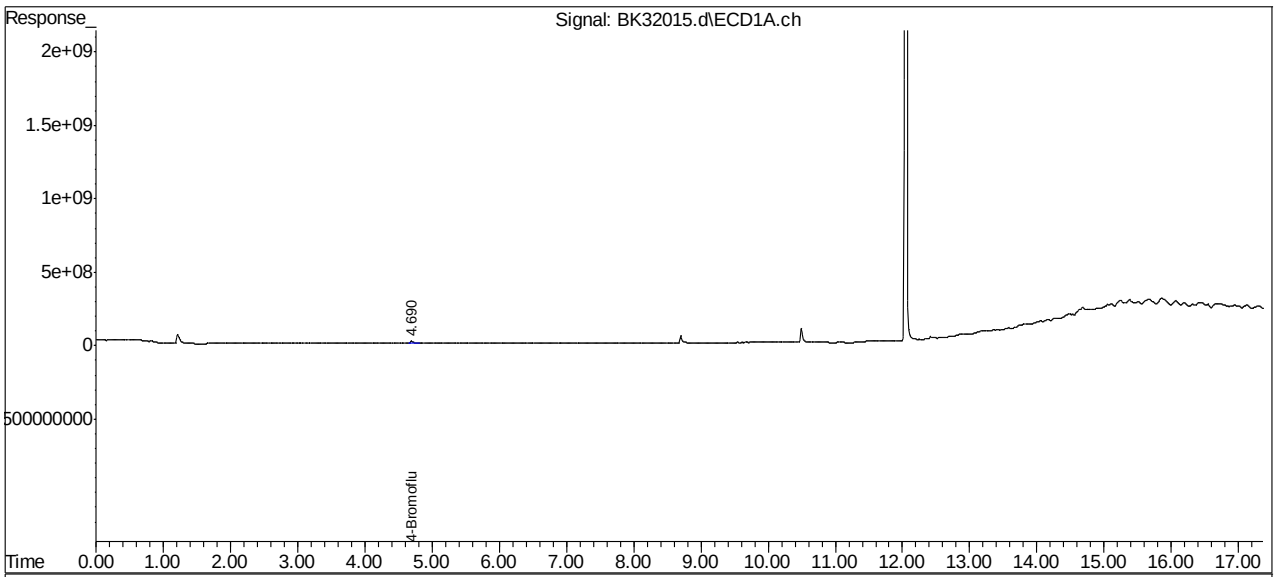
13.1.2
13

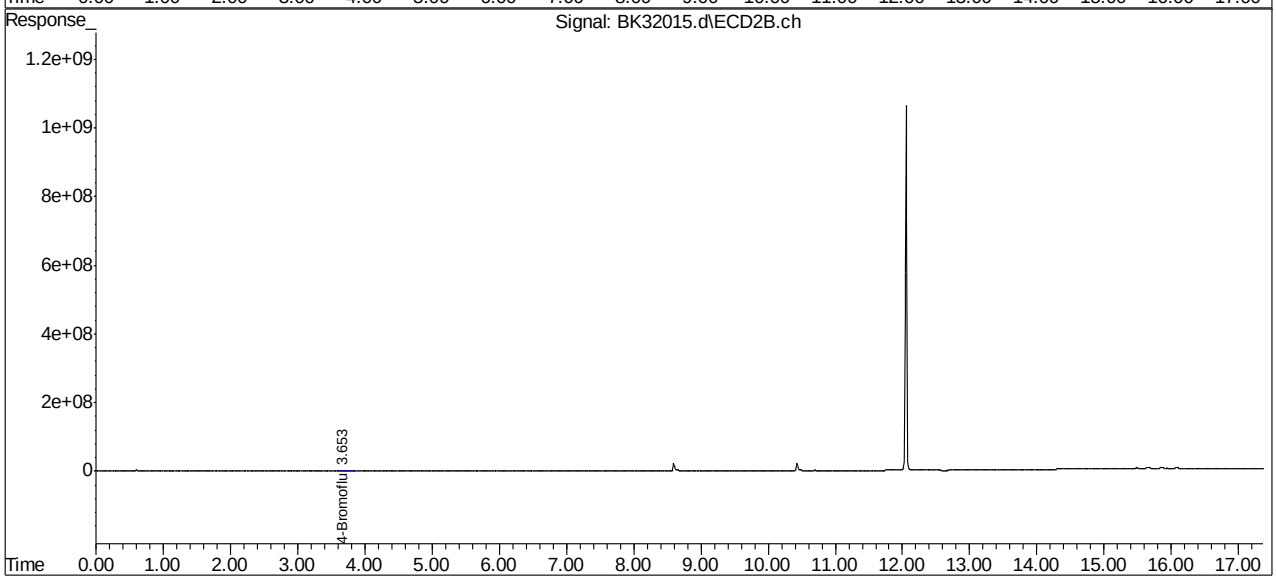
Quantitation Report (QT Reviewed)

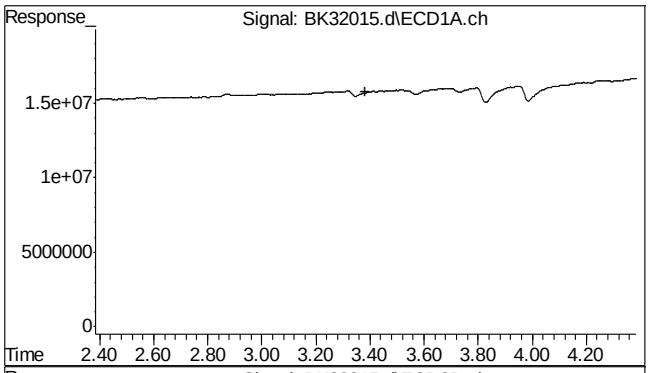
Data Path : C:\msdchem\1\DATA\BK131112\
Data File : BK32015.d
Signal(s) : Signal #1: ECD1A.ch Signal #2: ECD2B.ch
Acq On : 13 Nov 2013 6:51 am
Operator : nickk
Sample : jb52301-5,op35676
Misc : op35676,gbk1055,30.01,,,50,,s
ALS Vial : 42 Sample Multiplier: 1

Integration File signal 1: events.e
Integration File signal 2: events2.e
Quant Time: Nov 13 16:53:56 2013
Quant Method : C:\msdchem\1\METHODS\EDS131112.M
Quant Title : EDB /Rtx35/DB1701
QLast Update : Wed Nov 13 08:40:44 2013
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

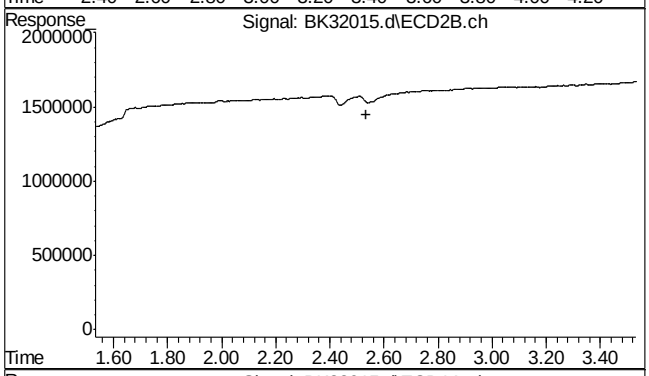




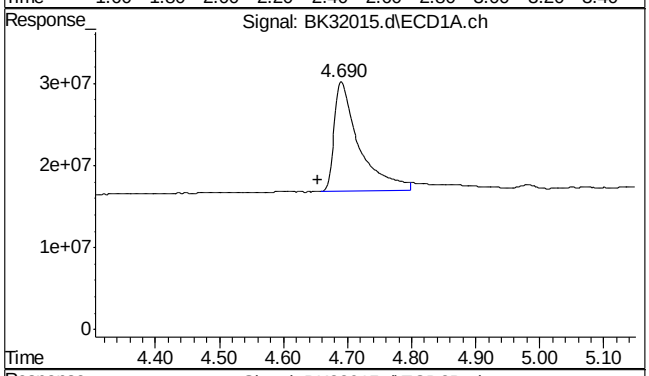

#1 1,2-Dibromoethane

R.T.: 0.000 min
Exp R.T. : 3.384 min
Response: 0
Conc: N.D.



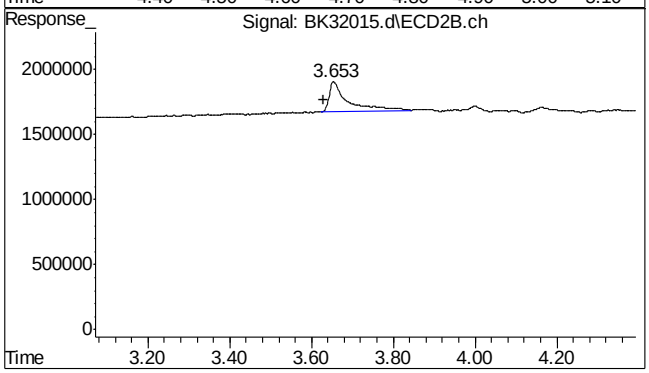

#1 1,2-Dibromoethane

R.T.: 0.000 min
Exp R.T. : 2.533 min
Response: 0
Conc: N.D.



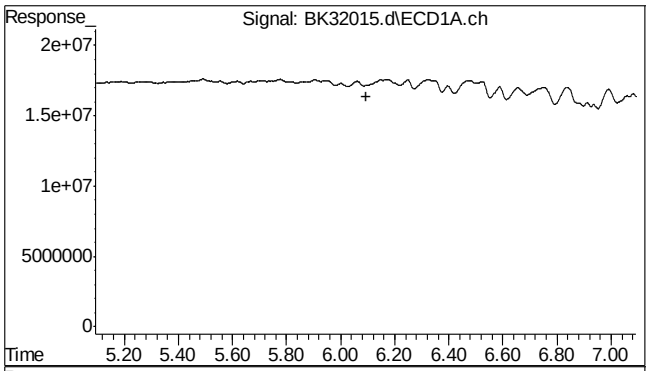

#2 4-Bromofluorobenzene

R.T.: 4.690 min
Delta R.T.: 0.036 min
Response: 360487542
Conc: 73.16 ug/L m



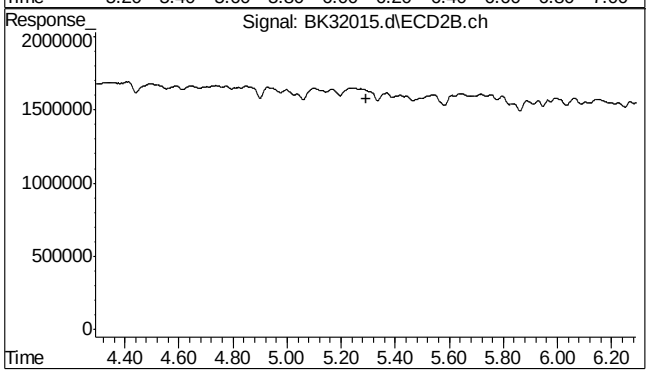

#2 4-Bromofluorobenzene

R.T.: 3.653 min
Delta R.T.: 0.022 min
Response: 7417612
Conc: 53.45 ug/L m




#3 1,2-Dibromo-3-chloropropane

R.T.: 0.000 min
Exp R.T. : 6.093 min
Response: 0
Conc: N.D.




#3 1,2-Dibromo-3-chloropropane

R.T.: 0.000 min
Exp R.T. : 5.291 min
Response: 0
Conc: N.D.

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\BB131111a\
Data File : bb52383.d
Signal(s) : Signal #1: ECD1A.CH Signal #2: ECD2B.CH
Acq On : 12-Nov-13, 15:33:54
Operator : caobinz
Sample : jb52301-6
Misc : op35660,gbb3070,35.4,,,2,,w
ALS Vial : 36 (Sig #1); 0 (Sig #2) Sample Multiplier: 1

Integration File signal 1: rteint.p
Integration File signal 2: rteint2.p
Quant Time: Nov 13 07:43:39 2013
Quant Method : C:\msdchem\1\METHODS\ED131111.M
Quant Title : EDB on pest2/pest on gc23
QLast Update : Tue Nov 12 16:44:27 2013
Response via : Initial Calibration
Integrator: RTE 6890 Scale Mode: Small noise peaks clipped

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

| | Compound | RT#1 | RT#2 | Resp#1 | Resp#2 | ug/L | ug/L |
|---|---|---|---|---|---|---|---|
| | System Monitoring Compounds | | | | | | |
| 2) s | 4-Bromofl... | 4.688 | 5.798f | 103703 | 65982 | 51.567 | 56.733 |
| | Spiked Amount | 50.000 | Range 26 - 158 | Recovery = | | 103.13% | 113.47% |
| | Target Compounds | | | | | | |
| 1) | 1,2-Dibro... | 0.000 | 0.000 | 0 | 0 | N.D. d | N.D. d |
| 3) | 1,2-Dibro... | 0.000 | 0.000 | 0 | 0 | N.D. d | N.D. d |

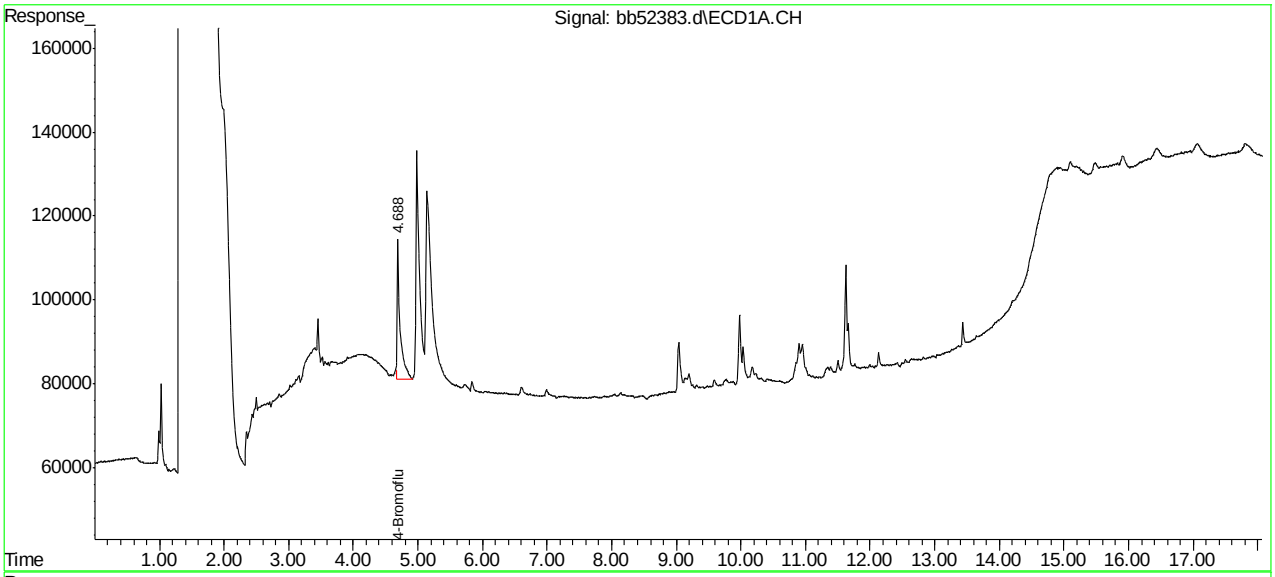
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

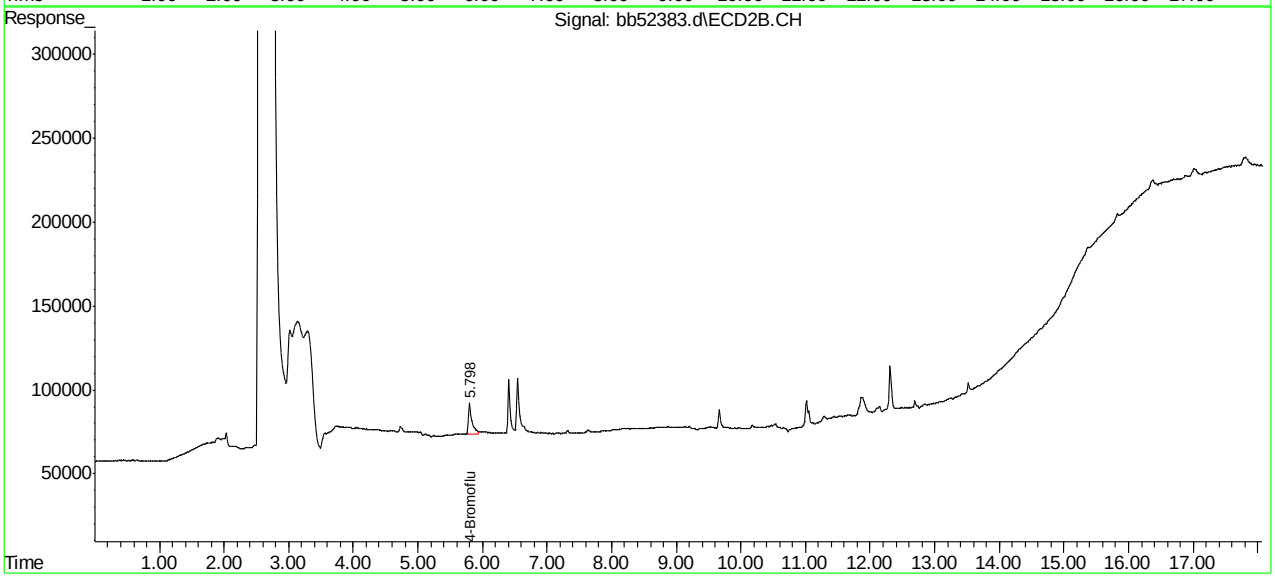
Quantitation Report (QT Reviewed)

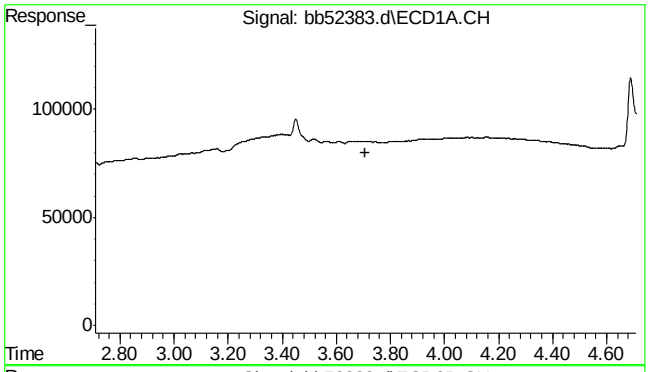
Data Path : C:\msdchem\1\DATA\BB131111a\
Data File : bb52383.d
Signal(s) : Signal #1: ECD1A.CH Signal #2: ECD2B.CH
Acq On : 12-Nov-13, 15:33:54
Operator : caobinz
Sample : jb52301-6
Misc : op35660,gbb3070,35.4,,,2,,w
ALS Vial : 36 (Sig #1); 0 (Sig #2) Sample Multiplier: 1

Integration File signal 1: rteint.p
Integration File signal 2: rteint2.p
Quant Time: Nov 13 07:43:39 2013
Quant Method : C:\msdchem\1\METHODS\ED131111.M
Quant Title : EDB on pest2/pest on gc23
QLast Update : Tue Nov 12 16:44:27 2013
Response via : Initial Calibration
Integrator: RTE 6890 Scale Mode: Small noise peaks clipped

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

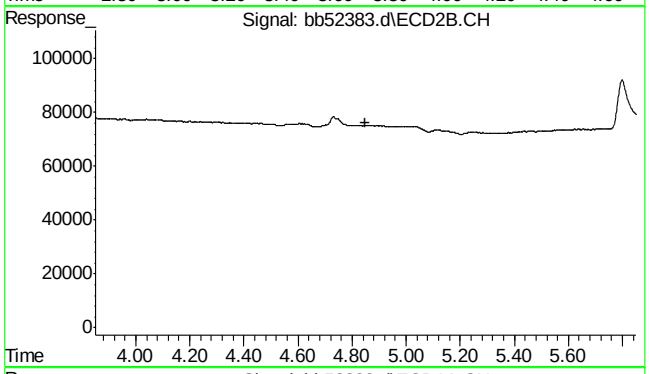




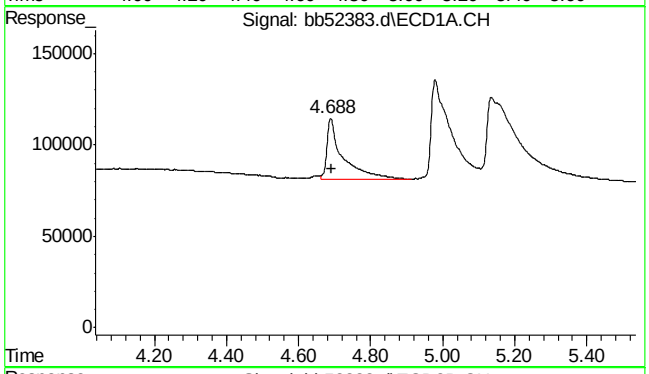

#1 1,2-Dibromoethane

R.T.: 0.000 min
Exp R.T. : 3.708 min
Response: 0
Conc: N.D.



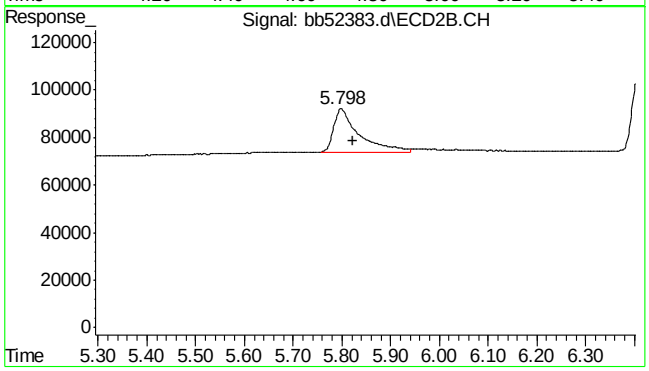

#1 1,2-Dibromoethane

R.T.: 0.000 min
Exp R.T. : 4.850 min
Response: 0
Conc: N.D.



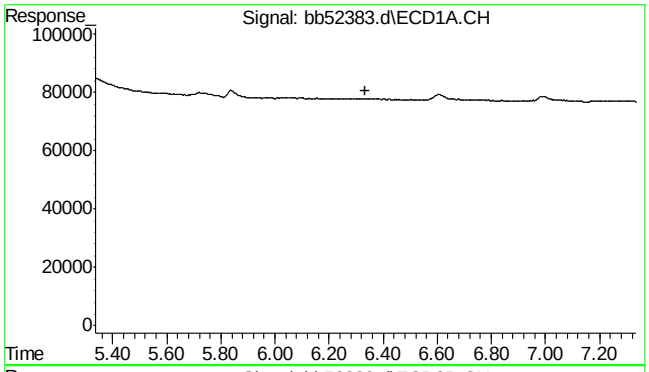

#2 4-Bromofluorobenzene

R.T.: 4.688 min
Delta R.T.: -0.002 min
Response: 103703
Conc: 51.57 ug/L



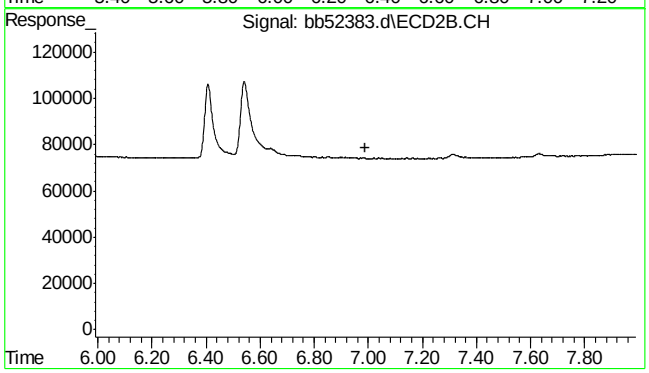

#2 4-Bromofluorobenzene

R.T.: 5.798 min
Delta R.T.: -0.025 min
Response: 65982
Conc: 56.73 ug/L




#3 1,2-Dibromo-3-chloropropane

R.T.: 0.000 min
Exp R.T. : 6.335 min
Response: 0
Conc: N.D.




#3 1,2-Dibromo-3-chloropropane

R.T.: 0.000 min
Exp R.T. : 6.990 min
Response: 0
Conc: N.D.

Manual Integrations APPROVED (compounds with "m" flag)
Andri Piluri
11/13/13 07:49

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\BB131111a\
Data File : bb52359.d
Signal(s) : Signal #1: ECD1A.CH Signal #2: ECD2B.CH
Acq On : 12-Nov-13, 04:33:10
Operator : caobinz
Sample : op35660-mb
Misc : op35660,gbb3070,35,,,2,,w
ALS Vial : 14 (Sig #1); 0 (Sig #2) Sample Multiplier: 1

Integration File signal 1: rteint.p
Integration File signal 2: rteint2.p
Quant Time: Nov 13 07:34:23 2013
Quant Method : C:\msdchem\1\METHODS\ED131111.M
Quant Title : EDB on pest2/pest on gc23
QLast Update : Tue Nov 12 16:44:27 2013
Response via : Initial Calibration
Integrator: RTE 6890 Scale Mode: Small noise peaks clipped

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

| | Compound | RT#1 | RT#2 | Resp#1 | Resp#2 | ug/L | ug/L |
|---|---|---|---|---|---|---|---|
| | System Monitoring Compounds | | | | | | |
| 2) s | 4-Bromofl... | 4.691 | 5.806f | 114856 | 68916 | 57.113m | 59.255m |
| | Spiked Amount | 50.000 | Range 26 - 158 | Recovery = | | 114.23% | 118.51% |
| | Target Compounds | | | | | | |
| 1) | 1,2-Dibro... | 0.000 | 0.000 | 0 | 0 | N.D. d | N.D. d |
| 3) | 1,2-Dibro... | 0.000 | 0.000 | 0 | 0 | N.D. d | N.D. d |

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

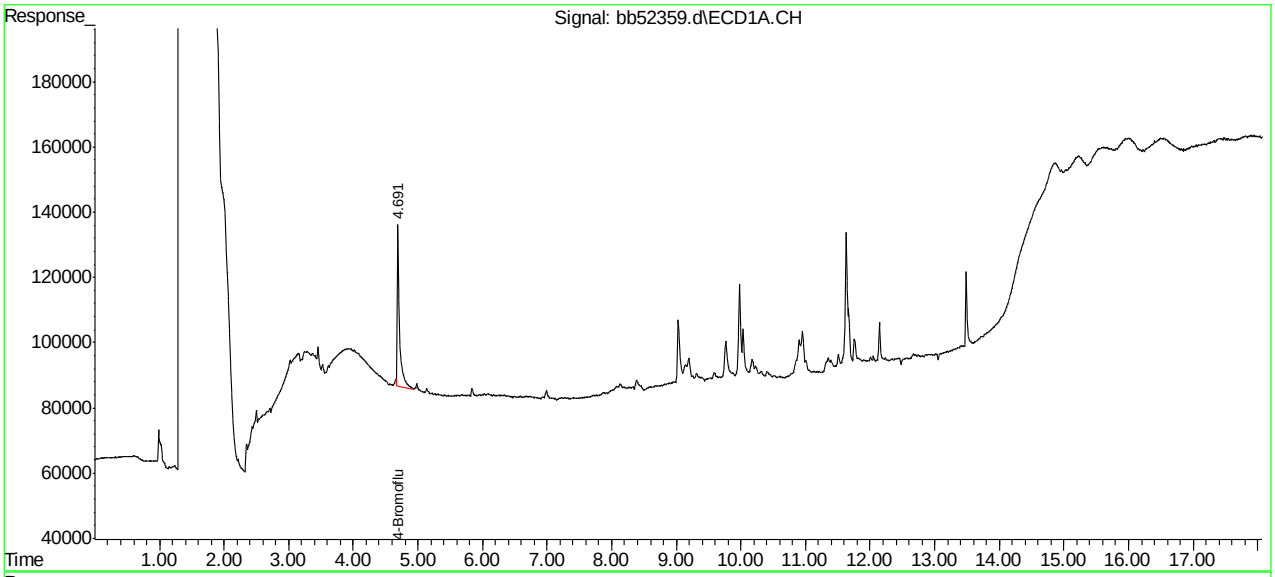
13.2.1
13

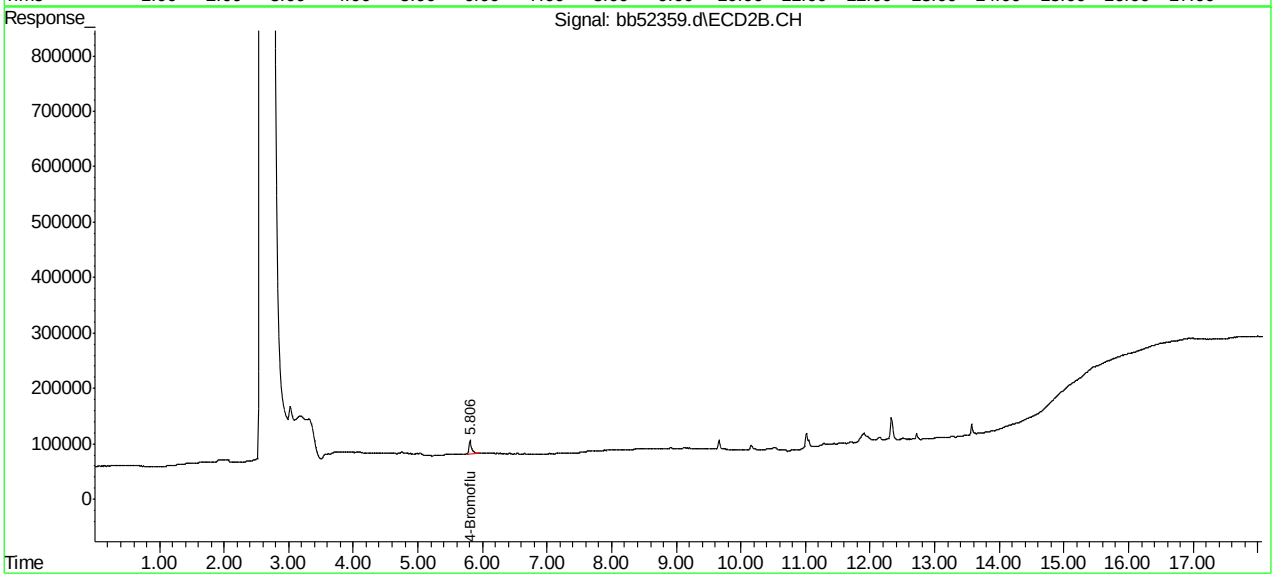
Quantitation Report (QT Reviewed)

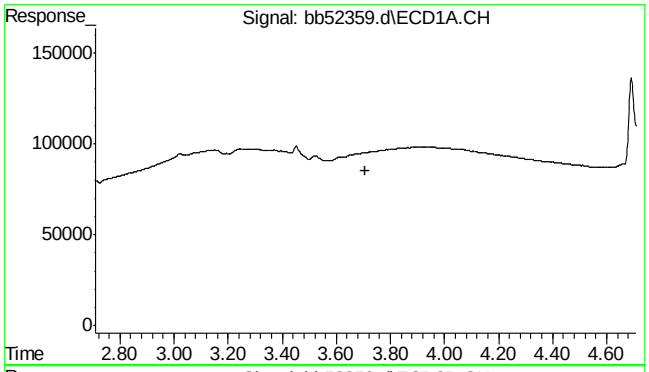
Data Path : C:\msdchem\1\DATA\BB131111a\
Data File : bb52359.d
Signal(s) : Signal #1: ECD1A.CH Signal #2: ECD2B.CH
Acq On : 12-Nov-13, 04:33:10
Operator : caobinz
Sample : op35660-mb
Misc : op35660,gbb3070,35,,,2,,w
ALS Vial : 14 (Sig #1); 0 (Sig #2) Sample Multiplier: 1

Integration File signal 1: rteint.p
Integration File signal 2: rteint2.p
Quant Time: Nov 13 07:34:23 2013
Quant Method : C:\msdchem\1\METHODS\ED131111.M
Quant Title : EDB on pest2/pest on gc23
QLast Update : Tue Nov 12 16:44:27 2013
Response via : Initial Calibration
Integrator: RTE 6890 Scale Mode: Small noise peaks clipped

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

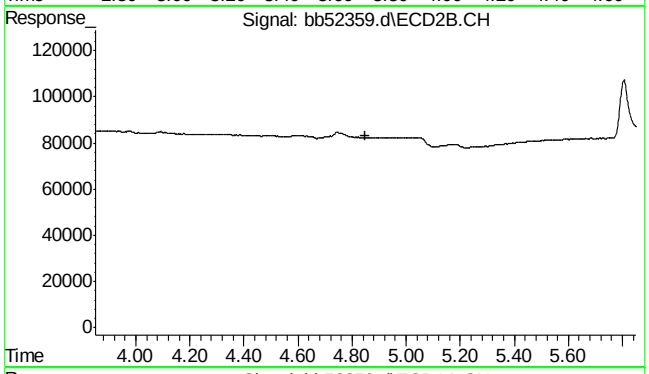




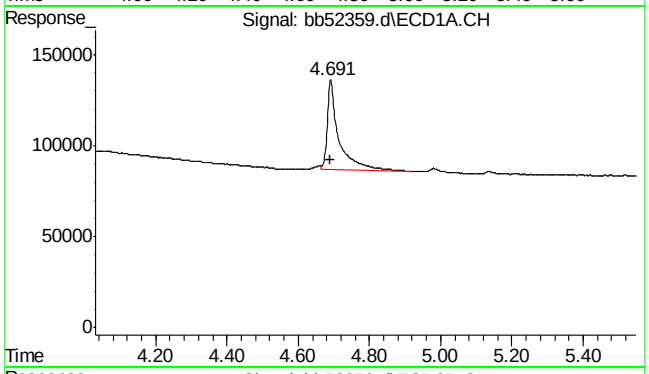

#1 1,2-Dibromoethane

R.T.: 0.000 min
Exp R.T. : 3.708 min
Response: 0
Conc: N.D.



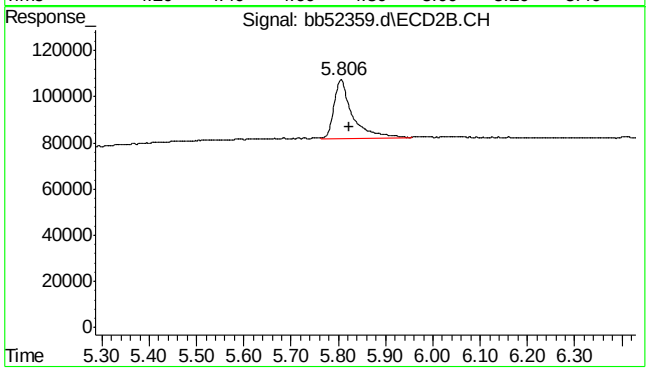

#1 1,2-Dibromoethane

R.T.: 0.000 min
Exp R.T. : 4.850 min
Response: 0
Conc: N.D.



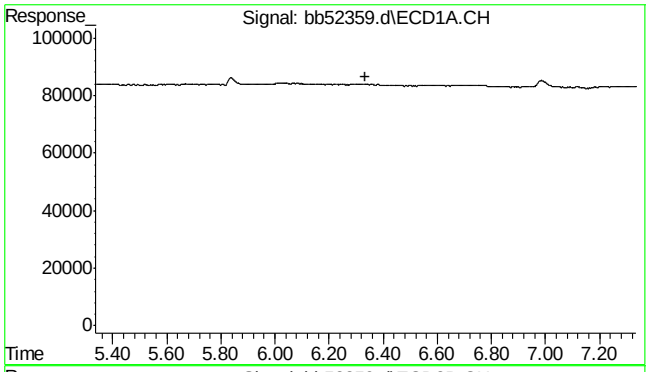

#2 4-Bromofluorobenzene

R.T.: 4.691 min
Delta R.T.: 0.001 min
Response: 114856
Conc: 57.11 ug/L m



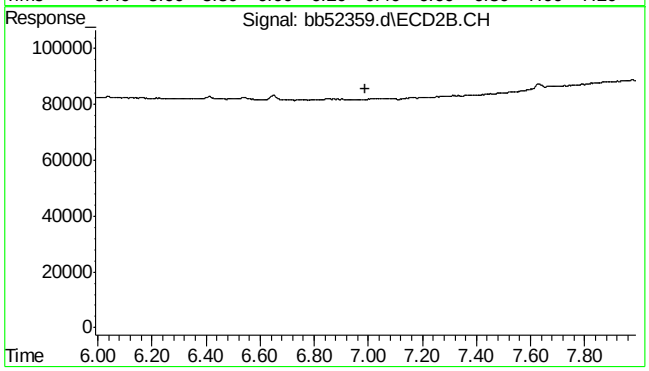

#2 4-Bromofluorobenzene

R.T.: 5.806 min
Delta R.T.: -0.017 min
Response: 68916
Conc: 59.26 ug/L m




#3 1,2-Dibromo-3-chloropropane

R.T.: 0.000 min
Exp R.T. : 6.335 min
Response: 0
Conc: N.D.




#3 1,2-Dibromo-3-chloropropane

R.T.: 0.000 min
Exp R.T. : 6.990 min
Response: 0
Conc: N.D.

Manual Integrations APPROVED (compounds with "m" flag)
Andri Piluri
11/14/13 09:56

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\BK131112\
Data File : BK31996.d
Signal(s) : Signal #1: ECD1A.ch Signal #2: ECD2B.ch
Acq On : 12 Nov 2013 11:37 pm
Operator : nickk
Sample : op35676-mb
Misc : op35676,gbk1055,30.38,,,50,,s
ALS Vial : 25 Sample Multiplier: 1

Integration File signal 1: events.e
Integration File signal 2: events2.e
Quant Time: Nov 13 16:09:05 2013
Quant Method : C:\msdchem\1\METHODS\EDS131112.M
Quant Title : EDB /Rtx35/DB1701
QLast Update : Wed Nov 13 08:40:44 2013
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

| | Compound | RT#1 | RT#2 | Resp#1 | Resp#2 | ug/L | ug/L |
|---|---|---|---|---|---|---|---|
| | System Monitoring Compounds | | | | | | |
| 2) s | 4-Bromofl... | 4.669f | 3.639 | 323.9E6 | 6030035 | 65.743m | 43.450m# |
| | Spiked Amount | 50.000 | Range 26 - 158 | | Recovery = | 131.49% | 86.90% |
| | Target Compounds | | | | | | |
| 1) | 1,2-Dibro... | 0.000 | 0.000 | 0 | 0 | N.D. | N.D. |
| 3) | 1,2-Dibro... | 0.000 | 0.000 | 0 | 0 | N.D. | N.D. |

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

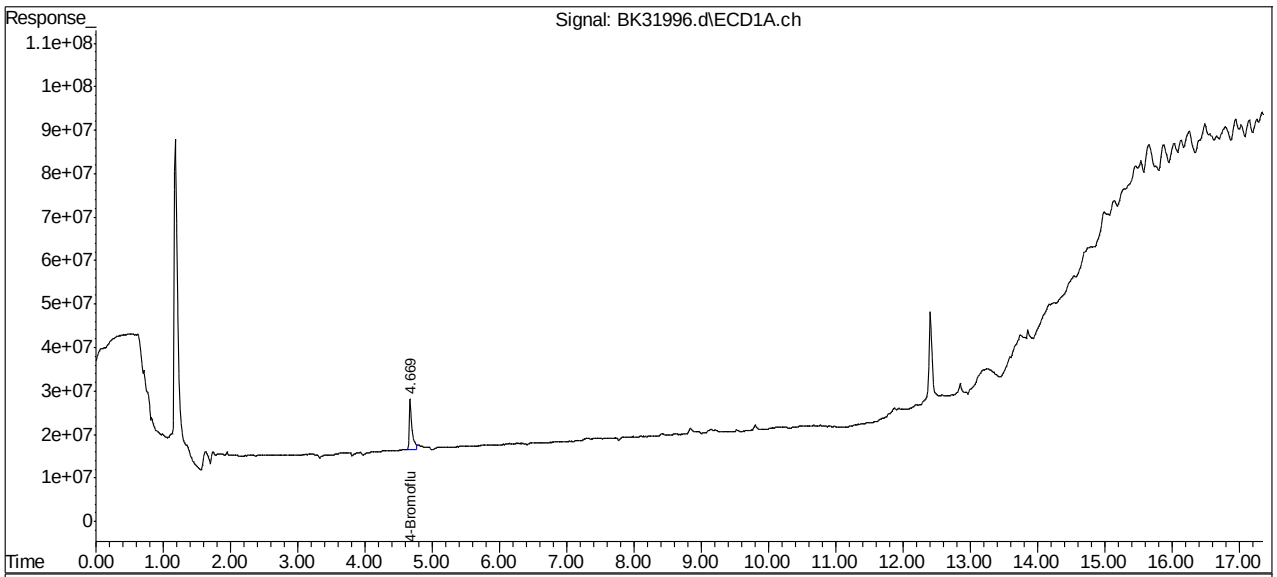
13.2.2
13

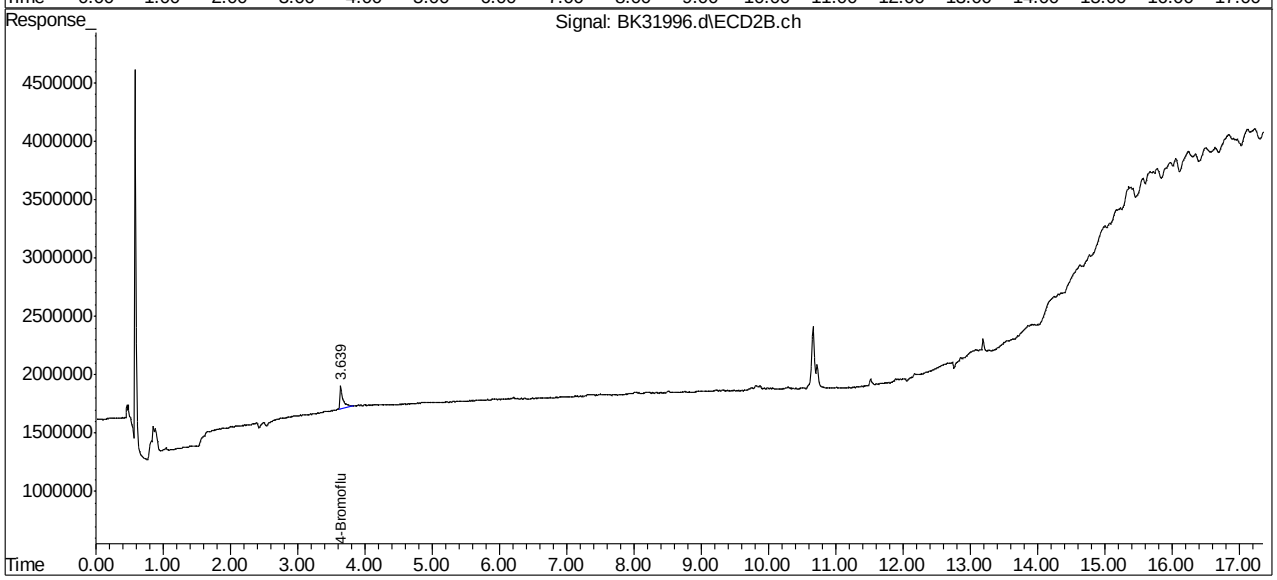
Quantitation Report (QT Reviewed)

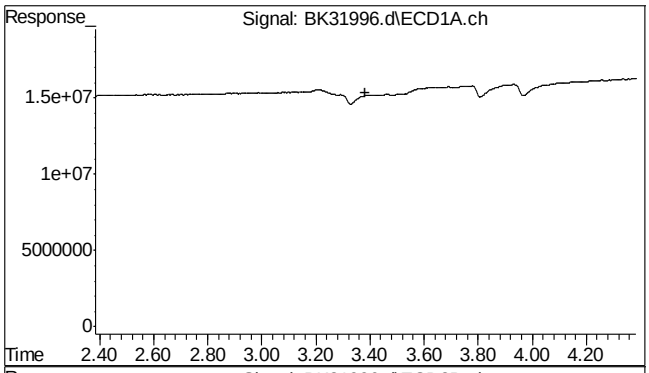
Data Path : C:\msdchem\1\DATA\BK131112\
Data File : BK31996.d
Signal(s) : Signal #1: ECD1A.ch Signal #2: ECD2B.ch
Acq On : 12 Nov 2013 11:37 pm
Operator : nickk
Sample : op35676-mb
Misc : op35676,gbk1055,30.38,,,50,,s
ALS Vial : 25 Sample Multiplier: 1

Integration File signal 1: events.e
Integration File signal 2: events2.e
Quant Time: Nov 13 16:09:05 2013
Quant Method : C:\msdchem\1\METHODS\EDS131112.M
Quant Title : EDB /Rtx35/DB1701
QLast Update : Wed Nov 13 08:40:44 2013
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

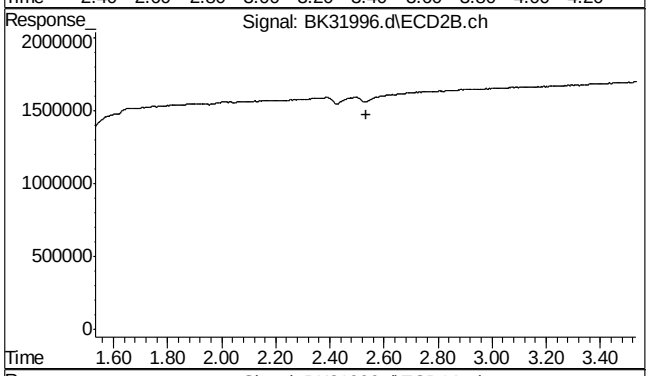




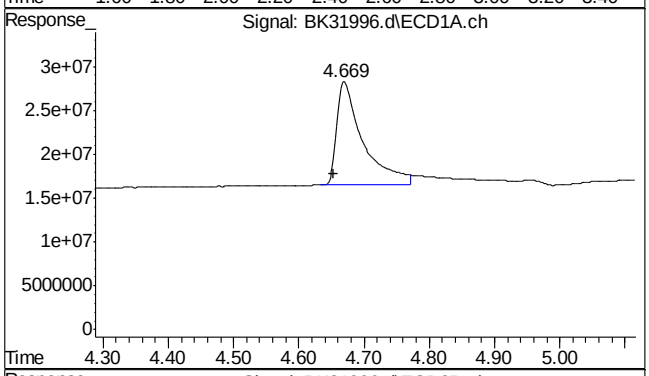

#1 1,2-Dibromoethane

R.T.: 0.000 min
Exp R.T. : 3.384 min
Response: 0
Conc: N.D.



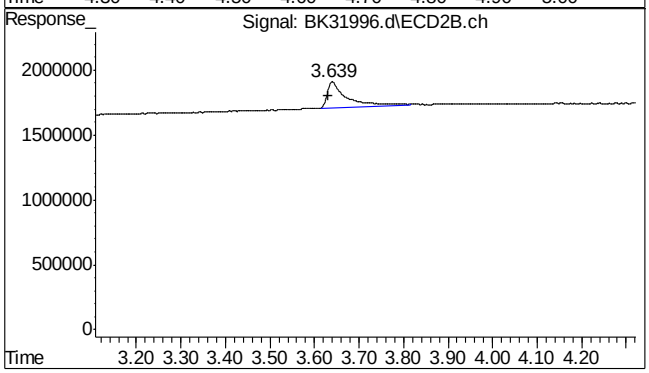

#1 1,2-Dibromoethane

R.T.: 0.000 min
Exp R.T. : 2.533 min
Response: 0
Conc: N.D.



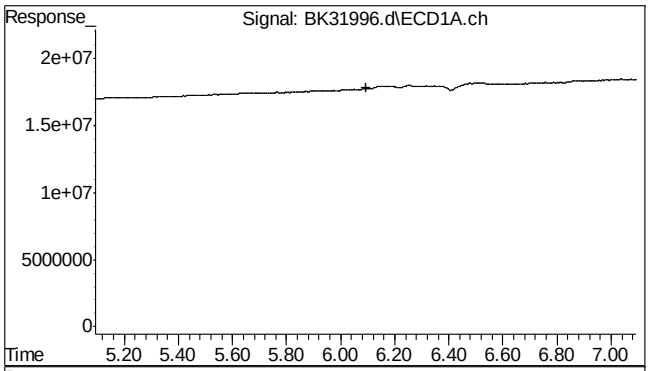

#2 4-Bromofluorobenzene

R.T.: 4.669 min
Delta R.T.: 0.015 min
Response: 323920806
Conc: 65.74 ug/L m



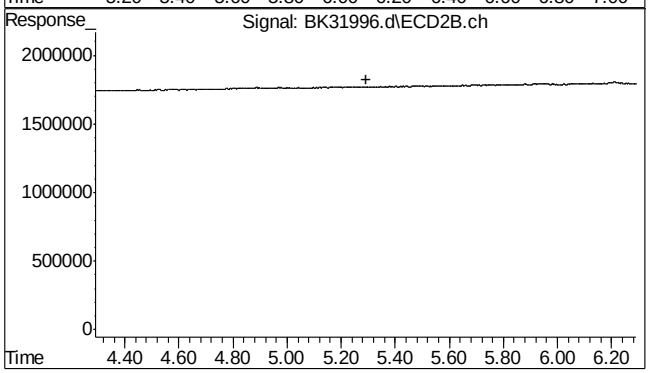

#2 4-Bromofluorobenzene

R.T.: 3.639 min
Delta R.T.: 0.008 min
Response: 6030035
Conc: 43.45 ug/L m




#3 1,2-Dibromo-3-chloropropane

R.T.: 0.000 min
Exp R.T. : 6.093 min
Response: 0
Conc: N.D.




#3 1,2-Dibromo-3-chloropropane

R.T.: 0.000 min
Exp R.T. : 5.291 min
Response: 0
Conc: N.D.

New Jersey ACCUTEST LABORATORIES

## Metals Analysis

# QC Data Summaries

(Accutest Labs of New England, Inc.)

Includes the following where applicable:

- Instrument Runlogs
- Initial and Continuing Calibration Blanks
- Initial and Continuing Calibration Checks
- High and Low Check Standards
- Interfering Element Check Standards
- Method Blank Summaries
- Matrix Spike and Duplicate Summaries
- Blank Spike and Lab Control Sample Summaries
- Serial Dilution Summaries

Accutest Laboratories Instrument Runlog
Inorganics Analyses

Login Number: JB52301
Account: ALNJ - Accutest New Jersey
Project: SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

File ID: SB111913M2.ICP  Date Analyzed: 11/19/13  Methods: SW846 6010C
Analyst: EAL  Run ID: MA16423
Parameters: Co,Pb,Ni,V,Zn

| Time | Sample Description | Dilution Factor | PS Recov | Comments |
|---|---|---|---|---|
| 18:20 | MA16423-STD1 | 1 | | STD1 |
| 18:25 | MA16423-STD2 | 1 | | STD2 |
| 18:30 | MA16423-STD3 | 1 | | STD3 |
| 18:34 | MA16423-STD4 | 1 | | STD4 |
| 18:39 | MA16423-ICV1 | 1 | | |
| 18:46 | MA16423-ICB1 | 1 | | |
| 18:51 | MA16423-CCV1 | 1 | | |
| 18:56 | MA16423-CCB1 | 1 | | |
| 19:01 | MA16423-CRIA1 | 1 | | |
| 19:06 | MA16423-ICSA1 | 1 | | |
| 19:11 | MA16423-ICSAB1 | 1 | | |
| 19:16 | ZZZZZZ | 1 | | |
| 19:21 | ZZZZZZ | 1 | | |
| 19:25 | ZZZZZZ | 1 | | |
| 19:30 | ZZZZZZ | 1 | | |
| 19:35 | ZZZZZZ | 1 | | |
| 19:40 | ZZZZZZ | 1 | | |
| 19:45 | ZZZZZZ | 1 | | |
| 19:50 | MA16423-CCV2 | 1 | | |
| 19:55 | MA16423-CCB2 | 1 | | |
| 20:00 | ZZZZZZ | 1 | | |
| 20:05 | ZZZZZZ | 1 | | |
| 20:10 | ZZZZZZ | 1 | | |
| 20:15 | ZZZZZZ | 1 | | |
| 20:20 | ZZZZZZ | 1 | | |
| 20:25 | ZZZZZZ | 1 | | |
| 20:30 | ZZZZZZ | 10 | | |
| 20:35 | ZZZZZZ | 100 | | |
| 20:40 | ZZZZZZ | 1000 | | |
| 20:45 | ZZZZZZ | 1 | | |
| 20:49 | MA16423-CCV3 | 1 | | |
| 20:54 | MA16423-CCB3 | 1 | | |
| 20:59 | ZZZZZZ | 1 | | |

Accutest Laboratories Instrument Runlog
Inorganics Analyses

Login Number: JB52301
Account: ALNJ - Accutest New Jersey
Project: SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

File ID: SB111913M2.ICP  Date Analyzed: 11/19/13  Methods: SW846 6010C
Analyst: EAL  Run ID: MA16423
Parameters: Co,Pb,Ni,V,Zn

| Time | Sample Description | Dilution Factor | PS Recov | Comments |
|---|---|---|---|---|
| 21:04 | ZZZZZZ | 1 | | |
| 21:09 | ZZZZZZ | 1 | | |
| 21:14 | ZZZZZZ | 1 | | |
| 21:19 | ZZZZZZ | 1 | | |
| 21:23 | ZZZZZZ | 1 | | |
| 21:28 | MP22077-B1 | 1 | | |
| 21:33 | MP22077-MB1 | 1 | | |
| 21:38 | MP22077-S1 | 1 | | |
| 21:43 | MP22077-S2 | 1 | | |
| 21:48 | MA16423-CCV4 | 1 | | |
| 21:53 | MA16423-CCB4 | 1 | | |
| 21:58 | JB52158-4 | 1 | | (sample used for QC only; not part of login JB52301) |
| 22:02 | MP22077-SD1 | 5 | | |
| 22:07 | MP22077-B2 | 1 | | |
| 22:12 | MP22077-LC1 | 1 | | |
| 22:17 | ZZZZZZ | 1 | | |
| 22:22 | ZZZZZZ | 1 | | |
| 22:27 | ZZZZZZ | 1 | | |
| 22:32 | ZZZZZZ | 1 | | |
| 22:37 | ZZZZZZ | 1 | | |
| 22:42 | ZZZZZZ | 1 | | |
| 22:47 | MA16423-CCV5 | 1 | | |
| 22:52 | MA16423-CCB5 | 1 | | |
| 22:57 | ZZZZZZ | 1 | | |
| 23:02 | ZZZZZZ | 1 | | |
| 23:07 | ZZZZZZ | 1 | | |
| 23:12 | ZZZZZZ | 1 | | |
| 23:17 | ZZZZZZ | 1 | | |
| 23:22 | ZZZZZZ | 1 | | |
| 23:27 | ZZZZZZ | 1 | | |
| 23:32 | ZZZZZZ | 1 | | |
| 23:36 | ZZZZZZ | 1 | | |
| 23:41 | ZZZZZZ | 1 | | |

Accutest Laboratories Instrument Runlog
Inorganics Analyses

Login Number: JB52301
Account: ALNJ - Accutest New Jersey
Project: SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

File ID: SB111913M2.ICP  Date Analyzed: 11/19/13  Methods: SW846 6010C
Analyst: EAL  Run ID: MA16423
Parameters: Co,Pb,Ni,V,Zn

| | Time | Sample Description | Dilution Factor | PS Recov | Comments |
|---|---|---|---|---|---|
| | 23:46 | MA16423-CCV6 | 1 | | |
| | 23:51 | MA16423-CCB6 | 1 | | |
| | 23:56 | ZZZZZZ | 1 | | |
| | 00:01 | JB52301-3 | 1 | | |
| | 00:06 | JB52301-5 | 1 | | |
| ----------> | | Last reportable sample/prep for job JB52301 | | | |
| | 00:11 | ZZZZZZ | 1 | | |
| | 00:16 | ZZZZZZ | 1 | | |
| | 00:20 | ZZZZZZ | 1 | | |
| | 00:25 | ZZZZZZ | 1 | | |
| | 00:30 | ZZZZZZ | 1 | | |
| | 00:35 | ZZZZZZ | 1 | | |
| | 00:40 | ZZZZZZ | 1 | | |
| | 00:45 | MA16423-CCV7 | 1 | | |
| | 00:50 | MA16423-CCB7 | 1 | | |
| | 00:55 | ZZZZZZ | 1 | | |
| | 01:00 | ZZZZZZ | 1 | | |
| | 01:05 | ZZZZZZ | 1 | | |
| | 01:10 | ZZZZZZ | 1 | | |
| | 01:15 | ZZZZZZ | 1 | | |
| | 01:20 | MA16423-CRIA2 | 1 | | |
| | 01:25 | MA16423-ICSA2 | 1 | | |
| | 01:30 | MA16423-ICSAB2 | 1 | | |
| | 01:35 | MA16423-CCV8 | 1 | | |
| | 01:40 | MA16423-CCB8 | 1 | | |
| ----------> | | Last reportable CCB for job JB52301 | | | |
| | 01:44 | MA16423-CRIB1 | 1 | | |
| | 01:49 | MP22078-B1 | 1 | | |
| | 01:54 | MP22078-MB1 | 1 | | |
| | 01:59 | MP22078-S1 | 1 | | |
| | 02:04 | MP22078-S2 | 1 | | |
| | 02:09 | MC26267-33A | 1 | | (sample used for QC only; not part of login JB52301) |
| | 02:15 | MP22078-SD1 | 5 | | |
| | 02:20 | MP22078-B2 | 1 | | |
| | 02:24 | MP22078-LB1 | 1 | | |

Accutest Laboratories Instrument Runlog
Inorganics Analyses

Login Number: JB52301
Account: ALNJ - Accutest New Jersey
Project: SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

File ID: SB111913M2.ICP  Date Analyzed: 11/19/13  Methods: SW846 6010C
Analyst: EAL  Run ID: MA16423
Parameters: Co,Pb,Ni,V,Zn

| Time | Sample Description | Dilution Factor | PS Recov | Comments |
|---|---|---|---|---|
| 02:29 | ZZZZZZ | 1 | | |
| 02:35 | MA16423-CCV9 | 1 | | |
| 02:39 | MA16423-CCB9 | 1 | | |
| 02:44 | ZZZZZZ | 1 | | |
| 02:49 | ZZZZZZ | 1 | | |
| 02:55 | ZZZZZZ | 1 | | |
| 03:00 | ZZZZZZ | 1 | | |
| 03:05 | MA16423-CRIB2 | 1 | | |
| 03:10 | MA16423-ICSA3 | 1 | | |
| 03:15 | MA16423-ICSAB3 | 1 | | |
| 03:20 | MA16423-CCV10 | 1 | | |
| 03:25 | MA16423-CCB10 | 1 | | |

Refer to raw data for calibration curve and standards.

INTERNAL STANDARD SUMMARY

Login Number: JB52301
Account: ALNJ - Accutest New Jersey
Project: SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

File ID: SB111913M2.ICP Date Analyzed: 11/19/13 Methods: SW846 6010C
Analyst: EAL Run ID: MA16423
Parameters: Co,Pb,Ni,V,Zn

| Time | Sample Description | Istd#1 | Istd#2 | Istd#3 |
|---|---|---|---|---|
| 18:20 | MA16423-STD1 | 1674 R | 77285 R | 23366 R |
| 18:25 | MA16423-STD2 | 1665 | 76696 | 23491 |
| 18:30 | MA16423-STD3 | | | 23404 |
| 18:34 | MA16423-STD4 | 1681 | 76526 | 23454 |
| 18:39 | MA16423-ICV1 | 1670 | 76637 | 23401 |
| 18:46 | MA16423-ICB1 | 1689 | 77426 | 25091 |
| 18:51 | MA16423-CCV1 | 1683 | 77072 | 23517 |
| 18:56 | MA16423-CCB1 | 1691 | 77322 | 25111 |
| 19:01 | MA16423-CRIA1 | 1693 | 77112 | 23309 |
| 19:06 | MA16423-ICSA1 | 1549 | 71522 | 23145 |
| 19:11 | MA16423-ICSAB1 | 1543 | 71630 | 23115 |
| 19:16 | ZZZZZZ | 1819 | 83174 | 25891 |
| 19:21 | ZZZZZZ | 1831 | 84354 | 26157 |
| 19:25 | ZZZZZZ | 2062 | 94804 | 29561 |
| 19:30 | ZZZZZZ | 1699 | 79720 | 25360 |
| 19:35 | ZZZZZZ | 1793 | 84016 | 26484 |
| 19:40 | ZZZZZZ | 1776 | 82657 | 26027 |
| 19:45 | ZZZZZZ | 1779 | 83208 | 26454 |
| 19:50 | MA16423-CCV2 | 1694 | 77693 | 23879 |
| 19:55 | MA16423-CCB2 | 1700 | 78204 | 24026 |
| 20:00 | ZZZZZZ | 1763 | 83291 | 26188 |
| 20:05 | ZZZZZZ | 1766 | 83760 | 26347 |
| 20:10 | ZZZZZZ | 1784 | 84527 | 26583 |
| 20:15 | ZZZZZZ | 1757 | 84644 | 26442 |
| 20:20 | ZZZZZZ | 1754 | 85236 | 26403 |
| 20:25 | ZZZZZZ | 1975 | 100500 !a | 31633 !a |
| 20:30 | ZZZZZZ | 1680 | 81990 | 25294 |
| 20:35 | ZZZZZZ | 1646 | 80060 | 24422 |
| 20:40 | ZZZZZZ | 1662 | 79580 | 24113 |
| 20:45 | ZZZZZZ | 1713 | 83340 | 25533 |
| 20:49 | MA16423-CCV3 | 1659 | 79916 | 24376 |
| 20:54 | MA16423-CCB3 | 1665 | 79948 | 24355 |
| 20:59 | ZZZZZZ | 1811 | 87931 | 26702 |

INTERNAL STANDARD SUMMARY

Login Number: JB52301
Account: ALNJ - Accutest New Jersey
Project: SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

File ID: SB111913M2.ICP  Date Analyzed: 11/19/13  Methods: SW846 6010C
Analyst: EAL  Run ID: MA16423
Parameters: Co,Pb,Ni,V,Zn

| Time | Sample Description | Istd#1 | Istd#2 | Istd#3 |
|---|---|---|---|---|
| 21:04 | ZZZZZZ | 1827 | 88804 | 27303 |
| 21:09 | ZZZZZZ | 1816 | 87517 | 27186 |
| 21:14 | ZZZZZZ | 1772 | 86897 | 26346 |
| 21:19 | ZZZZZZ | 1767 | 87142 | 26546 |
| 21:23 | ZZZZZZ | 1779 | 87840 | 26906 |
| 21:28 | MP22077-B1 | 1587 | 78424 | 24326 |
| 21:33 | MP22077-MB1 | 1619 | 79542 | 24394 |
| 21:38 | MP22077-S1 | 1435 | 73356 | 23526 |
| 21:43 | MP22077-S2 | 1441 | 73794 | 23697 |
| 21:48 | MA16423-CCV4 | 1634 | 78921 | 24358 |
| 21:53 | MA16423-CCB4 | 1649 | 79211 | 24483 |
| 21:58 | JB52158-4 | 1431 | 73547 | 23597 |
| 22:02 | MP22077-SD1 | 1539 | 76805 | 23839 |
| 22:07 | MP22077-B2 | 1596 | 78572 | 24424 |
| 22:12 | MP22077-LC1 | 1740 | 86248 | 26583 |
| 22:17 | ZZZZZZ | 1533 | 79596 | 25254 |
| 22:22 | ZZZZZZ | 1549 | 79968 | 24965 |
| 22:27 | ZZZZZZ | 1572 | 79840 | 25120 |
| 22:32 | ZZZZZZ | 1746 | 86049 | 26513 |
| 22:37 | ZZZZZZ | 1804 | 88836 | 27560 |
| 22:42 | ZZZZZZ | 1750 | 86451 | 26686 |
| 22:47 | MA16423-CCV5 | 1616 | 79969 | 24476 |
| 22:52 | MA16423-CCB5 | 1620 | 79943 | 23953 |
| 22:57 | ZZZZZZ | 1658 | 84660 | 25893 |
| 23:02 | ZZZZZZ | 1669 | 85335 | 26308 |
| 23:07 | ZZZZZZ | 1627 | 84211 | 26578 |
| 23:12 | ZZZZZZ | 1776 | 89645 | 29234 |
| 23:17 | ZZZZZZ | 1822 | 91236 | 28162 |
| 23:22 | ZZZZZZ | 1800 | 90945 | 26155 |
| 23:27 | ZZZZZZ | 1761 | 89053 | 27277 |
| 23:32 | ZZZZZZ | 1708 | 90224 | 26484 |
| 23:36 | ZZZZZZ | 1734 | 88152 | 27253 |
| 23:41 | ZZZZZZ | 1707 | 85656 | 26294 |

INTERNAL STANDARD SUMMARY

Login Number: JB52301
Account: ALNJ - Accutest New Jersey
Project: SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

File ID: SB111913M2.ICP Date Analyzed: 11/19/13 Methods: SW846 6010C
Analyst: EAL Run ID: MA16423
Parameters: Co,Pb,Ni,V,Zn

| Time | Sample Description | Istd#1 | Istd#2 | Istd#3 |
|---|---|---|---|---|
| 23:46 | MA16423-CCV6 | 1595 | 80594 | 24683 |
| 23:51 | MA16423-CCB6 | 1599 | 80600 | 24436 |
| 23:56 | ZZZZZZ | 1709 | 86228 | 26610 |
| 00:01 | JB52301-3 | 1496 | 79325 | 25141 |
| 00:06 | JB52301-5 | 1697 | 85714 | 26346 |
| 00:11 | ZZZZZZ | 1811 | 91782 | 28374 |
| 00:16 | ZZZZZZ | 1816 | 90780 | 28382 |
| 00:20 | ZZZZZZ | 1689 | 86578 | 26823 |
| 00:25 | ZZZZZZ | 1813 | 92416 | 28363 |
| 00:30 | ZZZZZZ | 1744 | 88863 | 27185 |
| 00:35 | ZZZZZZ | 1782 | 91390 | 28223 |
| 00:40 | ZZZZZZ | 1716 | 89353 | 27495 |
| 00:45 | MA16423-CCV7 | 1583 | 81067 | 24935 |
| 00:50 | MA16423-CCB7 | 1563 | 81113 | 24602 |
| 00:55 | ZZZZZZ | 1742 | 89340 | 27288 |
| 01:00 | ZZZZZZ | 1740 | 89278 | 27122 |
| 01:05 | ZZZZZZ | 1786 | 90048 | 27674 |
| 01:10 | ZZZZZZ | 1753 | 90031 | 27744 |
| 01:15 | ZZZZZZ | 1591 | 81490 | 24636 |
| 01:20 | MA16423-CRIA2 | 1581 | 81198 | 24623 |
| 01:25 | MA16423-ICSA2 | 1445 | 75373 | 24084 |
| 01:30 | MA16423-ICSAB2 | 1438 | 75277 | 23934 |
| 01:35 | MA16423-CCV8 | 1559 | 81350 | 24840 |
| 01:40 | MA16423-CCB8 | 1572 | 81820 | 24411 |
| 01:44 | MA16423-CRIB1 | 1558 | 80983 | 24744 |
| 01:49 | MP22078-B1 | 1448 | 76186 | 24202 |
| 01:54 | MP22078-MB1 | 1549 | 81320 | 24717 |
| 01:59 | MP22078-S1 | 1346 | 73414 | 23338 |
| 02:04 | MP22078-S2 | 1344 | 73580 | 23311 |
| 02:09 | MC26267-33A | 1353 | 73327 | 23342 |
| 02:15 | MP22078-SD1 | 1482 | 79561 | 24294 |
| 02:20 | MP22078-B2 | 1430 | 76102 | 24088 |
| 02:24 | MP22078-LB1 | 1435 | 76197 | 23922 |

INTERNAL STANDARD SUMMARY

Login Number: JB52301
Account: ALNJ - Accutest New Jersey
Project: SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

File ID: SB111913M2.ICP  Date Analyzed: 11/19/13  Methods: SW846 6010C
Analyst: EAL  Run ID: MA16423
Parameters: Co,Pb,Ni,V,Zn

| Time | Sample Description | Istd#1 | Istd#2 | Istd#3 |
|---|---|---|---|---|
| 02:29 | ZZZZZZ | 1351 | 73906 | 23386 |
| 02:35 | MA16423-CCV9 | 1548 | 81545 | 24514 |
| 02:39 | MA16423-CCB9 | 1544 | 81694 | 24627 |
| 02:44 | ZZZZZZ | 1348 | 73806 | 23315 |
| 02:49 | ZZZZZZ | 1365 | 74367 | 23522 |
| 02:55 | ZZZZZZ | 1336 | 74083 | 23616 |
| 03:00 | ZZZZZZ | 1312 | 73036 | 23049 |
| 03:05 | MA16423-CRIB2 | 1511 | 82245 | 24391 |
| 03:10 | MA16423-ICSA3 | 1371 | 76161 | 23894 |
| 03:15 | MA16423-ICSAB3 | 1364 | 76137 | 23811 |
| 03:20 | MA16423-CCV10 | 1490 | 81578 | 24521 |
| 03:25 | MA16423-CCB10 | 1515 | 81808 | 24434 |

R = Reference for ISTD limits.  ! = Outside limits.

LEGEND:

| Istd# | Parameter | Limits |
|---|---|---|
| Istd#1 | Yttrium (2243) | 70-130 % |
| Istd#2 | Yttrium (3600) | 70-130 % |
| Istd#3 | Yttrium (3710) | 70-130 % |

(a) No element reported by this internal standard.

BLANK RESULTS SUMMARY
Part 1 - Initial and Continuing Calibration Blanks

Login Number: JB52301
Account: ALNJ - Accutest New Jersey
Project: SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

File ID: SB111913M2.ICP  Date Analyzed: 11/19/13  Methods: SW846 6010C
QC Limits: result < RL  Run ID: MA16423  Units: ug/l

| Time: | | | 18:46 | | 18:56 | | 19:55 | | 20:54 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID: | | | ICB1 | | CCB1 | | CCB2 | | CCB3 | |
| Metal | RL | IDL | raw | final | raw | final | raw | final | raw | final |
| Aluminum | 200 | 6.1 | anr | | | | | | | |
| Antimony | 6.0 | 1.1 | anr | | | | | | | |
| Arsenic | 10 | 2.2 | anr | | | | | | | |
| Barium | 500 | .19 | anr | | | | | | | |
| Beryllium | 4.0 | .08 | anr | | | | | | | |
| Boron | 100 | .81 | | | | | | | | |
| Cadmium | 4.0 | .22 | anr | | | | | | | |
| Calcium | 5000 | 8.5 | anr | | | | | | | |
| Chromium | 10 | .74 | anr | | | | | | | |
| Cobalt | 50 | .28 | 0.30 | <50 | 0.50 | <50 | 0.30 | <50 | 0.30 | <50 |
| Copper | 25 | .86 | anr | | | | | | | |
| Gold | 50 | 1.8 | | | | | | | | |
| Iron | 100 | 4.4 | anr | | | | | | | |
| Lead | 10 | 1.6 | 0.10 | <10 | 0.10 | <10 | 0.0 | <10 | 0.20 | <10 |
| Magnesium | 5000 | 43 | anr | | | | | | | |
| Manganese | 15 | .17 | anr | | | | | | | |
| Molybdenum | 100 | .4 | | | | | | | | |
| Nickel | 40 | .45 | 0.0 | <40 | 0.40 | <40 | 0.30 | <40 | 0.20 | <40 |
| Palladium | 50 | 2 | | | | | | | | |
| Platinum | 50 | 8.7 | | | | | | | | |
| Potassium | 5000 | 24 | anr | | | | | | | |
| Selenium | 25 | 1.4 | anr | | | | | | | |
| Silicon | 100 | 2.1 | | | | | | | | |
| Silver | 5.0 | .47 | anr | | | | | | | |
| Sodium | 5000 | 42 | anr | | | | | | | |
| Sulfur | 50 | 2.9 | | | | | | | | |
| Strontium | 10 | .1 | | | | | | | | |
| Thallium | 5.0 | 1.7 | anr | | | | | | | |
| Tin | 100 | 1.5 | | | | | | | | |
| Titanium | 50 | .48 | | | | | | | | |
| Tungsten | 100 | 9.3 | | | | | | | | |
| Vanadium | 10 | .9 | 0.50 | <10 | 0.70 | <10 | 0.40 | <10 | 0.30 | <10 |
| Zinc | 100 | .91 | -0.70 | <100 | -0.40 | <100 | -0.60 | <100 | -0.70 | <100 |

BLANK RESULTS SUMMARY
Part 1 - Initial and Continuing Calibration Blanks

Login Number: JB52301
Account: ALNJ - Accutest New Jersey
Project: SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

File ID: SB111913M2.ICP  Date Analyzed: 11/19/13  Methods: SW846 6010C
QC Limits: result < RL  Run ID: MA16423  Units: ug/l

| Time: | | |
|---|---|---|
| Sample ID: | | |
| Metal | | |
| Zirconium | 50 | .76 |

(*) Outside of QC limits
(anr) Analyte not requested

BLANK RESULTS SUMMARY
Part 1 - Initial and Continuing Calibration Blanks

Login Number: JB52301
Account: ALNJ - Accutest New Jersey
Project: SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

File ID: SB111913M2.ICP  Date Analyzed: 11/19/13  Methods: SW846 6010C
QC Limits: result < RL  Run ID: MA16423  Units: ug/l

| Time: / Sample ID: | | | 21:53 CCB4 | | 22:52 CCB5 | | 23:51 CCB6 | | 00:50 CCB7 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Metal | RL | IDL | raw | final | raw | final | raw | final | raw | final |
| Aluminum | 200 | 6.1 | anr | | | | | | | |
| Antimony | 6.0 | 1.1 | anr | | | | | | | |
| Arsenic | 10 | 2.2 | anr | | | | | | | |
| Barium | 500 | .19 | anr | | | | | | | |
| Beryllium | 4.0 | .08 | anr | | | | | | | |
| Boron | 100 | .81 | | | | | | | | |
| Cadmium | 4.0 | .22 | anr | | | | | | | |
| Calcium | 5000 | 8.5 | anr | | | | | | | |
| Chromium | 10 | .74 | anr | | | | | | | |
| Cobalt | 50 | .28 | 0.30 | <50 | 0.10 | <50 | 0.40 | <50 | 0.30 | <50 |
| Copper | 25 | .86 | anr | | | | | | | |
| Gold | 50 | 1.8 | | | | | | | | |
| Iron | 100 | 4.4 | anr | | | | | | | |
| Lead | 10 | 1.6 | 0.0 | <10 | -0.20 | <10 | 0.30 | <10 | -0.10 | <10 |
| Magnesium | 5000 | 43 | anr | | | | | | | |
| Manganese | 15 | .17 | anr | | | | | | | |
| Molybdenum | 100 | .4 | | | | | | | | |
| Nickel | 40 | .45 | 0.0 | <40 | 0.0 | <40 | 0.10 | <40 | 0.0 | <40 |
| Palladium | 50 | 2 | | | | | | | | |
| Platinum | 50 | 8.7 | | | | | | | | |
| Potassium | 5000 | 24 | anr | | | | | | | |
| Selenium | 25 | 1.4 | anr | | | | | | | |
| Silicon | 100 | 2.1 | | | | | | | | |
| Silver | 5.0 | .47 | anr | | | | | | | |
| Sodium | 5000 | 42 | anr | | | | | | | |
| Sulfur | 50 | 2.9 | | | | | | | | |
| Strontium | 10 | .1 | | | | | | | | |
| Thallium | 5.0 | 1.7 | anr | | | | | | | |
| Tin | 100 | 1.5 | | | | | | | | |
| Titanium | 50 | .48 | | | | | | | | |
| Tungsten | 100 | 9.3 | | | | | | | | |
| Vanadium | 10 | .9 | 0.30 | <10 | 0.10 | <10 | 0.60 | <10 | 0.20 | <10 |
| Zinc | 100 | .91 | -0.70 | <100 | -0.70 | <100 | -0.80 | <100 | -0.80 | <100 |

BLANK RESULTS SUMMARY
Part 1 - Initial and Continuing Calibration Blanks

Login Number: JB52301
Account: ALNJ - Accutest New Jersey
Project: SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

File ID: SB111913M2.ICP  Date Analyzed: 11/19/13  Methods: SW846 6010C
QC Limits: result < RL  Run ID: MA16423  Units: ug/l

| Time: | | |
|---|---|---|
| Sample ID: | | |
| Metal | | |
| Zirconium | 50 | .76 |

(*) Outside of QC limits
(anr) Analyte not requested

BLANK RESULTS SUMMARY
Part 1 - Initial and Continuing Calibration Blanks

Login Number: JB52301
Account: ALNJ - Accutest New Jersey
Project: SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

File ID: SB111913M2.ICP  Date Analyzed: 11/19/13  Methods: SW846 6010C
QC Limits: result < RL  Run ID: MA16423  Units: ug/l

| Time: | | | 01:40 | |
|---|---|---|---|---|
| Sample ID: | | | CCB8 | |
| Metal | RL | IDL | raw | final |
| Aluminum | 200 | 6.1 | anr | |
| Antimony | 6.0 | 1.1 | anr | |
| Arsenic | 10 | 2.2 | anr | |
| Barium | 500 | .19 | anr | |
| Beryllium | 4.0 | .08 | anr | |
| Boron | 100 | .81 | | |
| Cadmium | 4.0 | .22 | anr | |
| Calcium | 5000 | 8.5 | anr | |
| Chromium | 10 | .74 | anr | |
| Cobalt | 50 | .28 | 0.20 | <50 |
| Copper | 25 | .86 | anr | |
| Gold | 50 | 1.8 | | |
| Iron | 100 | 4.4 | anr | |
| Lead | 10 | 1.6 | -0.30 | <10 |
| Magnesium | 5000 | 43 | anr | |
| Manganese | 15 | .17 | anr | |
| Molybdenum | 100 | .4 | | |
| Nickel | 40 | .45 | 0.0 | <40 |
| Palladium | 50 | 2 | | |
| Platinum | 50 | 8.7 | | |
| Potassium | 5000 | 24 | anr | |
| Selenium | 25 | 1.4 | anr | |
| Silicon | 100 | 2.1 | | |
| Silver | 5.0 | .47 | anr | |
| Sodium | 5000 | 42 | anr | |
| Sulfur | 50 | 2.9 | | |
| Strontium | 10 | .1 | | |
| Thallium | 5.0 | 1.7 | anr | |
| Tin | 100 | 1.5 | | |
| Titanium | 50 | .48 | | |
| Tungsten | 100 | 9.3 | | |
| Vanadium | 10 | .9 | 0.10 | <10 |
| Zinc | 100 | .91 | -0.70 | <100 |

BLANK RESULTS SUMMARY
Part 1 - Initial and Continuing Calibration Blanks

Login Number: JB52301
Account: ALNJ - Accutest New Jersey
Project: SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

File ID: SB111913M2.ICP  Date Analyzed: 11/19/13  Methods: SW846 6010C
QC Limits: result < RL  Run ID: MA16423  Units: ug/l

| Time: | | |
|---|---|---|
| Sample ID: | | |
| Metal | | |
| Zirconium | 50 | .76 |

(*) Outside of QC limits
(anr) Analyte not requested

CALIBRATION CHECK STANDARDS SUMMARY
Initial and Continuing Calibration Checks

Login Number: JB52301
Account: ALNJ - Accutest New Jersey
Project: SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

File ID: SB111913M2.ICP  Date Analyzed: 11/19/13  Methods: SW846 6010C
QC Limits: 90 to 110 % Recovery  Run ID: MA16423  Units: ug/l

| Time: | | 18:39 | | | 18:51 | | | 19:50 | |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID: | ICV | ICV1 | | CCV | CCV1 | | CCV | CCV2 | |
| Metal | True | Results | % Rec | True | Results | % Rec | True | Results | % Rec |
| Aluminum | anr | | | | | | | | |
| Antimony | anr | | | | | | | | |
| Arsenic | anr | | | | | | | | |
| Barium | anr | | | | | | | | |
| Beryllium | anr | | | | | | | | |
| Boron | | | | | | | | | |
| Cadmium | anr | | | | | | | | |
| Calcium | anr | | | | | | | | |
| Chromium | anr | | | | | | | | |
| Cobalt | 3000 | 2880 | 96.0 | 2000 | 1980 | 99.0 | 2000 | 1970 | 98.5 |
| Copper | anr | | | | | | | | |
| Gold | | | | | | | | | |
| Iron | anr | | | | | | | | |
| Lead | 3000 | 2800 | 93.3 | 2000 | 1880 | 94.0 | 2000 | 1880 | 94.0 |
| Magnesium | anr | | | | | | | | |
| Manganese | anr | | | | | | | | |
| Molybdenum | | | | | | | | | |
| Nickel | 3000 | 2770 | 92.3 | 2000 | 1880 | 94.0 | 2000 | 1880 | 94.0 |
| Palladium | | | | | | | | | |
| Platinum | | | | | | | | | |
| Potassium | anr | | | | | | | | |
| Selenium | anr | | | | | | | | |
| Silicon | | | | | | | | | |
| Silver | anr | | | | | | | | |
| Sodium | anr | | | | | | | | |
| Sulfur | | | | | | | | | |
| Strontium | | | | | | | | | |
| Thallium | anr | | | | | | | | |
| Tin | | | | | | | | | |
| Titanium | | | | | | | | | |
| Tungsten | | | | | | | | | |
| Vanadium | 3000 | 2860 | 95.3 | 2000 | 1910 | 95.5 | 2000 | 1890 | 94.5 |
| Zinc | 3000 | 2800 | 93.3 | 2000 | 1870 | 93.5 | 2000 | 1870 | 93.5 |

CALIBRATION CHECK STANDARDS SUMMARY
Initial and Continuing Calibration Checks

Login Number: JB52301
Account: ALNJ - Accutest New Jersey
Project: SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

File ID: SB111913M2.ICP Date Analyzed: 11/19/13 Methods: SW846 6010C
QC Limits: 90 to 110 % Recovery Run ID: MA16423 Units: ug/l

| Time: | |
|---|---|
| Sample ID: | |
| Metal | |

Zirconium

(*) Outside of QC limits
(anr) Analyte not requested

CALIBRATION CHECK STANDARDS SUMMARY
Initial and Continuing Calibration Checks

Login Number: JB52301
Account: ALNJ - Accutest New Jersey
Project: SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

File ID: SB111913M2.ICP  Date Analyzed: 11/19/13  Methods: SW846 6010C
QC Limits: 90 to 110 % Recovery  Run ID: MA16423  Units: ug/l

| Time: | | 20:49 | | | 21:48 | | | 22:47 | |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID: | CCV | CCV3 | | CCV | CCV4 | | CCV | CCV5 | |
| Metal | True | Results | % Rec | True | Results | % Rec | True | Results | % Rec |
| Aluminum | anr | | | | | | | | |
| Antimony | anr | | | | | | | | |
| Arsenic | anr | | | | | | | | |
| Barium | anr | | | | | | | | |
| Beryllium | anr | | | | | | | | |
| Boron | | | | | | | | | |
| Cadmium | anr | | | | | | | | |
| Calcium | anr | | | | | | | | |
| Chromium | anr | | | | | | | | |
| Cobalt | 2000 | 2000 | 100.0 | 2000 | 2020 | 101.0 | 2000 | 2030 | 101.5 |
| Copper | anr | | | | | | | | |
| Gold | | | | | | | | | |
| Iron | anr | | | | | | | | |
| Lead | 2000 | 1910 | 95.5 | 2000 | 1930 | 96.5 | 2000 | 1950 | 97.5 |
| Magnesium | anr | | | | | | | | |
| Manganese | anr | | | | | | | | |
| Molybdenum | | | | | | | | | |
| Nickel | 2000 | 1940 | 97.0 | 2000 | 1970 | 98.5 | 2000 | 2000 | 100.0 |
| Palladium | | | | | | | | | |
| Platinum | | | | | | | | | |
| Potassium | anr | | | | | | | | |
| Selenium | anr | | | | | | | | |
| Silicon | | | | | | | | | |
| Silver | anr | | | | | | | | |
| Sodium | anr | | | | | | | | |
| Sulfur | | | | | | | | | |
| Strontium | | | | | | | | | |
| Thallium | anr | | | | | | | | |
| Tin | | | | | | | | | |
| Titanium | | | | | | | | | |
| Tungsten | | | | | | | | | |
| Vanadium | 2000 | 1900 | 95.0 | 2000 | 1940 | 97.0 | 2000 | 1930 | 96.5 |
| Zinc | 2000 | 1870 | 93.5 | 2000 | 1880 | 94.0 | 2000 | 1890 | 94.5 |

CALIBRATION CHECK STANDARDS SUMMARY
Initial and Continuing Calibration Checks

Login Number: JB52301
Account: ALNJ - Accutest New Jersey
Project: SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

File ID: SB111913M2.ICP Date Analyzed: 11/19/13 Methods: SW846 6010C
QC Limits: 90 to 110 % Recovery Run ID: MA16423 Units: ug/l

| Time: | |
|---|---|
| Sample ID: | |
| Metal | |

Zirconium

(*) Outside of QC limits
(anr) Analyte not requested

CALIBRATION CHECK STANDARDS SUMMARY
Initial and Continuing Calibration Checks

Login Number: JB52301
Account: ALNJ - Accutest New Jersey
Project: SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

File ID: SB111913M2.ICP  Date Analyzed: 11/19/13  Methods: SW846 6010C
QC Limits: 90 to 110 % Recovery  Run ID: MA16423  Units: ug/l

| Time: | | 23:46 | | | 00:45 | | | 01:35 | |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID: | CCV | CCV6 | | CCV | CCV7 | | CCV | CCV8 | |
| Metal | True | Results | % Rec | True | Results | % Rec | True | Results | % Rec |
| Aluminum | anr | | | | | | | | |
| Antimony | anr | | | | | | | | |
| Arsenic | anr | | | | | | | | |
| Barium | anr | | | | | | | | |
| Beryllium | anr | | | | | | | | |
| Boron | | | | | | | | | |
| Cadmium | anr | | | | | | | | |
| Calcium | anr | | | | | | | | |
| Chromium | anr | | | | | | | | |
| Cobalt | 2000 | 2040 | 102.0 | 2000 | 2060 | 103.0 | 2000 | 2090 | 104.5 |
| Copper | anr | | | | | | | | |
| Gold | | | | | | | | | |
| Iron | anr | | | | | | | | |
| Lead | 2000 | 1970 | 98.5 | 2000 | 1990 | 99.5 | 2000 | 2020 | 101.0 |
| Magnesium | anr | | | | | | | | |
| Manganese | anr | | | | | | | | |
| Molybdenum | | | | | | | | | |
| Nickel | 2000 | 2030 | 101.5 | 2000 | 2050 | 102.5 | 2000 | 2100 | 105.0 |
| Palladium | | | | | | | | | |
| Platinum | | | | | | | | | |
| Potassium | anr | | | | | | | | |
| Selenium | anr | | | | | | | | |
| Silicon | | | | | | | | | |
| Silver | anr | | | | | | | | |
| Sodium | anr | | | | | | | | |
| Sulfur | | | | | | | | | |
| Strontium | | | | | | | | | |
| Thallium | anr | | | | | | | | |
| Tin | | | | | | | | | |
| Titanium | | | | | | | | | |
| Tungsten | | | | | | | | | |
| Vanadium | 2000 | 1950 | 97.5 | 2000 | 1970 | 98.5 | 2000 | 1980 | 99.0 |
| Zinc | 2000 | 1880 | 94.0 | 2000 | 1900 | 95.0 | 2000 | 1920 | 96.0 |

CALIBRATION CHECK STANDARDS SUMMARY
Initial and Continuing Calibration Checks

Login Number: JB52301
Account: ALNJ - Accutest New Jersey
Project: SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

File ID: SB111913M2.ICP Date Analyzed: 11/19/13 Methods: SW846 6010C
QC Limits: 90 to 110 % Recovery Run ID: MA16423 Units: ug/l

| Time: | |
|---|---|
| Sample ID: | |
| Metal | |

Zirconium

(*) Outside of QC limits
(anr) Analyte not requested

LOW CALIBRATION CHECK STANDARDS SUMMARY

Login Number: JB52301
Account: ALNJ - Accutest New Jersey
Project: SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

File ID: SB111913M2.ICP  Date Analyzed: 11/19/13  Methods: SW846 6010C
QC Limits: CRI 70-130%  CRIA 70-130%  Run ID: MA16423  Units: ug/l

| Time: | | | 19:01 | | 01:20 | |
|---|---|---|---|---|---|---|
| Sample ID: | CRI | CRIA | CRIA1 | | CRIA2 | |
| Metal | True | True | Results | % Rec | Results | % Rec |
| Aluminum | 200 | 200 | anr | | | |
| Antimony | 6.0 | 10 | anr | | | |
| Arsenic | 4.0 | 10 | anr | | | |
| Barium | 50 | 50 | anr | | | |
| Beryllium | 4.0 | 4.0 | anr | | | |
| Boron | 100 | 100 | | | | |
| Cadmium | 4.0 | 4.0 | anr | | | |
| Calcium | 5000 | 5000 | anr | | | |
| Chromium | 10 | 10 | anr | | | |
| Cobalt | 50 | 50 | 50.6 | 101.2 | 52.9 | 105.8 |
| Copper | 25 | 25 | anr | | | |
| Gold | 50 | 50 | | | | |
| Iron | 100 | 100 | anr | | | |
| Lead | 5.0 | 10 | 9.4 | 94.0 | 9.2 | 92.0 |
| Magnesium | 5000 | 5000 | anr | | | |
| Manganese | 15 | 15 | anr | | | |
| Molybdenum | 100 | 100 | | | | |
| Nickel | 40 | 40 | 39.6 | 99.0 | 43.8 | 109.5 |
| Palladium | 50 | 50 | | | | |
| Platinum | 50 | 50 | | | | |
| Potassium | 5000 | 5000 | anr | | | |
| Selenium | 10 | 10 | anr | | | |
| Silicon | 100 | 100 | | | | |
| Silver | 5.0 | 5.0 | anr | | | |
| Sodium | 5000 | 5000 | anr | | | |
| Sulfur | 50 | 50 | | | | |
| Strontium | 10 | 10 | | | | |
| Thallium | 5.0 | 10 | anr | | | |
| Tin | 100 | 100 | | | | |
| Titanium | 50 | 50 | | | | |
| Tungsten | 100 | 100 | | | | |
| Vanadium | 10 | 10 | 10.0 | 100.0 | 10.7 | 107.0 |
| Zinc | 20 | 20 | 19.2 | 96.0 | 19.3 | 96.5 |

LOW CALIBRATION CHECK STANDARDS SUMMARY

Login Number: JB52301
Account: ALNJ - Accutest New Jersey
Project: SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

File ID: SB111913M2.ICP  Date Analyzed: 11/19/13  Methods: SW846 6010C
QC Limits: CRI 70-130%  CRIA 70-130%  Run ID: MA16423  Units: ug/l

| Time: | | |
|---|---|---|
| Sample ID: | | |
| Metal | | |
| Zirconium | 50 | 50 |

(*) Outside of QC limits
(anr) Analyte not requested

INTERFERING ELEMENT CHECK STANDARDS SUMMARY
Part 1 - ICSA and ICSAB Standards

Login Number: JB52301
Account: ALNJ - Accutest New Jersey
Project: SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

File ID: SB111913M2.ICP  Date Analyzed: 11/19/13  Methods: SW846 6010C
QC Limits: 80 to 120 % Recovery  Run ID: MA16423  Units: ug/l

| Time: | | | 19:06 | | 19:11 | | 01:25 | | 01:30 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID: | ICSA | ICSAB | ICSA1 | | ICSAB1 | | ICSA2 | | ICSAB2 | |
| Metal | True | True | Results | % Rec | Results | % Rec | Results | % Rec | Results | % Rec |
| Aluminum | 500000 | 500000 | 514000 | 102.8 | 504000 | 100.8 | 519000 | 103.8 | 523000 | 104.6 |
| Antimony | | 2000 | 0.30 | | 1990 | 99.5 | -0.50 | | 2160 | 108.0 |
| Arsenic | | 2000 | 1.7 | | 2060 | 103.0 | 0.80 | | 2170 | 108.5 |
| Barium | | 500 | -0.10 | | 487 | 97.4 | -0.20 | | 488 | 97.6 |
| Beryllium | | 500 | 0.10 | | 446 | 89.2 | 0.10 | | 469 | 93.8 |
| Boron | | 1000 | -1.0 | | 966 | 96.6 | -0.60 | | 998 | 99.8 |
| Cadmium | | 1000 | -0.40 | | 991 | 99.1 | 0.60 | | 1020 | 102.0 |
| Calcium | 500000 | 500000 | 440000 | 88.0 | 438000 | 87.6 | 419000 | 83.8 | 425000 | 85.0 |
| Chromium | | 500 | -0.30 | | 454 | 90.8 | 0.60 | | 490 | 98.0 |
| Cobalt | | 500 | 0.20 | | 457 | 91.4 | 0.40 | | 475 | 95.0 |
| Copper | | 500 | -0.60 | | 491 | 98.2 | 0.20 | | 533 | 106.6 |
| Gold | | 500 | 1.9 | | 479 | 95.8 | 0.50 | | 455 | 91.0 |
| Iron | 200000 | 200000 | 176000 | 88.0 | 175000 | 87.5 | 180000 | 90.0 | 181000 | 90.5 |
| Lead | | 1000 | 2.5 | | 872 | 87.2 | 1.5 | | 913 | 91.3 |
| Magnesium | 500000 | 500000 | 502000 | 100.4 | 502000 | 100.4 | 522000 | 104.4 | 525000 | 105.0 |
| Manganese | | 500 | 0.20 | | 465 | 93.0 | 0.30 | | 463 | 92.6 |
| Molybdenum | | 1000 | -0.70 | | 918 | 91.8 | -1.4 | | 957 | 95.7 |
| Nickel | | 1000 | 3.2 | | 834 | 83.4 | 2.5 | | 912 | 91.2 |
| Palladium | | 500 | -20 | | 503 | 100.6 | -34 | | 504 | 100.8 |
| Platinum | | 500 | -21 | | 473 | 94.6 | -23 | | 475 | 95.0 |
| Potassium | | | 39.1 | | 39.8 | | 84.2 | | 91.9 | |
| Selenium | | 2000 | 3.0 | | 1950 | 97.5 | 2.9 | | 2110 | 105.5 |
| Silicon | | 2000 | 3290* | | 6310 | 315.5* | 4480* | | 7870 | 393.5* |
| Silver | | 1000 | -1.2 | | 1010 | 101.0 | -0.60 | | 972 | 97.2 |
| Sodium | | | 31.0 | | 57.0 | | 25.5 | | 35.1 | |
| Sulfur | | 500 | 85.2 | | 558 | 111.6 | 85.4 | | 567 | 113.4 |
| Strontium | | 1000 | -8.2 | | 942 | 94.2 | -7.8 | | 913 | 91.3 |
| Thallium | | 2000 | 4.9 | | 1810 | 90.5 | 2.8 | | 1830 | 91.5 |
| Tin | | 1000 | -1.5 | | 921 | 92.1 | -2.2 | | 1190 | 119.0 |
| Titanium | | 500 | 4.9 | | 483 | 96.6 | 5.1 | | 461 | 92.2 |
| Tungsten | | 2000 | -7.8 | | 1830 | 91.5 | -13 | | 1670 | 83.5 |
| Vanadium | | 500 | 4.4 | | 482 | 96.4 | 2.1 | | 503 | 100.6 |
| Zinc | | 1000 | -0.70 | | 860 | 86.0 | -0.70 | | 865 | 86.5 |

INTERFERING ELEMENT CHECK STANDARDS SUMMARY
Part 1 - ICSA and ICSAB Standards

Login Number: JB52301
Account: ALNJ - Accutest New Jersey
Project: SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

File ID: SB111913M2.ICP  Date Analyzed: 11/19/13  Methods: SW846 6010C
QC Limits: 80 to 120 % Recovery  Run ID: MA16423  Units: ug/l

| Time: / Sample ID: / Metal | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Zirconium | 500 | -12 | 379 | 75.8* | -20 | 368 | 73.6* | |

(*) Outside of QC limits
(anr) Analyte not requested

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: JB52301
Account: ALNJ - Accutest New Jersey
Project: SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

QC Batch ID: MP22077
Matrix Type: SOLID

Methods: SW846 6010C
Units: mg/kg

Prep Date: 11/19/13

| Metal | RL | IDL | MDL | MB raw | final |
|---|---|---|---|---|---|
| Aluminum | 20 | .61 | 3.6 | | |
| Antimony | 1.0 | .11 | .15 | | |
| Arsenic | 1.0 | .22 | .21 | | |
| Barium | 5.0 | .019 | .073 | | |
| Beryllium | 0.40 | .008 | .024 | | |
| Boron | 10 | .081 | .11 | | |
| Cadmium | 0.40 | .022 | .042 | | |
| Calcium | 500 | .85 | 6.3 | | |
| Chromium | 1.0 | .074 | .095 | | |
| Cobalt | 5.0 | .028 | .047 | 0.050 | <5.0 |
| Copper | 2.5 | .086 | .56 | | |
| Gold | 5.0 | .18 | .43 | | |
| Iron | 10 | .44 | .87 | | |
| Lead | 1.0 | .16 | .17 | -0.050 | <1.0 |
| Magnesium | 500 | 4.3 | 5.1 | | |
| Manganese | 1.5 | .017 | .04 | | |
| Molybdenum | 10 | .04 | .07 | | |
| Nickel | 4.0 | .045 | .044 | 0.64 | <4.0 |
| Palladium | 5.0 | .2 | .64 | | |
| Platinum | 5.0 | .87 | 1.5 | | |
| Potassium | 500 | 2.4 | 8.6 | | |
| Selenium | 1.0 | .14 | .35 | | |
| Silicon | 10 | .21 | 3.3 | | |
| Silver | 0.50 | .047 | .13 | | |
| Sodium | 500 | 4.2 | 3.3 | | |
| Sulfur | 5.0 | .29 | .82 | | |
| Strontium | 1.0 | .01 | .03 | | |
| Thallium | 1.0 | .17 | .13 | | |
| Tin | 10 | .15 | .14 | | |
| Titanium | 5.0 | .048 | .14 | | |
| Tungsten | 10 | .93 | .94 | | |
| Vanadium | 1.0 | .09 | .13 | 0.050 | <1.0 |
| Zinc | 2.0 | .091 | .16 | 0.030 | <2.0 |

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: JB52301
Account: ALNJ - Accutest New Jersey
Project: SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

QC Batch ID: MP22077 Methods: SW846 6010C
Matrix Type: SOLID Units: mg/kg

Prep Date:

| Metal | | | |
|---|---|---|---|
| Zirconium | 5.0 | .076 | .088 |

Associated samples MP22077: JB52301-3, JB52301-5

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: JB52301
Account: ALNJ - Accutest New Jersey
Project: SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

QC Batch ID: MP22077
Matrix Type: SOLID

Methods: SW846 6010C
Units: mg/kg

Prep Date: 11/19/13

| Metal | JB52158-4 Original | MS | Spikelot MPICP | % Rec | QC Limits |
|---|---|---|---|---|---|
| Aluminum | | | | | |
| Antimony | | | | | |
| Arsenic | anr | | | | |
| Barium | anr | | | | |
| Beryllium | | | | | |
| Boron | | | | | |
| Cadmium | anr | | | | |
| Calcium | | | | | |
| Chromium | anr | | | | |
| Cobalt | 0.98 | 42.3 | 43 | 96.1 | 75-125 |
| Copper | | | | | |
| Gold | | | | | |
| Iron | | | | | |
| Lead | 60.3 | 135 | 86 | 86.8 | 75-125 |
| Magnesium | | | | | |
| Manganese | | | | | |
| Molybdenum | | | | | |
| Nickel | 4.4 | 43.9 | 43 | 91.8 | 75-125 |
| Palladium | | | | | |
| Platinum | | | | | |
| Potassium | | | | | |
| Selenium | anr | | | | |
| Silicon | | | | | |
| Silver | anr | | | | |
| Sodium | | | | | |
| Sulfur | | | | | |
| Strontium | | | | | |
| Thallium | | | | | |
| Tin | | | | | |
| Titanium | | | | | |
| Tungsten | | | | | |
| Vanadium | 16.7 | 57.8 | 43 | 95.6 | 75-125 |
| Zinc | 46.8 | 85.5 | 43 | 90.0 | 75-125 |

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: JB52301
Account: ALNJ - Accutest New Jersey
Project: SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

QC Batch ID: MP22077
Matrix Type: SOLID

Methods: SW846 6010C
Units: mg/kg

Prep Date:

| Metal |
|---|

Zirconium

Associated samples MP22077: JB52301-3, JB52301-5

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: JB52301
Account: ALNJ - Accutest New Jersey
Project: SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

QC Batch ID: MP22077
Matrix Type: SOLID

Methods: SW846 6010C
Units: mg/kg

Prep Date: 11/19/13

| Metal | JB52158-4 Original | MSD | Spikelot MPICP | % Rec | MSD RPD | QC Limit |
|---|---|---|---|---|---|---|
| Aluminum | | | | | | |
| Antimony | | | | | | |
| Arsenic | anr | | | | | |
| Barium | anr | | | | | |
| Beryllium | | | | | | |
| Boron | | | | | | |
| Cadmium | anr | | | | | |
| Calcium | | | | | | |
| Chromium | anr | | | | | |
| Cobalt | 0.98 | 42.4 | 43 | 96.3 | 0.2 | 20 |
| Copper | | | | | | |
| Gold | | | | | | |
| Iron | | | | | | |
| Lead | 60.3 | 159 | 86 | 114.7 | 16.3 | 20 |
| Magnesium | | | | | | |
| Manganese | | | | | | |
| Molybdenum | | | | | | |
| Nickel | 4.4 | 44.1 | 43 | 92.3 | 0.5 | 20 |
| Palladium | | | | | | |
| Platinum | | | | | | |
| Potassium | | | | | | |
| Selenium | anr | | | | | |
| Silicon | | | | | | |
| Silver | anr | | | | | |
| Sodium | | | | | | |
| Sulfur | | | | | | |
| Strontium | | | | | | |
| Thallium | | | | | | |
| Tin | | | | | | |
| Titanium | | | | | | |
| Tungsten | | | | | | |
| Vanadium | 16.7 | 56.5 | 43 | 92.5 | 2.3 | 20 |
| Zinc | 46.8 | 93.3 | 43 | 108.1 | 8.7 | 20 |

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: JB52301
Account: ALNJ - Accutest New Jersey
Project: SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

QC Batch ID: MP22077
Matrix Type: SOLID

Methods: SW846 6010C
Units: mg/kg

Prep Date:

| Metal |
|---|

Zirconium

Associated samples MP22077: JB52301-3, JB52301-5

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: JB52301
Account: ALNJ - Accutest New Jersey
Project: SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

QC Batch ID: MP22077
Matrix Type: SOLID

Methods: SW846 6010C
Units: mg/kg

Prep Date: 11/19/13 11/19/13

| Metal | BSP Result | Spikelot MPICP | % Rec | QC Limits | BSD Result | Spikelot MPICP | % Rec | BSD RPD | QC Limit |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | | | | | | | | | |
| Antimony | | | | | | | | | |
| Arsenic | anr | | | | | | | | |
| Barium | anr | | | | | | | | |
| Beryllium | | | | | | | | | |
| Boron | | | | | | | | | |
| Cadmium | anr | | | | | | | | |
| Calcium | | | | | | | | | |
| Chromium | anr | | | | | | | | |
| Cobalt | 52.5 | 50 | 105.0 | 80-120 | 52.3 | 50 | 104.6 | 0.4 | 20 |
| Copper | | | | | | | | | |
| Gold | | | | | | | | | |
| Iron | | | | | | | | | |
| Lead | 102 | 100 | 102.0 | 80-120 | 102 | 100 | 102.0 | 0.0 | 20 |
| Magnesium | | | | | | | | | |
| Manganese | | | | | | | | | |
| Molybdenum | | | | | | | | | |
| Nickel | 51.2 | 50 | 102.4 | 80-120 | 50.9 | 50 | 101.8 | 0.6 | 20 |
| Palladium | | | | | | | | | |
| Platinum | | | | | | | | | |
| Potassium | | | | | | | | | |
| Selenium | anr | | | | | | | | |
| Silicon | | | | | | | | | |
| Silver | anr | | | | | | | | |
| Sodium | | | | | | | | | |
| Sulfur | | | | | | | | | |
| Strontium | | | | | | | | | |
| Thallium | | | | | | | | | |
| Tin | | | | | | | | | |
| Titanium | | | | | | | | | |
| Tungsten | | | | | | | | | |
| Vanadium | 53.4 | 50 | 106.8 | 80-120 | 53.0 | 50 | 106.0 | 0.8 | 20 |
| Zinc | 51.3 | 50 | 102.6 | 80-120 | 51.0 | 50 | 102.0 | 0.6 | 20 |

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: JB52301
Account: ALNJ - Accutest New Jersey
Project: SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

QC Batch ID: MP22077
Matrix Type: SOLID

Methods: SW846 6010C
Units: mg/kg

Prep Date:

| Metal |
|---|
| Zirconium |

Associated samples MP22077: JB52301-3, JB52301-5

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: JB52301
Account: ALNJ - Accutest New Jersey
Project: SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

QC Batch ID: MP22077
Matrix Type: SOLID

Methods: SW846 6010C
Units: mg/kg

Prep Date: 11/19/13

| Metal | LCS Result | Spikelot MPLCS78 | % Rec | QC Limits |
|---|---|---|---|---|
| Aluminum | | | | |
| Antimony | | | | |
| Arsenic | anr | | | |
| Barium | anr | | | |
| Beryllium | | | | |
| Boron | | | | |
| Cadmium | anr | | | |
| Calcium | | | | |
| Chromium | anr | | | |
| Cobalt | 103 | 101 | 102.0 | 84-116 |
| Copper | | | | |
| Gold | | | | |
| Iron | | | | |
| Lead | 91.3 | 91.7 | 99.6 | 82-118 |
| Magnesium | | | | |
| Manganese | | | | |
| Molybdenum | | | | |
| Nickel | 58.7 | 56.6 | 103.7 | 82-118 |
| Palladium | | | | |
| Platinum | | | | |
| Potassium | | | | |
| Selenium | anr | | | |
| Silicon | | | | |
| Silver | anr | | | |
| Sodium | | | | |
| Sulfur | | | | |
| Strontium | | | | |
| Thallium | | | | |
| Tin | | | | |
| Titanium | | | | |
| Tungsten | | | | |
| Vanadium | 58.6 | 56.3 | 104.1 | 73-127 |
| Zinc | 135 | 137 | 98.5 | 81-119 |

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: JB52301
Account: ALNJ - Accutest New Jersey
Project: SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

QC Batch ID: MP22077
Matrix Type: SOLID

Methods: SW846 6010C
Units: mg/kg

Prep Date:

| Metal |
|---|
| Zirconium |

Associated samples MP22077: JB52301-3, JB52301-5

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: JB52301
Account: ALNJ - Accutest New Jersey
Project: SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

QC Batch ID: MP22077
Matrix Type: SOLID

Methods: SW846 6010C
Units: ug/l

Prep Date: 11/19/13

| Metal | JB52158-4 Original | SDL 1:5 | %DIF | QC Limits |
|---|---|---|---|---|
| Aluminum | | | | |
| Antimony | | | | |
| Arsenic | anr | | | |
| Barium | anr | | | |
| Beryllium | | | | |
| Boron | | | | |
| Cadmium | anr | | | |
| Calcium | | | | |
| Chromium | anr | | | |
| Cobalt | 11.5 | 11.2 | 2.6 | 0-10 |
| Copper | | | | |
| Gold | | | | |
| Iron | | | | |
| Lead | 706 | 758 | 7.4 | 0-10 |
| Magnesium | | | | |
| Manganese | | | | |
| Molybdenum | | | | |
| Nickel | 51.0 | 55.0 | 7.8 | 0-10 |
| Palladium | | | | |
| Platinum | | | | |
| Potassium | | | | |
| Selenium | anr | | | |
| Silicon | | | | |
| Silver | anr | | | |
| Sodium | | | | |
| Sulfur | | | | |
| Strontium | | | | |
| Thallium | | | | |
| Tin | | | | |
| Titanium | | | | |
| Tungsten | | | | |
| Vanadium | 196 | 210 | 7.2 | 0-10 |
| Zinc | 548 | 617 | 12.4 (a) | 0-10 |

SERIAL DILUTION RESULTS SUMMARY

Login Number: JB52301
Account: ALNJ - Accutest New Jersey
Project: SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA

QC Batch ID: MP22077
Matrix Type: SOLID

Methods: SW846 6010C
Units: ug/l

Prep Date:

| Metal |
|---|

Zirconium

Associated samples MP22077: JB52301-3, JB52301-5

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested
(a) Serial dilution indicates possible matrix interference.

New Jersey
ACCUTEST LABORATORIES

12/03/13

Technical Report for

Stantec Consulting Services Inc.

Sunoco, Philadelphia Refinery, Philadelphia, PA

AOI-8

Accutest Job Number: JB52677

Sampling Dates: 11/07/13 - 11/08/13

Report to:

Stantec

Stephanie.Andrews@stantec.com

ATTN: Stephanie Andrews

Total number of pages in report: **39**

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

Nancy Cole
Laboratory Director

Client Service contact: Kristin Beebe 732-329-0200

Certifications: NJ(12129), NY(10983), CA, CT, DE, FL, IL, IN, KS, KY, LA, MA, MD, MI, MT, NC, OH VAP (CL0056), PA, RI, SC, TN, VA, WV, DoD ELAP (L-A-B L2248)

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# Sample Summary

Stantec Consulting Services Inc.

**Job No:** JB52677

Sunoco, Philadelphia Refinery, Philadelphia, PA
Project No: AOI-8

| Sample Number | Collected Date | Time | By | Received | Matrix Code | Type | Client Sample ID |
|---|---|---|---|---|---|---|---|
| JB52677-1 | 11/07/13 | 08:55 | JR | 11/08/13 | SO | Soil | AOI-8-N-142-0-2 |
| JB52677-2 | 11/07/13 | 10:10 | JR | 11/08/13 | SO | Soil | AOI-8-N-142-4-6 |
| JB52677-3 | 11/07/13 | 10:30 | JR | 11/08/13 | SO | Soil | AOI-8-N-141-10-10.5 |
| JB52677-4 | 11/07/13 | 14:15 | JR | 11/08/13 | SO | Soil | AOI-8-N-146-17-18 |
| JB52677-5 | 11/08/13 | 15:00 | JR | 11/08/13 | SO | Soil | AOI-8-N-145-8-10 |
| JB52677-6 | 11/08/13 | 15:00 | JR | 11/08/13 | AQ | Trip Blank Soil | TB110813 |

Soil samples reported on a dry weight basis unless otherwise indicated on result page.

# CASE NARRATIVE / CONFORMANCE SUMMARY

| | | | |
|---|---|---|---|
| **Client:** | Stantec Consulting Services Inc. | **Job No** | JB52677 |
| **Site:** | Sunoco, Philadelphia Refinery, Philadelphia, PA | **Report Date** | 12/2/2013 3:07:52 PM |

On 11/08/2013, 4 Sample(s), 1 Trip Blank(s) and 0 Field Blank(s) were received at Accutest Laboratories at a temperature of 1.2 C. Samples were intact and chemically preserved, unless noted below. An Accutest Job Number of JB52677 was assigned to the project. Laboratory sample ID, client sample ID and dates of sample collection are detailed in the report's Results Summary Section. One Sample on hold.

Specified quality control criteria were achieved for this job except as noted below. For more information, please refer to the analytical results and QC summary pages.

## Volatiles by GCMS By Method SW846 8260B

**Matrix:** AQ **Batch ID:** V3V199

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JB52756-4MS, JB52756-4MSD were used as the QC samples indicated.

**Matrix:** SO **Batch ID:** VE9201

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JB52677-3MS, JB52677-3MSD were used as the QC samples indicated.
- JB52677-4: Dilution required due to matrix interference.
- JB52677-3: Dilution required due to matrix interference.

**Matrix:** SO **Batch ID:** VE9202

- All samples were analyzed within the recommended method holding time.
- Sample(s) JB52617-3MS, JB52617-3MSD were used as the QC samples indicated.
- All method blanks for this batch meet method specific criteria.

**Matrix:** SO **Batch ID:** VY6081

- All samples were analyzed within the recommended method holding time.
- Sample(s) JB52231-4DUP, JB52775-12MS were used as the QC samples indicated.
- All method blanks for this batch meet method specific criteria.

## Extractables by GCMS By Method SW846 8270D

**Matrix:** SO **Batch ID:** OP70564

- All samples were extracted within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JB52671-1MS, JB52671-1MSD were used as the QC samples indicated.
- Blank Spike Recovery(s) for 4-Nitrophenol are outside control limits. Outside of in house control limits.
- Matrix Spike Recovery(s) for 2,4-Dimethylphenol, 2-Methylnaphthalene, 4-Nitrophenol, Naphthalene are outside control limits. Outside control limits due to matrix interference.
- Matrix Spike Duplicate Recovery(s) for 2,4-Dimethylphenol, 2-Methylnaphthalene, 4-Nitrophenol, Naphthalene are outside control limits. Outside control limits due to matrix interference.
- JB52677-5: Elevated detection limit due to high final volume of viscous extract.
- JB52677-5 for 2-Fluorobiphenyl: Outside of in house control limits, but within reasonable method recovery limits.
- JB52677-5 for Terphenyl-d14: Outside control limits due to matrix interference.
- JB52677-5 for 2,4,6-Tribromophenol: Outside control limits due to matrix interference.
- OP70564-MS for Nitrobenzene-d5: Outside of in house control limits.
- OP70564-MB1 for Nitrobenzene-d5: Outside of in house control limits.
- OP70564-BS1 for Nitrobenzene-d5: Outside of in house control limits.
- OP70564-MSD for Nitrobenzene-d5: Outside of in house control limits.
- JB52677-5 for 2-Fluorobiphenyl: Outside control limits due to dilution.
- JB52677-5 for Nitrobenzene-d5: Outside control limits due to dilution.

## Volatiles by GC By Method SW846 8011

**Matrix:** AQ **Batch ID:** M:OP35711

- The data for SW846 8011 meets quality control requirements.
- JB52677-6: Analysis performed at Accutest Laboratories, Marlborough, MA.

**Matrix:** SO **Batch ID:** M:OP35717

- The data for SW846 8011 meets quality control requirements.
- JB52677-4: Analysis performed at Accutest Laboratories, Marlborough, MA.
- JB52677-3: Analysis performed at Accutest Laboratories, Marlborough, MA.
- JB52677-5: Analysis performed at Accutest Laboratories, Marlborough, MA.
- JB52677-1: Analysis performed at Accutest Laboratories, Marlborough, MA.

## Metals By Method SW846 6010C

**Matrix:** SO **Batch ID:** M:MP22123

- The data for SW846 6010C meets quality control requirements.
- JB52677-5 for Cobalt: Analysis performed at Accutest Laboratories, Marlborough, MA.
- JB52677-4 for Cobalt: Analysis performed at Accutest Laboratories, Marlborough, MA.
- JB52677-5 for Zinc: Analysis performed at Accutest Laboratories, Marlborough, MA.
- JB52677-5 for Vanadium: Analysis performed at Accutest Laboratories, Marlborough, MA.
- JB52677-5 for Nickel: Analysis performed at Accutest Laboratories, Marlborough, MA.
- JB52677-5 for Lead: Analysis performed at Accutest Laboratories, Marlborough, MA.
- JB52677-4 for Zinc: Analysis performed at Accutest Laboratories, Marlborough, MA.
- JB52677-4 for Vanadium: Analysis performed at Accutest Laboratories, Marlborough, MA.
- JB52677-4 for Lead: Analysis performed at Accutest Laboratories, Marlborough, MA.
- JB52677-1 for Nickel: Analysis performed at Accutest Laboratories, Marlborough, MA.
- JB52677-3 for Zinc: Analysis performed at Accutest Laboratories, Marlborough, MA.
- JB52677-3 for Vanadium: Analysis performed at Accutest Laboratories, Marlborough, MA.
- JB52677-3 for Nickel: Analysis performed at Accutest Laboratories, Marlborough, MA.
- JB52677-3 for Lead: Analysis performed at Accutest Laboratories, Marlborough, MA.
- JB52677-3 for Cobalt: Analysis performed at Accutest Laboratories, Marlborough, MA.
- JB52677-1 for Zinc: Analysis performed at Accutest Laboratories, Marlborough, MA.
- JB52677-1 for Vanadium: Analysis performed at Accutest Laboratories, Marlborough, MA.
- JB52677-1 for Cobalt: Analysis performed at Accutest Laboratories, Marlborough, MA.
- JB52677-1 for Lead: Analysis performed at Accutest Laboratories, Marlborough, MA.
- JB52677-4 for Nickel: Analysis performed at Accutest Laboratories, Marlborough, MA.

## Wet Chemistry By Method SM2540 G-97

**Matrix:** SO **Batch ID:** GN94861

- The data for SM2540 G-97 meets quality control requirements.

Accutest certifies that data reported for samples received, listed on the associated custody chain or analytical task order, were produced to specifications meeting Accutest's Quality System precision, accuracy and completeness objectives except as noted.

Estimated non-standard method measurement uncertainty data is available on request, based on quality control bias and implicit for standard methods. Acceptable uncertainty requires tested parameter quality control data to meet method criteria.

Accutest Laboratories is not responsible for data quality assumptions if partial reports are used and recommends that this report be used in its entirety. Data release is authorized by Accutest Laboratories indicated via signature on the report cover

# SAMPLE DELIVERY GROUP CASE NARRATIVE

**Client:** Accutest New Jersey **Job No** JB52677

**Site:** SECORPAE: Sunoco, Philadelphia Refinery, Philadelphia, PA **Report Date** 12/2/2013 1:25:50 PM

4 Sample(s), 1 Trip Blank(s) and 0 Field Blank(s) were collected on between 11/07/2013 and 11/08/2013 and were received at Accutest on 11/08/2013 properly preserved, at 2.2 Deg. C and intact. These Samples received an Accutest job number of JB52677. A listing of the Laboratory Sample ID, Client Sample ID and dates of collection are presented in the Results Summary Section of this report.

Except as noted below, all method specified calibrations and quality control performance criteria were met for this job. For more information, please refer to QC summary pages.

## Volatiles by GC By Method SW846 8011

**Matrix:** AQ **Batch ID:** OP35711

- All samples were extracted within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) MC26200-1MS, MC26200-1MSD were used as the QC samples indicated.

**Matrix:** SO **Batch ID:** OP35717

- All samples were extracted within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) MC26178-2MS, MC26178-2MSD were used as the QC samples indicated.
- RPD(s) for OP35717-MSD for 1,2-Dibromoethane are outside control limits. High RPD due to possible matrix interference and/or sample non-homogeneity.

## Metals By Method SW846 6010C

**Matrix:** SO **Batch ID:** MP22123

- All samples were digested within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JB52627-3MS, JB52627-3MSD, JB52627-3SDL were used as the QC samples for metals.
- RPD(s) for Serial Dilution for Nickel are outside control limits for sample MP22123-SD1. Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

The Accutest Laboratories of New England certifies that all analysis were performed within method specification. It is further recommended that this report to be used in its entirety.The Accutest Laboratories of NE, Laboratory Director or assignee as verified by the signature on the cover page has authorized the release of this report(JB52677).

# Summary of Hits

**Job Number:** JB52677
**Account:** Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA
**Collected:** 11/07/13 thru 11/08/13



| Lab Sample ID / Analyte | Client Sample ID | Result/ Qual | RL | MDL | Units | Method |
|---|---|---|---|---|---|---|
| **JB52677-1** | **AOI-8-N-142-0-2** | | | | | |
| Anthracene | | 66.5 | 34 | 12 | ug/kg | SW846 8270D |
| Benzo(a)anthracene | | 301 | 34 | 11 | ug/kg | SW846 8270D |
| Benzo(a)pyrene | | 305 | 34 | 10 | ug/kg | SW846 8270D |
| Benzo(b)fluoranthene | | 348 | 34 | 11 | ug/kg | SW846 8270D |
| Benzo(g,h,i)perylene | | 217 | 34 | 13 | ug/kg | SW846 8270D |
| Benzo(k)fluoranthene | | 120 | 34 | 13 | ug/kg | SW846 8270D |
| Chrysene | | 326 | 34 | 11 | ug/kg | SW846 8270D |
| Dibenzo(a,h)anthracene | | 64.0 | 34 | 11 | ug/kg | SW846 8270D |
| Fluoranthene | | 519 | 34 | 15 | ug/kg | SW846 8270D |
| Indeno(1,2,3-cd)pyrene | | 177 | 34 | 12 | ug/kg | SW846 8270D |
| 2-Methylnaphthalene | | 23.7 J | 67 | 19 | ug/kg | SW846 8270D |
| Phenanthrene | | 186 | 34 | 15 | ug/kg | SW846 8270D |
| Pyrene | | 426 | 34 | 13 | ug/kg | SW846 8270D |
| Cobalt [a] | | 4.7 B | 5.2 | 0.049 | mg/kg | SW846 6010C |
| Lead [a] | | 83.3 | 1.0 | 0.18 | mg/kg | SW846 6010C |
| Nickel [a] | | 13.0 | 4.2 | 0.046 | mg/kg | SW846 6010C |
| Vanadium [a] | | 72.5 | 1.0 | 0.14 | mg/kg | SW846 6010C |
| Zinc [a] | | 169 | 2.1 | 0.17 | mg/kg | SW846 6010C |
| **JB52677-3** | **AOI-8-N-141-10-10.5** | | | | | |
| sec-Butylbenzene [b] | | 121 J | 500 | 18 | ug/kg | SW846 8260B |
| Isopropylbenzene [b] | | 31.2 J | 500 | 15 | ug/kg | SW846 8260B |
| Acenaphthene | | 124 | 34 | 9.7 | ug/kg | SW846 8270D |
| Anthracene | | 155 | 34 | 12 | ug/kg | SW846 8270D |
| Benzo(a)anthracene | | 53.9 | 34 | 11 | ug/kg | SW846 8270D |
| Benzo(a)pyrene | | 19.7 J | 34 | 10 | ug/kg | SW846 8270D |
| Chrysene | | 93.0 | 34 | 11 | ug/kg | SW846 8270D |
| bis(2-Ethylhexyl)phthalate | | 114 | 67 | 30 | ug/kg | SW846 8270D |
| Fluoranthene | | 43.9 | 34 | 15 | ug/kg | SW846 8270D |
| Fluorene | | 338 | 34 | 11 | ug/kg | SW846 8270D |
| Phenanthrene | | 947 | 34 | 15 | ug/kg | SW846 8270D |
| Pyrene | | 191 | 34 | 13 | ug/kg | SW846 8270D |
| Cobalt [a] | | 7.8 | 5.5 | 0.051 | mg/kg | SW846 6010C |
| Lead [a] | | 5.0 | 1.1 | 0.18 | mg/kg | SW846 6010C |
| Nickel [a] | | 13.3 | 4.4 | 0.048 | mg/kg | SW846 6010C |
| Vanadium [a] | | 15.5 | 1.1 | 0.14 | mg/kg | SW846 6010C |
| Zinc [a] | | 41.9 | 2.2 | 0.18 | mg/kg | SW846 6010C |
| **JB52677-4** | **AOI-8-N-146-17-18** | | | | | |
| sec-Butylbenzene [b] | | 395 J | 570 | 20 | ug/kg | SW846 8260B |
| tert-Butylbenzene [b] | | 312 J | 570 | 19 | ug/kg | SW846 8260B |

# Summary of Hits

**Job Number:** JB52677
**Account:** Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA
**Collected:** 11/07/13 thru 11/08/13



| Lab Sample ID / Client Sample ID / Analyte | Result/ Qual | RL | MDL | Units | Method |
|---|---|---|---|---|---|
| Cyclohexane [b] | 622 | 570 | 29 | ug/kg | SW846 8260B |
| Isopropylbenzene [b] | 562 J | 570 | 17 | ug/kg | SW846 8260B |
| 1,2,4-Trimethylbenzene [b] | 150 J | 570 | 18 | ug/kg | SW846 8260B |
| Acenaphthene | 294 | 36 | 11 | ug/kg | SW846 8270D |
| Anthracene | 526 | 36 | 13 | ug/kg | SW846 8270D |
| Benzo(a)anthracene | 640 | 36 | 12 | ug/kg | SW846 8270D |
| Benzo(a)pyrene | 487 | 36 | 11 | ug/kg | SW846 8270D |
| Benzo(b)fluoranthene | 523 | 36 | 12 | ug/kg | SW846 8270D |
| Benzo(g,h,i)perylene | 404 | 36 | 14 | ug/kg | SW846 8270D |
| Benzo(k)fluoranthene | 108 | 36 | 14 | ug/kg | SW846 8270D |
| Chrysene | 1090 | 36 | 12 | ug/kg | SW846 8270D |
| Dibenzo(a,h)anthracene | 154 | 36 | 12 | ug/kg | SW846 8270D |
| Fluoranthene | 1040 | 36 | 16 | ug/kg | SW846 8270D |
| Fluorene | 1050 | 36 | 12 | ug/kg | SW846 8270D |
| Indeno(1,2,3-cd)pyrene | 245 | 36 | 13 | ug/kg | SW846 8270D |
| Phenanthrene | 3210 | 36 | 17 | ug/kg | SW846 8270D |
| Pyrene | 1210 | 36 | 14 | ug/kg | SW846 8270D |
| Cobalt [a] | 13.3 | 5.6 | 0.053 | mg/kg | SW846 6010C |
| Lead [a] | 31.9 | 1.1 | 0.19 | mg/kg | SW846 6010C |
| Nickel [a] | 20.2 | 4.5 | 0.049 | mg/kg | SW846 6010C |
| Vanadium [a] | 24.5 | 1.1 | 0.15 | mg/kg | SW846 6010C |
| Zinc [a] | 75.0 | 2.3 | 0.18 | mg/kg | SW846 6010C |
| **JB52677-5 AOI-8-N-145-8-10** | | | | | |
| Benzene | 20300 | 170 | 21 | ug/kg | SW846 8260B |
| Toluene | 6740 | 170 | 24 | ug/kg | SW846 8260B |
| Ethylbenzene | 2300 | 170 | 29 | ug/kg | SW846 8260B |
| Xylene (total) | 4730 | 170 | 30 | ug/kg | SW846 8260B |
| sec-Butylbenzene | 1330 | 840 | 30 | ug/kg | SW846 8260B |
| tert-Butylbenzene | 745 J | 840 | 27 | ug/kg | SW846 8260B |
| Cyclohexane | 33900 | 4500 | 230 | ug/kg | SW846 8260B |
| Hexane | 56300 | 4500 | 480 | ug/kg | SW846 8260B |
| Isopropylbenzene | 20000 | 840 | 25 | ug/kg | SW846 8260B |
| 1,2,4-Trimethylbenzene | 4310 | 840 | 27 | ug/kg | SW846 8260B |
| 1,3,5-Trimethylbenzene | 1900 | 840 | 37 | ug/kg | SW846 8260B |
| Acenaphthene [c] | 7370 | 200 | 57 | ug/kg | SW846 8270D |
| Anthracene [c] | 11500 | 200 | 68 | ug/kg | SW846 8270D |
| Benzo(a)anthracene [c] | 2940 | 200 | 64 | ug/kg | SW846 8270D |
| Benzo(a)pyrene [c] | 1690 | 200 | 60 | ug/kg | SW846 8270D |
| Benzo(b)fluoranthene [c] | 1650 | 200 | 65 | ug/kg | SW846 8270D |
| Benzo(g,h,i)perylene [c] | 2250 | 200 | 73 | ug/kg | SW846 8270D |
| Benzo(k)fluoranthene [c] | 350 | 200 | 73 | ug/kg | SW846 8270D |
| 1,1'-Biphenyl [c] | 1540 | 390 | 23 | ug/kg | SW846 8270D |
| Chrysene [c] | 6100 | 200 | 66 | ug/kg | SW846 8270D |

# Summary of Hits

**Job Number:** JB52677
**Account:** Stantec Consulting Services Inc.
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA
**Collected:** 11/07/13 thru 11/08/13



| Lab Sample ID / Analyte | Client Sample ID | Result/ Qual | RL | MDL | Units | Method |
|---|---|---|---|---|---|---|
| Dibenzo(a,h)anthracene [c] | | 820 | 200 | 67 | ug/kg | SW846 8270D |
| Fluoranthene [c] | | 4050 | 200 | 86 | ug/kg | SW846 8270D |
| Fluorene [c] | | 18700 | 200 | 64 | ug/kg | SW846 8270D |
| Indeno(1,2,3-cd)pyrene [c] | | 1090 | 200 | 68 | ug/kg | SW846 8270D |
| 2-Methylnaphthalene | | 105000 | 3900 | 1100 | ug/kg | SW846 8270D |
| Naphthalene [c] | | 7080 | 200 | 53 | ug/kg | SW846 8270D |
| Phenanthrene | | 41400 | 2000 | 890 | ug/kg | SW846 8270D |
| Pyrene | | 18300 | 2000 | 750 | ug/kg | SW846 8270D |
| Cobalt [a] | | 7.6 | 6.0 | 0.057 | mg/kg | SW846 6010C |
| Lead [a] | | 379 | 1.2 | 0.20 | mg/kg | SW846 6010C |
| Nickel [a] | | 26.7 | 4.8 | 0.053 | mg/kg | SW846 6010C |
| Vanadium [a] | | 22.1 | 1.2 | 0.16 | mg/kg | SW846 6010C |
| Zinc [a] | | 415 | 2.4 | 0.19 | mg/kg | SW846 6010C |

**JB52677-6** **TB110813**

No hits reported in this sample.

(a) Analysis performed at Accutest Laboratories, Marlborough, MA.
(b) Dilution required due to matrix interference.
(c) Elevated detection limit due to high final volume of viscous extract.

New Jersey ACCUTEST LABORATORIES



## Sample Results

Report of Analysis

# Report of Analysis





| | | | |
|---|---|---|---|
| **Client Sample ID:** | AOI-8-N-142-0-2 | | |
| **Lab Sample ID:** | JB52677-1 | **Date Sampled:** | 11/07/13 |
| **Matrix:** | SO - Soil | **Date Received:** | 11/08/13 |
| **Method:** | SW846 8260B | **Percent Solids:** | 92.2 |
| **Project:** | Sunoco, Philadelphia Refinery, Philadelphia, PA | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | Y140576.D | 1 | 11/13/13 | PS | n/a | n/a | VY6081 |
| Run #2 | | | | | | | |

| | Initial Weight |
|---|---|
| Run #1 | 5.8 g |
| Run #2 | |

**Leaded Gasoline and Aviation Gas List**

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | ND | 0.93 | 0.12 | ug/kg | |
| 108-88-3 | Toluene | ND | 0.93 | 0.13 | ug/kg | |
| 100-41-4 | Ethylbenzene | ND | 0.93 | 0.16 | ug/kg | |
| 1330-20-7 | Xylene (total) | ND | 0.93 | 0.17 | ug/kg | |
| 1634-04-4 | Methyl Tert Butyl Ether | ND | 0.93 | 0.32 | ug/kg | |
| 135-98-8 | sec-Butylbenzene | ND | 4.7 | 0.17 | ug/kg | |
| 98-06-6 | tert-Butylbenzene | ND | 4.7 | 0.15 | ug/kg | |
| 110-82-7 | Cyclohexane | ND | 4.7 | 0.24 | ug/kg | |
| 107-06-2 | 1,2-Dichloroethane | ND | 0.93 | 0.30 | ug/kg | |
| 110-54-3 | Hexane | ND | 4.7 | 0.50 | ug/kg | |
| 98-82-8 | Isopropylbenzene | ND | 4.7 | 0.14 | ug/kg | |
| 95-63-6 | 1,2,4-Trimethylbenzene | ND | 4.7 | 0.15 | ug/kg | |
| 108-67-8 | 1,3,5-Trimethylbenzene | ND | 4.7 | 0.21 | ug/kg | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 100% | | 59-130% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 94% | | 65-123% |
| 2037-26-5 | Toluene-D8 | 105% | | 80-124% |
| 460-00-4 | 4-Bromofluorobenzene | 104% | | 71-132% |

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

# Report of Analysis





| | | | |
|---|---|---|---|
| **Client Sample ID:** | AOI-8-N-142-0-2 | | |
| **Lab Sample ID:** | JB52677-1 | **Date Sampled:** | 11/07/13 |
| **Matrix:** | SO - Soil | **Date Received:** | 11/08/13 |
| **Method:** | SW846 8270D SW846 3550C | **Percent Solids:** | 92.2 |
| **Project:** | Sunoco, Philadelphia Refinery, Philadelphia, PA | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | 6P2222.D | 1 | 11/21/13 | EP | 11/11/13 | OP70564 | E6P91 |
| Run #2 | | | | | | | |

| | Initial Weight | Final Volume |
|---|---|---|
| Run #1 | 32.3 g | 1.0 ml |
| Run #2 | | |

**ABN Special List**

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 105-67-9 | 2,4-Dimethylphenol | ND | 170 | 57 | ug/kg | |
| 51-28-5 | 2,4-Dinitrophenol | ND | 670 | 41 | ug/kg | |
| 95-48-7 | 2-Methylphenol | ND | 67 | 38 | ug/kg | |
| | 3&4-Methylphenol | ND | 67 | 43 | ug/kg | |
| 100-02-7 | 4-Nitrophenol | ND | 340 | 57 | ug/kg | |
| 108-95-2 | Phenol | ND | 67 | 35 | ug/kg | |
| 83-32-9 | Acenaphthene | ND | 34 | 9.8 | ug/kg | |
| 120-12-7 | Anthracene | 66.5 | 34 | 12 | ug/kg | |
| 56-55-3 | Benzo(a)anthracene | 301 | 34 | 11 | ug/kg | |
| 50-32-8 | Benzo(a)pyrene | 305 | 34 | 10 | ug/kg | |
| 205-99-2 | Benzo(b)fluoranthene | 348 | 34 | 11 | ug/kg | |
| 191-24-2 | Benzo(g,h,i)perylene | 217 | 34 | 13 | ug/kg | |
| 207-08-9 | Benzo(k)fluoranthene | 120 | 34 | 13 | ug/kg | |
| 92-52-4 | 1,1'-Biphenyl | ND | 67 | 3.9 | ug/kg | |
| 218-01-9 | Chrysene | 326 | 34 | 11 | ug/kg | |
| 53-70-3 | Dibenzo(a,h)anthracene | 64.0 | 34 | 11 | ug/kg | |
| 84-74-2 | Di-n-butyl phthalate | ND | 67 | 7.5 | ug/kg | |
| 84-66-2 | Diethyl phthalate | ND | 67 | 11 | ug/kg | |
| 117-81-7 | bis(2-Ethylhexyl)phthalate | ND | 67 | 30 | ug/kg | |
| 206-44-0 | Fluoranthene | 519 | 34 | 15 | ug/kg | |
| 86-73-7 | Fluorene | ND | 34 | 11 | ug/kg | |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | 177 | 34 | 12 | ug/kg | |
| 91-57-6 | 2-Methylnaphthalene | 23.7 | 67 | 19 | ug/kg | J |
| 91-20-3 | Naphthalene | ND | 34 | 9.2 | ug/kg | |
| 85-01-8 | Phenanthrene | 186 | 34 | 15 | ug/kg | |
| 129-00-0 | Pyrene | 426 | 34 | 13 | ug/kg | |
| 110-86-1 | Pyridine | ND | 67 | 13 | ug/kg | |
| 91-22-5 | Quinoline | ND | 170 | 32 | ug/kg | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 367-12-4 | 2-Fluorophenol | 79% | | 13-110% |

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

# Report of Analysis





| | | | |
|---|---|---|---|
| **Client Sample ID:** | AOI-8-N-142-0-2 | | |
| **Lab Sample ID:** | JB52677-1 | **Date Sampled:** | 11/07/13 |
| **Matrix:** | SO - Soil | **Date Received:** | 11/08/13 |
| **Method:** | SW846 8270D SW846 3550C | **Percent Solids:** | 92.2 |
| **Project:** | Sunoco, Philadelphia Refinery, Philadelphia, PA | | |

**ABN Special List**

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 4165-62-2 | Phenol-d5 | 74% | | 15-110% |
| 118-79-6 | 2,4,6-Tribromophenol | 73% | | 20-123% |
| 4165-60-0 | Nitrobenzene-d5 | 81% | | 10-110% |
| 321-60-8 | 2-Fluorobiphenyl | 72% | | 17-110% |
| 1718-51-0 | Terphenyl-d14 | 70% | | 30-124% |

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

# Report of Analysis





**Client Sample ID:** AOI-8-N-142-0-2
**Lab Sample ID:** JB52677-1
**Matrix:** SO - Soil
**Method:** SW846 8011 SW846 3550B
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

**Date Sampled:** 11/07/13
**Date Received:** 11/08/13
**Percent Solids:** 92.2

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 [a] | BB52470.D | 1 | 11/14/13 | AMA | 11/13/13 | M:OP35717 | M:GBB3074 |
| Run #2 | | | | | | | |

| | Initial Weight | Final Volume |
|---|---|---|
| Run #1 | 30.3 g | 50.0 ml |
| Run #2 | | |

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 106-93-4 | 1,2-Dibromoethane | ND | 2.7 | 0.99 | ug/kg | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 460-00-4 | Bromofluorobenzene (S) | 111% | | 61-167% |
| 460-00-4 | Bromofluorobenzene (S) | 109% | | 61-167% |

(a) Analysis performed at Accutest Laboratories, Marlborough, MA.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

# Report of Analysis





| | | | |
|---|---|---|---|
| **Client Sample ID:** | AOI-8-N-142-0-2 | | |
| **Lab Sample ID:** | JB52677-1 | **Date Sampled:** | 11/07/13 |
| **Matrix:** | SO - Soil | **Date Received:** | 11/08/13 |
| | | **Percent Solids:** | 92.2 |
| **Project:** | Sunoco, Philadelphia Refinery, Philadelphia, PA | | |

**Metals Analysis**

| Analyte | Result | RL | MDL | Units | DF | Prep | Analyzed | By | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|---|---|
| Cobalt [a] | 4.7 B | 5.2 | 0.049 | mg/kg | 1 | 11/25/13 | 11/28/13 | AMA | SW846 6010C [1] | SW846 3050B [2] |
| Lead [a] | 83.3 | 1.0 | 0.18 | mg/kg | 1 | 11/25/13 | 11/28/13 | AMA | SW846 6010C [1] | SW846 3050B [2] |
| Nickel [a] | 13.0 | 4.2 | 0.046 | mg/kg | 1 | 11/25/13 | 11/28/13 | AMA | SW846 6010C [1] | SW846 3050B [2] |
| Vanadium [a] | 72.5 | 1.0 | 0.14 | mg/kg | 1 | 11/25/13 | 11/28/13 | AMA | SW846 6010C [1] | SW846 3050B [2] |
| Zinc [a] | 169 | 2.1 | 0.17 | mg/kg | 1 | 11/25/13 | 11/28/13 | AMA | SW846 6010C [1] | SW846 3050B [2] |

(1) Instrument QC Batch: M:MA16479
(2) Prep QC Batch: M:MP22123

(a) Analysis performed at Accutest Laboratories, Marlborough, MA.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
B = Indicates a result > = MDL but < RL

# Report of Analysis





| | | | |
|---|---|---|---|
| **Client Sample ID:** | AOI-8-N-141-10-10.5 | | |
| **Lab Sample ID:** | JB52677-3 | **Date Sampled:** | 11/07/13 |
| **Matrix:** | SO - Soil | **Date Received:** | 11/08/13 |
| **Method:** | SW846 8260B | **Percent Solids:** | 89.2 |
| **Project:** | Sunoco, Philadelphia Refinery, Philadelphia, PA | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 [a] | E209691.D | 1 | 11/15/13 | DP | n/a | n/a | VE9201 |
| Run #2 | | | | | | | |

| | Initial Weight | Final Volume | Methanol Aliquot |
|---|---|---|---|
| Run #1 | 6.0 g | 10.0 ml | 100 ul |
| Run #2 | | | |

**Leaded Gasoline and Aviation Gas List**

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | ND | 99 | 13 | ug/kg | |
| 108-88-3 | Toluene | ND | 99 | 14 | ug/kg | |
| 100-41-4 | Ethylbenzene | ND | 99 | 17 | ug/kg | |
| 1330-20-7 | Xylene (total) | ND | 99 | 18 | ug/kg | |
| 1634-04-4 | Methyl Tert Butyl Ether | ND | 99 | 34 | ug/kg | |
| 135-98-8 | sec-Butylbenzene | 121 | 500 | 18 | ug/kg | J |
| 98-06-6 | tert-Butylbenzene | ND | 500 | 16 | ug/kg | |
| 110-82-7 | Cyclohexane | ND | 500 | 26 | ug/kg | |
| 107-06-2 | 1,2-Dichloroethane | ND | 99 | 32 | ug/kg | |
| 110-54-3 | Hexane | ND | 500 | 54 | ug/kg | |
| 98-82-8 | Isopropylbenzene | 31.2 | 500 | 15 | ug/kg | J |
| 95-63-6 | 1,2,4-Trimethylbenzene | ND | 500 | 16 | ug/kg | |
| 108-67-8 | 1,3,5-Trimethylbenzene | ND | 500 | 22 | ug/kg | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 99% | | 59-130% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 85% | | 65-123% |
| 2037-26-5 | Toluene-D8 | 100% | | 80-124% |
| 460-00-4 | 4-Bromofluorobenzene | 105% | | 71-132% |

(a) Dilution required due to matrix interference.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

# Report of Analysis





**Client Sample ID:** AOI-8-N-141-10-10.5
**Lab Sample ID:** JB52677-3
**Matrix:** SO - Soil
**Method:** SW846 8270D SW846 3550C
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

**Date Sampled:** 11/07/13
**Date Received:** 11/08/13
**Percent Solids:** 89.2

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | 6P2221.D | 1 | 11/21/13 | EP | 11/11/13 | OP70564 | E6P91 |
| Run #2 | | | | | | | |

| | Initial Weight | Final Volume |
|---|---|---|
| Run #1 | 33.4 g | 1.0 ml |
| Run #2 | | |

**ABN Special List**

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 105-67-9 | 2,4-Dimethylphenol | ND | 170 | 56 | ug/kg | |
| 51-28-5 | 2,4-Dinitrophenol | ND | 670 | 41 | ug/kg | |
| 95-48-7 | 2-Methylphenol | ND | 67 | 38 | ug/kg | |
| | 3&4-Methylphenol | ND | 67 | 43 | ug/kg | |
| 100-02-7 | 4-Nitrophenol | ND | 340 | 57 | ug/kg | |
| 108-95-2 | Phenol | ND | 67 | 35 | ug/kg | |
| 83-32-9 | Acenaphthene | 124 | 34 | 9.7 | ug/kg | |
| 120-12-7 | Anthracene | 155 | 34 | 12 | ug/kg | |
| 56-55-3 | Benzo(a)anthracene | 53.9 | 34 | 11 | ug/kg | |
| 50-32-8 | Benzo(a)pyrene | 19.7 | 34 | 10 | ug/kg | J |
| 205-99-2 | Benzo(b)fluoranthene | ND | 34 | 11 | ug/kg | |
| 191-24-2 | Benzo(g,h,i)perylene | ND | 34 | 12 | ug/kg | |
| 207-08-9 | Benzo(k)fluoranthene | ND | 34 | 13 | ug/kg | |
| 92-52-4 | 1,1'-Biphenyl | ND | 67 | 3.9 | ug/kg | |
| 218-01-9 | Chrysene | 93.0 | 34 | 11 | ug/kg | |
| 53-70-3 | Dibenzo(a,h)anthracene | ND | 34 | 11 | ug/kg | |
| 84-74-2 | Di-n-butyl phthalate | ND | 67 | 7.4 | ug/kg | |
| 84-66-2 | Diethyl phthalate | ND | 67 | 11 | ug/kg | |
| 117-81-7 | bis(2-Ethylhexyl)phthalate | 114 | 67 | 30 | ug/kg | |
| 206-44-0 | Fluoranthene | 43.9 | 34 | 15 | ug/kg | |
| 86-73-7 | Fluorene | 338 | 34 | 11 | ug/kg | |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | ND | 34 | 12 | ug/kg | |
| 91-57-6 | 2-Methylnaphthalene | ND | 67 | 19 | ug/kg | |
| 91-20-3 | Naphthalene | ND | 34 | 9.2 | ug/kg | |
| 85-01-8 | Phenanthrene | 947 | 34 | 15 | ug/kg | |
| 129-00-0 | Pyrene | 191 | 34 | 13 | ug/kg | |
| 110-86-1 | Pyridine | ND | 67 | 13 | ug/kg | |
| 91-22-5 | Quinoline | ND | 170 | 32 | ug/kg | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 367-12-4 | 2-Fluorophenol | 84% | | 13-110% |

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

# Report of Analysis





| | | | |
|---|---|---|---|
| **Client Sample ID:** | AOI-8-N-141-10-10.5 | | |
| **Lab Sample ID:** | JB52677-3 | **Date Sampled:** | 11/07/13 |
| **Matrix:** | SO - Soil | **Date Received:** | 11/08/13 |
| **Method:** | SW846 8270D SW846 3550C | **Percent Solids:** | 89.2 |
| **Project:** | Sunoco, Philadelphia Refinery, Philadelphia, PA | | |

**ABN Special List**

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 4165-62-2 | Phenol-d5 | 80% | | 15-110% |
| 118-79-6 | 2,4,6-Tribromophenol | 80% | | 20-123% |
| 4165-60-0 | Nitrobenzene-d5 | 83% | | 10-110% |
| 321-60-8 | 2-Fluorobiphenyl | 81% | | 17-110% |
| 1718-51-0 | Terphenyl-d14 | 90% | | 30-124% |

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

# Report of Analysis





**Client Sample ID:** AOI-8-N-141-10-10.5
**Lab Sample ID:** JB52677-3
**Matrix:** SO - Soil
**Method:** SW846 8011 SW846 3550B
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

**Date Sampled:** 11/07/13
**Date Received:** 11/08/13
**Percent Solids:** 89.2

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 [a] | BB52472.D | 1 | 11/14/13 | AMA | 11/13/13 | M:OP35717 | M:GBB3074 |
| Run #2 | | | | | | | |

| | Initial Weight | Final Volume |
|---|---|---|
| Run #1 | 30.5 g | 50.0 ml |
| Run #2 | | |

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 106-93-4 | 1,2-Dibromoethane | ND | 2.8 | 1.0 | ug/kg | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 460-00-4 | Bromofluorobenzene (S) | 84% | | 61-167% |
| 460-00-4 | Bromofluorobenzene (S) | 86% | | 61-167% |

(a) Analysis performed at Accutest Laboratories, Marlborough, MA.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

# Report of Analysis





| | | | |
|---|---|---|---|
| **Client Sample ID:** | AOI-8-N-141-10-10.5 | | |
| **Lab Sample ID:** | JB52677-3 | **Date Sampled:** | 11/07/13 |
| **Matrix:** | SO - Soil | **Date Received:** | 11/08/13 |
| | | **Percent Solids:** | 89.2 |
| **Project:** | Sunoco, Philadelphia Refinery, Philadelphia, PA | | |

**Metals Analysis**

| Analyte | Result | RL | MDL | Units | DF | Prep | Analyzed | By | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|---|---|
| Cobalt [a] | 7.8 | 5.5 | 0.051 | mg/kg | 1 | 11/25/13 | 11/28/13 | AMA | SW846 6010C [1] | SW846 3050B [2] |
| Lead [a] | 5.0 | 1.1 | 0.18 | mg/kg | 1 | 11/25/13 | 11/28/13 | AMA | SW846 6010C [1] | SW846 3050B [2] |
| Nickel [a] | 13.3 | 4.4 | 0.048 | mg/kg | 1 | 11/25/13 | 11/28/13 | AMA | SW846 6010C [1] | SW846 3050B [2] |
| Vanadium [a] | 15.5 | 1.1 | 0.14 | mg/kg | 1 | 11/25/13 | 11/28/13 | AMA | SW846 6010C [1] | SW846 3050B [2] |
| Zinc [a] | 41.9 | 2.2 | 0.18 | mg/kg | 1 | 11/25/13 | 11/28/13 | AMA | SW846 6010C [1] | SW846 3050B [2] |

(1) Instrument QC Batch: M:MA16479
(2) Prep QC Batch: M:MP22123

(a) Analysis performed at Accutest Laboratories, Marlborough, MA.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
B = Indicates a result > = MDL but < RL

# Report of Analysis





| | | | |
|---|---|---|---|
| **Client Sample ID:** | AOI-8-N-146-17-18 | | |
| **Lab Sample ID:** | JB52677-4 | **Date Sampled:** | 11/07/13 |
| **Matrix:** | SO - Soil | **Date Received:** | 11/08/13 |
| **Method:** | SW846 8260B | **Percent Solids:** | 83.3 |
| **Project:** | Sunoco, Philadelphia Refinery, Philadelphia, PA | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 [a] | E209705.D | 1 | 11/15/13 | DP | n/a | n/a | VE9201 |
| Run #2 | | | | | | | |

| | Initial Weight | Final Volume | Methanol Aliquot |
|---|---|---|---|
| Run #1 | 5.8 g | 10.0 ml | 100 ul |
| Run #2 | | | |

**Leaded Gasoline and Aviation Gas List**

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | ND | 110 | 14 | ug/kg | |
| 108-88-3 | Toluene | ND | 110 | 16 | ug/kg | |
| 100-41-4 | Ethylbenzene | ND | 110 | 20 | ug/kg | |
| 1330-20-7 | Xylene (total) | ND | 110 | 20 | ug/kg | |
| 1634-04-4 | Methyl Tert Butyl Ether | ND | 110 | 39 | ug/kg | |
| 135-98-8 | sec-Butylbenzene | 395 | 570 | 20 | ug/kg | J |
| 98-06-6 | tert-Butylbenzene | 312 | 570 | 19 | ug/kg | J |
| 110-82-7 | Cyclohexane | 622 | 570 | 29 | ug/kg | |
| 107-06-2 | 1,2-Dichloroethane | ND | 110 | 36 | ug/kg | |
| 110-54-3 | Hexane | ND | 570 | 61 | ug/kg | |
| 98-82-8 | Isopropylbenzene | 562 | 570 | 17 | ug/kg | J |
| 95-63-6 | 1,2,4-Trimethylbenzene | 150 | 570 | 18 | ug/kg | J |
| 108-67-8 | 1,3,5-Trimethylbenzene | ND | 570 | 25 | ug/kg | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 99% | | 59-130% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 88% | | 65-123% |
| 2037-26-5 | Toluene-D8 | 104% | | 80-124% |
| 460-00-4 | 4-Bromofluorobenzene | 106% | | 71-132% |

(a) Dilution required due to matrix interference.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

# Report of Analysis





| | | | |
|---|---|---|---|
| **Client Sample ID:** | AOI-8-N-146-17-18 | | |
| **Lab Sample ID:** | JB52677-4 | **Date Sampled:** | 11/07/13 |
| **Matrix:** | SO - Soil | **Date Received:** | 11/08/13 |
| **Method:** | SW846 8270D SW846 3550C | **Percent Solids:** | 83.3 |
| **Project:** | Sunoco, Philadelphia Refinery, Philadelphia, PA | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | 6P2223.D | 1 | 11/21/13 | EP | 11/11/13 | OP70564 | E6P91 |
| Run #2 | | | | | | | |

| | Initial Weight | Final Volume |
|---|---|---|
| Run #1 | 32.9 g | 1.0 ml |
| Run #2 | | |

**ABN Special List**

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 105-67-9 | 2,4-Dimethylphenol | ND | 180 | 61 | ug/kg | |
| 51-28-5 | 2,4-Dinitrophenol | ND | 730 | 45 | ug/kg | |
| 95-48-7 | 2-Methylphenol | ND | 73 | 42 | ug/kg | |
| | 3&4-Methylphenol | ND | 73 | 46 | ug/kg | |
| 100-02-7 | 4-Nitrophenol | ND | 360 | 62 | ug/kg | |
| 108-95-2 | Phenol | ND | 73 | 38 | ug/kg | |
| 83-32-9 | Acenaphthene | 294 | 36 | 11 | ug/kg | |
| 120-12-7 | Anthracene | 526 | 36 | 13 | ug/kg | |
| 56-55-3 | Benzo(a)anthracene | 640 | 36 | 12 | ug/kg | |
| 50-32-8 | Benzo(a)pyrene | 487 | 36 | 11 | ug/kg | |
| 205-99-2 | Benzo(b)fluoranthene | 523 | 36 | 12 | ug/kg | |
| 191-24-2 | Benzo(g,h,i)perylene | 404 | 36 | 14 | ug/kg | |
| 207-08-9 | Benzo(k)fluoranthene | 108 | 36 | 14 | ug/kg | |
| 92-52-4 | 1,1'-Biphenyl | ND | 73 | 4.2 | ug/kg | |
| 218-01-9 | Chrysene | 1090 | 36 | 12 | ug/kg | |
| 53-70-3 | Dibenzo(a,h)anthracene | 154 | 36 | 12 | ug/kg | |
| 84-74-2 | Di-n-butyl phthalate | ND | 73 | 8.1 | ug/kg | |
| 84-66-2 | Diethyl phthalate | ND | 73 | 12 | ug/kg | |
| 117-81-7 | bis(2-Ethylhexyl)phthalate | ND | 73 | 32 | ug/kg | |
| 206-44-0 | Fluoranthene | 1040 | 36 | 16 | ug/kg | |
| 86-73-7 | Fluorene | 1050 | 36 | 12 | ug/kg | |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | 245 | 36 | 13 | ug/kg | |
| 91-57-6 | 2-Methylnaphthalene | ND | 73 | 20 | ug/kg | |
| 91-20-3 | Naphthalene | ND | 36 | 10 | ug/kg | |
| 85-01-8 | Phenanthrene | 3210 | 36 | 17 | ug/kg | |
| 129-00-0 | Pyrene | 1210 | 36 | 14 | ug/kg | |
| 110-86-1 | Pyridine | ND | 73 | 15 | ug/kg | |
| 91-22-5 | Quinoline | ND | 180 | 34 | ug/kg | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 367-12-4 | 2-Fluorophenol | 92% | | 13-110% |

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

# Report of Analysis





| | | | |
|---|---|---|---|
| **Client Sample ID:** | AOI-8-N-146-17-18 | | |
| **Lab Sample ID:** | JB52677-4 | **Date Sampled:** | 11/07/13 |
| **Matrix:** | SO - Soil | **Date Received:** | 11/08/13 |
| **Method:** | SW846 8270D SW846 3550C | **Percent Solids:** | 83.3 |
| **Project:** | Sunoco, Philadelphia Refinery, Philadelphia, PA | | |

**ABN Special List**

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 4165-62-2 | Phenol-d5 | 91% | | 15-110% |
| 118-79-6 | 2,4,6-Tribromophenol | 99% | | 20-123% |
| 4165-60-0 | Nitrobenzene-d5 | 95% | | 10-110% |
| 321-60-8 | 2-Fluorobiphenyl | 81% | | 17-110% |
| 1718-51-0 | Terphenyl-d14 | 94% | | 30-124% |

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

# Report of Analysis





**Client Sample ID:** AOI-8-N-146-17-18
**Lab Sample ID:** JB52677-4
**Matrix:** SO - Soil
**Method:** SW846 8011 SW846 3550B
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

**Date Sampled:** 11/07/13
**Date Received:** 11/08/13
**Percent Solids:** 83.3

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 [a] | BB52473.D | 1 | 11/14/13 | AMA | 11/13/13 | M:OP35717 | M:GBB3074 |
| Run #2 | | | | | | | |

| | Initial Weight | Final Volume |
|---|---|---|
| Run #1 | 30.3 g | 50.0 ml |
| Run #2 | | |

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 106-93-4 | 1,2-Dibromoethane | ND | 3.0 | 1.1 | ug/kg | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 460-00-4 | Bromofluorobenzene (S) | 97% | | 61-167% |
| 460-00-4 | Bromofluorobenzene (S) | 96% | | 61-167% |

(a) Analysis performed at Accutest Laboratories, Marlborough, MA.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

# Report of Analysis





| | | | |
|---|---|---|---|
| **Client Sample ID:** | AOI-8-N-146-17-18 | | |
| **Lab Sample ID:** | JB52677-4 | **Date Sampled:** | 11/07/13 |
| **Matrix:** | SO - Soil | **Date Received:** | 11/08/13 |
| | | **Percent Solids:** | 83.3 |
| **Project:** | Sunoco, Philadelphia Refinery, Philadelphia, PA | | |

**Metals Analysis**

| Analyte | Result | RL | MDL | Units | DF | Prep | Analyzed | By | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|---|---|
| Cobalt [a] | 13.3 | 5.6 | 0.053 | mg/kg | 1 | 11/25/13 | 11/28/13 | AMA | SW846 6010C [1] | SW846 3050B [2] |
| Lead [a] | 31.9 | 1.1 | 0.19 | mg/kg | 1 | 11/25/13 | 11/28/13 | AMA | SW846 6010C [1] | SW846 3050B [2] |
| Nickel [a] | 20.2 | 4.5 | 0.049 | mg/kg | 1 | 11/25/13 | 11/28/13 | AMA | SW846 6010C [1] | SW846 3050B [2] |
| Vanadium [a] | 24.5 | 1.1 | 0.15 | mg/kg | 1 | 11/25/13 | 11/28/13 | AMA | SW846 6010C [1] | SW846 3050B [2] |
| Zinc [a] | 75.0 | 2.3 | 0.18 | mg/kg | 1 | 11/25/13 | 11/28/13 | AMA | SW846 6010C [1] | SW846 3050B [2] |

(1) Instrument QC Batch: M:MA16479
(2) Prep QC Batch: M:MP22123

(a) Analysis performed at Accutest Laboratories, Marlborough, MA.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
B = Indicates a result > = MDL but < RL

# Report of Analysis





| | | | |
|---|---|---|---|
| **Client Sample ID:** | AOI-8-N-145-8-10 | | |
| **Lab Sample ID:** | JB52677-5 | **Date Sampled:** | 11/08/13 |
| **Matrix:** | SO - Soil | **Date Received:** | 11/08/13 |
| **Method:** | SW846 8260B | **Percent Solids:** | 80.5 |
| **Project:** | Sunoco, Philadelphia Refinery, Philadelphia, PA | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | E209706.D | 1 | 11/15/13 | DP | n/a | n/a | VE9201 |
| Run #2 | E209721.D | 1 | 11/15/13 | DP | n/a | n/a | VE9202 |

| | Initial Weight | Final Volume | Methanol Aliquot |
|---|---|---|---|
| Run #1 | 4.0 g | 10.0 ml | 100 ul |
| Run #2 | 4.0 g | 5.0 ml | 10.0 ul |

**Leaded Gasoline and Aviation Gas List**

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | 20300 | 170 | 21 | ug/kg | |
| 108-88-3 | Toluene | 6740 | 170 | 24 | ug/kg | |
| 100-41-4 | Ethylbenzene | 2300 | 170 | 29 | ug/kg | |
| 1330-20-7 | Xylene (total) | 4730 | 170 | 30 | ug/kg | |
| 1634-04-4 | Methyl Tert Butyl Ether | ND | 170 | 57 | ug/kg | |
| 135-98-8 | sec-Butylbenzene | 1330 | 840 | 30 | ug/kg | |
| 98-06-6 | tert-Butylbenzene | 745 | 840 | 27 | ug/kg | J |
| 110-82-7 | Cyclohexane | 33900 [a] | 4500 | 230 | ug/kg | |
| 107-06-2 | 1,2-Dichloroethane | ND | 170 | 54 | ug/kg | |
| 110-54-3 | Hexane | 56300 [a] | 4500 | 480 | ug/kg | |
| 98-82-8 | Isopropylbenzene | 20000 | 840 | 25 | ug/kg | |
| 95-63-6 | 1,2,4-Trimethylbenzene | 4310 | 840 | 27 | ug/kg | |
| 108-67-8 | 1,3,5-Trimethylbenzene | 1900 | 840 | 37 | ug/kg | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 97% | 102% | 59-130% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 95% | 97% | 65-123% |
| 2037-26-5 | Toluene-D8 | 107% | 100% | 80-124% |
| 460-00-4 | 4-Bromofluorobenzene | 119% | 110% | 71-132% |

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

# Report of Analysis





**Client Sample ID:** AOI-8-N-145-8-10
**Lab Sample ID:** JB52677-5
**Matrix:** SO - Soil
**Method:** SW846 8270D SW846 3550C
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

**Date Sampled:** 11/08/13
**Date Received:** 11/08/13
**Percent Solids:** 80.5

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 [a] | 6P2224.D | 1 | 11/21/13 | EP | 11/11/13 | OP70564 | E6P91 |
| Run #2 | 6P2249.D | 10 | 11/22/13 | EP | 11/11/13 | OP70564 | E6P93 |

| | Initial Weight | Final Volume |
|---|---|---|
| Run #1 | 31.8 g | 5.0 ml |
| Run #2 | 31.8 g | 5.0 ml |

**ABN Special List**

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 105-67-9 | 2,4-Dimethylphenol | ND | 980 | 330 | ug/kg | |
| 51-28-5 | 2,4-Dinitrophenol | ND | 3900 | 240 | ug/kg | |
| 95-48-7 | 2-Methylphenol | ND | 390 | 220 | ug/kg | |
| | 3&4-Methylphenol | ND | 390 | 250 | ug/kg | |
| 100-02-7 | 4-Nitrophenol | ND | 2000 | 330 | ug/kg | |
| 108-95-2 | Phenol | ND | 390 | 210 | ug/kg | |
| 83-32-9 | Acenaphthene | 7370 | 200 | 57 | ug/kg | |
| 120-12-7 | Anthracene | 11500 | 200 | 68 | ug/kg | |
| 56-55-3 | Benzo(a)anthracene | 2940 | 200 | 64 | ug/kg | |
| 50-32-8 | Benzo(a)pyrene | 1690 | 200 | 60 | ug/kg | |
| 205-99-2 | Benzo(b)fluoranthene | 1650 | 200 | 65 | ug/kg | |
| 191-24-2 | Benzo(g,h,i)perylene | 2250 | 200 | 73 | ug/kg | |
| 207-08-9 | Benzo(k)fluoranthene | 350 | 200 | 73 | ug/kg | |
| 92-52-4 | 1,1'-Biphenyl | 1540 | 390 | 23 | ug/kg | |
| 218-01-9 | Chrysene | 6100 | 200 | 66 | ug/kg | |
| 53-70-3 | Dibenzo(a,h)anthracene | 820 | 200 | 67 | ug/kg | |
| 84-74-2 | Di-n-butyl phthalate | ND | 390 | 43 | ug/kg | |
| 84-66-2 | Diethyl phthalate | ND | 390 | 67 | ug/kg | |
| 117-81-7 | bis(2-Ethylhexyl)phthalate | ND | 390 | 170 | ug/kg | |
| 206-44-0 | Fluoranthene | 4050 | 200 | 86 | ug/kg | |
| 86-73-7 | Fluorene | 18700 | 200 | 64 | ug/kg | |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | 1090 | 200 | 68 | ug/kg | |
| 91-57-6 | 2-Methylnaphthalene | 105000 [b] | 3900 | 1100 | ug/kg | |
| 91-20-3 | Naphthalene | 7080 | 200 | 53 | ug/kg | |
| 85-01-8 | Phenanthrene | 41400 [b] | 2000 | 890 | ug/kg | |
| 129-00-0 | Pyrene | 18300 [b] | 2000 | 750 | ug/kg | |
| 110-86-1 | Pyridine | ND | 390 | 78 | ug/kg | |
| 91-22-5 | Quinoline | ND | 980 | 180 | ug/kg | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 367-12-4 | 2-Fluorophenol | 66% | 65% | 13-110% |

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

# Report of Analysis





| | | | |
|---|---|---|---|
| **Client Sample ID:** | AOI-8-N-145-8-10 | | |
| **Lab Sample ID:** | JB52677-5 | **Date Sampled:** | 11/08/13 |
| **Matrix:** | SO - Soil | **Date Received:** | 11/08/13 |
| **Method:** | SW846 8270D SW846 3550C | **Percent Solids:** | 80.5 |
| **Project:** | Sunoco, Philadelphia Refinery, Philadelphia, PA | | |

**ABN Special List**

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 4165-62-2 | Phenol-d5 | 91% | 77% | 15-110% |
| 118-79-6 | 2,4,6-Tribromophenol | 151% [c] | 116% | 20-123% |
| 4165-60-0 | Nitrobenzene-d5 | 99% | 0% [d] | 10-110% |
| 321-60-8 | 2-Fluorobiphenyl | 112% [e] | 0% [d] | 17-110% |
| 1718-51-0 | Terphenyl-d14 | 154% [c] | 100% | 30-124% |

(a) Elevated detection limit due to high final volume of viscous extract.
(b) Result is from Run# 2
(c) Outside control limits due to matrix interference.
(d) Outside control limits due to dilution.
(e) Outside of in house control limits, but within reasonable method recovery limits.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

# Report of Analysis





**Client Sample ID:** AOI-8-N-145-8-10
**Lab Sample ID:** JB52677-5
**Matrix:** SO - Soil
**Method:** SW846 8011 SW846 3550B
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

**Date Sampled:** 11/08/13
**Date Received:** 11/08/13
**Percent Solids:** 80.5

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 [a] | BB52474.D | 1 | 11/14/13 | AMA | 11/13/13 | M:OP35717 | M:GBB3074 |
| Run #2 | | | | | | | |

| | Initial Weight | Final Volume |
|---|---|---|
| Run #1 | 30.4 g | 50.0 ml |
| Run #2 | | |

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 106-93-4 | 1,2-Dibromoethane | ND | 3.1 | 1.1 | ug/kg | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 460-00-4 | Bromofluorobenzene (S) | 102% | | 61-167% |
| 460-00-4 | Bromofluorobenzene (S) | 92% | | 61-167% |

(a) Analysis performed at Accutest Laboratories, Marlborough, MA.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

# Report of Analysis





| | | | |
|---|---|---|---|
| **Client Sample ID:** | AOI-8-N-145-8-10 | | |
| **Lab Sample ID:** | JB52677-5 | **Date Sampled:** | 11/08/13 |
| **Matrix:** | SO - Soil | **Date Received:** | 11/08/13 |
| | | **Percent Solids:** | 80.5 |
| **Project:** | Sunoco, Philadelphia Refinery, Philadelphia, PA | | |

**Metals Analysis**

| Analyte | Result | RL | MDL | Units | DF | Prep | Analyzed | By | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|---|---|
| Cobalt [a] | 7.6 | 6.0 | 0.057 | mg/kg | 1 | 11/25/13 | 11/28/13 | AMA | SW846 6010C [1] | SW846 3050B [2] |
| Lead [a] | 379 | 1.2 | 0.20 | mg/kg | 1 | 11/25/13 | 11/28/13 | AMA | SW846 6010C [1] | SW846 3050B [2] |
| Nickel [a] | 26.7 | 4.8 | 0.053 | mg/kg | 1 | 11/25/13 | 11/28/13 | AMA | SW846 6010C [1] | SW846 3050B [2] |
| Vanadium [a] | 22.1 | 1.2 | 0.16 | mg/kg | 1 | 11/25/13 | 11/28/13 | AMA | SW846 6010C [1] | SW846 3050B [2] |
| Zinc [a] | 415 | 2.4 | 0.19 | mg/kg | 1 | 11/25/13 | 11/28/13 | AMA | SW846 6010C [1] | SW846 3050B [2] |

(1) Instrument QC Batch: M:MA16479
(2) Prep QC Batch: M:MP22123

(a) Analysis performed at Accutest Laboratories, Marlborough, MA.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
B = Indicates a result > = MDL but < RL

# Report of Analysis





| | | | |
|---|---|---|---|
| **Client Sample ID:** | TB110813 | | |
| **Lab Sample ID:** | JB52677-6 | **Date Sampled:** | 11/08/13 |
| **Matrix:** | AQ - Trip Blank Soil | **Date Received:** | 11/08/13 |
| **Method:** | SW846 8260B | **Percent Solids:** | n/a |
| **Project:** | Sunoco, Philadelphia Refinery, Philadelphia, PA | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | 3V4794.D | 1 | 11/16/13 | YXC | n/a | n/a | V3V199 |
| Run #2 | | | | | | | |

| | Purge Volume |
|---|---|
| Run #1 | 5.0 ml |
| Run #2 | |

**Leaded Gasoline and Aviation Gas List**

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | ND | 1.0 | 0.28 | ug/l | |
| 108-88-3 | Toluene | ND | 1.0 | 0.44 | ug/l | |
| 100-41-4 | Ethylbenzene | ND | 1.0 | 0.21 | ug/l | |
| 1330-20-7 | Xylene (total) | ND | 1.0 | 0.19 | ug/l | |
| 1634-04-4 | Methyl Tert Butyl Ether | ND | 1.0 | 0.29 | ug/l | |
| 135-98-8 | sec-Butylbenzene | ND | 5.0 | 0.48 | ug/l | |
| 98-06-6 | tert-Butylbenzene | ND | 5.0 | 0.25 | ug/l | |
| 110-82-7 | Cyclohexane | ND | 5.0 | 0.18 | ug/l | |
| 107-06-2 | 1,2-Dichloroethane | ND | 1.0 | 0.22 | ug/l | |
| 110-54-3 | Hexane | ND | 5.0 | 1.1 | ug/l | |
| 98-82-8 | Isopropylbenzene | ND | 2.0 | 0.22 | ug/l | |
| 95-63-6 | 1,2,4-Trimethylbenzene | ND | 2.0 | 0.23 | ug/l | |
| 108-67-8 | 1,3,5-Trimethylbenzene | ND | 2.0 | 0.43 | ug/l | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 92% | | 79-117% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 95% | | 72-123% |
| 2037-26-5 | Toluene-D8 | 92% | | 82-118% |
| 460-00-4 | 4-Bromofluorobenzene | 93% | | 75-118% |

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

# Report of Analysis





**Client Sample ID:** TB110813
**Lab Sample ID:** JB52677-6
**Matrix:** AQ - Trip Blank Soil
**Method:** SW846 8011 SW846 8011
**Project:** Sunoco, Philadelphia Refinery, Philadelphia, PA

**Date Sampled:** 11/08/13
**Date Received:** 11/08/13
**Percent Solids:** n/a

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 [a] | BK32032.D | 1 | 11/13/13 | AMA | 11/13/13 | M:OP35711 | M:GBK1056 |
| Run #2 | | | | | | | |

| | Initial Volume | Final Volume |
|---|---|---|
| Run #1 | 35.6 ml | 2.0 ml |
| Run #2 | | |

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 106-93-4 | 1,2-Dibromoethane | ND | 0.015 | 0.011 | ug/l | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 460-00-4 | Bromofluorobenzene (S) | 116% | | 36-173% |
| 460-00-4 | Bromofluorobenzene (S) | 117% | | 36-173% |

(a) Analysis performed at Accutest Laboratories, Marlborough, MA.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

New Jersey ACCUTEST LABORATORIES



## Misc. Forms

### Custody Documents and Other Forms

Includes the following where applicable:

- Chain of Custody
- Chain of Custody (Accutest Labs of New England, Inc.)

SLL
STB

# CHAIN OF CUSTODY

PAGE 1 OF 1

ACCUTEST LABORATORIES
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX: 732-329-3499/3480
www.accutest.com

FED-EX Tracking #: | Bottle Order Control #:
Accutest Quote #: | Accutest Job #: JB52677

**Client / Reporting Information**

Company Name: Stantec
Street Address: 1060 Andrew Drive
City State Zip: West Chester PA 19380
Project Contact E-mail: Jennifer.Menges@stantec.com
Phone # Fax #: 610-840-2500
Sampler(s) Name(s) Phone #: Jenny DeBoer, Jeremy Richter 610-709-2511

**Project Information**

Project Name: Sunoco Philadelphia Refinery AOI-8
Street:
City State:
Project #:
Client Purchase Order #:
Project Manager:

**Billing Information ( If different from Report to)**

Company Name:
Street Address:
City State Zip:
Attention:

**Requested Analysis ( see TEST CODE sheet)**

| Accutest Sample # | Field ID / Point of Collection | MEOH/DI Vial # | Collection Date | Collection Time | Sampled by | Matrix | # of bottles | Number of preserved Bottles: HCl | NaOH | HNO3 | H2SO4 | NONE | DI Water | MEOH | ENCORE | V8260 SL2 | V8011 EDB | A382 TOSL | Co,Ni,Pb,V,Zn | | | | | | | LAB USE ONLY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | AOI-8-N-142-0-2 | 6480/6517 6518 | 11/7/13 | 0855 | JR | SO | 5 | | | | | 2 | 2 | 1 | | X | X | X | X | | | | | | | SUB |
| 2 | AOI-8-N-142-4-6 | 8120/8661 8662 | 11/7/13 | 1010 | JR | SO | 5 | | | | | 2 | 2 | 1 | | X | X | X | X | | HOLD | | | | | |
| 3 | AOI-8-N-141-10-10.5 | 6481/6519 6520 | 11/7/13 | 1030 | JD | SO | 5 | | | | | 2 | 2 | 1 | | X | X | X | X | | | | | | | B15 |
| 4 | AOI-8-N-146-17-18 | 8097/8642 8641 | ~~11/8/13~~ 11/7/13 | 1415 | JD | SO | 5 | | | | | 2 | 2 | 1 | | X | X | X | X | | | | | | | 14F3 |
| 5 | AOI-8-N-145-8-10 | 8142/8649 8650 | 11/8/13 | 1500 | JD | SO | 5 | | | | | 2 | 2 | 1 | | X | X | X | X | | | | | | | 4958 |
| 6 | TB 110813 | | 11/8/13 | 1500 | JD | TB | 4 | 4 | | | | | | | | X | X | | | | | | | | | 801 |

D.I. slurry voc vials frozen storage
Date: 11/8 Time: 23:59 Initials: ams

**Turnaround Time ( Business days)**

- [X] Std. 10 Business Days
- [ ] 5 Day RUSH
- [ ] 3 Day EMERGENCY
- [ ] 2 Day EMERGENCY
- [ ] 1 Day EMERGENCY
- [ ] other _____

Emergency & Rush T/A data available VIA Lablink

Approved By (Accutest PM): / Date:

Rec'd at Exton Service Center
11/9

**Data Deliverable Information**

- [ ] Commercial "A" (Level 1)
- [X] Commercial "B" ( Level 2)
- [ ] FULLT1 ( Level 3+4 )
- [ ] NJ Reduced
- [ ] Commercial "C"
- [ ] NYASP Category A
- [ ] NYASP Category B
- [ ] State Forms
- [ ] EDD Format _____
- [ ] Other _____

Commercial "A" = Results Only
Commercial "B" = Results + QC Summary
NJ Reduced = Results + QC Summary + Partial Raw data

**Comments / Special Instructions**

Analyze for comprehensive COC list for Sunoco characterizations (attached)
Hold samples indicated pending further instruction

**Sample Custody must be documented below each time samples change possession, including courier delivery.**

| | Relinquished by Sampler: | Date Time: | Received By: | Relinquished By: | Date Time: | Received By: |
|---|---|---|---|---|---|---|
| 1 | | 11/8/13 1530 | 1 | 2 | 11/8/13 1705 | 2 |
| 3 | | 11/8/13 1935 | 3 | 4 | Date Time: | 4 |
| 5 | Relinquished by: | Date Time: | Received By: 5 | Custody Seal # | [ ] Intact [ ] Not intact | Preserved where applicable [ ] |

On Ice [X] Cooler Temp. 1.2 6.1G

**JB52677: Chain of Custody**
**Page 1 of 3**

JB52677

## Comprehensive COC List for Sunoco Characterizations (Sept. 2013)

| VOCs by EPA Method 8260 | CAS No. |
|---|---|
| Benzene | 71-43-2 |
| Butylbenzene, sec- | 135-98-8 |
| Butylbenzene, tert- | 98-06-6 |
| Cumene | 98-82-8 |
| Cyclohexane | 110-82-7 |
| Dichloroethane, 1,2- | 107-06-2 |
| Ethylbenzene | 100-41-4 |
| Hexane | 110-54-3 |
| Methyl tert butyl ether | 1634-04-4 |
| Toluene | 108-88-3 |
| Trimethylbenzene, 1,2,4- | 95-63-6 |
| Trimethylbenzene, 1,3,5- | 108-67-8 |
| Xylenes | 1330-20-7 |

| EDB by EPA Method 8011 | CAS No. |
|---|---|
| Ethylene Dibromide | 106-93-4 |

| Metals by Method 6010/6020 | CAS No. |
|---|---|
| Cobalt | 7440-48-4 |
| Lead | 7439-92-1 |
| Nickel | 7440-02-0 |
| Vanadium | 7440-62-2 |
| Zinc | 7440-66-6 |

| SVOCs by EPA Method 8270 | CAS No. |
|---|---|
| Acenaphthene | 83-32-9 |
| Anthracene | 120-12-7 |
| Benzo(a)anthracene | 56-55-3 |
| Benzo(a)pyrene | 50-32-8 |
| Benzo(b)fluoranthene | 205-99-2 |
| Benzo(g,h,i)perylene | 191-24-2 |
| Benzo(k)fluoranthene | 207-08-9 |
| Biphenyl, 1,1- | 92-52-4 |
| Bis(2-ethylhexyl) phthalate | 117-81-7 |
| Chrysene | 218-01-9 |
| Cresol, m- (3-methylphenol) | 108-39-4 |
| Cresol, o- (2-methylphenol) | 95-48-7 |
| Cresol, p- (4-methylphenol) | 106-44-5 |
| Dibenz(a,h)anthracene | 53-70-3 |
| Diethyl phthalate | 84-66-2 |
| Dimethylphenol, 2,4- | 105-67-9 |
| Dibutyl phthalate, n- | 84-74-2 |
| Dinitrophenol, 2,4- | 51-28-5 |
| Fluoranthene | 206-44-0 |
| Fluorene | 86-73-7 |
| Indeno(1,2,3-cd)pyrene | 193-39-5 |
| Methylnaphthalene, 2- | 91-57-6 |
| Naphthalene | 91-20-3 |
| Nitrophenol, 4- | 100-02-7 |
| Phenanthrene | 85-01-8 |
| Phenol | 108-95-2 |
| Pyrene | 129-00-0 |
| Pyridine | 110-86-1 |
| Quinoline | 91-22-5 |

List from PADEP SERO Crude Oil Parameters for Corrective Action (CDB | SERO | PA DEP | 9 Aug 2013) combined with PADEP Petroleum Shortlist (leaded and unleaded gasoline and No. 2, 4, 5, 6 Fuel Oils).

5.1

5

**JB52677: Chain of Custody**
**Page 2 of 3**

# Accutest Laboratories Sample Receipt Summary

**Accutest Job Number:** JB52677 **Client:** **Project:**

**Date / Time Received:** 11/8/2013 **Delivery Method:** **Airbill #'s:**

**Cooler Temps (Initial/Adjusted):** #1: (1.2/1.2); 0

| Cooler Security | Y | or | N | | Y | or | N |
|---|---|---|---|---|---|---|---|
| 1. Custody Seals Present: | ☑ | | ☐ | 3. COC Present: | ☑ | | ☐ |
| 2. Custody Seals Intact: | ☑ | | ☐ | 4. Smpl Dates/Time OK | ☑ | | ☐ |

| Cooler Temperature | Y | or | N |
|---|---|---|---|
| 1. Temp criteria achieved: | ☑ | | ☐ |
| 2. Cooler temp verification: | IR Gun | | |
| 3. Cooler media: | Ice (Bag) | | |
| 4. No. Coolers: | 1 | | |

| Quality Control Preservatio | Y | or | N | N/A |
|---|---|---|---|---|
| 1. Trip Blank present / cooler: | ☑ | | ☐ | ☐ |
| 2. Trip Blank listed on COC: | ☑ | | ☐ | ☐ |
| 3. Samples preserved properly: | ☑ | | ☐ | |
| 4. VOCs headspace free: | ☑ | | ☐ | ☐ |

| Sample Integrity - Documentation | Y | or | N |
|---|---|---|---|
| 1. Sample labels present on bottles: | ☑ | | ☐ |
| 2. Container labeling complete: | ☑ | | ☐ |
| 3. Sample container label / COC agree: | ☑ | | ☐ |

| Sample Integrity - Condition | Y | or | N |
|---|---|---|---|
| 1. Sample recvd within HT: | ☑ | | ☐ |
| 2. All containers accounted for: | ☑ | | ☐ |
| 3. Condition of sample: | Intact | | |

| Sample Integrity - Instructions | Y | or | N | N/A |
|---|---|---|---|---|
| 1. Analysis requested is clear: | ☑ | | ☐ | |
| 2. Bottles received for unspecified tests | ☐ | | ☑ | |
| 3. Sufficient volume recvd for analysis: | ☑ | | ☐ | |
| 4. Compositing instructions clear: | ☐ | | ☐ | ☑ |
| 5. Filtering instructions clear: | ☐ | | ☐ | ☑ |

Comments

Accutest Laboratories
V:732.329.0200

2235 US Highway 130
F: 732.329.3499

Dayton, New Jersey
www/accutest.com



**JB52677: Chain of Custody**
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ACCUTEST LABORATORIES

# CHAIN OF CUSTODY

Page 1 of 1 NE

2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX: 732-329-3499/3480
www.accutest.com

FED-EX Tracking #: | Bottle Order Control #:
Accutest Quote #: | Accutest Job #: JB52677

| Client / Reporting Information | Project Information | Requested Analysis ( see TEST CODE sheet) | Matrix Codes |
|---|---|---|---|
| Company Name: Accutest Laboratories | Project Name: Sunoco, Philadelphia Refinery, Philadelphia, PA | | DW - Drinking Water<br>GW - Ground Water<br>WW - Water<br>SW - Surface Water<br>SO - Soil<br>SL- Sludge<br>SED-Sediment<br>OI - Oil<br>LIQ - Other Liquid<br>AIR - Air<br>SOL - Other Solid<br>WP - Wipe<br>FB-Field Blank<br>EB-Equipment Blank<br>RB- Rinse Blank<br>TB-Trip Blank |
| Street Address: 2235 Route 130 | Street: | Billing Information ( if different from Report to) | |
| City: Dayton State: NJ Zip: 08810 | City: State: | Company Name: | |
| Project Contact: KristinB E-mail: KristinB@accutest.com | Project #: | Street Address: | |
| Phone #: 732-329-0200 Fax #: | Client Purchase Order #: | City: State: Zip: | |
| Sampler(s) Name(s): JR Phone: | Project Manager: | Attention: | |

| Accutest Sample # | Field ID / Point of Collection | MEOH/DI Vial # | Collection Date | Collection Time | Sampled by | Matrix | # of bottles | Number of preserved Bottles: HCl | NaOH | HNO3 | H2SO4 | NONE | DI Water | MECH | ENCORE | CO ,NI ,PB ,V ,V8011EDB ,ZN , | V8011EDB , | LAB USE ONLY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | AOI-8-N-142-0-2 | | 11/7/13 | 8:55:00 AM | JR | SO | 2 | | | | | X | | | | X | | |
| 2 | AOI-8-N-142-4-6 | | 11/7/13 | 10:10:00 AM | JR | SO | 2 | | | | | X | | | | X | | |
| 3 | AOI-8-N-141-10-10.5 | | 11/7/13 | 10:30:00 AM | JR | SO | 2 | | | | | X | | | | X | | |
| 4 | AOI-8-N-146-17-18 | | 11/7/13 | 2:15:00 PM | JR | SO | 2 | | | | | X | | | | X | | |
| 5 | AOI-8-N-145-8-10 | | 11/8/13 | 3:00:00 PM | JR | SO | 2 | | | | | X | | | | X | | |
| 6 | TB110813 | | 11/8/13 | 3:00:00 PM | JR | AQ | 2 | X | | | | | | | | | X | |
| | | | | | | | | | | | | | | | | | | 3D2,9C |

Turnaround Time ( Business days)

Approved By (Accutest PM): / Date:

- ☐ Std. 10 Business Days
- ☐ 5 Day RUSH
- ☐ 3 Day EMERGENCY
- ☐ 2 Day EMERGENCY
- ☐ 1 Day EMERGENCY
- ☒ other Due 11/22/2013

Emergency & Rush T/A data available VIA Lablink

Data Deliverable Information

- ☐ Commercial "A" (Level 1)
- ☐ Commercial "B" ( Level 2)
- ☐ FULL T1 ( Level 3+4 )
- ☐ NJ Reduced
- ☐ Commercial "C"
- ☐ NYASP Category A
- ☐ NYASP Category B
- ☐ State Forms
- ☐ EDD Format
- ☒ Other REDT2

Commercial "A" = Results Only
Commercial "B" = Results + QC Summary
NJ Reduced = Results + QC Summary + Partial Raw data

Comments / Special Instructions

Samples -1 thru -5 aliquot 2 oz jar from 300ml bottle on shelf B15 for ~~V8011EDB~~ METALS
Data due 11/22/13

Sample Custody must be documented below each time samples change possession, including courier delivery.

| | Relinquished by Sampler: | Date Time: | Received By: | Relinquished By: | Date Time: | Received By: |
|---|---|---|---|---|---|---|
| 1 | Fernando | 11-11-13 17:00 | 1 FEDEX | 2 FX | 11-12-13 930 | 2 |
| 3 | | | 3 | 4 | | 4 |
| 5 | | | 5 | Custody Seal # 319 ☐ Intact ☐ Not Intact | Preserved where applicable ☐ | On Ice ☐ Cooler Temp. 2.2c |

**JB52677: Chain of Custody**
**Page 1 of 2**
**Accutest Labs of New England, Inc.**

# Accutest Laboratories Sample Receipt Summary

**Accutest Job Number:** JB52677 **Client:** ACNJ **Immediate Client Services Action Required:** No

**Date / Time Received:** 11/12/2013 **Delivery Method:** **Client Service Action Required at Login:** No

**Project:** SUB **No. Coolers:** 1 **Airbill #'s:**

| Cooler Security | Y | or | N | | Y | or | N |
|---|---|---|---|---|---|---|---|
| 1. Custody Seals Present: | ☑ | | ☐ | 3. COC Present: | ☑ | | ☐ |
| 2. Custody Seals Intact: | ☑ | | ☐ | 4. Smpl Dates/Time OK | ☑ | | ☐ |

| Cooler Temperature | Y | or | N |
|---|---|---|---|
| 1. Temp criteria achieved: | ☑ | | ☐ |
| 2. Cooler temp verification: | Infared gun | | |
| 3. Cooler media: | Ice (bag) | | |

| Quality Control -Preservation | Y | or | N | N/A |
|---|---|---|---|---|
| 1. Trip Blank present / cooler: | ☐ | | ☐ | ☑ |
| 2. Trip Blank listed on COC: | ☐ | | ☐ | ☑ |
| 3. Samples preserved properly: | ☑ | | ☐ | |
| 4. VOCs headspace free: | ☐ | | ☐ | ☑ |

| Sample Integrity - Documentation | Y | or | N |
|---|---|---|---|
| 1. Sample labels present on bottles: | ☑ | | ☐ |
| 2. Container labeling complete: | ☑ | | ☐ |
| 3. Sample container label / COC agree: | ☑ | | ☐ |

| Sample Integrity - Condition | Y | or | N |
|---|---|---|---|
| 1. Sample recvd within HT: | ☑ | | ☐ |
| 2. All containers accounted for: | ☑ | | ☐ |
| 3. Condition of sample: | Intact | | |

| Sample Integrity - Instructions | Y | or | N | N/A |
|---|---|---|---|---|
| 1. Analysis requested is clear: | ☑ | | ☐ | |
| 2. Bottles received for unspecified tests | ☐ | | ☑ | |
| 3. Sufficient volume recvd for analysis: | ☑ | | ☐ | |
| 4. Compositing instructions clear: | ☐ | | ☐ | ☑ |
| 5. Filtering instructions clear: | ☐ | | ☐ | ☑ |

Comments

Accutest Laboratories
V:508.481.6200

495 Technology Center West, Bldg One
F: 508.481.7753

Marlborough, MA
www/accutest.com



**JB52677: Chain of Custody**
**Page 2 of 2**

# ANALYTICAL REPORT

September 15, 2016

## Aquaterra Technologies, Inc. - S/E

| | |
|---|---|
| Sample Delivery Group: | L856076 |
| Samples Received: | 08/26/2016 |
| Project Number: | 213402435 |
| Description: | AOI-8 |
| Site: | PHILA REFINERY (AOI-8) |
| Report To: | Michael Sarcinello |
| | 122 South Church Street |
| | West Chester, PA 19382 |

Entire Report Reviewed By:

Mark W. Beasley
Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.

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P2-507-20160825-WG L856076-03 15

RW-501-20160825-WG L856076-04 18

RW-501-20160825-WG DUP L856076-05 21

P2-504-20160825-WG L856076-06 24

N-29-20160825-WG L856076-07 27

N-122-20160825-WG L856076-08 30

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AOI8-FIELD BLANK-20160825 L856076-13 45

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AOI8-EQUIPMENT BLANK-20160825 L856076-16 54

AOI8-FIELD BLANK-20160825 L856076-17 57

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## TRIP BLANK L856076-01 GW

Collected by: Dane Hopkins | Collected date/time: 08/25/16 00:00 | Received date/time: 08/26/16 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| Volatile Organic Compounds (GC/MS) by Method 8260B | WG902871 | 1 | 08/31/16 15:40 | 08/31/16 15:40 | DWR |

## N-64-20160825-WG L856076-02 GW

Collected by: Dane Hopkins | Collected date/time: 08/25/16 08:25 | Received date/time: 08/26/16 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| EDB / DBCP by Method 8011 | WG903771 | 1 | 08/31/16 06:27 | 09/01/16 22:00 | HMH |
| Metals (ICPMS) by Method 6020 | WG903407 | 1 | 08/30/16 12:02 | 08/30/16 17:08 | JDG |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903057 | 1 | 08/29/16 02:20 | 08/29/16 14:02 | JF |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903057 | 1 | 08/29/16 02:20 | 08/30/16 11:30 | SNR |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM | WG903328 | 1 | 08/30/16 14:41 | 08/31/16 01:15 | FMB |
| Volatile Organic Compounds (GC/MS) by Method 8260B | WG902871 | 1 | 08/31/16 16:25 | 08/31/16 16:25 | DWR |

## P2-507-20160825-WG L856076-03 GW

Collected by: Dane Hopkins | Collected date/time: 08/25/16 09:15 | Received date/time: 08/26/16 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| EDB / DBCP by Method 8011 | WG903771 | 1 | 08/31/16 06:27 | 09/01/16 22:11 | HMH |
| Metals (ICPMS) by Method 6020 | WG903407 | 1 | 08/30/16 12:02 | 08/30/16 17:11 | JDG |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903057 | 1 | 08/29/16 02:20 | 08/30/16 13:57 | JF |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903057 | 1 | 08/29/16 02:20 | 08/30/16 16:49 | SNR |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM | WG903328 | 1 | 08/30/16 14:41 | 08/31/16 07:04 | FMB |
| Volatile Organic Compounds (GC/MS) by Method 8260B | WG902871 | 1 | 09/02/16 01:12 | 09/02/16 01:12 | JAH |

## RW-501-20160825-WG L856076-04 GW

Collected by: Dane Hopkins | Collected date/time: 08/25/16 10:55 | Received date/time: 08/26/16 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| EDB / DBCP by Method 8011 | WG903771 | 1 | 08/31/16 06:27 | 09/01/16 22:22 | HMH |
| Metals (ICPMS) by Method 6020 | WG903407 | 1 | 08/30/16 12:02 | 08/30/16 17:14 | JDG |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903057 | 1 | 08/29/16 02:20 | 08/29/16 14:25 | JF |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903057 | 1 | 08/29/16 02:20 | 08/30/16 11:50 | SNR |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM | WG903328 | 1 | 08/30/16 14:41 | 08/31/16 01:37 | FMB |
| Volatile Organic Compounds (GC/MS) by Method 8260B | WG902871 | 1 | 09/02/16 01:36 | 09/02/16 01:36 | JAH |

## RW-501-20160825-WG DUP L856076-05 GW

Collected by: Dane Hopkins | Collected date/time: 08/25/16 10:55 | Received date/time: 08/26/16 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| EDB / DBCP by Method 8011 | WG903771 | 1 | 08/31/16 06:27 | 09/01/16 22:33 | HMH |
| Metals (ICPMS) by Method 6020 | WG903407 | 1 | 08/30/16 12:02 | 08/30/16 17:17 | JDG |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903057 | 1 | 08/29/16 02:20 | 08/29/16 14:49 | JF |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903057 | 1 | 08/29/16 02:20 | 08/30/16 12:09 | SNR |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM | WG903328 | 1 | 08/30/16 14:41 | 08/31/16 01:59 | FMB |
| Volatile Organic Compounds (GC/MS) by Method 8260B | WG902871 | 1 | 09/02/16 01:59 | 09/02/16 01:59 | JAH |

## P2-504-20160825-WG L856076-06 GW

Collected by: Dane Hopkins
Collected date/time: 08/25/16 10:35
Received date/time: 08/26/16 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| EDB / DBCP by Method 8011 | WG903771 | 1 | 08/31/16 06:27 | 09/01/16 22:44 | HMH |
| Metals (ICPMS) by Method 6020 | WG903407 | 5 | 08/30/16 12:02 | 08/30/16 17:20 | JDG |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903056 | 1 | 08/31/16 12:08 | 09/01/16 14:21 | SNR |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903056 | 1 | 08/31/16 12:08 | 09/02/16 20:05 | SNR |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM | WG903328 | 1 | 08/30/16 14:41 | 09/12/16 19:17 | FMB |
| Volatile Organic Compounds (GC/MS) by Method 8260B | WG902871 | 1 | 09/02/16 19:47 | 09/02/16 19:47 | LRL |

## N-29-20160825-WG L856076-07 GW

Collected by: Dane Hopkins
Collected date/time: 08/25/16 13:10
Received date/time: 08/26/16 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| EDB / DBCP by Method 8011 | WG903771 | 1 | 08/31/16 06:27 | 09/01/16 22:55 | HMH |
| Metals (ICPMS) by Method 6020 | WG903407 | 1 | 08/30/16 12:02 | 08/30/16 17:23 | JDG |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903057 | 1 | 08/29/16 02:20 | 08/29/16 15:12 | JF |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903057 | 1 | 08/29/16 02:20 | 08/30/16 12:29 | SNR |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM | WG903328 | 1 | 08/30/16 14:41 | 08/31/16 02:21 | FMB |
| Volatile Organic Compounds (GC/MS) by Method 8260B | WG902871 | 1 | 08/31/16 20:16 | 08/31/16 20:16 | DWR |

## N-122-20160825-WG L856076-08 GW

Collected by: Dane Hopkins
Collected date/time: 08/25/16 09:40
Received date/time: 08/26/16 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| EDB / DBCP by Method 8011 | WG903771 | 1 | 08/31/16 06:27 | 09/01/16 23:06 | HMH |
| Metals (ICPMS) by Method 6020 | WG903407 | 1 | 08/30/16 12:02 | 08/30/16 17:26 | JDG |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903057 | 1 | 08/29/16 02:20 | 08/29/16 15:35 | JF |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903057 | 1 | 08/29/16 02:20 | 08/30/16 12:49 | SNR |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM | WG903328 | 1 | 08/30/16 14:41 | 08/31/16 02:42 | FMB |
| Volatile Organic Compounds (GC/MS) by Method 8260B | WG902871 | 1 | 08/31/16 21:03 | 08/31/16 21:03 | DWR |

## N-150-20160825-WG L856076-09 GW

Collected by: Dane Hopkins
Collected date/time: 08/25/16 08:40
Received date/time: 08/26/16 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| EDB / DBCP by Method 8011 | WG903771 | 1 | 08/31/16 06:27 | 09/01/16 23:17 | HMH |
| Metals (ICPMS) by Method 6020 | WG903407 | 1 | 08/30/16 12:02 | 08/30/16 17:29 | JDG |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903057 | 1 | 08/29/16 02:20 | 08/29/16 15:59 | JF |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903057 | 1 | 08/29/16 02:20 | 08/30/16 13:09 | SNR |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM | WG903328 | 1 | 08/30/16 14:41 | 08/31/16 03:04 | FMB |
| Volatile Organic Compounds (GC/MS) by Method 8260B | WG902871 | 1 | 08/31/16 21:25 | 08/31/16 21:25 | DWR |

## N-94-20160825-WG L856076-10 GW

Collected by: Dane Hopkins
Collected date/time: 08/25/16 12:25
Received date/time: 08/26/16 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| EDB / DBCP by Method 8011 | WG903771 | 1 | 08/31/16 06:27 | 09/01/16 23:39 | HMH |
| Metals (ICPMS) by Method 6020 | WG903407 | 1 | 08/30/16 12:02 | 08/30/16 17:33 | JDG |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903057 | 1 | 08/29/16 02:20 | 08/30/16 14:20 | JF |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903057 | 5 | 08/29/16 02:20 | 08/30/16 17:09 | SNR |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM | WG903328 | 1 | 08/30/16 14:41 | 08/31/16 07:26 | FMB |
| Volatile Organic Compounds (GC/MS) by Method 8260B | WG902871 | 1 | 08/31/16 21:47 | 08/31/16 21:47 | DWR |

## N-143-20160825-WG L856076-11 GW

Collected by: Dane Hopkins | Collected date/time: 08/25/16 13:15 | Received date/time: 08/26/16 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| EDB / DBCP by Method 8011 | WG903771 | 1 | 08/31/16 06:27 | 09/01/16 23:50 | HMH |
| Metals (ICPMS) by Method 6020 | WG903828 | 1 | 08/31/16 11:22 | 09/01/16 06:41 | JPD |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903057 | 1 | 08/29/16 02:20 | 08/29/16 16:46 | JF |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903057 | 1 | 08/29/16 02:20 | 08/30/16 13:28 | SNR |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM | WG903328 | 1 | 08/30/16 14:41 | 08/31/16 03:26 | FMB |
| Volatile Organic Compounds (GC/MS) by Method 8260B | WG902871 | 1 | 08/31/16 22:09 | 08/31/16 22:09 | DWR |

## AOI8-EQUIPMENT BLANK-20160825 L856076-12 GW

Collected by: Dane Hopkins | Collected date/time: 08/25/16 13:30 | Received date/time: 08/26/16 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| EDB / DBCP by Method 8011 | WG903771 | 1 | 08/31/16 06:27 | 09/02/16 00:01 | HMH |
| Metals (ICPMS) by Method 6020 | WG903828 | 1 | 08/31/16 11:22 | 09/01/16 06:29 | JPD |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903057 | 1 | 08/29/16 02:20 | 08/29/16 17:10 | JF |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903057 | 1 | 08/29/16 02:20 | 08/30/16 13:48 | SNR |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM | WG903328 | 1 | 08/30/16 14:41 | 08/31/16 03:48 | FMB |
| Volatile Organic Compounds (GC/MS) by Method 8260B | WG902871 | 1 | 08/31/16 22:30 | 08/31/16 22:30 | DWR |

## AOI8-FIELD BLANK-20160825 L856076-13 GW

Collected by: Dane Hopkins | Collected date/time: 08/25/16 13:30 | Received date/time: 08/26/16 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| EDB / DBCP by Method 8011 | WG903771 | 1 | 08/31/16 06:27 | 09/02/16 00:12 | HMH |
| Metals (ICPMS) by Method 6020 | WG903828 | 1 | 08/31/16 11:22 | 09/01/16 06:45 | JPD |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903057 | 1 | 08/29/16 02:20 | 08/29/16 17:33 | JF |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903057 | 1 | 08/29/16 02:20 | 08/30/16 14:08 | SNR |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM | WG903328 | 1 | 08/30/16 14:41 | 08/31/16 04:10 | FMB |
| Volatile Organic Compounds (GC/MS) by Method 8260B | WG902871 | 1 | 09/01/16 01:24 | 09/01/16 01:24 | DWR |

## N-132-20160825-WG L856076-14 GW

Collected by: Dane Hopkins | Collected date/time: 08/25/16 10:00 | Received date/time: 08/26/16 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| EDB / DBCP by Method 8011 | WG903771 | 1 | 08/31/16 06:27 | 09/01/16 21:49 | HMH |
| Metals (ICPMS) by Method 6020 | WG903828 | 1 | 08/31/16 11:22 | 09/01/16 06:48 | JPD |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903057 | 1 | 08/29/16 02:20 | 08/29/16 17:56 | JF |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903057 | 1 | 08/29/16 02:20 | 08/30/16 14:28 | SNR |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM | WG903328 | 1 | 08/30/16 14:41 | 08/31/16 04:31 | FMB |
| Volatile Organic Compounds (GC/MS) by Method 8260B | WG902871 | 1 | 09/08/16 12:23 | 09/08/16 12:23 | DWR |

## N-132-20160825-WG-DUP L856076-15 GW

Collected by: Dane Hopkins | Collected date/time: 08/25/16 10:10 | Received date/time: 08/26/16 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| EDB / DBCP by Method 8011 | WG903771 | 1 | 08/31/16 06:27 | 09/01/16 21:26 | HMH |
| Metals (ICPMS) by Method 6020 | WG903828 | 1 | 08/31/16 11:22 | 09/01/16 06:57 | JPD |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903057 | 1 | 08/29/16 02:20 | 08/29/16 18:19 | JF |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903057 | 1 | 08/29/16 02:20 | 08/30/16 14:51 | SNR |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM | WG903328 | 1 | 08/30/16 14:41 | 08/31/16 04:53 | FMB |
| Volatile Organic Compounds (GC/MS) by Method 8260B | WG902871 | 1 | 09/02/16 03:09 | 09/02/16 03:09 | JAH |

## AOI8-EQUIPMENT BLANK-20160825 L856076-16 GW

Collected by: Dane Hopkins | Collected date/time: 08/25/16 10:30 | Received date/time: 08/26/16 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| EDB / DBCP by Method 8011 | WG903771 | 1 | 08/31/16 06:27 | 09/02/16 00:23 | HMH |
| Metals (ICPMS) by Method 6020 | WG903828 | 1 | 08/31/16 11:22 | 09/01/16 07:00 | JPD |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903057 | 1 | 08/29/16 02:20 | 08/29/16 18:42 | JF |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903057 | 1 | 08/29/16 02:20 | 08/30/16 15:11 | SNR |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM | WG903328 | 1 | 08/30/16 14:41 | 08/31/16 05:15 | FMB |
| Volatile Organic Compounds (GC/MS) by Method 8260B | WG902871 | 1 | 08/31/16 16:03 | 08/31/16 16:03 | DWR |

## AOI8-FIELD BLANK-20160825 L856076-17 GW

Collected by: Dane Hopkins | Collected date/time: 08/25/16 10:40 | Received date/time: 08/26/16 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| EDB / DBCP by Method 8011 | WG903771 | 1 | 08/31/16 06:27 | 09/02/16 00:34 | HMH |
| Metals (ICPMS) by Method 6020 | WG903828 | 1 | 08/31/16 11:22 | 09/01/16 07:03 | JPD |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903057 | 1 | 08/29/16 02:20 | 08/29/16 19:06 | JF |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903057 | 1 | 08/29/16 02:20 | 08/30/16 15:30 | SNR |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM | WG903328 | 1 | 08/30/16 14:41 | 08/31/16 05:37 | FMB |
| Volatile Organic Compounds (GC/MS) by Method 8260B | WG904106 | 1 | 09/03/16 13:05 | 09/03/16 13:05 | DWR |

## N-109-20160825-WG L856076-18 GW

Collected by: Dane Hopkins | Collected date/time: 08/25/16 12:10 | Received date/time: 08/26/16 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| EDB / DBCP by Method 8011 | WG903771 | 1 | 08/31/16 06:27 | 09/02/16 00:45 | HMH |
| Metals (ICPMS) by Method 6020 | WG903828 | 1 | 08/31/16 11:22 | 09/01/16 07:06 | JPD |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903057 | 1 | 08/29/16 02:20 | 08/29/16 19:29 | JF |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903057 | 1 | 08/29/16 02:20 | 08/30/16 15:50 | SNR |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM | WG903328 | 1 | 08/30/16 14:41 | 08/31/16 05:59 | FMB |
| Volatile Organic Compounds (GC/MS) by Method 8260B | WG904106 | 1 | 09/03/16 13:28 | 09/03/16 13:28 | DWR |

## N-37-20160825-WG L856076-19 GW

Collected by: Dane Hopkins | Collected date/time: 08/25/16 08:15 | Received date/time: 08/26/16 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| EDB / DBCP by Method 8011 | WG903771 | 1 | 08/31/16 06:27 | 09/02/16 00:56 | HMH |
| Metals (ICPMS) by Method 6020 | WG903828 | 1 | 08/31/16 11:22 | 09/01/16 07:09 | JPD |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903057 | 1 | 08/29/16 02:20 | 08/29/16 19:52 | JF |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903057 | 1 | 08/29/16 02:20 | 08/30/16 16:10 | SNR |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM | WG903328 | 1 | 08/30/16 14:41 | 08/31/16 06:20 | FMB |
| Volatile Organic Compounds (GC/MS) by Method 8260B | WG904106 | 1 | 09/03/16 13:52 | 09/03/16 13:52 | DWR |

## AOI8-FIELD BLANK-20160825 L856076-20 GW

Collected by: Dane Hopkins | Collected date/time: 08/25/16 08:30 | Received date/time: 08/26/16 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| EDB / DBCP by Method 8011 | WG903771 | 1 | 08/31/16 06:27 | 09/02/16 01:07 | HMH |
| Metals (ICPMS) by Method 6020 | WG903828 | 1 | 08/31/16 11:22 | 09/01/16 07:12 | JPD |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903335 | 1 | 08/30/16 09:07 | 08/30/16 22:43 | JF |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903335 | 1 | 08/30/16 09:07 | 09/01/16 16:21 | ADF |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM | WG904136 | 1 | 09/01/16 02:55 | 09/01/16 06:44 | FMB |
| Volatile Organic Compounds (GC/MS) by Method 8260B | WG904106 | 1 | 09/03/16 14:15 | 09/03/16 14:15 | DWR |

## AOI8-EQUIPMENT BLANK-20160825 L856076-21 GW

Collected by: Dane Hopkins | Collected date/time: 08/25/16 08:40 | Received date/time: 08/26/16 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| EDB / DBCP by Method 8011 | WG903771 | 1 | 08/31/16 06:27 | 09/02/16 01:18 | HMH |
| Metals (ICPMS) by Method 6020 | WG903828 | 1 | 08/31/16 11:22 | 09/01/16 07:15 | JPD |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903335 | 1 | 08/30/16 09:07 | 08/30/16 23:07 | JF |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903335 | 1 | 08/30/16 09:07 | 09/01/16 16:51 | ADF |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM | WG904136 | 1 | 09/01/16 02:55 | 09/01/16 07:06 | FMB |
| Volatile Organic Compounds (GC/MS) by Method 8260B | WG902865 | 1 | 09/01/16 14:38 | 09/01/16 14:38 | ACG |

## N-56-20160825-WG L856076-22 GW

Collected by: Dane Hopkins | Collected date/time: 08/25/16 10:20 | Received date/time: 08/26/16 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| EDB / DBCP by Method 8011 | WG903773 | 1 | 08/31/16 06:27 | 09/02/16 02:46 | HMH |
| Metals (ICPMS) by Method 6020 | WG903828 | 1 | 08/31/16 11:22 | 09/01/16 07:18 | JPD |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903335 | 50 | 08/30/16 09:07 | 08/30/16 23:30 | JF |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903335 | 50 | 08/30/16 09:07 | 09/01/16 17:10 | ADF |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM | WG904136 | 6.67 | 09/01/16 02:55 | 09/01/16 14:22 | FMB |
| Volatile Organic Compounds (GC/MS) by Method 8260B | WG902865 | 1 | 09/01/16 14:58 | 09/01/16 14:58 | ACG |

## AOI8-BH-16-074-0-2-20160825 L856076-23 Solid

Collected by: Dane Hopkins | Collected date/time: 08/25/16 08:55 | Received date/time: 08/26/16 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| Metals (ICP) by Method 6010B | WG903104 | 1 | 08/30/16 12:48 | 08/31/16 00:29 | LTB |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903324 | 2 | 08/29/16 22:11 | 08/30/16 19:40 | SNR |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903324 | 2 | 08/29/16 22:11 | 08/31/16 18:40 | SNR |
| Total Solids by Method 2540 G-2011 | WG902905 | 1 | 08/27/16 10:27 | 08/29/16 09:03 | KDW |
| Volatile Organic Compounds (GC/MS) by Method 8260B | WG903957 | 1.18 | 09/01/16 12:34 | 09/03/16 18:12 | BMB |

## AOI8-BH-16-074-6-8-20160825 L856076-24 Solid

Collected by: Dane Hopkins | Collected date/time: 08/25/16 09:10 | Received date/time: 08/26/16 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| Metals (ICP) by Method 6010B | WG903104 | 1 | 08/30/16 12:48 | 08/31/16 00:32 | LTB |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903324 | 5 | 08/29/16 22:11 | 08/30/16 21:14 | SNR |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903324 | 5 | 08/29/16 22:11 | 08/31/16 19:00 | SNR |
| Total Solids by Method 2540 G-2011 | WG902905 | 1 | 08/27/16 10:27 | 08/29/16 09:03 | KDW |
| Volatile Organic Compounds (GC/MS) by Method 8260B | WG903957 | 1 | 09/01/16 12:34 | 09/01/16 18:40 | ACG |

## AOI8-BH-16-075-0-2-20160825 L856076-25 Solid

Collected by: Dane Hopkins | Collected date/time: 08/25/16 10:55 | Received date/time: 08/26/16 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| Metals (ICP) by Method 6010B | WG903104 | 1 | 08/30/16 12:48 | 08/31/16 00:40 | LTB |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903324 | 5 | 08/29/16 22:11 | 08/30/16 21:38 | SNR |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903324 | 5 | 08/29/16 22:11 | 08/31/16 19:19 | SNR |
| Total Solids by Method 2540 G-2011 | WG902905 | 1 | 08/27/16 10:27 | 08/29/16 09:03 | KDW |
| Volatile Organic Compounds (GC/MS) by Method 8260B | WG903957 | 1 | 09/01/16 12:34 | 09/01/16 19:00 | ACG |

## AOI8-BH-16-075-4-6-20160825 L856076-26 Solid

Collected by: Dane Hopkins | Collected date/time: 08/25/16 11:10 | Received date/time: 08/26/16 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| Metals (ICP) by Method 6010B | WG903104 | 1 | 08/30/16 12:48 | 08/31/16 00:43 | LTB |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903324 | 10 | 08/29/16 22:11 | 08/30/16 22:01 | SNR |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903324 | 10 | 08/29/16 22:11 | 08/31/16 19:39 | SNR |
| Total Solids by Method 2540 G-2011 | WG902905 | 1 | 08/27/16 10:27 | 08/29/16 09:04 | KDW |
| Volatile Organic Compounds (GC/MS) by Method 8260B | WG903957 | 1 | 09/01/16 12:34 | 09/03/16 17:32 | BMB |

## AOI8-BH-16-076-0-2-20160825 L856076-27 Solid

Collected by: Dane Hopkins | Collected date/time: 08/25/16 13:10 | Received date/time: 08/26/16 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| Metals (ICP) by Method 6010B | WG903104 | 1 | 08/30/16 12:48 | 08/31/16 00:45 | LTB |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903324 | 100 | 08/29/16 22:11 | 08/30/16 23:11 | SNR |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903324 | 100 | 08/29/16 22:11 | 08/31/16 20:18 | SNR |
| Total Solids by Method 2540 G-2011 | WG902930 | 1 | 08/27/16 13:09 | 08/29/16 09:20 | KDW |
| Volatile Organic Compounds (GC/MS) by Method 8260B | WG903957 | 1.03 | 09/01/16 12:34 | 09/03/16 17:52 | BMB |

## AOI8-BH-16-076-4-6-20160825 L856076-28 Solid

Collected by: Dane Hopkins | Collected date/time: 08/25/16 13:30 | Received date/time: 08/26/16 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| Metals (ICP) by Method 6010B | WG903104 | 1 | 08/30/16 12:48 | 08/31/16 00:48 | LTB |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903324 | 1 | 08/29/16 22:11 | 08/30/16 18:54 | SNR |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903324 | 1 | 08/29/16 22:11 | 08/31/16 18:01 | SNR |
| Total Solids by Method 2540 G-2011 | WG902930 | 1 | 08/27/16 13:09 | 08/29/16 09:21 | KDW |
| Volatile Organic Compounds (GC/MS) by Method 8260B | WG903957 | 1 | 09/01/16 12:34 | 09/01/16 19:59 | ACG |

## AOI8-BH-16-077-0-2-20160825 L856076-29 Solid

Collected by: Dane Hopkins | Collected date/time: 08/25/16 11:40 | Received date/time: 08/26/16 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| Metals (ICP) by Method 6010B | WG903104 | 1 | 08/30/16 12:48 | 08/31/16 00:51 | LTB |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903324 | 1 | 08/29/16 22:11 | 08/30/16 19:17 | SNR |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903324 | 1 | 08/29/16 22:11 | 08/31/16 18:21 | SNR |
| Total Solids by Method 2540 G-2011 | WG902930 | 1 | 08/27/16 13:09 | 08/29/16 09:21 | KDW |
| Volatile Organic Compounds (GC/MS) by Method 8260B | WG903957 | 1 | 09/01/16 12:34 | 09/01/16 20:19 | ACG |

## AOI8-BH-16-077-4-6-20160825 L856076-30 Solid

Collected by: Dane Hopkins | Collected date/time: 08/25/16 12:00 | Received date/time: 08/26/16 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| Metals (ICP) by Method 6010B | WG903104 | 1 | 08/30/16 12:48 | 08/31/16 00:54 | LTB |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903324 | 10 | 08/29/16 22:11 | 08/30/16 22:24 | SNR |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG903324 | 10 | 08/29/16 22:11 | 08/31/16 19:58 | SNR |
| Total Solids by Method 2540 G-2011 | WG902930 | 1 | 08/27/16 13:09 | 08/29/16 09:21 | KDW |
| Volatile Organic Compounds (GC/MS) by Method 8260B | WG903957 | 1 | 09/01/16 12:34 | 09/01/16 20:40 | ACG |

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times. All MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Mark W. Beasley
Technical Service Representative

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Acetone | ND | | 50.0 | 1 | 08/31/2016 15:40 | WG902871 |
| Benzene | ND | | 1.00 | 1 | 08/31/2016 15:40 | WG902871 |
| Bromochloromethane | ND | | 1.00 | 1 | 08/31/2016 15:40 | WG902871 |
| Bromodichloromethane | ND | | 1.00 | 1 | 08/31/2016 15:40 | WG902871 |
| Bromoform | ND | | 1.00 | 1 | 08/31/2016 15:40 | WG902871 |
| Bromomethane | ND | | 5.00 | 1 | 08/31/2016 15:40 | WG902871 |
| Carbon disulfide | ND | | 1.00 | 1 | 08/31/2016 15:40 | WG902871 |
| Carbon tetrachloride | ND | J4 | 1.00 | 1 | 08/31/2016 15:40 | WG902871 |
| Chlorobenzene | ND | | 1.00 | 1 | 08/31/2016 15:40 | WG902871 |
| Chlorodibromomethane | ND | | 1.00 | 1 | 08/31/2016 15:40 | WG902871 |
| Chloroethane | ND | | 5.00 | 1 | 08/31/2016 15:40 | WG902871 |
| Chloroform | ND | | 5.00 | 1 | 08/31/2016 15:40 | WG902871 |
| Chloromethane | ND | | 2.50 | 1 | 08/31/2016 15:40 | WG902871 |
| Cyclohexane | ND | | 1.00 | 1 | 08/31/2016 15:40 | WG902871 |
| 1,2-Dibromo-3-Chloropropane | ND | | 5.00 | 1 | 08/31/2016 15:40 | WG902871 |
| 1,2-Dibromoethane | ND | | 1.00 | 1 | 08/31/2016 15:40 | WG902871 |
| 1,2-Dichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 15:40 | WG902871 |
| 1,3-Dichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 15:40 | WG902871 |
| 1,4-Dichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 15:40 | WG902871 |
| Dichlorodifluoromethane | ND | | 5.00 | 1 | 08/31/2016 15:40 | WG902871 |
| 1,1-Dichloroethane | ND | | 1.00 | 1 | 08/31/2016 15:40 | WG902871 |
| 1,2-Dichloroethane | ND | | 1.00 | 1 | 08/31/2016 15:40 | WG902871 |
| 1,1-Dichloroethene | ND | | 1.00 | 1 | 08/31/2016 15:40 | WG902871 |
| cis-1,2-Dichloroethene | ND | | 1.00 | 1 | 08/31/2016 15:40 | WG902871 |
| trans-1,2-Dichloroethene | ND | | 1.00 | 1 | 08/31/2016 15:40 | WG902871 |
| 1,2-Dichloropropane | ND | | 1.00 | 1 | 08/31/2016 15:40 | WG902871 |
| cis-1,3-Dichloropropene | ND | | 1.00 | 1 | 08/31/2016 15:40 | WG902871 |
| trans-1,3-Dichloropropene | ND | J4 | 1.00 | 1 | 08/31/2016 15:40 | WG902871 |
| Ethylbenzene | ND | | 1.00 | 1 | 08/31/2016 15:40 | WG902871 |
| 2-Hexanone | ND | | 10.0 | 1 | 08/31/2016 15:40 | WG902871 |
| Isopropylbenzene | ND | | 1.00 | 1 | 08/31/2016 15:40 | WG902871 |
| 2-Butanone (MEK) | ND | | 10.0 | 1 | 08/31/2016 15:40 | WG902871 |
| Methyl Acetate | ND | | 20.0 | 1 | 08/31/2016 15:40 | WG902871 |
| Methyl Cyclohexane | ND | | 1.00 | 1 | 08/31/2016 15:40 | WG902871 |
| Methylene Chloride | ND | | 5.00 | 1 | 08/31/2016 15:40 | WG902871 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 10.0 | 1 | 08/31/2016 15:40 | WG902871 |
| Methyl tert-butyl ether | ND | | 1.00 | 1 | 08/31/2016 15:40 | WG902871 |
| Styrene | ND | | 1.00 | 1 | 08/31/2016 15:40 | WG902871 |
| 1,1,2,2-Tetrachloroethane | ND | | 1.00 | 1 | 08/31/2016 15:40 | WG902871 |
| Tetrachloroethene | ND | | 1.00 | 1 | 08/31/2016 15:40 | WG902871 |
| Toluene | ND | | 5.00 | 1 | 08/31/2016 15:40 | WG902871 |
| 1,2,3-Trichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 15:40 | WG902871 |
| 1,2,4-Trichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 15:40 | WG902871 |
| 1,1,1-Trichloroethane | ND | | 1.00 | 1 | 08/31/2016 15:40 | WG902871 |
| 1,1,2-Trichloroethane | ND | | 1.00 | 1 | 08/31/2016 15:40 | WG902871 |
| Trichloroethene | ND | | 1.00 | 1 | 08/31/2016 15:40 | WG902871 |
| Trichlorofluoromethane | ND | | 5.00 | 1 | 08/31/2016 15:40 | WG902871 |
| 1,1,2-Trichlorotrifluoroethane | ND | | 1.00 | 1 | 08/31/2016 15:40 | WG902871 |
| Vinyl chloride | ND | | 1.00 | 1 | 08/31/2016 15:40 | WG902871 |
| Xylenes, Total | ND | | 3.00 | 1 | 08/31/2016 15:40 | WG902871 |
| *(S) Toluene-d8* | *101* | | *90.0-115* | | *08/31/2016 15:40* | WG902871 |
| *(S) Dibromofluoromethane* | *93.6* | | *79.0-121* | | *08/31/2016 15:40* | WG902871 |
| *(S) a,a,a-Trifluorotoluene* | *103* | | *90.4-116* | | *08/31/2016 15:40* | WG902871 |
| *(S) 4-Bromofluorobenzene* | *101* | | *80.1-120* | | *08/31/2016 15:40* | WG902871 |

## Metals (ICPMS) by Method 6020

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Cobalt,Dissolved | 66.2 | | 2.00 | 1 | 08/30/2016 17:08 | WG903407 |
| Lead,Dissolved | ND | | 2.00 | 1 | 08/30/2016 17:08 | WG903407 |
| Nickel,Dissolved | 8.06 | B | 2.00 | 1 | 08/30/2016 17:08 | WG903407 |
| Vanadium,Dissolved | ND | | 5.00 | 1 | 08/30/2016 17:08 | WG903407 |
| Zinc,Dissolved | 449 | | 25.0 | 1 | 08/30/2016 17:08 | WG903407 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Acetone | ND | | 50.0 | 1 | 08/31/2016 16:25 | WG902871 |
| Benzene | ND | | 1.00 | 1 | 08/31/2016 16:25 | WG902871 |
| Bromochloromethane | ND | | 1.00 | 1 | 08/31/2016 16:25 | WG902871 |
| Bromodichloromethane | ND | | 1.00 | 1 | 08/31/2016 16:25 | WG902871 |
| Bromoform | ND | | 1.00 | 1 | 08/31/2016 16:25 | WG902871 |
| Bromomethane | ND | | 5.00 | 1 | 08/31/2016 16:25 | WG902871 |
| Carbon disulfide | ND | | 1.00 | 1 | 08/31/2016 16:25 | WG902871 |
| Carbon tetrachloride | ND | J4 | 1.00 | 1 | 08/31/2016 16:25 | WG902871 |
| Chlorobenzene | ND | | 1.00 | 1 | 08/31/2016 16:25 | WG902871 |
| Chlorodibromomethane | ND | | 1.00 | 1 | 08/31/2016 16:25 | WG902871 |
| Chloroethane | ND | | 5.00 | 1 | 08/31/2016 16:25 | WG902871 |
| Chloroform | ND | | 5.00 | 1 | 08/31/2016 16:25 | WG902871 |
| Chloromethane | ND | | 2.50 | 1 | 08/31/2016 16:25 | WG902871 |
| Cyclohexane | 1.46 | | 1.00 | 1 | 08/31/2016 16:25 | WG902871 |
| 1,2-Dibromo-3-Chloropropane | ND | | 5.00 | 1 | 08/31/2016 16:25 | WG902871 |
| 1,2-Dibromoethane | ND | | 1.00 | 1 | 08/31/2016 16:25 | WG902871 |
| 1,2-Dichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 16:25 | WG902871 |
| 1,3-Dichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 16:25 | WG902871 |
| 1,4-Dichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 16:25 | WG902871 |
| Dichlorodifluoromethane | ND | | 5.00 | 1 | 08/31/2016 16:25 | WG902871 |
| 1,1-Dichloroethane | ND | | 1.00 | 1 | 08/31/2016 16:25 | WG902871 |
| 1,2-Dichloroethane | ND | | 1.00 | 1 | 08/31/2016 16:25 | WG902871 |
| 1,1-Dichloroethene | ND | | 1.00 | 1 | 08/31/2016 16:25 | WG902871 |
| cis-1,2-Dichloroethene | ND | | 1.00 | 1 | 08/31/2016 16:25 | WG902871 |
| trans-1,2-Dichloroethene | ND | | 1.00 | 1 | 08/31/2016 16:25 | WG902871 |
| 1,2-Dichloropropane | ND | | 1.00 | 1 | 08/31/2016 16:25 | WG902871 |
| cis-1,3-Dichloropropene | ND | | 1.00 | 1 | 08/31/2016 16:25 | WG902871 |
| trans-1,3-Dichloropropene | ND | J4 | 1.00 | 1 | 08/31/2016 16:25 | WG902871 |
| Ethylbenzene | ND | | 1.00 | 1 | 08/31/2016 16:25 | WG902871 |
| 2-Hexanone | ND | | 10.0 | 1 | 08/31/2016 16:25 | WG902871 |
| Isopropylbenzene | ND | | 1.00 | 1 | 08/31/2016 16:25 | WG902871 |
| 2-Butanone (MEK) | ND | | 10.0 | 1 | 08/31/2016 16:25 | WG902871 |
| Methyl Acetate | ND | | 20.0 | 1 | 08/31/2016 16:25 | WG902871 |
| Methyl Cyclohexane | 1.42 | | 1.00 | 1 | 08/31/2016 16:25 | WG902871 |
| Methylene Chloride | ND | | 5.00 | 1 | 08/31/2016 16:25 | WG902871 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 10.0 | 1 | 08/31/2016 16:25 | WG902871 |
| Methyl tert-butyl ether | ND | | 1.00 | 1 | 08/31/2016 16:25 | WG902871 |
| Styrene | ND | | 1.00 | 1 | 08/31/2016 16:25 | WG902871 |
| 1,1,2,2-Tetrachloroethane | ND | | 1.00 | 1 | 08/31/2016 16:25 | WG902871 |
| Tetrachloroethene | ND | | 1.00 | 1 | 08/31/2016 16:25 | WG902871 |
| Toluene | ND | | 5.00 | 1 | 08/31/2016 16:25 | WG902871 |
| 1,2,3-Trichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 16:25 | WG902871 |
| 1,2,4-Trichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 16:25 | WG902871 |
| 1,1,1-Trichloroethane | ND | | 1.00 | 1 | 08/31/2016 16:25 | WG902871 |
| 1,1,2-Trichloroethane | ND | | 1.00 | 1 | 08/31/2016 16:25 | WG902871 |
| Trichloroethene | ND | | 1.00 | 1 | 08/31/2016 16:25 | WG902871 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Trichlorofluoromethane | ND | | 5.00 | 1 | 08/31/2016 16:25 | WG902871 |
| 1,1,2-Trichlorotrifluoroethane | ND | | 1.00 | 1 | 08/31/2016 16:25 | WG902871 |
| Vinyl chloride | ND | | 1.00 | 1 | 08/31/2016 16:25 | WG902871 |
| Xylenes, Total | ND | | 3.00 | 1 | 08/31/2016 16:25 | WG902871 |
| *(S) Toluene-d8* | *101* | | *90.0-115* | | *08/31/2016 16:25* | WG902871 |
| *(S) Dibromofluoromethane* | *93.3* | | *79.0-121* | | *08/31/2016 16:25* | WG902871 |
| *(S) a,a,a-Trifluorotoluene* | *103* | | *90.4-116* | | *08/31/2016 16:25* | WG902871 |
| *(S) 4-Bromofluorobenzene* | *102* | | *80.1-120* | | *08/31/2016 16:25* | WG902871 |

## EDB / DBCP by Method 8011

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Ethylene Dibromide | ND | | 0.0100 | 1 | 09/01/2016 22:00 | WG903771 |
| 1,2-Dibromo-3-Chloropropane | ND | | 0.0200 | 1 | 09/01/2016 22:00 | WG903771 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Biphenyl | ND | | 10.0 | 1 | 08/29/2016 14:02 | WG903057 |
| Bis(2-Ethylhexyl)phthalate | ND | | 3.00 | 1 | 08/29/2016 14:02 | WG903057 |
| Di-n-butyl phthalate | ND | | 3.00 | 1 | 08/29/2016 14:02 | WG903057 |
| Diethyl phthalate | ND | | 3.00 | 1 | 08/29/2016 14:02 | WG903057 |
| Pyridine | ND | | 10.0 | 1 | 08/29/2016 14:02 | WG903057 |
| Quinoline | ND | | 50.0 | 1 | 08/30/2016 11:30 | WG903057 |
| 2,4-Dimethylphenol | ND | | 10.0 | 1 | 08/29/2016 14:02 | WG903057 |
| 2,4-Dinitrophenol | ND | J4 | 10.0 | 1 | 08/29/2016 14:02 | WG903057 |
| 2-Methylphenol | ND | | 10.0 | 1 | 08/29/2016 14:02 | WG903057 |
| 3&4-Methyl Phenol | ND | | 10.0 | 1 | 08/29/2016 14:02 | WG903057 |
| 4-Nitrophenol | ND | | 10.0 | 1 | 08/29/2016 14:02 | WG903057 |
| Phenol | ND | | 10.0 | 1 | 08/29/2016 14:02 | WG903057 |
| *(S) 2-Fluorophenol* | *30.8* | | *10.0-77.9* | | *08/29/2016 14:02* | WG903057 |
| *(S) Phenol-d5* | *22.7* | | *5.00-70.1* | | *08/29/2016 14:02* | WG903057 |
| *(S) Nitrobenzene-d5* | *70.9* | | *21.8-123* | | *08/29/2016 14:02* | WG903057 |
| *(S) 2-Fluorobiphenyl* | *72.7* | | *29.5-131* | | *08/29/2016 14:02* | WG903057 |
| *(S) 2,4,6-Tribromophenol* | *115* | | *11.2-130* | | *08/29/2016 14:02* | WG903057 |
| *(S) p-Terphenyl-d14* | *72.9* | | *29.3-137* | | *08/29/2016 14:02* | WG903057 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Anthracene | 1.21 | | 0.0500 | 1 | 08/31/2016 01:15 | WG903328 |
| Acenaphthene | 6.47 | | 0.0500 | 1 | 08/31/2016 01:15 | WG903328 |
| Benzo(a)anthracene | 0.0526 | | 0.0500 | 1 | 08/31/2016 01:15 | WG903328 |
| Benzo(a)pyrene | ND | | 0.0500 | 1 | 08/31/2016 01:15 | WG903328 |
| Benzo(b)fluoranthene | ND | | 0.0500 | 1 | 08/31/2016 01:15 | WG903328 |
| Benzo(g,h,i)perylene | ND | | 0.0500 | 1 | 08/31/2016 01:15 | WG903328 |
| Benzo(k)fluoranthene | ND | | 0.0500 | 1 | 08/31/2016 01:15 | WG903328 |
| Chrysene | ND | | 0.0500 | 1 | 08/31/2016 01:15 | WG903328 |
| Dibenz(a,h)anthracene | ND | | 0.0500 | 1 | 08/31/2016 01:15 | WG903328 |
| Fluoranthene | 0.532 | | 0.0500 | 1 | 08/31/2016 01:15 | WG903328 |
| Fluorene | 4.08 | | 0.0500 | 1 | 08/31/2016 01:15 | WG903328 |
| Indeno(1,2,3-cd)pyrene | ND | | 0.0500 | 1 | 08/31/2016 01:15 | WG903328 |
| Naphthalene | ND | | 0.250 | 1 | 08/31/2016 01:15 | WG903328 |
| Phenanthrene | 1.56 | | 0.0500 | 1 | 08/31/2016 01:15 | WG903328 |
| Pyrene | 0.359 | | 0.0500 | 1 | 08/31/2016 01:15 | WG903328 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

| Analyte | Result | Qualifier | RDL | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | ug/l | | ug/l | | date / time | |
| 2-Methylnaphthalene | ND | | 0.250 | 1 | 08/31/2016 01:15 | WG903328 |
| *(S) Nitrobenzene-d5* | *91.5* | | *33.8-179* | | *08/31/2016 01:15* | WG903328 |
| *(S) 2-Fluorobiphenyl* | *82.5* | | *55.5-150* | | *08/31/2016 01:15* | WG903328 |
| *(S) p-Terphenyl-d14* | *83.8* | | *46.2-163* | | *08/31/2016 01:15* | WG903328 |

## Metals (ICPMS) by Method 6020

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Cobalt,Dissolved | ND | | 2.00 | 1 | 08/30/2016 17:11 | WG903407 |
| Lead,Dissolved | ND | | 2.00 | 1 | 08/30/2016 17:11 | WG903407 |
| Nickel,Dissolved | 2.81 | B | 2.00 | 1 | 08/30/2016 17:11 | WG903407 |
| Vanadium,Dissolved | ND | | 5.00 | 1 | 08/30/2016 17:11 | WG903407 |
| Zinc,Dissolved | ND | | 25.0 | 1 | 08/30/2016 17:11 | WG903407 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Acetone | ND | | 50.0 | 1 | 09/02/2016 01:12 | WG902871 |
| Benzene | ND | | 1.00 | 1 | 09/02/2016 01:12 | WG902871 |
| Bromochloromethane | ND | | 1.00 | 1 | 09/02/2016 01:12 | WG902871 |
| Bromodichloromethane | ND | | 1.00 | 1 | 09/02/2016 01:12 | WG902871 |
| Bromoform | ND | | 1.00 | 1 | 09/02/2016 01:12 | WG902871 |
| Bromomethane | ND | | 5.00 | 1 | 09/02/2016 01:12 | WG902871 |
| Carbon disulfide | 1.43 | | 1.00 | 1 | 09/02/2016 01:12 | WG902871 |
| Carbon tetrachloride | ND | J4 | 1.00 | 1 | 09/02/2016 01:12 | WG902871 |
| Chlorobenzene | ND | | 1.00 | 1 | 09/02/2016 01:12 | WG902871 |
| Chlorodibromomethane | ND | | 1.00 | 1 | 09/02/2016 01:12 | WG902871 |
| Chloroethane | ND | | 5.00 | 1 | 09/02/2016 01:12 | WG902871 |
| Chloroform | ND | | 5.00 | 1 | 09/02/2016 01:12 | WG902871 |
| Chloromethane | ND | | 2.50 | 1 | 09/02/2016 01:12 | WG902871 |
| Cyclohexane | ND | | 1.00 | 1 | 09/02/2016 01:12 | WG902871 |
| 1,2-Dibromo-3-Chloropropane | ND | | 5.00 | 1 | 09/02/2016 01:12 | WG902871 |
| 1,2-Dibromoethane | ND | | 1.00 | 1 | 09/02/2016 01:12 | WG902871 |
| 1,2-Dichlorobenzene | ND | | 1.00 | 1 | 09/02/2016 01:12 | WG902871 |
| 1,3-Dichlorobenzene | ND | | 1.00 | 1 | 09/02/2016 01:12 | WG902871 |
| 1,4-Dichlorobenzene | ND | | 1.00 | 1 | 09/02/2016 01:12 | WG902871 |
| Dichlorodifluoromethane | ND | | 5.00 | 1 | 09/02/2016 01:12 | WG902871 |
| 1,1-Dichloroethane | ND | | 1.00 | 1 | 09/02/2016 01:12 | WG902871 |
| 1,2-Dichloroethane | ND | | 1.00 | 1 | 09/02/2016 01:12 | WG902871 |
| 1,1-Dichloroethene | ND | | 1.00 | 1 | 09/02/2016 01:12 | WG902871 |
| cis-1,2-Dichloroethene | ND | | 1.00 | 1 | 09/02/2016 01:12 | WG902871 |
| trans-1,2-Dichloroethene | ND | | 1.00 | 1 | 09/02/2016 01:12 | WG902871 |
| 1,2-Dichloropropane | ND | | 1.00 | 1 | 09/02/2016 01:12 | WG902871 |
| cis-1,3-Dichloropropene | ND | | 1.00 | 1 | 09/02/2016 01:12 | WG902871 |
| trans-1,3-Dichloropropene | ND | J4 | 1.00 | 1 | 09/02/2016 01:12 | WG902871 |
| Ethylbenzene | ND | | 1.00 | 1 | 09/02/2016 01:12 | WG902871 |
| 2-Hexanone | ND | | 10.0 | 1 | 09/02/2016 01:12 | WG902871 |
| Isopropylbenzene | ND | | 1.00 | 1 | 09/02/2016 01:12 | WG902871 |
| 2-Butanone (MEK) | ND | | 10.0 | 1 | 09/02/2016 01:12 | WG902871 |
| Methyl Acetate | ND | | 20.0 | 1 | 09/02/2016 01:12 | WG902871 |
| Methyl Cyclohexane | ND | | 1.00 | 1 | 09/02/2016 01:12 | WG902871 |
| Methylene Chloride | ND | | 5.00 | 1 | 09/02/2016 01:12 | WG902871 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 10.0 | 1 | 09/02/2016 01:12 | WG902871 |
| Methyl tert-butyl ether | ND | | 1.00 | 1 | 09/02/2016 01:12 | WG902871 |
| Styrene | ND | | 1.00 | 1 | 09/02/2016 01:12 | WG902871 |
| 1,1,2,2-Tetrachloroethane | ND | | 1.00 | 1 | 09/02/2016 01:12 | WG902871 |
| Tetrachloroethene | ND | | 1.00 | 1 | 09/02/2016 01:12 | WG902871 |
| Toluene | ND | | 5.00 | 1 | 09/02/2016 01:12 | WG902871 |
| 1,2,3-Trichlorobenzene | ND | | 1.00 | 1 | 09/02/2016 01:12 | WG902871 |
| 1,2,4-Trichlorobenzene | ND | | 1.00 | 1 | 09/02/2016 01:12 | WG902871 |
| 1,1,1-Trichloroethane | ND | | 1.00 | 1 | 09/02/2016 01:12 | WG902871 |
| 1,1,2-Trichloroethane | ND | | 1.00 | 1 | 09/02/2016 01:12 | WG902871 |
| Trichloroethene | ND | | 1.00 | 1 | 09/02/2016 01:12 | WG902871 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Trichlorofluoromethane | ND | | 5.00 | 1 | 09/02/2016 01:12 | WG902871 |
| 1,1,2-Trichlorotrifluoroethane | ND | | 1.00 | 1 | 09/02/2016 01:12 | WG902871 |
| Vinyl chloride | ND | | 1.00 | 1 | 09/02/2016 01:12 | WG902871 |
| Xylenes, Total | ND | | 3.00 | 1 | 09/02/2016 01:12 | WG902871 |
| *(S) Toluene-d8* | *101* | | *90.0-115* | | *09/02/2016 01:12* | WG902871 |
| *(S) Dibromofluoromethane* | *97.4* | | *79.0-121* | | *09/02/2016 01:12* | WG902871 |
| *(S) a,a,a-Trifluorotoluene* | *94.8* | | *90.4-116* | | *09/02/2016 01:12* | WG902871 |
| *(S) 4-Bromofluorobenzene* | *87.3* | | *80.1-120* | | *09/02/2016 01:12* | WG902871 |

## EDB / DBCP by Method 8011

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Ethylene Dibromide | ND | | 0.0100 | 1 | 09/01/2016 22:11 | WG903771 |
| 1,2-Dibromo-3-Chloropropane | ND | | 0.0200 | 1 | 09/01/2016 22:11 | WG903771 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Biphenyl | ND | | 10.0 | 1 | 08/30/2016 13:57 | WG903057 |
| Bis(2-Ethylhexyl)phthalate | ND | | 3.00 | 1 | 08/30/2016 13:57 | WG903057 |
| Di-n-butyl phthalate | ND | | 3.00 | 1 | 08/30/2016 13:57 | WG903057 |
| Diethyl phthalate | ND | | 3.00 | 1 | 08/30/2016 13:57 | WG903057 |
| Pyridine | ND | | 10.0 | 1 | 08/30/2016 13:57 | WG903057 |
| Quinoline | ND | | 50.0 | 1 | 08/30/2016 16:49 | WG903057 |
| 2,4-Dimethylphenol | ND | | 10.0 | 1 | 08/30/2016 13:57 | WG903057 |
| 2,4-Dinitrophenol | ND | J4 | 10.0 | 1 | 08/30/2016 13:57 | WG903057 |
| 2-Methylphenol | ND | | 10.0 | 1 | 08/30/2016 13:57 | WG903057 |
| 3&4-Methyl Phenol | ND | | 10.0 | 1 | 08/30/2016 13:57 | WG903057 |
| 4-Nitrophenol | ND | | 10.0 | 1 | 08/30/2016 13:57 | WG903057 |
| Phenol | ND | | 10.0 | 1 | 08/30/2016 13:57 | WG903057 |
| *(S) 2-Fluorophenol* | *34.3* | | *10.0-77.9* | | *08/30/2016 13:57* | WG903057 |
| *(S) Phenol-d5* | *27.4* | | *5.00-70.1* | | *08/30/2016 13:57* | WG903057 |
| *(S) Nitrobenzene-d5* | *58.0* | | *21.8-123* | | *08/30/2016 13:57* | WG903057 |
| *(S) 2-Fluorobiphenyl* | *70.3* | | *29.5-131* | | *08/30/2016 13:57* | WG903057 |
| *(S) 2,4,6-Tribromophenol* | *93.6* | | *11.2-130* | | *08/30/2016 13:57* | WG903057 |
| *(S) p-Terphenyl-d14* | *61.8* | | *29.3-137* | | *08/30/2016 13:57* | WG903057 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Anthracene | 0.488 | | 0.0500 | 1 | 08/31/2016 07:04 | WG903328 |
| Acenaphthene | 1.06 | | 0.0500 | 1 | 08/31/2016 07:04 | WG903328 |
| Benzo(a)anthracene | 2.66 | | 0.0500 | 1 | 08/31/2016 07:04 | WG903328 |
| Benzo(a)pyrene | 2.65 | | 0.0500 | 1 | 08/31/2016 07:04 | WG903328 |
| Benzo(b)fluoranthene | 1.75 | | 0.0500 | 1 | 08/31/2016 07:04 | WG903328 |
| Benzo(g,h,i)perylene | 1.75 | | 0.0500 | 1 | 08/31/2016 07:04 | WG903328 |
| Benzo(k)fluoranthene | 0.367 | | 0.0500 | 1 | 08/31/2016 07:04 | WG903328 |
| Chrysene | 2.27 | | 0.0500 | 1 | 08/31/2016 07:04 | WG903328 |
| Dibenz(a,h)anthracene | 0.736 | | 0.0500 | 1 | 08/31/2016 07:04 | WG903328 |
| Fluoranthene | 2.39 | | 0.0500 | 1 | 08/31/2016 07:04 | WG903328 |
| Fluorene | 0.143 | | 0.0500 | 1 | 08/31/2016 07:04 | WG903328 |
| Indeno(1,2,3-cd)pyrene | 0.747 | | 0.0500 | 1 | 08/31/2016 07:04 | WG903328 |
| Naphthalene | 0.276 | | 0.250 | 1 | 08/31/2016 07:04 | WG903328 |
| Phenanthrene | ND | | 0.0500 | 1 | 08/31/2016 07:04 | WG903328 |
| Pyrene | 4.68 | | 0.0500 | 1 | 08/31/2016 07:04 | WG903328 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

| Analyte | Result | Qualifier | RDL | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| | ug/l | | ug/l | | | |
| 2-Methylnaphthalene | ND | | 0.250 | 1 | 08/31/2016 07:04 | WG903328 |
| *(S) Nitrobenzene-d5* | *85.6* | | *33.8-179* | | *08/31/2016 07:04* | WG903328 |
| *(S) 2-Fluorobiphenyl* | *95.0* | | *55.5-150* | | *08/31/2016 07:04* | WG903328 |
| *(S) p-Terphenyl-d14* | *86.2* | | *46.2-163* | | *08/31/2016 07:04* | WG903328 |

## Metals (ICPMS) by Method 6020

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Cobalt,Dissolved | ND | | 2.00 | 1 | 08/30/2016 17:14 | WG903407 |
| Lead,Dissolved | ND | | 2.00 | 1 | 08/30/2016 17:14 | WG903407 |
| Nickel,Dissolved | ND | | 2.00 | 1 | 08/30/2016 17:14 | WG903407 |
| Vanadium,Dissolved | ND | | 5.00 | 1 | 08/30/2016 17:14 | WG903407 |
| Zinc,Dissolved | ND | | 25.0 | 1 | 08/30/2016 17:14 | WG903407 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Acetone | ND | | 50.0 | 1 | 09/02/2016 01:36 | WG902871 |
| Benzene | ND | | 1.00 | 1 | 09/02/2016 01:36 | WG902871 |
| Bromochloromethane | ND | | 1.00 | 1 | 09/02/2016 01:36 | WG902871 |
| Bromodichloromethane | ND | | 1.00 | 1 | 09/02/2016 01:36 | WG902871 |
| Bromoform | ND | | 1.00 | 1 | 09/02/2016 01:36 | WG902871 |
| Bromomethane | ND | | 5.00 | 1 | 09/02/2016 01:36 | WG902871 |
| Carbon disulfide | ND | | 1.00 | 1 | 09/02/2016 01:36 | WG902871 |
| Carbon tetrachloride | ND | J4 | 1.00 | 1 | 09/02/2016 01:36 | WG902871 |
| Chlorobenzene | ND | | 1.00 | 1 | 09/02/2016 01:36 | WG902871 |
| Chlorodibromomethane | ND | | 1.00 | 1 | 09/02/2016 01:36 | WG902871 |
| Chloroethane | ND | | 5.00 | 1 | 09/02/2016 01:36 | WG902871 |
| Chloroform | ND | | 5.00 | 1 | 09/02/2016 01:36 | WG902871 |
| Chloromethane | ND | | 2.50 | 1 | 09/02/2016 01:36 | WG902871 |
| Cyclohexane | ND | | 1.00 | 1 | 09/02/2016 01:36 | WG902871 |
| 1,2-Dibromo-3-Chloropropane | ND | | 5.00 | 1 | 09/02/2016 01:36 | WG902871 |
| 1,2-Dibromoethane | ND | | 1.00 | 1 | 09/02/2016 01:36 | WG902871 |
| 1,2-Dichlorobenzene | ND | | 1.00 | 1 | 09/02/2016 01:36 | WG902871 |
| 1,3-Dichlorobenzene | ND | | 1.00 | 1 | 09/02/2016 01:36 | WG902871 |
| 1,4-Dichlorobenzene | ND | | 1.00 | 1 | 09/02/2016 01:36 | WG902871 |
| Dichlorodifluoromethane | ND | | 5.00 | 1 | 09/02/2016 01:36 | WG902871 |
| 1,1-Dichloroethane | ND | | 1.00 | 1 | 09/02/2016 01:36 | WG902871 |
| 1,2-Dichloroethane | ND | | 1.00 | 1 | 09/02/2016 01:36 | WG902871 |
| 1,1-Dichloroethene | ND | | 1.00 | 1 | 09/02/2016 01:36 | WG902871 |
| cis-1,2-Dichloroethene | ND | | 1.00 | 1 | 09/02/2016 01:36 | WG902871 |
| trans-1,2-Dichloroethene | ND | | 1.00 | 1 | 09/02/2016 01:36 | WG902871 |
| 1,2-Dichloropropane | ND | | 1.00 | 1 | 09/02/2016 01:36 | WG902871 |
| cis-1,3-Dichloropropene | ND | | 1.00 | 1 | 09/02/2016 01:36 | WG902871 |
| trans-1,3-Dichloropropene | ND | J4 | 1.00 | 1 | 09/02/2016 01:36 | WG902871 |
| Ethylbenzene | ND | | 1.00 | 1 | 09/02/2016 01:36 | WG902871 |
| 2-Hexanone | ND | | 10.0 | 1 | 09/02/2016 01:36 | WG902871 |
| Isopropylbenzene | ND | | 1.00 | 1 | 09/02/2016 01:36 | WG902871 |
| 2-Butanone (MEK) | ND | | 10.0 | 1 | 09/02/2016 01:36 | WG902871 |
| Methyl Acetate | ND | | 20.0 | 1 | 09/02/2016 01:36 | WG902871 |
| Methyl Cyclohexane | ND | | 1.00 | 1 | 09/02/2016 01:36 | WG902871 |
| Methylene Chloride | ND | | 5.00 | 1 | 09/02/2016 01:36 | WG902871 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 10.0 | 1 | 09/02/2016 01:36 | WG902871 |
| Methyl tert-butyl ether | ND | | 1.00 | 1 | 09/02/2016 01:36 | WG902871 |
| Styrene | ND | | 1.00 | 1 | 09/02/2016 01:36 | WG902871 |
| 1,1,2,2-Tetrachloroethane | ND | | 1.00 | 1 | 09/02/2016 01:36 | WG902871 |
| Tetrachloroethene | ND | | 1.00 | 1 | 09/02/2016 01:36 | WG902871 |
| Toluene | ND | | 5.00 | 1 | 09/02/2016 01:36 | WG902871 |
| 1,2,3-Trichlorobenzene | ND | | 1.00 | 1 | 09/02/2016 01:36 | WG902871 |
| 1,2,4-Trichlorobenzene | ND | | 1.00 | 1 | 09/02/2016 01:36 | WG902871 |
| 1,1,1-Trichloroethane | ND | | 1.00 | 1 | 09/02/2016 01:36 | WG902871 |
| 1,1,2-Trichloroethane | ND | | 1.00 | 1 | 09/02/2016 01:36 | WG902871 |
| Trichloroethene | ND | | 1.00 | 1 | 09/02/2016 01:36 | WG902871 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Trichlorofluoromethane | ND | | 5.00 | 1 | 09/02/2016 01:36 | WG902871 |
| 1,1,2-Trichlorotrifluoroethane | ND | | 1.00 | 1 | 09/02/2016 01:36 | WG902871 |
| Vinyl chloride | ND | | 1.00 | 1 | 09/02/2016 01:36 | WG902871 |
| Xylenes, Total | ND | | 3.00 | 1 | 09/02/2016 01:36 | WG902871 |
| *(S) Toluene-d8* | *100* | | *90.0-115* | | *09/02/2016 01:36* | WG902871 |
| *(S) Dibromofluoromethane* | *88.1* | | *79.0-121* | | *09/02/2016 01:36* | WG902871 |
| *(S) a,a,a-Trifluorotoluene* | *97.0* | | *90.4-116* | | *09/02/2016 01:36* | WG902871 |
| *(S) 4-Bromofluorobenzene* | *90.5* | | *80.1-120* | | *09/02/2016 01:36* | WG902871 |

## EDB / DBCP by Method 8011

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Ethylene Dibromide | ND | | 0.0100 | 1 | 09/01/2016 22:22 | WG903771 |
| 1,2-Dibromo-3-Chloropropane | ND | | 0.0200 | 1 | 09/01/2016 22:22 | WG903771 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Biphenyl | ND | | 10.0 | 1 | 08/29/2016 14:25 | WG903057 |
| Bis(2-Ethylhexyl)phthalate | ND | | 3.00 | 1 | 08/29/2016 14:25 | WG903057 |
| Di-n-butyl phthalate | ND | | 3.00 | 1 | 08/29/2016 14:25 | WG903057 |
| Diethyl phthalate | ND | | 3.00 | 1 | 08/29/2016 14:25 | WG903057 |
| Pyridine | ND | | 10.0 | 1 | 08/29/2016 14:25 | WG903057 |
| Quinoline | ND | | 50.0 | 1 | 08/30/2016 11:50 | WG903057 |
| 2,4-Dimethylphenol | ND | | 10.0 | 1 | 08/29/2016 14:25 | WG903057 |
| 2,4-Dinitrophenol | ND | J4 | 10.0 | 1 | 08/29/2016 14:25 | WG903057 |
| 2-Methylphenol | ND | | 10.0 | 1 | 08/29/2016 14:25 | WG903057 |
| 3&4-Methyl Phenol | ND | | 10.0 | 1 | 08/29/2016 14:25 | WG903057 |
| 4-Nitrophenol | ND | | 10.0 | 1 | 08/29/2016 14:25 | WG903057 |
| Phenol | ND | | 10.0 | 1 | 08/29/2016 14:25 | WG903057 |
| *(S) 2-Fluorophenol* | *35.2* | | *10.0-77.9* | | *08/29/2016 14:25* | WG903057 |
| *(S) Phenol-d5* | *28.5* | | *5.00-70.1* | | *08/29/2016 14:25* | WG903057 |
| *(S) Nitrobenzene-d5* | *72.1* | | *21.8-123* | | *08/29/2016 14:25* | WG903057 |
| *(S) 2-Fluorobiphenyl* | *78.5* | | *29.5-131* | | *08/29/2016 14:25* | WG903057 |
| *(S) 2,4,6-Tribromophenol* | *108* | | *11.2-130* | | *08/29/2016 14:25* | WG903057 |
| *(S) p-Terphenyl-d14* | *75.7* | | *29.3-137* | | *08/29/2016 14:25* | WG903057 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Anthracene | 0.148 | | 0.0500 | 1 | 08/31/2016 01:37 | WG903328 |
| Acenaphthene | 0.315 | | 0.0500 | 1 | 08/31/2016 01:37 | WG903328 |
| Benzo(a)anthracene | ND | | 0.0500 | 1 | 08/31/2016 01:37 | WG903328 |
| Benzo(a)pyrene | ND | | 0.0500 | 1 | 08/31/2016 01:37 | WG903328 |
| Benzo(b)fluoranthene | ND | | 0.0500 | 1 | 08/31/2016 01:37 | WG903328 |
| Benzo(g,h,i)perylene | ND | | 0.0500 | 1 | 08/31/2016 01:37 | WG903328 |
| Benzo(k)fluoranthene | ND | | 0.0500 | 1 | 08/31/2016 01:37 | WG903328 |
| Chrysene | ND | | 0.0500 | 1 | 08/31/2016 01:37 | WG903328 |
| Dibenz(a,h)anthracene | ND | | 0.0500 | 1 | 08/31/2016 01:37 | WG903328 |
| Fluoranthene | ND | | 0.0500 | 1 | 08/31/2016 01:37 | WG903328 |
| Fluorene | 0.221 | | 0.0500 | 1 | 08/31/2016 01:37 | WG903328 |
| Indeno(1,2,3-cd)pyrene | ND | | 0.0500 | 1 | 08/31/2016 01:37 | WG903328 |
| Naphthalene | ND | | 0.250 | 1 | 08/31/2016 01:37 | WG903328 |
| Phenanthrene | ND | | 0.0500 | 1 | 08/31/2016 01:37 | WG903328 |
| Pyrene | 0.122 | | 0.0500 | 1 | 08/31/2016 01:37 | WG903328 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

| Analyte | Result | Qualifier | RDL | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | ug/l | | ug/l | | date / time | |
| 2-Methylnaphthalene | ND | | 0.250 | 1 | 08/31/2016 01:37 | WG903328 |
| *(S) Nitrobenzene-d5* | *124* | | *33.8-179* | | *08/31/2016 01:37* | WG903328 |
| *(S) 2-Fluorobiphenyl* | *93.1* | | *55.5-150* | | *08/31/2016 01:37* | WG903328 |
| *(S) p-Terphenyl-d14* | *87.6* | | *46.2-163* | | *08/31/2016 01:37* | WG903328 |

## Metals (ICPMS) by Method 6020

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Cobalt,Dissolved | ND | | 2.00 | 1 | 08/30/2016 17:17 | WG903407 |
| Lead,Dissolved | ND | | 2.00 | 1 | 08/30/2016 17:17 | WG903407 |
| Nickel,Dissolved | 2.24 | B | 2.00 | 1 | 08/30/2016 17:17 | WG903407 |
| Vanadium,Dissolved | ND | | 5.00 | 1 | 08/30/2016 17:17 | WG903407 |
| Zinc,Dissolved | ND | | 25.0 | 1 | 08/30/2016 17:17 | WG903407 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Acetone | ND | | 50.0 | 1 | 09/02/2016 01:59 | WG902871 |
| Benzene | ND | | 1.00 | 1 | 09/02/2016 01:59 | WG902871 |
| Bromochloromethane | ND | | 1.00 | 1 | 09/02/2016 01:59 | WG902871 |
| Bromodichloromethane | ND | | 1.00 | 1 | 09/02/2016 01:59 | WG902871 |
| Bromoform | ND | | 1.00 | 1 | 09/02/2016 01:59 | WG902871 |
| Bromomethane | ND | | 5.00 | 1 | 09/02/2016 01:59 | WG902871 |
| Carbon disulfide | ND | | 1.00 | 1 | 09/02/2016 01:59 | WG902871 |
| Carbon tetrachloride | ND | J4 | 1.00 | 1 | 09/02/2016 01:59 | WG902871 |
| Chlorobenzene | ND | | 1.00 | 1 | 09/02/2016 01:59 | WG902871 |
| Chlorodibromomethane | ND | | 1.00 | 1 | 09/02/2016 01:59 | WG902871 |
| Chloroethane | ND | | 5.00 | 1 | 09/02/2016 01:59 | WG902871 |
| Chloroform | ND | | 5.00 | 1 | 09/02/2016 01:59 | WG902871 |
| Chloromethane | ND | | 2.50 | 1 | 09/02/2016 01:59 | WG902871 |
| Cyclohexane | ND | | 1.00 | 1 | 09/02/2016 01:59 | WG902871 |
| 1,2-Dibromo-3-Chloropropane | ND | | 5.00 | 1 | 09/02/2016 01:59 | WG902871 |
| 1,2-Dibromoethane | ND | | 1.00 | 1 | 09/02/2016 01:59 | WG902871 |
| 1,2-Dichlorobenzene | ND | | 1.00 | 1 | 09/02/2016 01:59 | WG902871 |
| 1,3-Dichlorobenzene | ND | | 1.00 | 1 | 09/02/2016 01:59 | WG902871 |
| 1,4-Dichlorobenzene | ND | | 1.00 | 1 | 09/02/2016 01:59 | WG902871 |
| Dichlorodifluoromethane | ND | | 5.00 | 1 | 09/02/2016 01:59 | WG902871 |
| 1,1-Dichloroethane | ND | | 1.00 | 1 | 09/02/2016 01:59 | WG902871 |
| 1,2-Dichloroethane | ND | | 1.00 | 1 | 09/02/2016 01:59 | WG902871 |
| 1,1-Dichloroethene | ND | | 1.00 | 1 | 09/02/2016 01:59 | WG902871 |
| cis-1,2-Dichloroethene | ND | | 1.00 | 1 | 09/02/2016 01:59 | WG902871 |
| trans-1,2-Dichloroethene | ND | | 1.00 | 1 | 09/02/2016 01:59 | WG902871 |
| 1,2-Dichloropropane | ND | | 1.00 | 1 | 09/02/2016 01:59 | WG902871 |
| cis-1,3-Dichloropropene | ND | | 1.00 | 1 | 09/02/2016 01:59 | WG902871 |
| trans-1,3-Dichloropropene | ND | J4 | 1.00 | 1 | 09/02/2016 01:59 | WG902871 |
| Ethylbenzene | ND | | 1.00 | 1 | 09/02/2016 01:59 | WG902871 |
| 2-Hexanone | ND | | 10.0 | 1 | 09/02/2016 01:59 | WG902871 |
| Isopropylbenzene | ND | | 1.00 | 1 | 09/02/2016 01:59 | WG902871 |
| 2-Butanone (MEK) | ND | | 10.0 | 1 | 09/02/2016 01:59 | WG902871 |
| Methyl Acetate | ND | | 20.0 | 1 | 09/02/2016 01:59 | WG902871 |
| Methyl Cyclohexane | ND | | 1.00 | 1 | 09/02/2016 01:59 | WG902871 |
| Methylene Chloride | ND | | 5.00 | 1 | 09/02/2016 01:59 | WG902871 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 10.0 | 1 | 09/02/2016 01:59 | WG902871 |
| Methyl tert-butyl ether | ND | | 1.00 | 1 | 09/02/2016 01:59 | WG902871 |
| Styrene | ND | | 1.00 | 1 | 09/02/2016 01:59 | WG902871 |
| 1,1,2,2-Tetrachloroethane | ND | | 1.00 | 1 | 09/02/2016 01:59 | WG902871 |
| Tetrachloroethene | ND | | 1.00 | 1 | 09/02/2016 01:59 | WG902871 |
| Toluene | ND | | 5.00 | 1 | 09/02/2016 01:59 | WG902871 |
| 1,2,3-Trichlorobenzene | ND | | 1.00 | 1 | 09/02/2016 01:59 | WG902871 |
| 1,2,4-Trichlorobenzene | ND | | 1.00 | 1 | 09/02/2016 01:59 | WG902871 |
| 1,1,1-Trichloroethane | ND | | 1.00 | 1 | 09/02/2016 01:59 | WG902871 |
| 1,1,2-Trichloroethane | ND | | 1.00 | 1 | 09/02/2016 01:59 | WG902871 |
| Trichloroethene | ND | | 1.00 | 1 | 09/02/2016 01:59 | WG902871 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Trichlorofluoromethane | ND | | 5.00 | 1 | 09/02/2016 01:59 | WG902871 |
| 1,1,2-Trichlorotrifluoroethane | ND | | 1.00 | 1 | 09/02/2016 01:59 | WG902871 |
| Vinyl chloride | ND | | 1.00 | 1 | 09/02/2016 01:59 | WG902871 |
| Xylenes, Total | ND | | 3.00 | 1 | 09/02/2016 01:59 | WG902871 |
| *(S) Toluene-d8* | *102* | | *90.0-115* | | *09/02/2016 01:59* | WG902871 |
| *(S) Dibromofluoromethane* | *90.1* | | *79.0-121* | | *09/02/2016 01:59* | WG902871 |
| *(S) a,a,a-Trifluorotoluene* | *94.0* | | *90.4-116* | | *09/02/2016 01:59* | WG902871 |
| *(S) 4-Bromofluorobenzene* | *85.2* | | *80.1-120* | | *09/02/2016 01:59* | WG902871 |

## EDB / DBCP by Method 8011

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Ethylene Dibromide | ND | | 0.0100 | 1 | 09/01/2016 22:33 | WG903771 |
| 1,2-Dibromo-3-Chloropropane | ND | | 0.0200 | 1 | 09/01/2016 22:33 | WG903771 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Biphenyl | ND | | 10.0 | 1 | 08/29/2016 14:49 | WG903057 |
| Bis(2-Ethylhexyl)phthalate | ND | | 3.00 | 1 | 08/29/2016 14:49 | WG903057 |
| Di-n-butyl phthalate | ND | | 3.00 | 1 | 08/29/2016 14:49 | WG903057 |
| Diethyl phthalate | ND | | 3.00 | 1 | 08/29/2016 14:49 | WG903057 |
| Pyridine | ND | | 10.0 | 1 | 08/29/2016 14:49 | WG903057 |
| Quinoline | ND | | 50.0 | 1 | 08/30/2016 12:09 | WG903057 |
| 2,4-Dimethylphenol | ND | | 10.0 | 1 | 08/29/2016 14:49 | WG903057 |
| 2,4-Dinitrophenol | ND | J4 | 10.0 | 1 | 08/29/2016 14:49 | WG903057 |
| 2-Methylphenol | ND | | 10.0 | 1 | 08/29/2016 14:49 | WG903057 |
| 3&4-Methyl Phenol | ND | | 10.0 | 1 | 08/29/2016 14:49 | WG903057 |
| 4-Nitrophenol | ND | | 10.0 | 1 | 08/29/2016 14:49 | WG903057 |
| Phenol | ND | | 10.0 | 1 | 08/29/2016 14:49 | WG903057 |
| *(S) 2-Fluorophenol* | *32.0* | | *10.0-77.9* | | *08/29/2016 14:49* | WG903057 |
| *(S) Phenol-d5* | *25.9* | | *5.00-70.1* | | *08/29/2016 14:49* | WG903057 |
| *(S) Nitrobenzene-d5* | *78.2* | | *21.8-123* | | *08/29/2016 14:49* | WG903057 |
| *(S) 2-Fluorobiphenyl* | *73.2* | | *29.5-131* | | *08/29/2016 14:49* | WG903057 |
| *(S) 2,4,6-Tribromophenol* | *103* | | *11.2-130* | | *08/29/2016 14:49* | WG903057 |
| *(S) p-Terphenyl-d14* | *67.9* | | *29.3-137* | | *08/29/2016 14:49* | WG903057 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Anthracene | 0.145 | | 0.0500 | 1 | 08/31/2016 01:59 | WG903328 |
| Acenaphthene | 0.249 | | 0.0500 | 1 | 08/31/2016 01:59 | WG903328 |
| Benzo(a)anthracene | ND | | 0.0500 | 1 | 08/31/2016 01:59 | WG903328 |
| Benzo(a)pyrene | ND | | 0.0500 | 1 | 08/31/2016 01:59 | WG903328 |
| Benzo(b)fluoranthene | ND | | 0.0500 | 1 | 08/31/2016 01:59 | WG903328 |
| Benzo(g,h,i)perylene | ND | | 0.0500 | 1 | 08/31/2016 01:59 | WG903328 |
| Benzo(k)fluoranthene | ND | | 0.0500 | 1 | 08/31/2016 01:59 | WG903328 |
| Chrysene | ND | | 0.0500 | 1 | 08/31/2016 01:59 | WG903328 |
| Dibenz(a,h)anthracene | ND | | 0.0500 | 1 | 08/31/2016 01:59 | WG903328 |
| Fluoranthene | 0.0650 | | 0.0500 | 1 | 08/31/2016 01:59 | WG903328 |
| Fluorene | 0.0887 | | 0.0500 | 1 | 08/31/2016 01:59 | WG903328 |
| Indeno(1,2,3-cd)pyrene | ND | | 0.0500 | 1 | 08/31/2016 01:59 | WG903328 |
| Naphthalene | ND | | 0.250 | 1 | 08/31/2016 01:59 | WG903328 |
| Phenanthrene | ND | | 0.0500 | 1 | 08/31/2016 01:59 | WG903328 |
| Pyrene | 0.189 | | 0.0500 | 1 | 08/31/2016 01:59 | WG903328 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

| Analyte | Result | Qualifier | RDL | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | ug/l | | ug/l | | date / time | |
| 2-Methylnaphthalene | ND | | 0.250 | 1 | 08/31/2016 01:59 | WG903328 |
| *(S) Nitrobenzene-d5* | *118* | | *33.8-179* | | *08/31/2016 01:59* | WG903328 |
| *(S) 2-Fluorobiphenyl* | *92.3* | | *55.5-150* | | *08/31/2016 01:59* | WG903328 |
| *(S) p-Terphenyl-d14* | *86.0* | | *46.2-163* | | *08/31/2016 01:59* | WG903328 |

## Metals (ICPMS) by Method 6020

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Cobalt,Dissolved | ND | | 10.0 | 5 | 08/30/2016 17:20 | WG903407 |
| Lead,Dissolved | ND | | 10.0 | 5 | 08/30/2016 17:20 | WG903407 |
| Nickel,Dissolved | ND | | 10.0 | 5 | 08/30/2016 17:20 | WG903407 |
| Vanadium,Dissolved | ND | | 25.0 | 5 | 08/30/2016 17:20 | WG903407 |
| Zinc,Dissolved | ND | | 125 | 5 | 08/30/2016 17:20 | WG903407 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Acetone | ND | | 50.0 | 1 | 09/02/2016 19:47 | WG902871 |
| Benzene | 138 | | 1.00 | 1 | 09/02/2016 19:47 | WG902871 |
| Bromochloromethane | ND | | 1.00 | 1 | 09/02/2016 19:47 | WG902871 |
| Bromodichloromethane | ND | | 1.00 | 1 | 09/02/2016 19:47 | WG902871 |
| Bromoform | ND | | 1.00 | 1 | 09/02/2016 19:47 | WG902871 |
| Bromomethane | ND | | 5.00 | 1 | 09/02/2016 19:47 | WG902871 |
| Carbon disulfide | ND | | 1.00 | 1 | 09/02/2016 19:47 | WG902871 |
| Carbon tetrachloride | ND | J4 | 1.00 | 1 | 09/02/2016 19:47 | WG902871 |
| Chlorobenzene | ND | | 1.00 | 1 | 09/02/2016 19:47 | WG902871 |
| Chlorodibromomethane | ND | | 1.00 | 1 | 09/02/2016 19:47 | WG902871 |
| Chloroethane | ND | | 5.00 | 1 | 09/02/2016 19:47 | WG902871 |
| Chloroform | ND | | 5.00 | 1 | 09/02/2016 19:47 | WG902871 |
| Chloromethane | ND | | 2.50 | 1 | 09/02/2016 19:47 | WG902871 |
| Cyclohexane | 8.46 | | 1.00 | 1 | 09/02/2016 19:47 | WG902871 |
| 1,2-Dibromo-3-Chloropropane | ND | | 5.00 | 1 | 09/02/2016 19:47 | WG902871 |
| 1,2-Dibromoethane | ND | | 1.00 | 1 | 09/02/2016 19:47 | WG902871 |
| 1,2-Dichlorobenzene | ND | | 1.00 | 1 | 09/02/2016 19:47 | WG902871 |
| 1,3-Dichlorobenzene | ND | | 1.00 | 1 | 09/02/2016 19:47 | WG902871 |
| 1,4-Dichlorobenzene | ND | | 1.00 | 1 | 09/02/2016 19:47 | WG902871 |
| Dichlorodifluoromethane | ND | | 5.00 | 1 | 09/02/2016 19:47 | WG902871 |
| 1,1-Dichloroethane | ND | | 1.00 | 1 | 09/02/2016 19:47 | WG902871 |
| 1,2-Dichloroethane | ND | | 1.00 | 1 | 09/02/2016 19:47 | WG902871 |
| 1,1-Dichloroethene | ND | | 1.00 | 1 | 09/02/2016 19:47 | WG902871 |
| cis-1,2-Dichloroethene | ND | | 1.00 | 1 | 09/02/2016 19:47 | WG902871 |
| trans-1,2-Dichloroethene | ND | | 1.00 | 1 | 09/02/2016 19:47 | WG902871 |
| 1,2-Dichloropropane | ND | | 1.00 | 1 | 09/02/2016 19:47 | WG902871 |
| cis-1,3-Dichloropropene | ND | | 1.00 | 1 | 09/02/2016 19:47 | WG902871 |
| trans-1,3-Dichloropropene | ND | J4 | 1.00 | 1 | 09/02/2016 19:47 | WG902871 |
| Ethylbenzene | ND | | 1.00 | 1 | 09/02/2016 19:47 | WG902871 |
| 2-Hexanone | ND | | 10.0 | 1 | 09/02/2016 19:47 | WG902871 |
| Isopropylbenzene | 3.43 | | 1.00 | 1 | 09/02/2016 19:47 | WG902871 |
| 2-Butanone (MEK) | ND | | 10.0 | 1 | 09/02/2016 19:47 | WG902871 |
| Methyl Acetate | ND | | 20.0 | 1 | 09/02/2016 19:47 | WG902871 |
| Methyl Cyclohexane | ND | | 1.00 | 1 | 09/02/2016 19:47 | WG902871 |
| Methylene Chloride | ND | | 5.00 | 1 | 09/02/2016 19:47 | WG902871 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 10.0 | 1 | 09/02/2016 19:47 | WG902871 |
| Methyl tert-butyl ether | ND | | 1.00 | 1 | 09/02/2016 19:47 | WG902871 |
| Styrene | ND | | 1.00 | 1 | 09/02/2016 19:47 | WG902871 |
| 1,1,2,2-Tetrachloroethane | ND | | 1.00 | 1 | 09/02/2016 19:47 | WG902871 |
| Tetrachloroethene | ND | | 1.00 | 1 | 09/02/2016 19:47 | WG902871 |
| Toluene | ND | | 5.00 | 1 | 09/02/2016 19:47 | WG902871 |
| 1,2,3-Trichlorobenzene | ND | | 1.00 | 1 | 09/02/2016 19:47 | WG902871 |
| 1,2,4-Trichlorobenzene | ND | | 1.00 | 1 | 09/02/2016 19:47 | WG902871 |
| 1,1,1-Trichloroethane | ND | | 1.00 | 1 | 09/02/2016 19:47 | WG902871 |
| 1,1,2-Trichloroethane | ND | | 1.00 | 1 | 09/02/2016 19:47 | WG902871 |
| Trichloroethene | ND | | 1.00 | 1 | 09/02/2016 19:47 | WG902871 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Trichlorofluoromethane | ND | | 5.00 | 1 | 09/02/2016 19:47 | WG902871 |
| 1,1,2-Trichlorotrifluoroethane | ND | | 1.00 | 1 | 09/02/2016 19:47 | WG902871 |
| Vinyl chloride | ND | | 1.00 | 1 | 09/02/2016 19:47 | WG902871 |
| Xylenes, Total | 4.13 | | 3.00 | 1 | 09/02/2016 19:47 | WG902871 |
| *(S) Toluene-d8* | *109* | | *90.0-115* | | *09/02/2016 19:47* | WG902871 |
| *(S) Dibromofluoromethane* | *108* | | *79.0-121* | | *09/02/2016 19:47* | WG902871 |
| *(S) a,a,a-Trifluorotoluene* | *95.3* | | *90.4-116* | | *09/02/2016 19:47* | WG902871 |
| *(S) 4-Bromofluorobenzene* | *96.6* | | *80.1-120* | | *09/02/2016 19:47* | WG902871 |

## EDB / DBCP by Method 8011

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Ethylene Dibromide | ND | | 0.0100 | 1 | 09/01/2016 22:44 | WG903771 |
| 1,2-Dibromo-3-Chloropropane | ND | | 0.0200 | 1 | 09/01/2016 22:44 | WG903771 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Biphenyl | ND | | 10.0 | 1 | 09/01/2016 14:21 | WG903056 |
| Bis(2-Ethylhexyl)phthalate | ND | | 3.00 | 1 | 09/01/2016 14:21 | WG903056 |
| Di-n-butyl phthalate | ND | | 3.00 | 1 | 09/01/2016 14:21 | WG903056 |
| Diethyl phthalate | ND | | 3.00 | 1 | 09/01/2016 14:21 | WG903056 |
| Pyridine | ND | | 10.0 | 1 | 09/01/2016 14:21 | WG903056 |
| Quinoline | ND | | 50.0 | 1 | 09/02/2016 20:05 | WG903056 |
| 2,4-Dimethylphenol | ND | | 10.0 | 1 | 09/01/2016 14:21 | WG903056 |
| 2,4-Dinitrophenol | ND | | 10.0 | 1 | 09/01/2016 14:21 | WG903056 |
| 2-Methylphenol | ND | | 10.0 | 1 | 09/01/2016 14:21 | WG903056 |
| 3&4-Methyl Phenol | ND | | 10.0 | 1 | 09/01/2016 14:21 | WG903056 |
| 4-Nitrophenol | ND | | 10.0 | 1 | 09/01/2016 14:21 | WG903056 |
| Phenol | ND | | 10.0 | 1 | 09/01/2016 14:21 | WG903056 |
| *(S) 2-Fluorophenol* | *56.1* | | *10.0-77.9* | | *09/01/2016 14:21* | WG903056 |
| *(S) Phenol-d5* | *40.5* | | *5.00-70.1* | | *09/01/2016 14:21* | WG903056 |
| *(S) Nitrobenzene-d5* | *86.2* | | *21.8-123* | | *09/01/2016 14:21* | WG903056 |
| *(S) 2-Fluorobiphenyl* | *74.2* | | *29.5-131* | | *09/01/2016 14:21* | WG903056 |
| *(S) 2,4,6-Tribromophenol* | *135* | J1 | *11.2-130* | | *09/01/2016 14:21* | WG903056 |
| *(S) p-Terphenyl-d14* | *81.5* | | *29.3-137* | | *09/01/2016 14:21* | WG903056 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Anthracene | 0.248 | | 0.0500 | 1 | 09/12/2016 19:17 | WG903328 |
| Acenaphthene | 1.01 | | 0.0500 | 1 | 09/12/2016 19:17 | WG903328 |
| Benzo(a)anthracene | 0.0560 | | 0.0500 | 1 | 09/12/2016 19:17 | WG903328 |
| Benzo(a)pyrene | 0.0544 | | 0.0500 | 1 | 09/12/2016 19:17 | WG903328 |
| Benzo(b)fluoranthene | 0.0600 | | 0.0500 | 1 | 09/12/2016 19:17 | WG903328 |
| Benzo(g,h,i)perylene | 0.0581 | | 0.0500 | 1 | 09/12/2016 19:17 | WG903328 |
| Benzo(k)fluoranthene | ND | | 0.0500 | 1 | 09/12/2016 19:17 | WG903328 |
| Chrysene | 0.0663 | | 0.0500 | 1 | 09/12/2016 19:17 | WG903328 |
| Dibenz(a,h)anthracene | ND | | 0.0500 | 1 | 09/12/2016 19:17 | WG903328 |
| Fluoranthene | 0.161 | | 0.0500 | 1 | 09/12/2016 19:17 | WG903328 |
| Fluorene | 0.449 | | 0.0500 | 1 | 09/12/2016 19:17 | WG903328 |
| Indeno(1,2,3-cd)pyrene | ND | | 0.0500 | 1 | 09/12/2016 19:17 | WG903328 |
| Naphthalene | 0.332 | | 0.250 | 1 | 09/12/2016 19:17 | WG903328 |
| Phenanthrene | 0.112 | | 0.0500 | 1 | 09/12/2016 19:17 | WG903328 |
| Pyrene | 0.311 | | 0.0500 | 1 | 09/12/2016 19:17 | WG903328 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

| Analyte | Result | Qualifier | RDL | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | ug/l | | ug/l | | date / time | |
| 2-Methylnaphthalene | ND | | 0.250 | 1 | 09/12/2016 19:17 | WG903328 |
| *(S) Nitrobenzene-d5* | *177* | | *33.8-179* | | *09/12/2016 19:17* | WG903328 |
| *(S) 2-Fluorobiphenyl* | *76.5* | | *55.5-150* | | *09/12/2016 19:17* | WG903328 |
| *(S) p-Terphenyl-d14* | *78.6* | | *46.2-163* | | *09/12/2016 19:17* | WG903328 |

## Metals (ICPMS) by Method 6020

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Cobalt,Dissolved | 13.7 | | 2.00 | 1 | 08/30/2016 17:23 | WG903407 |
| Lead,Dissolved | ND | | 2.00 | 1 | 08/30/2016 17:23 | WG903407 |
| Nickel,Dissolved | 20.6 | | 2.00 | 1 | 08/30/2016 17:23 | WG903407 |
| Vanadium,Dissolved | ND | | 5.00 | 1 | 08/30/2016 17:23 | WG903407 |
| Zinc,Dissolved | 104 | | 25.0 | 1 | 08/30/2016 17:23 | WG903407 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Acetone | ND | | 50.0 | 1 | 08/31/2016 20:16 | WG902871 |
| Benzene | ND | | 1.00 | 1 | 08/31/2016 20:16 | WG902871 |
| Bromochloromethane | ND | | 1.00 | 1 | 08/31/2016 20:16 | WG902871 |
| Bromodichloromethane | ND | | 1.00 | 1 | 08/31/2016 20:16 | WG902871 |
| Bromoform | ND | | 1.00 | 1 | 08/31/2016 20:16 | WG902871 |
| Bromomethane | ND | | 5.00 | 1 | 08/31/2016 20:16 | WG902871 |
| Carbon disulfide | ND | | 1.00 | 1 | 08/31/2016 20:16 | WG902871 |
| Carbon tetrachloride | ND | J4 | 1.00 | 1 | 08/31/2016 20:16 | WG902871 |
| Chlorobenzene | ND | | 1.00 | 1 | 08/31/2016 20:16 | WG902871 |
| Chlorodibromomethane | ND | | 1.00 | 1 | 08/31/2016 20:16 | WG902871 |
| Chloroethane | ND | | 5.00 | 1 | 08/31/2016 20:16 | WG902871 |
| Chloroform | ND | | 5.00 | 1 | 08/31/2016 20:16 | WG902871 |
| Chloromethane | ND | | 2.50 | 1 | 08/31/2016 20:16 | WG902871 |
| Cyclohexane | ND | | 1.00 | 1 | 08/31/2016 20:16 | WG902871 |
| 1,2-Dibromo-3-Chloropropane | ND | | 5.00 | 1 | 08/31/2016 20:16 | WG902871 |
| 1,2-Dibromoethane | ND | | 1.00 | 1 | 08/31/2016 20:16 | WG902871 |
| 1,2-Dichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 20:16 | WG902871 |
| 1,3-Dichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 20:16 | WG902871 |
| 1,4-Dichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 20:16 | WG902871 |
| Dichlorodifluoromethane | ND | | 5.00 | 1 | 08/31/2016 20:16 | WG902871 |
| 1,1-Dichloroethane | ND | | 1.00 | 1 | 08/31/2016 20:16 | WG902871 |
| 1,2-Dichloroethane | ND | | 1.00 | 1 | 08/31/2016 20:16 | WG902871 |
| 1,1-Dichloroethene | ND | | 1.00 | 1 | 08/31/2016 20:16 | WG902871 |
| cis-1,2-Dichloroethene | ND | | 1.00 | 1 | 08/31/2016 20:16 | WG902871 |
| trans-1,2-Dichloroethene | ND | | 1.00 | 1 | 08/31/2016 20:16 | WG902871 |
| 1,2-Dichloropropane | ND | | 1.00 | 1 | 08/31/2016 20:16 | WG902871 |
| cis-1,3-Dichloropropene | ND | | 1.00 | 1 | 08/31/2016 20:16 | WG902871 |
| trans-1,3-Dichloropropene | ND | J4 | 1.00 | 1 | 08/31/2016 20:16 | WG902871 |
| Ethylbenzene | ND | | 1.00 | 1 | 08/31/2016 20:16 | WG902871 |
| 2-Hexanone | ND | | 10.0 | 1 | 08/31/2016 20:16 | WG902871 |
| Isopropylbenzene | ND | | 1.00 | 1 | 08/31/2016 20:16 | WG902871 |
| 2-Butanone (MEK) | ND | | 10.0 | 1 | 08/31/2016 20:16 | WG902871 |
| Methyl Acetate | ND | | 20.0 | 1 | 08/31/2016 20:16 | WG902871 |
| Methyl Cyclohexane | ND | | 1.00 | 1 | 08/31/2016 20:16 | WG902871 |
| Methylene Chloride | ND | | 5.00 | 1 | 08/31/2016 20:16 | WG902871 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 10.0 | 1 | 08/31/2016 20:16 | WG902871 |
| Methyl tert-butyl ether | ND | | 1.00 | 1 | 08/31/2016 20:16 | WG902871 |
| Styrene | ND | | 1.00 | 1 | 08/31/2016 20:16 | WG902871 |
| 1,1,2,2-Tetrachloroethane | ND | | 1.00 | 1 | 08/31/2016 20:16 | WG902871 |
| Tetrachloroethene | ND | | 1.00 | 1 | 08/31/2016 20:16 | WG902871 |
| Toluene | ND | | 5.00 | 1 | 08/31/2016 20:16 | WG902871 |
| 1,2,3-Trichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 20:16 | WG902871 |
| 1,2,4-Trichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 20:16 | WG902871 |
| 1,1,1-Trichloroethane | ND | | 1.00 | 1 | 08/31/2016 20:16 | WG902871 |
| 1,1,2-Trichloroethane | ND | | 1.00 | 1 | 08/31/2016 20:16 | WG902871 |
| Trichloroethene | ND | | 1.00 | 1 | 08/31/2016 20:16 | WG902871 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Trichlorofluoromethane | ND | | 5.00 | 1 | 08/31/2016 20:16 | WG902871 |
| 1,1,2-Trichlorotrifluoroethane | ND | | 1.00 | 1 | 08/31/2016 20:16 | WG902871 |
| Vinyl chloride | ND | | 1.00 | 1 | 08/31/2016 20:16 | WG902871 |
| Xylenes, Total | ND | | 3.00 | 1 | 08/31/2016 20:16 | WG902871 |
| *(S) Toluene-d8* | *102* | | *90.0-115* | | *08/31/2016 20:16* | WG902871 |
| *(S) Dibromofluoromethane* | *94.4* | | *79.0-121* | | *08/31/2016 20:16* | WG902871 |
| *(S) a,a,a-Trifluorotoluene* | *105* | | *90.4-116* | | *08/31/2016 20:16* | WG902871 |
| *(S) 4-Bromofluorobenzene* | *93.8* | | *80.1-120* | | *08/31/2016 20:16* | WG902871 |

## EDB / DBCP by Method 8011

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Ethylene Dibromide | ND | | 0.0100 | 1 | 09/01/2016 22:55 | WG903771 |
| 1,2-Dibromo-3-Chloropropane | ND | | 0.0200 | 1 | 09/01/2016 22:55 | WG903771 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Biphenyl | ND | | 10.0 | 1 | 08/29/2016 15:12 | WG903057 |
| Bis(2-Ethylhexyl)phthalate | ND | | 3.00 | 1 | 08/29/2016 15:12 | WG903057 |
| Di-n-butyl phthalate | ND | | 3.00 | 1 | 08/29/2016 15:12 | WG903057 |
| Diethyl phthalate | ND | | 3.00 | 1 | 08/29/2016 15:12 | WG903057 |
| Pyridine | ND | | 10.0 | 1 | 08/29/2016 15:12 | WG903057 |
| Quinoline | ND | | 50.0 | 1 | 08/30/2016 12:29 | WG903057 |
| 2,4-Dimethylphenol | ND | | 10.0 | 1 | 08/29/2016 15:12 | WG903057 |
| 2,4-Dinitrophenol | ND | J4 | 10.0 | 1 | 08/29/2016 15:12 | WG903057 |
| 2-Methylphenol | ND | | 10.0 | 1 | 08/29/2016 15:12 | WG903057 |
| 3&4-Methyl Phenol | ND | | 10.0 | 1 | 08/29/2016 15:12 | WG903057 |
| 4-Nitrophenol | ND | | 10.0 | 1 | 08/29/2016 15:12 | WG903057 |
| Phenol | ND | | 10.0 | 1 | 08/29/2016 15:12 | WG903057 |
| *(S) 2-Fluorophenol* | *23.4* | | *10.0-77.9* | | *08/29/2016 15:12* | WG903057 |
| *(S) Phenol-d5* | *14.8* | | *5.00-70.1* | | *08/29/2016 15:12* | WG903057 |
| *(S) Nitrobenzene-d5* | *56.4* | | *21.8-123* | | *08/29/2016 15:12* | WG903057 |
| *(S) 2-Fluorobiphenyl* | *66.3* | | *29.5-131* | | *08/29/2016 15:12* | WG903057 |
| *(S) 2,4,6-Tribromophenol* | *80.2* | | *11.2-130* | | *08/29/2016 15:12* | WG903057 |
| *(S) p-Terphenyl-d14* | *57.9* | | *29.3-137* | | *08/29/2016 15:12* | WG903057 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Anthracene | 0.0669 | | 0.0500 | 1 | 08/31/2016 02:21 | WG903328 |
| Acenaphthene | ND | | 0.0500 | 1 | 08/31/2016 02:21 | WG903328 |
| Benzo(a)anthracene | 0.110 | | 0.0500 | 1 | 08/31/2016 02:21 | WG903328 |
| Benzo(a)pyrene | 0.149 | | 0.0500 | 1 | 08/31/2016 02:21 | WG903328 |
| Benzo(b)fluoranthene | 0.173 | | 0.0500 | 1 | 08/31/2016 02:21 | WG903328 |
| Benzo(g,h,i)perylene | 0.142 | | 0.0500 | 1 | 08/31/2016 02:21 | WG903328 |
| Benzo(k)fluoranthene | 0.0502 | | 0.0500 | 1 | 08/31/2016 02:21 | WG903328 |
| Chrysene | 0.0962 | | 0.0500 | 1 | 08/31/2016 02:21 | WG903328 |
| Dibenz(a,h)anthracene | ND | | 0.0500 | 1 | 08/31/2016 02:21 | WG903328 |
| Fluoranthene | 0.108 | | 0.0500 | 1 | 08/31/2016 02:21 | WG903328 |
| Fluorene | ND | | 0.0500 | 1 | 08/31/2016 02:21 | WG903328 |
| Indeno(1,2,3-cd)pyrene | 0.119 | | 0.0500 | 1 | 08/31/2016 02:21 | WG903328 |
| Naphthalene | ND | | 0.250 | 1 | 08/31/2016 02:21 | WG903328 |
| Phenanthrene | 0.0902 | | 0.0500 | 1 | 08/31/2016 02:21 | WG903328 |
| Pyrene | 0.117 | | 0.0500 | 1 | 08/31/2016 02:21 | WG903328 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

| Analyte | Result | Qualifier | RDL | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | ug/l | | ug/l | | date / time | |
| 2-Methylnaphthalene | ND | | 0.250 | 1 | 08/31/2016 02:21 | WG903328 |
| *(S) Nitrobenzene-d5* | *96.0* | | *33.8-179* | | *08/31/2016 02:21* | WG903328 |
| *(S) 2-Fluorobiphenyl* | *98.7* | | *55.5-150* | | *08/31/2016 02:21* | WG903328 |
| *(S) p-Terphenyl-d14* | *84.9* | | *46.2-163* | | *08/31/2016 02:21* | WG903328 |

## Metals (ICPMS) by Method 6020

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Cobalt,Dissolved | 4.23 | | 2.00 | 1 | 08/30/2016 17:26 | WG903407 |
| Lead,Dissolved | ND | | 2.00 | 1 | 08/30/2016 17:26 | WG903407 |
| Nickel,Dissolved | 3.73 | B | 2.00 | 1 | 08/30/2016 17:26 | WG903407 |
| Vanadium,Dissolved | ND | | 5.00 | 1 | 08/30/2016 17:26 | WG903407 |
| Zinc,Dissolved | ND | | 25.0 | 1 | 08/30/2016 17:26 | WG903407 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Acetone | ND | | 50.0 | 1 | 08/31/2016 21:03 | WG902871 |
| Benzene | ND | | 1.00 | 1 | 08/31/2016 21:03 | WG902871 |
| Bromochloromethane | ND | | 1.00 | 1 | 08/31/2016 21:03 | WG902871 |
| Bromodichloromethane | ND | | 1.00 | 1 | 08/31/2016 21:03 | WG902871 |
| Bromoform | ND | | 1.00 | 1 | 08/31/2016 21:03 | WG902871 |
| Bromomethane | ND | | 5.00 | 1 | 08/31/2016 21:03 | WG902871 |
| Carbon disulfide | ND | | 1.00 | 1 | 08/31/2016 21:03 | WG902871 |
| Carbon tetrachloride | ND | J4 | 1.00 | 1 | 08/31/2016 21:03 | WG902871 |
| Chlorobenzene | ND | | 1.00 | 1 | 08/31/2016 21:03 | WG902871 |
| Chlorodibromomethane | ND | | 1.00 | 1 | 08/31/2016 21:03 | WG902871 |
| Chloroethane | ND | | 5.00 | 1 | 08/31/2016 21:03 | WG902871 |
| Chloroform | ND | | 5.00 | 1 | 08/31/2016 21:03 | WG902871 |
| Chloromethane | ND | | 2.50 | 1 | 08/31/2016 21:03 | WG902871 |
| Cyclohexane | 16.0 | | 1.00 | 1 | 08/31/2016 21:03 | WG902871 |
| 1,2-Dibromo-3-Chloropropane | ND | | 5.00 | 1 | 08/31/2016 21:03 | WG902871 |
| 1,2-Dibromoethane | ND | | 1.00 | 1 | 08/31/2016 21:03 | WG902871 |
| 1,2-Dichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 21:03 | WG902871 |
| 1,3-Dichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 21:03 | WG902871 |
| 1,4-Dichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 21:03 | WG902871 |
| Dichlorodifluoromethane | ND | | 5.00 | 1 | 08/31/2016 21:03 | WG902871 |
| 1,1-Dichloroethane | ND | | 1.00 | 1 | 08/31/2016 21:03 | WG902871 |
| 1,2-Dichloroethane | ND | | 1.00 | 1 | 08/31/2016 21:03 | WG902871 |
| 1,1-Dichloroethene | ND | | 1.00 | 1 | 08/31/2016 21:03 | WG902871 |
| cis-1,2-Dichloroethene | ND | | 1.00 | 1 | 08/31/2016 21:03 | WG902871 |
| trans-1,2-Dichloroethene | ND | | 1.00 | 1 | 08/31/2016 21:03 | WG902871 |
| 1,2-Dichloropropane | ND | | 1.00 | 1 | 08/31/2016 21:03 | WG902871 |
| cis-1,3-Dichloropropene | ND | | 1.00 | 1 | 08/31/2016 21:03 | WG902871 |
| trans-1,3-Dichloropropene | ND | J4 | 1.00 | 1 | 08/31/2016 21:03 | WG902871 |
| Ethylbenzene | ND | | 1.00 | 1 | 08/31/2016 21:03 | WG902871 |
| 2-Hexanone | ND | | 10.0 | 1 | 08/31/2016 21:03 | WG902871 |
| Isopropylbenzene | 7.42 | | 1.00 | 1 | 08/31/2016 21:03 | WG902871 |
| 2-Butanone (MEK) | ND | | 10.0 | 1 | 08/31/2016 21:03 | WG902871 |
| Methyl Acetate | ND | | 20.0 | 1 | 08/31/2016 21:03 | WG902871 |
| Methyl Cyclohexane | 47.0 | | 1.00 | 1 | 08/31/2016 21:03 | WG902871 |
| Methylene Chloride | ND | | 5.00 | 1 | 08/31/2016 21:03 | WG902871 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 10.0 | 1 | 08/31/2016 21:03 | WG902871 |
| Methyl tert-butyl ether | ND | | 1.00 | 1 | 08/31/2016 21:03 | WG902871 |
| Styrene | ND | | 1.00 | 1 | 08/31/2016 21:03 | WG902871 |
| 1,1,2,2-Tetrachloroethane | ND | | 1.00 | 1 | 08/31/2016 21:03 | WG902871 |
| Tetrachloroethene | ND | | 1.00 | 1 | 08/31/2016 21:03 | WG902871 |
| Toluene | ND | | 5.00 | 1 | 08/31/2016 21:03 | WG902871 |
| 1,2,3-Trichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 21:03 | WG902871 |
| 1,2,4-Trichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 21:03 | WG902871 |
| 1,1,1-Trichloroethane | ND | | 1.00 | 1 | 08/31/2016 21:03 | WG902871 |
| 1,1,2-Trichloroethane | ND | | 1.00 | 1 | 08/31/2016 21:03 | WG902871 |
| Trichloroethene | ND | | 1.00 | 1 | 08/31/2016 21:03 | WG902871 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Trichlorofluoromethane | ND | | 5.00 | 1 | 08/31/2016 21:03 | WG902871 |
| 1,1,2-Trichlorotrifluoroethane | ND | | 1.00 | 1 | 08/31/2016 21:03 | WG902871 |
| Vinyl chloride | ND | | 1.00 | 1 | 08/31/2016 21:03 | WG902871 |
| Xylenes, Total | ND | | 3.00 | 1 | 08/31/2016 21:03 | WG902871 |
| *(S) Toluene-d8* | *101* | | *90.0-115* | | *08/31/2016 21:03* | WG902871 |
| *(S) Dibromofluoromethane* | *93.2* | | *79.0-121* | | *08/31/2016 21:03* | WG902871 |
| *(S) a,a,a-Trifluorotoluene* | *103* | | *90.4-116* | | *08/31/2016 21:03* | WG902871 |
| *(S) 4-Bromofluorobenzene* | *93.6* | | *80.1-120* | | *08/31/2016 21:03* | WG902871 |

## EDB / DBCP by Method 8011

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Ethylene Dibromide | ND | | 0.0100 | 1 | 09/01/2016 23:06 | WG903771 |
| 1,2-Dibromo-3-Chloropropane | ND | | 0.0200 | 1 | 09/01/2016 23:06 | WG903771 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Biphenyl | ND | | 10.0 | 1 | 08/29/2016 15:35 | WG903057 |
| Bis(2-Ethylhexyl)phthalate | ND | | 3.00 | 1 | 08/29/2016 15:35 | WG903057 |
| Di-n-butyl phthalate | ND | | 3.00 | 1 | 08/29/2016 15:35 | WG903057 |
| Diethyl phthalate | ND | | 3.00 | 1 | 08/29/2016 15:35 | WG903057 |
| Pyridine | ND | | 10.0 | 1 | 08/29/2016 15:35 | WG903057 |
| Quinoline | ND | | 50.0 | 1 | 08/30/2016 12:49 | WG903057 |
| 2,4-Dimethylphenol | ND | | 10.0 | 1 | 08/29/2016 15:35 | WG903057 |
| 2,4-Dinitrophenol | ND | J4 | 10.0 | 1 | 08/29/2016 15:35 | WG903057 |
| 2-Methylphenol | ND | | 10.0 | 1 | 08/29/2016 15:35 | WG903057 |
| 3&4-Methyl Phenol | ND | | 10.0 | 1 | 08/29/2016 15:35 | WG903057 |
| 4-Nitrophenol | ND | | 10.0 | 1 | 08/29/2016 15:35 | WG903057 |
| Phenol | ND | | 10.0 | 1 | 08/29/2016 15:35 | WG903057 |
| *(S) 2-Fluorophenol* | *16.7* | | *10.0-77.9* | | *08/29/2016 15:35* | WG903057 |
| *(S) Phenol-d5* | *15.1* | | *5.00-70.1* | | *08/29/2016 15:35* | WG903057 |
| *(S) Nitrobenzene-d5* | *49.0* | | *21.8-123* | | *08/29/2016 15:35* | WG903057 |
| *(S) 2-Fluorobiphenyl* | *63.5* | | *29.5-131* | | *08/29/2016 15:35* | WG903057 |
| *(S) 2,4,6-Tribromophenol* | *83.2* | | *11.2-130* | | *08/29/2016 15:35* | WG903057 |
| *(S) p-Terphenyl-d14* | *72.2* | | *29.3-137* | | *08/29/2016 15:35* | WG903057 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Anthracene | 2.00 | | 0.0500 | 1 | 08/31/2016 02:42 | WG903328 |
| Acenaphthene | 6.45 | | 0.0500 | 1 | 08/31/2016 02:42 | WG903328 |
| Benzo(a)anthracene | 0.117 | | 0.0500 | 1 | 08/31/2016 02:42 | WG903328 |
| Benzo(a)pyrene | 0.0703 | | 0.0500 | 1 | 08/31/2016 02:42 | WG903328 |
| Benzo(b)fluoranthene | 0.0639 | | 0.0500 | 1 | 08/31/2016 02:42 | WG903328 |
| Benzo(g,h,i)perylene | 0.0647 | | 0.0500 | 1 | 08/31/2016 02:42 | WG903328 |
| Benzo(k)fluoranthene | ND | | 0.0500 | 1 | 08/31/2016 02:42 | WG903328 |
| Chrysene | 0.107 | | 0.0500 | 1 | 08/31/2016 02:42 | WG903328 |
| Dibenz(a,h)anthracene | ND | | 0.0500 | 1 | 08/31/2016 02:42 | WG903328 |
| Fluoranthene | 0.335 | | 0.0500 | 1 | 08/31/2016 02:42 | WG903328 |
| Fluorene | 4.37 | | 0.0500 | 1 | 08/31/2016 02:42 | WG903328 |
| Indeno(1,2,3-cd)pyrene | ND | | 0.0500 | 1 | 08/31/2016 02:42 | WG903328 |
| Naphthalene | ND | | 0.250 | 1 | 08/31/2016 02:42 | WG903328 |
| Phenanthrene | 12.5 | | 0.0500 | 1 | 08/31/2016 02:42 | WG903328 |
| Pyrene | 0.929 | | 0.0500 | 1 | 08/31/2016 02:42 | WG903328 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

| Analyte | Result | Qualifier | RDL | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | ug/l | | ug/l | | date / time | |
| 2-Methylnaphthalene | ND | | 0.250 | 1 | 08/31/2016 02:42 | WG903328 |
| *(S) Nitrobenzene-d5* | *102* | | *33.8-179* | | *08/31/2016 02:42* | WG903328 |
| *(S) 2-Fluorobiphenyl* | *78.2* | | *55.5-150* | | *08/31/2016 02:42* | WG903328 |
| *(S) p-Terphenyl-d14* | *84.9* | | *46.2-163* | | *08/31/2016 02:42* | WG903328 |

## Metals (ICPMS) by Method 6020

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Cobalt,Dissolved | ND | | 2.00 | 1 | 08/30/2016 17:29 | WG903407 |
| Lead,Dissolved | ND | | 2.00 | 1 | 08/30/2016 17:29 | WG903407 |
| Nickel,Dissolved | ND | | 2.00 | 1 | 08/30/2016 17:29 | WG903407 |
| Vanadium,Dissolved | ND | | 5.00 | 1 | 08/30/2016 17:29 | WG903407 |
| Zinc,Dissolved | ND | | 25.0 | 1 | 08/30/2016 17:29 | WG903407 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Acetone | ND | | 50.0 | 1 | 08/31/2016 21:25 | WG902871 |
| Benzene | ND | | 1.00 | 1 | 08/31/2016 21:25 | WG902871 |
| Bromochloromethane | ND | | 1.00 | 1 | 08/31/2016 21:25 | WG902871 |
| Bromodichloromethane | ND | | 1.00 | 1 | 08/31/2016 21:25 | WG902871 |
| Bromoform | ND | | 1.00 | 1 | 08/31/2016 21:25 | WG902871 |
| Bromomethane | ND | | 5.00 | 1 | 08/31/2016 21:25 | WG902871 |
| Carbon disulfide | ND | | 1.00 | 1 | 08/31/2016 21:25 | WG902871 |
| Carbon tetrachloride | ND | J4 | 1.00 | 1 | 08/31/2016 21:25 | WG902871 |
| Chlorobenzene | ND | | 1.00 | 1 | 08/31/2016 21:25 | WG902871 |
| Chlorodibromomethane | ND | | 1.00 | 1 | 08/31/2016 21:25 | WG902871 |
| Chloroethane | ND | | 5.00 | 1 | 08/31/2016 21:25 | WG902871 |
| Chloroform | ND | | 5.00 | 1 | 08/31/2016 21:25 | WG902871 |
| Chloromethane | ND | | 2.50 | 1 | 08/31/2016 21:25 | WG902871 |
| Cyclohexane | ND | | 1.00 | 1 | 08/31/2016 21:25 | WG902871 |
| 1,2-Dibromo-3-Chloropropane | ND | | 5.00 | 1 | 08/31/2016 21:25 | WG902871 |
| 1,2-Dibromoethane | ND | | 1.00 | 1 | 08/31/2016 21:25 | WG902871 |
| 1,2-Dichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 21:25 | WG902871 |
| 1,3-Dichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 21:25 | WG902871 |
| 1,4-Dichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 21:25 | WG902871 |
| Dichlorodifluoromethane | ND | | 5.00 | 1 | 08/31/2016 21:25 | WG902871 |
| 1,1-Dichloroethane | ND | | 1.00 | 1 | 08/31/2016 21:25 | WG902871 |
| 1,2-Dichloroethane | ND | | 1.00 | 1 | 08/31/2016 21:25 | WG902871 |
| 1,1-Dichloroethene | ND | | 1.00 | 1 | 08/31/2016 21:25 | WG902871 |
| cis-1,2-Dichloroethene | ND | | 1.00 | 1 | 08/31/2016 21:25 | WG902871 |
| trans-1,2-Dichloroethene | ND | | 1.00 | 1 | 08/31/2016 21:25 | WG902871 |
| 1,2-Dichloropropane | ND | | 1.00 | 1 | 08/31/2016 21:25 | WG902871 |
| cis-1,3-Dichloropropene | ND | | 1.00 | 1 | 08/31/2016 21:25 | WG902871 |
| trans-1,3-Dichloropropene | ND | J4 | 1.00 | 1 | 08/31/2016 21:25 | WG902871 |
| Ethylbenzene | ND | | 1.00 | 1 | 08/31/2016 21:25 | WG902871 |
| 2-Hexanone | ND | | 10.0 | 1 | 08/31/2016 21:25 | WG902871 |
| Isopropylbenzene | ND | | 1.00 | 1 | 08/31/2016 21:25 | WG902871 |
| 2-Butanone (MEK) | ND | | 10.0 | 1 | 08/31/2016 21:25 | WG902871 |
| Methyl Acetate | ND | | 20.0 | 1 | 08/31/2016 21:25 | WG902871 |
| Methyl Cyclohexane | 1.78 | | 1.00 | 1 | 08/31/2016 21:25 | WG902871 |
| Methylene Chloride | ND | | 5.00 | 1 | 08/31/2016 21:25 | WG902871 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 10.0 | 1 | 08/31/2016 21:25 | WG902871 |
| Methyl tert-butyl ether | ND | | 1.00 | 1 | 08/31/2016 21:25 | WG902871 |
| Styrene | ND | | 1.00 | 1 | 08/31/2016 21:25 | WG902871 |
| 1,1,2,2-Tetrachloroethane | ND | | 1.00 | 1 | 08/31/2016 21:25 | WG902871 |
| Tetrachloroethene | ND | | 1.00 | 1 | 08/31/2016 21:25 | WG902871 |
| Toluene | ND | | 5.00 | 1 | 08/31/2016 21:25 | WG902871 |
| 1,2,3-Trichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 21:25 | WG902871 |
| 1,2,4-Trichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 21:25 | WG902871 |
| 1,1,1-Trichloroethane | ND | | 1.00 | 1 | 08/31/2016 21:25 | WG902871 |
| 1,1,2-Trichloroethane | ND | | 1.00 | 1 | 08/31/2016 21:25 | WG902871 |
| Trichloroethene | ND | | 1.00 | 1 | 08/31/2016 21:25 | WG902871 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Trichlorofluoromethane | ND | | 5.00 | 1 | 08/31/2016 21:25 | WG902871 |
| 1,1,2-Trichlorotrifluoroethane | ND | | 1.00 | 1 | 08/31/2016 21:25 | WG902871 |
| Vinyl chloride | ND | | 1.00 | 1 | 08/31/2016 21:25 | WG902871 |
| Xylenes, Total | ND | | 3.00 | 1 | 08/31/2016 21:25 | WG902871 |
| *(S) Toluene-d8* | *103* | | *90.0-115* | | *08/31/2016 21:25* | WG902871 |
| *(S) Dibromofluoromethane* | *94.4* | | *79.0-121* | | *08/31/2016 21:25* | WG902871 |
| *(S) a,a,a-Trifluorotoluene* | *103* | | *90.4-116* | | *08/31/2016 21:25* | WG902871 |
| *(S) 4-Bromofluorobenzene* | *97.3* | | *80.1-120* | | *08/31/2016 21:25* | WG902871 |

## EDB / DBCP by Method 8011

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Ethylene Dibromide | ND | | 0.0100 | 1 | 09/01/2016 23:17 | WG903771 |
| 1,2-Dibromo-3-Chloropropane | ND | | 0.0200 | 1 | 09/01/2016 23:17 | WG903771 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Biphenyl | ND | | 10.0 | 1 | 08/29/2016 15:59 | WG903057 |
| Bis(2-Ethylhexyl)phthalate | ND | | 3.00 | 1 | 08/29/2016 15:59 | WG903057 |
| Di-n-butyl phthalate | ND | | 3.00 | 1 | 08/29/2016 15:59 | WG903057 |
| Diethyl phthalate | ND | | 3.00 | 1 | 08/29/2016 15:59 | WG903057 |
| Pyridine | ND | | 10.0 | 1 | 08/29/2016 15:59 | WG903057 |
| Quinoline | ND | | 50.0 | 1 | 08/30/2016 13:09 | WG903057 |
| 2,4-Dimethylphenol | ND | | 10.0 | 1 | 08/29/2016 15:59 | WG903057 |
| 2,4-Dinitrophenol | ND | J4 | 10.0 | 1 | 08/29/2016 15:59 | WG903057 |
| 2-Methylphenol | ND | | 10.0 | 1 | 08/29/2016 15:59 | WG903057 |
| 3&4-Methyl Phenol | ND | | 10.0 | 1 | 08/29/2016 15:59 | WG903057 |
| 4-Nitrophenol | ND | | 10.0 | 1 | 08/29/2016 15:59 | WG903057 |
| Phenol | ND | | 10.0 | 1 | 08/29/2016 15:59 | WG903057 |
| *(S) 2-Fluorophenol* | *34.4* | | *10.0-77.9* | | *08/29/2016 15:59* | WG903057 |
| *(S) Phenol-d5* | *25.5* | | *5.00-70.1* | | *08/29/2016 15:59* | WG903057 |
| *(S) Nitrobenzene-d5* | *68.4* | | *21.8-123* | | *08/29/2016 15:59* | WG903057 |
| *(S) 2-Fluorobiphenyl* | *73.8* | | *29.5-131* | | *08/29/2016 15:59* | WG903057 |
| *(S) 2,4,6-Tribromophenol* | *110* | | *11.2-130* | | *08/29/2016 15:59* | WG903057 |
| *(S) p-Terphenyl-d14* | *80.4* | | *29.3-137* | | *08/29/2016 15:59* | WG903057 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Anthracene | 0.752 | | 0.0500 | 1 | 08/31/2016 03:04 | WG903328 |
| Acenaphthene | 3.71 | | 0.0500 | 1 | 08/31/2016 03:04 | WG903328 |
| Benzo(a)anthracene | 0.601 | | 0.0500 | 1 | 08/31/2016 03:04 | WG903328 |
| Benzo(a)pyrene | 0.330 | | 0.0500 | 1 | 08/31/2016 03:04 | WG903328 |
| Benzo(b)fluoranthene | 0.399 | | 0.0500 | 1 | 08/31/2016 03:04 | WG903328 |
| Benzo(g,h,i)perylene | 0.159 | | 0.0500 | 1 | 08/31/2016 03:04 | WG903328 |
| Benzo(k)fluoranthene | 0.119 | | 0.0500 | 1 | 08/31/2016 03:04 | WG903328 |
| Chrysene | 0.523 | | 0.0500 | 1 | 08/31/2016 03:04 | WG903328 |
| Dibenz(a,h)anthracene | ND | | 0.0500 | 1 | 08/31/2016 03:04 | WG903328 |
| Fluoranthene | 2.78 | | 0.0500 | 1 | 08/31/2016 03:04 | WG903328 |
| Fluorene | 1.76 | | 0.0500 | 1 | 08/31/2016 03:04 | WG903328 |
| Indeno(1,2,3-cd)pyrene | 0.142 | | 0.0500 | 1 | 08/31/2016 03:04 | WG903328 |
| Naphthalene | 0.884 | | 0.250 | 1 | 08/31/2016 03:04 | WG903328 |
| Phenanthrene | 0.864 | | 0.0500 | 1 | 08/31/2016 03:04 | WG903328 |
| Pyrene | 2.57 | | 0.0500 | 1 | 08/31/2016 03:04 | WG903328 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

| Analyte | Result | Qualifier | RDL | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | ug/l | | ug/l | | date / time | |
| 2-Methylnaphthalene | 0.363 | | 0.250 | 1 | 08/31/2016 03:04 | WG903328 |
| *(S) Nitrobenzene-d5* | *113* | | *33.8-179* | | *08/31/2016 03:04* | WG903328 |
| *(S) 2-Fluorobiphenyl* | *84.2* | | *55.5-150* | | *08/31/2016 03:04* | WG903328 |
| *(S) p-Terphenyl-d14* | *84.7* | | *46.2-163* | | *08/31/2016 03:04* | WG903328 |

## Metals (ICPMS) by Method 6020

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Cobalt,Dissolved | ND | | 2.00 | 1 | 08/30/2016 17:33 | WG903407 |
| Lead,Dissolved | 4.05 | | 2.00 | 1 | 08/30/2016 17:33 | WG903407 |
| Nickel,Dissolved | ND | | 2.00 | 1 | 08/30/2016 17:33 | WG903407 |
| Vanadium,Dissolved | ND | | 5.00 | 1 | 08/30/2016 17:33 | WG903407 |
| Zinc,Dissolved | ND | | 25.0 | 1 | 08/30/2016 17:33 | WG903407 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Acetone | ND | | 50.0 | 1 | 08/31/2016 21:47 | WG902871 |
| Benzene | ND | | 1.00 | 1 | 08/31/2016 21:47 | WG902871 |
| Bromochloromethane | ND | | 1.00 | 1 | 08/31/2016 21:47 | WG902871 |
| Bromodichloromethane | ND | | 1.00 | 1 | 08/31/2016 21:47 | WG902871 |
| Bromoform | ND | | 1.00 | 1 | 08/31/2016 21:47 | WG902871 |
| Bromomethane | ND | | 5.00 | 1 | 08/31/2016 21:47 | WG902871 |
| Carbon disulfide | ND | | 1.00 | 1 | 08/31/2016 21:47 | WG902871 |
| Carbon tetrachloride | ND | J4 | 1.00 | 1 | 08/31/2016 21:47 | WG902871 |
| Chlorobenzene | ND | | 1.00 | 1 | 08/31/2016 21:47 | WG902871 |
| Chlorodibromomethane | ND | | 1.00 | 1 | 08/31/2016 21:47 | WG902871 |
| Chloroethane | ND | | 5.00 | 1 | 08/31/2016 21:47 | WG902871 |
| Chloroform | ND | | 5.00 | 1 | 08/31/2016 21:47 | WG902871 |
| Chloromethane | ND | | 2.50 | 1 | 08/31/2016 21:47 | WG902871 |
| Cyclohexane | ND | | 1.00 | 1 | 08/31/2016 21:47 | WG902871 |
| 1,2-Dibromo-3-Chloropropane | ND | | 5.00 | 1 | 08/31/2016 21:47 | WG902871 |
| 1,2-Dibromoethane | ND | | 1.00 | 1 | 08/31/2016 21:47 | WG902871 |
| 1,2-Dichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 21:47 | WG902871 |
| 1,3-Dichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 21:47 | WG902871 |
| 1,4-Dichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 21:47 | WG902871 |
| Dichlorodifluoromethane | ND | | 5.00 | 1 | 08/31/2016 21:47 | WG902871 |
| 1,1-Dichloroethane | ND | | 1.00 | 1 | 08/31/2016 21:47 | WG902871 |
| 1,2-Dichloroethane | ND | | 1.00 | 1 | 08/31/2016 21:47 | WG902871 |
| 1,1-Dichloroethene | ND | | 1.00 | 1 | 08/31/2016 21:47 | WG902871 |
| cis-1,2-Dichloroethene | ND | | 1.00 | 1 | 08/31/2016 21:47 | WG902871 |
| trans-1,2-Dichloroethene | ND | | 1.00 | 1 | 08/31/2016 21:47 | WG902871 |
| 1,2-Dichloropropane | ND | | 1.00 | 1 | 08/31/2016 21:47 | WG902871 |
| cis-1,3-Dichloropropene | ND | | 1.00 | 1 | 08/31/2016 21:47 | WG902871 |
| trans-1,3-Dichloropropene | ND | J4 | 1.00 | 1 | 08/31/2016 21:47 | WG902871 |
| Ethylbenzene | ND | | 1.00 | 1 | 08/31/2016 21:47 | WG902871 |
| 2-Hexanone | ND | | 10.0 | 1 | 08/31/2016 21:47 | WG902871 |
| Isopropylbenzene | ND | | 1.00 | 1 | 08/31/2016 21:47 | WG902871 |
| 2-Butanone (MEK) | ND | | 10.0 | 1 | 08/31/2016 21:47 | WG902871 |
| Methyl Acetate | ND | | 20.0 | 1 | 08/31/2016 21:47 | WG902871 |
| Methyl Cyclohexane | ND | | 1.00 | 1 | 08/31/2016 21:47 | WG902871 |
| Methylene Chloride | ND | | 5.00 | 1 | 08/31/2016 21:47 | WG902871 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 10.0 | 1 | 08/31/2016 21:47 | WG902871 |
| Methyl tert-butyl ether | ND | | 1.00 | 1 | 08/31/2016 21:47 | WG902871 |
| Styrene | ND | | 1.00 | 1 | 08/31/2016 21:47 | WG902871 |
| 1,1,2,2-Tetrachloroethane | ND | | 1.00 | 1 | 08/31/2016 21:47 | WG902871 |
| Tetrachloroethene | ND | | 1.00 | 1 | 08/31/2016 21:47 | WG902871 |
| Toluene | ND | | 5.00 | 1 | 08/31/2016 21:47 | WG902871 |
| 1,2,3-Trichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 21:47 | WG902871 |
| 1,2,4-Trichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 21:47 | WG902871 |
| 1,1,1-Trichloroethane | ND | | 1.00 | 1 | 08/31/2016 21:47 | WG902871 |
| 1,1,2-Trichloroethane | ND | | 1.00 | 1 | 08/31/2016 21:47 | WG902871 |
| Trichloroethene | ND | | 1.00 | 1 | 08/31/2016 21:47 | WG902871 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Trichlorofluoromethane | ND | | 5.00 | 1 | 08/31/2016 21:47 | WG902871 |
| 1,1,2-Trichlorotrifluoroethane | ND | | 1.00 | 1 | 08/31/2016 21:47 | WG902871 |
| Vinyl chloride | ND | | 1.00 | 1 | 08/31/2016 21:47 | WG902871 |
| Xylenes, Total | ND | | 3.00 | 1 | 08/31/2016 21:47 | WG902871 |
| *(S) Toluene-d8* | *102* | | *90.0-115* | | *08/31/2016 21:47* | WG902871 |
| *(S) Dibromofluoromethane* | *93.3* | | *79.0-121* | | *08/31/2016 21:47* | WG902871 |
| *(S) a,a,a-Trifluorotoluene* | *104* | | *90.4-116* | | *08/31/2016 21:47* | WG902871 |
| *(S) 4-Bromofluorobenzene* | *93.9* | | *80.1-120* | | *08/31/2016 21:47* | WG902871 |

## EDB / DBCP by Method 8011

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Ethylene Dibromide | ND | | 0.0100 | 1 | 09/01/2016 23:39 | WG903771 |
| 1,2-Dibromo-3-Chloropropane | ND | | 0.0200 | 1 | 09/01/2016 23:39 | WG903771 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Biphenyl | ND | | 10.0 | 1 | 08/30/2016 14:20 | WG903057 |
| Bis(2-Ethylhexyl)phthalate | 18.0 | | 3.00 | 1 | 08/30/2016 14:20 | WG903057 |
| Di-n-butyl phthalate | ND | | 3.00 | 1 | 08/30/2016 14:20 | WG903057 |
| Diethyl phthalate | ND | | 3.00 | 1 | 08/30/2016 14:20 | WG903057 |
| Pyridine | ND | | 10.0 | 1 | 08/30/2016 14:20 | WG903057 |
| Quinoline | ND | | 250 | 5 | 08/30/2016 17:09 | WG903057 |
| 2,4-Dimethylphenol | ND | | 10.0 | 1 | 08/30/2016 14:20 | WG903057 |
| 2,4-Dinitrophenol | ND | J4 | 10.0 | 1 | 08/30/2016 14:20 | WG903057 |
| 2-Methylphenol | ND | | 10.0 | 1 | 08/30/2016 14:20 | WG903057 |
| 3&4-Methyl Phenol | ND | | 10.0 | 1 | 08/30/2016 14:20 | WG903057 |
| 4-Nitrophenol | ND | | 10.0 | 1 | 08/30/2016 14:20 | WG903057 |
| Phenol | ND | | 10.0 | 1 | 08/30/2016 14:20 | WG903057 |
| *(S) 2-Fluorophenol* | *30.4* | | *10.0-77.9* | | *08/30/2016 14:20* | WG903057 |
| *(S) Phenol-d5* | *23.3* | | *5.00-70.1* | | *08/30/2016 14:20* | WG903057 |
| *(S) Nitrobenzene-d5* | *76.7* | | *21.8-123* | | *08/30/2016 14:20* | WG903057 |
| *(S) 2-Fluorobiphenyl* | *73.3* | | *29.5-131* | | *08/30/2016 14:20* | WG903057 |
| *(S) 2,4,6-Tribromophenol* | *90.6* | | *11.2-130* | | *08/30/2016 14:20* | WG903057 |
| *(S) p-Terphenyl-d14* | *72.1* | | *29.3-137* | | *08/30/2016 14:20* | WG903057 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Anthracene | 0.298 | | 0.0500 | 1 | 08/31/2016 07:26 | WG903328 |
| Acenaphthene | 0.0685 | | 0.0500 | 1 | 08/31/2016 07:26 | WG903328 |
| Benzo(a)anthracene | 0.589 | | 0.0500 | 1 | 08/31/2016 07:26 | WG903328 |
| Benzo(a)pyrene | 0.589 | | 0.0500 | 1 | 08/31/2016 07:26 | WG903328 |
| Benzo(b)fluoranthene | 0.332 | | 0.0500 | 1 | 08/31/2016 07:26 | WG903328 |
| Benzo(g,h,i)perylene | 0.787 | | 0.0500 | 1 | 08/31/2016 07:26 | WG903328 |
| Benzo(k)fluoranthene | 0.0808 | | 0.0500 | 1 | 08/31/2016 07:26 | WG903328 |
| Chrysene | 0.677 | | 0.0500 | 1 | 08/31/2016 07:26 | WG903328 |
| Dibenz(a,h)anthracene | 0.132 | | 0.0500 | 1 | 08/31/2016 07:26 | WG903328 |
| Fluoranthene | 0.139 | | 0.0500 | 1 | 08/31/2016 07:26 | WG903328 |
| Fluorene | ND | | 0.0500 | 1 | 08/31/2016 07:26 | WG903328 |
| Indeno(1,2,3-cd)pyrene | 0.201 | | 0.0500 | 1 | 08/31/2016 07:26 | WG903328 |
| Naphthalene | ND | | 0.250 | 1 | 08/31/2016 07:26 | WG903328 |
| Phenanthrene | ND | | 0.0500 | 1 | 08/31/2016 07:26 | WG903328 |
| Pyrene | 2.06 | | 0.0500 | 1 | 08/31/2016 07:26 | WG903328 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

| Analyte | Result | Qualifier | RDL | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | ug/l | | ug/l | | date / time | |
| 2-Methylnaphthalene | ND | | 0.250 | 1 | 08/31/2016 07:26 | WG903328 |
| *(S) Nitrobenzene-d5* | *105* | | *33.8-179* | | *08/31/2016 07:26* | WG903328 |
| *(S) 2-Fluorobiphenyl* | *91.4* | | *55.5-150* | | *08/31/2016 07:26* | WG903328 |
| *(S) p-Terphenyl-d14* | *76.2* | | *46.2-163* | | *08/31/2016 07:26* | WG903328 |

## Metals (ICPMS) by Method 6020

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Cobalt,Dissolved | ND | | 2.00 | 1 | 09/01/2016 06:41 | WG903828 |
| Lead,Dissolved | ND | | 2.00 | 1 | 09/01/2016 06:41 | WG903828 |
| Nickel,Dissolved | ND | | 2.00 | 1 | 09/01/2016 06:41 | WG903828 |
| Vanadium,Dissolved | ND | | 5.00 | 1 | 09/01/2016 06:41 | WG903828 |
| Zinc,Dissolved | ND | | 25.0 | 1 | 09/01/2016 06:41 | WG903828 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Acetone | ND | | 50.0 | 1 | 08/31/2016 22:09 | WG902871 |
| Benzene | ND | | 1.00 | 1 | 08/31/2016 22:09 | WG902871 |
| Bromochloromethane | ND | | 1.00 | 1 | 08/31/2016 22:09 | WG902871 |
| Bromodichloromethane | ND | | 1.00 | 1 | 08/31/2016 22:09 | WG902871 |
| Bromoform | ND | | 1.00 | 1 | 08/31/2016 22:09 | WG902871 |
| Bromomethane | ND | | 5.00 | 1 | 08/31/2016 22:09 | WG902871 |
| Carbon disulfide | ND | | 1.00 | 1 | 08/31/2016 22:09 | WG902871 |
| Carbon tetrachloride | ND | J4 | 1.00 | 1 | 08/31/2016 22:09 | WG902871 |
| Chlorobenzene | ND | | 1.00 | 1 | 08/31/2016 22:09 | WG902871 |
| Chlorodibromomethane | ND | | 1.00 | 1 | 08/31/2016 22:09 | WG902871 |
| Chloroethane | ND | | 5.00 | 1 | 08/31/2016 22:09 | WG902871 |
| Chloroform | ND | | 5.00 | 1 | 08/31/2016 22:09 | WG902871 |
| Chloromethane | ND | | 2.50 | 1 | 08/31/2016 22:09 | WG902871 |
| Cyclohexane | ND | | 1.00 | 1 | 08/31/2016 22:09 | WG902871 |
| 1,2-Dibromo-3-Chloropropane | ND | | 5.00 | 1 | 08/31/2016 22:09 | WG902871 |
| 1,2-Dibromoethane | ND | | 1.00 | 1 | 08/31/2016 22:09 | WG902871 |
| 1,2-Dichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 22:09 | WG902871 |
| 1,3-Dichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 22:09 | WG902871 |
| 1,4-Dichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 22:09 | WG902871 |
| Dichlorodifluoromethane | ND | | 5.00 | 1 | 08/31/2016 22:09 | WG902871 |
| 1,1-Dichloroethane | ND | | 1.00 | 1 | 08/31/2016 22:09 | WG902871 |
| 1,2-Dichloroethane | ND | | 1.00 | 1 | 08/31/2016 22:09 | WG902871 |
| 1,1-Dichloroethene | ND | | 1.00 | 1 | 08/31/2016 22:09 | WG902871 |
| cis-1,2-Dichloroethene | ND | | 1.00 | 1 | 08/31/2016 22:09 | WG902871 |
| trans-1,2-Dichloroethene | ND | | 1.00 | 1 | 08/31/2016 22:09 | WG902871 |
| 1,2-Dichloropropane | ND | | 1.00 | 1 | 08/31/2016 22:09 | WG902871 |
| cis-1,3-Dichloropropene | ND | | 1.00 | 1 | 08/31/2016 22:09 | WG902871 |
| trans-1,3-Dichloropropene | ND | J4 | 1.00 | 1 | 08/31/2016 22:09 | WG902871 |
| Ethylbenzene | ND | | 1.00 | 1 | 08/31/2016 22:09 | WG902871 |
| 2-Hexanone | ND | | 10.0 | 1 | 08/31/2016 22:09 | WG902871 |
| Isopropylbenzene | ND | | 1.00 | 1 | 08/31/2016 22:09 | WG902871 |
| 2-Butanone (MEK) | ND | | 10.0 | 1 | 08/31/2016 22:09 | WG902871 |
| Methyl Acetate | ND | | 20.0 | 1 | 08/31/2016 22:09 | WG902871 |
| Methyl Cyclohexane | ND | | 1.00 | 1 | 08/31/2016 22:09 | WG902871 |
| Methylene Chloride | ND | | 5.00 | 1 | 08/31/2016 22:09 | WG902871 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 10.0 | 1 | 08/31/2016 22:09 | WG902871 |
| Methyl tert-butyl ether | ND | | 1.00 | 1 | 08/31/2016 22:09 | WG902871 |
| Styrene | ND | | 1.00 | 1 | 08/31/2016 22:09 | WG902871 |
| 1,1,2,2-Tetrachloroethane | ND | | 1.00 | 1 | 08/31/2016 22:09 | WG902871 |
| Tetrachloroethene | ND | | 1.00 | 1 | 08/31/2016 22:09 | WG902871 |
| Toluene | ND | | 5.00 | 1 | 08/31/2016 22:09 | WG902871 |
| 1,2,3-Trichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 22:09 | WG902871 |
| 1,2,4-Trichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 22:09 | WG902871 |
| 1,1,1-Trichloroethane | ND | | 1.00 | 1 | 08/31/2016 22:09 | WG902871 |
| 1,1,2-Trichloroethane | ND | | 1.00 | 1 | 08/31/2016 22:09 | WG902871 |
| Trichloroethene | ND | | 1.00 | 1 | 08/31/2016 22:09 | WG902871 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Trichlorofluoromethane | ND | | 5.00 | 1 | 08/31/2016 22:09 | WG902871 |
| 1,1,2-Trichlorotrifluoroethane | ND | | 1.00 | 1 | 08/31/2016 22:09 | WG902871 |
| Vinyl chloride | ND | | 1.00 | 1 | 08/31/2016 22:09 | WG902871 |
| Xylenes, Total | ND | | 3.00 | 1 | 08/31/2016 22:09 | WG902871 |
| *(S) Toluene-d8* | *103* | | *90.0-115* | | *08/31/2016 22:09* | WG902871 |
| *(S) Dibromofluoromethane* | *94.1* | | *79.0-121* | | *08/31/2016 22:09* | WG902871 |
| *(S) a,a,a-Trifluorotoluene* | *104* | | *90.4-116* | | *08/31/2016 22:09* | WG902871 |
| *(S) 4-Bromofluorobenzene* | *96.4* | | *80.1-120* | | *08/31/2016 22:09* | WG902871 |

## EDB / DBCP by Method 8011

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Ethylene Dibromide | ND | | 0.0100 | 1 | 09/01/2016 23:50 | WG903771 |
| 1,2-Dibromo-3-Chloropropane | ND | | 0.0200 | 1 | 09/01/2016 23:50 | WG903771 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Biphenyl | ND | | 10.0 | 1 | 08/29/2016 16:46 | WG903057 |
| Bis(2-Ethylhexyl)phthalate | 3.01 | B | 3.00 | 1 | 08/29/2016 16:46 | WG903057 |
| Di-n-butyl phthalate | ND | | 3.00 | 1 | 08/29/2016 16:46 | WG903057 |
| Diethyl phthalate | ND | | 3.00 | 1 | 08/29/2016 16:46 | WG903057 |
| Pyridine | ND | | 10.0 | 1 | 08/29/2016 16:46 | WG903057 |
| Quinoline | ND | | 50.0 | 1 | 08/30/2016 13:28 | WG903057 |
| 2,4-Dimethylphenol | ND | | 10.0 | 1 | 08/29/2016 16:46 | WG903057 |
| 2,4-Dinitrophenol | ND | J4 | 10.0 | 1 | 08/29/2016 16:46 | WG903057 |
| 2-Methylphenol | ND | | 10.0 | 1 | 08/29/2016 16:46 | WG903057 |
| 3&4-Methyl Phenol | ND | | 10.0 | 1 | 08/29/2016 16:46 | WG903057 |
| 4-Nitrophenol | ND | | 10.0 | 1 | 08/29/2016 16:46 | WG903057 |
| Phenol | ND | | 10.0 | 1 | 08/29/2016 16:46 | WG903057 |
| *(S) 2-Fluorophenol* | *31.8* | | *10.0-77.9* | | *08/29/2016 16:46* | WG903057 |
| *(S) Phenol-d5* | *22.2* | | *5.00-70.1* | | *08/29/2016 16:46* | WG903057 |
| *(S) Nitrobenzene-d5* | *72.8* | | *21.8-123* | | *08/29/2016 16:46* | WG903057 |
| *(S) 2-Fluorobiphenyl* | *72.2* | | *29.5-131* | | *08/29/2016 16:46* | WG903057 |
| *(S) 2,4,6-Tribromophenol* | *97.3* | | *11.2-130* | | *08/29/2016 16:46* | WG903057 |
| *(S) p-Terphenyl-d14* | *70.9* | | *29.3-137* | | *08/29/2016 16:46* | WG903057 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Anthracene | ND | | 0.0500 | 1 | 08/31/2016 03:26 | WG903328 |
| Acenaphthene | ND | | 0.0500 | 1 | 08/31/2016 03:26 | WG903328 |
| Benzo(a)anthracene | ND | | 0.0500 | 1 | 08/31/2016 03:26 | WG903328 |
| Benzo(a)pyrene | ND | | 0.0500 | 1 | 08/31/2016 03:26 | WG903328 |
| Benzo(b)fluoranthene | ND | | 0.0500 | 1 | 08/31/2016 03:26 | WG903328 |
| Benzo(g,h,i)perylene | ND | | 0.0500 | 1 | 08/31/2016 03:26 | WG903328 |
| Benzo(k)fluoranthene | ND | | 0.0500 | 1 | 08/31/2016 03:26 | WG903328 |
| Chrysene | ND | | 0.0500 | 1 | 08/31/2016 03:26 | WG903328 |
| Dibenz(a,h)anthracene | ND | | 0.0500 | 1 | 08/31/2016 03:26 | WG903328 |
| Fluoranthene | ND | | 0.0500 | 1 | 08/31/2016 03:26 | WG903328 |
| Fluorene | ND | | 0.0500 | 1 | 08/31/2016 03:26 | WG903328 |
| Indeno(1,2,3-cd)pyrene | ND | | 0.0500 | 1 | 08/31/2016 03:26 | WG903328 |
| Naphthalene | ND | | 0.250 | 1 | 08/31/2016 03:26 | WG903328 |
| Phenanthrene | ND | | 0.0500 | 1 | 08/31/2016 03:26 | WG903328 |
| Pyrene | 0.148 | | 0.0500 | 1 | 08/31/2016 03:26 | WG903328 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| 2-Methylnaphthalene | ND | | 0.250 | 1 | 08/31/2016 03:26 | WG903328 |
| *(S) Nitrobenzene-d5* | *91.8* | | *33.8-179* | | *08/31/2016 03:26* | WG903328 |
| *(S) 2-Fluorobiphenyl* | *96.5* | | *55.5-150* | | *08/31/2016 03:26* | WG903328 |
| *(S) p-Terphenyl-d14* | *87.4* | | *46.2-163* | | *08/31/2016 03:26* | WG903328 |

## Metals (ICPMS) by Method 6020

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Cobalt,Dissolved | ND | | 2.00 | 1 | 09/01/2016 06:29 | WG903828 |
| Lead,Dissolved | ND | | 2.00 | 1 | 09/01/2016 06:29 | WG903828 |
| Nickel,Dissolved | ND | | 2.00 | 1 | 09/01/2016 06:29 | WG903828 |
| Vanadium,Dissolved | ND | | 5.00 | 1 | 09/01/2016 06:29 | WG903828 |
| Zinc,Dissolved | ND | | 25.0 | 1 | 09/01/2016 06:29 | WG903828 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Acetone | ND | | 50.0 | 1 | 08/31/2016 22:30 | WG902871 |
| Benzene | ND | | 1.00 | 1 | 08/31/2016 22:30 | WG902871 |
| Bromochloromethane | ND | | 1.00 | 1 | 08/31/2016 22:30 | WG902871 |
| Bromodichloromethane | ND | | 1.00 | 1 | 08/31/2016 22:30 | WG902871 |
| Bromoform | ND | | 1.00 | 1 | 08/31/2016 22:30 | WG902871 |
| Bromomethane | ND | | 5.00 | 1 | 08/31/2016 22:30 | WG902871 |
| Carbon disulfide | ND | | 1.00 | 1 | 08/31/2016 22:30 | WG902871 |
| Carbon tetrachloride | ND | J4 | 1.00 | 1 | 08/31/2016 22:30 | WG902871 |
| Chlorobenzene | ND | | 1.00 | 1 | 08/31/2016 22:30 | WG902871 |
| Chlorodibromomethane | ND | | 1.00 | 1 | 08/31/2016 22:30 | WG902871 |
| Chloroethane | ND | | 5.00 | 1 | 08/31/2016 22:30 | WG902871 |
| Chloroform | ND | | 5.00 | 1 | 08/31/2016 22:30 | WG902871 |
| Chloromethane | ND | | 2.50 | 1 | 08/31/2016 22:30 | WG902871 |
| Cyclohexane | ND | | 1.00 | 1 | 08/31/2016 22:30 | WG902871 |
| 1,2-Dibromo-3-Chloropropane | ND | | 5.00 | 1 | 08/31/2016 22:30 | WG902871 |
| 1,2-Dibromoethane | ND | | 1.00 | 1 | 08/31/2016 22:30 | WG902871 |
| 1,2-Dichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 22:30 | WG902871 |
| 1,3-Dichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 22:30 | WG902871 |
| 1,4-Dichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 22:30 | WG902871 |
| Dichlorodifluoromethane | ND | | 5.00 | 1 | 08/31/2016 22:30 | WG902871 |
| 1,1-Dichloroethane | ND | | 1.00 | 1 | 08/31/2016 22:30 | WG902871 |
| 1,2-Dichloroethane | ND | | 1.00 | 1 | 08/31/2016 22:30 | WG902871 |
| 1,1-Dichloroethene | ND | | 1.00 | 1 | 08/31/2016 22:30 | WG902871 |
| cis-1,2-Dichloroethene | ND | | 1.00 | 1 | 08/31/2016 22:30 | WG902871 |
| trans-1,2-Dichloroethene | ND | | 1.00 | 1 | 08/31/2016 22:30 | WG902871 |
| 1,2-Dichloropropane | ND | | 1.00 | 1 | 08/31/2016 22:30 | WG902871 |
| cis-1,3-Dichloropropene | ND | | 1.00 | 1 | 08/31/2016 22:30 | WG902871 |
| trans-1,3-Dichloropropene | ND | J4 | 1.00 | 1 | 08/31/2016 22:30 | WG902871 |
| Ethylbenzene | ND | | 1.00 | 1 | 08/31/2016 22:30 | WG902871 |
| 2-Hexanone | ND | | 10.0 | 1 | 08/31/2016 22:30 | WG902871 |
| Isopropylbenzene | ND | | 1.00 | 1 | 08/31/2016 22:30 | WG902871 |
| 2-Butanone (MEK) | ND | | 10.0 | 1 | 08/31/2016 22:30 | WG902871 |
| Methyl Acetate | ND | | 20.0 | 1 | 08/31/2016 22:30 | WG902871 |
| Methyl Cyclohexane | ND | | 1.00 | 1 | 08/31/2016 22:30 | WG902871 |
| Methylene Chloride | ND | | 5.00 | 1 | 08/31/2016 22:30 | WG902871 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 10.0 | 1 | 08/31/2016 22:30 | WG902871 |
| Methyl tert-butyl ether | ND | | 1.00 | 1 | 08/31/2016 22:30 | WG902871 |
| Styrene | ND | | 1.00 | 1 | 08/31/2016 22:30 | WG902871 |
| 1,1,2,2-Tetrachloroethane | ND | | 1.00 | 1 | 08/31/2016 22:30 | WG902871 |
| Tetrachloroethene | ND | | 1.00 | 1 | 08/31/2016 22:30 | WG902871 |
| Toluene | ND | | 5.00 | 1 | 08/31/2016 22:30 | WG902871 |
| 1,2,3-Trichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 22:30 | WG902871 |
| 1,2,4-Trichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 22:30 | WG902871 |
| 1,1,1-Trichloroethane | ND | | 1.00 | 1 | 08/31/2016 22:30 | WG902871 |
| 1,1,2-Trichloroethane | ND | | 1.00 | 1 | 08/31/2016 22:30 | WG902871 |
| Trichloroethene | ND | | 1.00 | 1 | 08/31/2016 22:30 | WG902871 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Trichlorofluoromethane | ND | | 5.00 | 1 | 08/31/2016 22:30 | WG902871 |
| 1,1,2-Trichlorotrifluoroethane | ND | | 1.00 | 1 | 08/31/2016 22:30 | WG902871 |
| Vinyl chloride | ND | | 1.00 | 1 | 08/31/2016 22:30 | WG902871 |
| Xylenes, Total | ND | | 3.00 | 1 | 08/31/2016 22:30 | WG902871 |
| *(S) Toluene-d8* | *102* | | *90.0-115* | | *08/31/2016 22:30* | WG902871 |
| *(S) Dibromofluoromethane* | *92.7* | | *79.0-121* | | *08/31/2016 22:30* | WG902871 |
| *(S) a,a,a-Trifluorotoluene* | *105* | | *90.4-116* | | *08/31/2016 22:30* | WG902871 |
| *(S) 4-Bromofluorobenzene* | *95.5* | | *80.1-120* | | *08/31/2016 22:30* | WG902871 |

## EDB / DBCP by Method 8011

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Ethylene Dibromide | ND | | 0.0100 | 1 | 09/02/2016 00:01 | WG903771 |
| 1,2-Dibromo-3-Chloropropane | ND | | 0.0200 | 1 | 09/02/2016 00:01 | WG903771 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Biphenyl | ND | | 10.0 | 1 | 08/29/2016 17:10 | WG903057 |
| Bis(2-Ethylhexyl)phthalate | ND | | 3.00 | 1 | 08/29/2016 17:10 | WG903057 |
| Di-n-butyl phthalate | ND | | 3.00 | 1 | 08/29/2016 17:10 | WG903057 |
| Diethyl phthalate | ND | | 3.00 | 1 | 08/29/2016 17:10 | WG903057 |
| Pyridine | ND | | 10.0 | 1 | 08/29/2016 17:10 | WG903057 |
| Quinoline | ND | | 50.0 | 1 | 08/30/2016 13:48 | WG903057 |
| 2,4-Dimethylphenol | ND | | 10.0 | 1 | 08/29/2016 17:10 | WG903057 |
| 2,4-Dinitrophenol | ND | J4 | 10.0 | 1 | 08/29/2016 17:10 | WG903057 |
| 2-Methylphenol | ND | | 10.0 | 1 | 08/29/2016 17:10 | WG903057 |
| 3&4-Methyl Phenol | ND | | 10.0 | 1 | 08/29/2016 17:10 | WG903057 |
| 4-Nitrophenol | ND | | 10.0 | 1 | 08/29/2016 17:10 | WG903057 |
| Phenol | ND | | 10.0 | 1 | 08/29/2016 17:10 | WG903057 |
| *(S) 2-Fluorophenol* | *26.1* | | *10.0-77.9* | | *08/29/2016 17:10* | WG903057 |
| *(S) Phenol-d5* | *16.7* | | *5.00-70.1* | | *08/29/2016 17:10* | WG903057 |
| *(S) Nitrobenzene-d5* | *69.1* | | *21.8-123* | | *08/29/2016 17:10* | WG903057 |
| *(S) 2-Fluorobiphenyl* | *66.9* | | *29.5-131* | | *08/29/2016 17:10* | WG903057 |
| *(S) 2,4,6-Tribromophenol* | *59.7* | | *11.2-130* | | *08/29/2016 17:10* | WG903057 |
| *(S) p-Terphenyl-d14* | *74.5* | | *29.3-137* | | *08/29/2016 17:10* | WG903057 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Anthracene | ND | | 0.0500 | 1 | 08/31/2016 03:48 | WG903328 |
| Acenaphthene | ND | | 0.0500 | 1 | 08/31/2016 03:48 | WG903328 |
| Benzo(a)anthracene | ND | | 0.0500 | 1 | 08/31/2016 03:48 | WG903328 |
| Benzo(a)pyrene | ND | | 0.0500 | 1 | 08/31/2016 03:48 | WG903328 |
| Benzo(b)fluoranthene | ND | | 0.0500 | 1 | 08/31/2016 03:48 | WG903328 |
| Benzo(g,h,i)perylene | ND | | 0.0500 | 1 | 08/31/2016 03:48 | WG903328 |
| Benzo(k)fluoranthene | ND | | 0.0500 | 1 | 08/31/2016 03:48 | WG903328 |
| Chrysene | ND | | 0.0500 | 1 | 08/31/2016 03:48 | WG903328 |
| Dibenz(a,h)anthracene | ND | | 0.0500 | 1 | 08/31/2016 03:48 | WG903328 |
| Fluoranthene | ND | | 0.0500 | 1 | 08/31/2016 03:48 | WG903328 |
| Fluorene | ND | | 0.0500 | 1 | 08/31/2016 03:48 | WG903328 |
| Indeno(1,2,3-cd)pyrene | ND | | 0.0500 | 1 | 08/31/2016 03:48 | WG903328 |
| Naphthalene | ND | | 0.250 | 1 | 08/31/2016 03:48 | WG903328 |
| Phenanthrene | ND | | 0.0500 | 1 | 08/31/2016 03:48 | WG903328 |
| Pyrene | ND | | 0.0500 | 1 | 08/31/2016 03:48 | WG903328 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

| Analyte | Result | Qualifier | RDL | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | ug/l | | ug/l | | date / time | |
| 2-Methylnaphthalene | ND | | 0.250 | 1 | 08/31/2016 03:48 | WG903328 |
| *(S) Nitrobenzene-d5* | *86.9* | | *33.8-179* | | *08/31/2016 03:48* | WG903328 |
| *(S) 2-Fluorobiphenyl* | *96.4* | | *55.5-150* | | *08/31/2016 03:48* | WG903328 |
| *(S) p-Terphenyl-d14* | *88.4* | | *46.2-163* | | *08/31/2016 03:48* | WG903328 |

## Metals (ICPMS) by Method 6020

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Cobalt,Dissolved | ND | | 2.00 | 1 | 09/01/2016 06:45 | WG903828 |
| Lead,Dissolved | ND | | 2.00 | 1 | 09/01/2016 06:45 | WG903828 |
| Nickel,Dissolved | ND | | 2.00 | 1 | 09/01/2016 06:45 | WG903828 |
| Vanadium,Dissolved | ND | | 5.00 | 1 | 09/01/2016 06:45 | WG903828 |
| Zinc,Dissolved | ND | | 25.0 | 1 | 09/01/2016 06:45 | WG903828 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Acetone | ND | | 50.0 | 1 | 09/01/2016 01:24 | WG902871 |
| Benzene | ND | | 1.00 | 1 | 09/01/2016 01:24 | WG902871 |
| Bromochloromethane | ND | | 1.00 | 1 | 09/01/2016 01:24 | WG902871 |
| Bromodichloromethane | ND | | 1.00 | 1 | 09/01/2016 01:24 | WG902871 |
| Bromoform | ND | | 1.00 | 1 | 09/01/2016 01:24 | WG902871 |
| Bromomethane | ND | | 5.00 | 1 | 09/01/2016 01:24 | WG902871 |
| Carbon disulfide | ND | | 1.00 | 1 | 09/01/2016 01:24 | WG902871 |
| Carbon tetrachloride | ND | J4 | 1.00 | 1 | 09/01/2016 01:24 | WG902871 |
| Chlorobenzene | ND | | 1.00 | 1 | 09/01/2016 01:24 | WG902871 |
| Chlorodibromomethane | ND | | 1.00 | 1 | 09/01/2016 01:24 | WG902871 |
| Chloroethane | ND | | 5.00 | 1 | 09/01/2016 01:24 | WG902871 |
| Chloroform | ND | | 5.00 | 1 | 09/01/2016 01:24 | WG902871 |
| Chloromethane | ND | | 2.50 | 1 | 09/01/2016 01:24 | WG902871 |
| Cyclohexane | ND | | 1.00 | 1 | 09/01/2016 01:24 | WG902871 |
| 1,2-Dibromo-3-Chloropropane | ND | | 5.00 | 1 | 09/01/2016 01:24 | WG902871 |
| 1,2-Dibromoethane | ND | | 1.00 | 1 | 09/01/2016 01:24 | WG902871 |
| 1,2-Dichlorobenzene | ND | | 1.00 | 1 | 09/01/2016 01:24 | WG902871 |
| 1,3-Dichlorobenzene | ND | | 1.00 | 1 | 09/01/2016 01:24 | WG902871 |
| 1,4-Dichlorobenzene | ND | | 1.00 | 1 | 09/01/2016 01:24 | WG902871 |
| Dichlorodifluoromethane | ND | | 5.00 | 1 | 09/01/2016 01:24 | WG902871 |
| 1,1-Dichloroethane | ND | | 1.00 | 1 | 09/01/2016 01:24 | WG902871 |
| 1,2-Dichloroethane | ND | | 1.00 | 1 | 09/01/2016 01:24 | WG902871 |
| 1,1-Dichloroethene | ND | | 1.00 | 1 | 09/01/2016 01:24 | WG902871 |
| cis-1,2-Dichloroethene | ND | | 1.00 | 1 | 09/01/2016 01:24 | WG902871 |
| trans-1,2-Dichloroethene | ND | | 1.00 | 1 | 09/01/2016 01:24 | WG902871 |
| 1,2-Dichloropropane | ND | | 1.00 | 1 | 09/01/2016 01:24 | WG902871 |
| cis-1,3-Dichloropropene | ND | | 1.00 | 1 | 09/01/2016 01:24 | WG902871 |
| trans-1,3-Dichloropropene | ND | J4 | 1.00 | 1 | 09/01/2016 01:24 | WG902871 |
| Ethylbenzene | ND | | 1.00 | 1 | 09/01/2016 01:24 | WG902871 |
| 2-Hexanone | ND | | 10.0 | 1 | 09/01/2016 01:24 | WG902871 |
| Isopropylbenzene | ND | | 1.00 | 1 | 09/01/2016 01:24 | WG902871 |
| 2-Butanone (MEK) | ND | | 10.0 | 1 | 09/01/2016 01:24 | WG902871 |
| Methyl Acetate | ND | | 20.0 | 1 | 09/01/2016 01:24 | WG902871 |
| Methyl Cyclohexane | ND | | 1.00 | 1 | 09/01/2016 01:24 | WG902871 |
| Methylene Chloride | ND | | 5.00 | 1 | 09/01/2016 01:24 | WG902871 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 10.0 | 1 | 09/01/2016 01:24 | WG902871 |
| Methyl tert-butyl ether | ND | | 1.00 | 1 | 09/01/2016 01:24 | WG902871 |
| Styrene | ND | | 1.00 | 1 | 09/01/2016 01:24 | WG902871 |
| 1,1,2,2-Tetrachloroethane | ND | | 1.00 | 1 | 09/01/2016 01:24 | WG902871 |
| Tetrachloroethene | ND | | 1.00 | 1 | 09/01/2016 01:24 | WG902871 |
| Toluene | ND | | 5.00 | 1 | 09/01/2016 01:24 | WG902871 |
| 1,2,3-Trichlorobenzene | ND | | 1.00 | 1 | 09/01/2016 01:24 | WG902871 |
| 1,2,4-Trichlorobenzene | ND | | 1.00 | 1 | 09/01/2016 01:24 | WG902871 |
| 1,1,1-Trichloroethane | ND | | 1.00 | 1 | 09/01/2016 01:24 | WG902871 |
| 1,1,2-Trichloroethane | ND | | 1.00 | 1 | 09/01/2016 01:24 | WG902871 |
| Trichloroethene | ND | | 1.00 | 1 | 09/01/2016 01:24 | WG902871 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Trichlorofluoromethane | ND | | 5.00 | 1 | 09/01/2016 01:24 | WG902871 |
| 1,1,2-Trichlorotrifluoroethane | ND | | 1.00 | 1 | 09/01/2016 01:24 | WG902871 |
| Vinyl chloride | ND | | 1.00 | 1 | 09/01/2016 01:24 | WG902871 |
| Xylenes, Total | ND | | 3.00 | 1 | 09/01/2016 01:24 | WG902871 |
| *(S) Toluene-d8* | *101* | | *90.0-115* | | *09/01/2016 01:24* | WG902871 |
| *(S) Dibromofluoromethane* | *94.5* | | *79.0-121* | | *09/01/2016 01:24* | WG902871 |
| *(S) a,a,a-Trifluorotoluene* | *104* | | *90.4-116* | | *09/01/2016 01:24* | WG902871 |
| *(S) 4-Bromofluorobenzene* | *95.0* | | *80.1-120* | | *09/01/2016 01:24* | WG902871 |

## EDB / DBCP by Method 8011

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Ethylene Dibromide | ND | | 0.0100 | 1 | 09/02/2016 00:12 | WG903771 |
| 1,2-Dibromo-3-Chloropropane | ND | | 0.0200 | 1 | 09/02/2016 00:12 | WG903771 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Biphenyl | ND | | 10.0 | 1 | 08/29/2016 17:33 | WG903057 |
| Bis(2-Ethylhexyl)phthalate | ND | | 3.00 | 1 | 08/29/2016 17:33 | WG903057 |
| Di-n-butyl phthalate | ND | | 3.00 | 1 | 08/29/2016 17:33 | WG903057 |
| Diethyl phthalate | ND | | 3.00 | 1 | 08/29/2016 17:33 | WG903057 |
| Pyridine | ND | | 10.0 | 1 | 08/29/2016 17:33 | WG903057 |
| Quinoline | ND | | 50.0 | 1 | 08/30/2016 14:08 | WG903057 |
| 2,4-Dimethylphenol | ND | | 10.0 | 1 | 08/29/2016 17:33 | WG903057 |
| 2,4-Dinitrophenol | ND | J4 | 10.0 | 1 | 08/29/2016 17:33 | WG903057 |
| 2-Methylphenol | ND | | 10.0 | 1 | 08/29/2016 17:33 | WG903057 |
| 3&4-Methyl Phenol | ND | | 10.0 | 1 | 08/29/2016 17:33 | WG903057 |
| 4-Nitrophenol | ND | | 10.0 | 1 | 08/29/2016 17:33 | WG903057 |
| Phenol | ND | | 10.0 | 1 | 08/29/2016 17:33 | WG903057 |
| *(S) 2-Fluorophenol* | *29.9* | | *10.0-77.9* | | *08/29/2016 17:33* | WG903057 |
| *(S) Phenol-d5* | *18.9* | | *5.00-70.1* | | *08/29/2016 17:33* | WG903057 |
| *(S) Nitrobenzene-d5* | *59.0* | | *21.8-123* | | *08/29/2016 17:33* | WG903057 |
| *(S) 2-Fluorobiphenyl* | *65.8* | | *29.5-131* | | *08/29/2016 17:33* | WG903057 |
| *(S) 2,4,6-Tribromophenol* | *85.8* | | *11.2-130* | | *08/29/2016 17:33* | WG903057 |
| *(S) p-Terphenyl-d14* | *83.7* | | *29.3-137* | | *08/29/2016 17:33* | WG903057 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Anthracene | ND | | 0.0500 | 1 | 08/31/2016 04:10 | WG903328 |
| Acenaphthene | ND | | 0.0500 | 1 | 08/31/2016 04:10 | WG903328 |
| Benzo(a)anthracene | ND | | 0.0500 | 1 | 08/31/2016 04:10 | WG903328 |
| Benzo(a)pyrene | ND | | 0.0500 | 1 | 08/31/2016 04:10 | WG903328 |
| Benzo(b)fluoranthene | ND | | 0.0500 | 1 | 08/31/2016 04:10 | WG903328 |
| Benzo(g,h,i)perylene | ND | | 0.0500 | 1 | 08/31/2016 04:10 | WG903328 |
| Benzo(k)fluoranthene | ND | | 0.0500 | 1 | 08/31/2016 04:10 | WG903328 |
| Chrysene | ND | | 0.0500 | 1 | 08/31/2016 04:10 | WG903328 |
| Dibenz(a,h)anthracene | ND | | 0.0500 | 1 | 08/31/2016 04:10 | WG903328 |
| Fluoranthene | ND | | 0.0500 | 1 | 08/31/2016 04:10 | WG903328 |
| Fluorene | ND | | 0.0500 | 1 | 08/31/2016 04:10 | WG903328 |
| Indeno(1,2,3-cd)pyrene | ND | | 0.0500 | 1 | 08/31/2016 04:10 | WG903328 |
| Naphthalene | ND | | 0.250 | 1 | 08/31/2016 04:10 | WG903328 |
| Phenanthrene | ND | | 0.0500 | 1 | 08/31/2016 04:10 | WG903328 |
| Pyrene | ND | | 0.0500 | 1 | 08/31/2016 04:10 | WG903328 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

| Analyte | Result | Qualifier | RDL | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | ug/l | | ug/l | | date / time | |
| 2-Methylnaphthalene | ND | | 0.250 | 1 | 08/31/2016 04:10 | WG903328 |
| *(S) Nitrobenzene-d5* | *89.7* | | *33.8-179* | | *08/31/2016 04:10* | WG903328 |
| *(S) 2-Fluorobiphenyl* | *99.7* | | *55.5-150* | | *08/31/2016 04:10* | WG903328 |
| *(S) p-Terphenyl-d14* | *91.8* | | *46.2-163* | | *08/31/2016 04:10* | WG903328 |

## Metals (ICPMS) by Method 6020

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Cobalt,Dissolved | ND | | 2.00 | 1 | 09/01/2016 06:48 | WG903828 |
| Lead,Dissolved | ND | | 2.00 | 1 | 09/01/2016 06:48 | WG903828 |
| Nickel,Dissolved | ND | | 2.00 | 1 | 09/01/2016 06:48 | WG903828 |
| Vanadium,Dissolved | ND | | 5.00 | 1 | 09/01/2016 06:48 | WG903828 |
| Zinc,Dissolved | ND | | 25.0 | 1 | 09/01/2016 06:48 | WG903828 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Acetone | ND | | 50.0 | 1 | 09/08/2016 12:23 | WG902871 |
| Benzene | ND | | 1.00 | 1 | 09/08/2016 12:23 | WG902871 |
| Bromochloromethane | ND | | 1.00 | 1 | 09/08/2016 12:23 | WG902871 |
| Bromodichloromethane | ND | | 1.00 | 1 | 09/08/2016 12:23 | WG902871 |
| Bromoform | ND | | 1.00 | 1 | 09/08/2016 12:23 | WG902871 |
| Bromomethane | ND | | 5.00 | 1 | 09/08/2016 12:23 | WG902871 |
| Carbon disulfide | ND | | 1.00 | 1 | 09/08/2016 12:23 | WG902871 |
| Carbon tetrachloride | ND | J4 | 1.00 | 1 | 09/08/2016 12:23 | WG902871 |
| Chlorobenzene | ND | | 1.00 | 1 | 09/08/2016 12:23 | WG902871 |
| Chlorodibromomethane | ND | | 1.00 | 1 | 09/08/2016 12:23 | WG902871 |
| Chloroethane | ND | | 5.00 | 1 | 09/08/2016 12:23 | WG902871 |
| Chloroform | ND | | 5.00 | 1 | 09/08/2016 12:23 | WG902871 |
| Chloromethane | ND | | 2.50 | 1 | 09/08/2016 12:23 | WG902871 |
| Cyclohexane | ND | | 1.00 | 1 | 09/08/2016 12:23 | WG902871 |
| 1,2-Dibromo-3-Chloropropane | ND | | 5.00 | 1 | 09/08/2016 12:23 | WG902871 |
| 1,2-Dibromoethane | ND | | 1.00 | 1 | 09/08/2016 12:23 | WG902871 |
| 1,2-Dichlorobenzene | ND | | 1.00 | 1 | 09/08/2016 12:23 | WG902871 |
| 1,3-Dichlorobenzene | ND | | 1.00 | 1 | 09/08/2016 12:23 | WG902871 |
| 1,4-Dichlorobenzene | ND | | 1.00 | 1 | 09/08/2016 12:23 | WG902871 |
| Dichlorodifluoromethane | ND | | 5.00 | 1 | 09/08/2016 12:23 | WG902871 |
| 1,1-Dichloroethane | ND | | 1.00 | 1 | 09/08/2016 12:23 | WG902871 |
| 1,2-Dichloroethane | ND | | 1.00 | 1 | 09/08/2016 12:23 | WG902871 |
| 1,1-Dichloroethene | ND | | 1.00 | 1 | 09/08/2016 12:23 | WG902871 |
| cis-1,2-Dichloroethene | ND | | 1.00 | 1 | 09/08/2016 12:23 | WG902871 |
| trans-1,2-Dichloroethene | ND | | 1.00 | 1 | 09/08/2016 12:23 | WG902871 |
| 1,2-Dichloropropane | ND | | 1.00 | 1 | 09/08/2016 12:23 | WG902871 |
| cis-1,3-Dichloropropene | ND | | 1.00 | 1 | 09/08/2016 12:23 | WG902871 |
| trans-1,3-Dichloropropene | ND | J4 | 1.00 | 1 | 09/08/2016 12:23 | WG902871 |
| Ethylbenzene | ND | | 1.00 | 1 | 09/08/2016 12:23 | WG902871 |
| 2-Hexanone | ND | | 10.0 | 1 | 09/08/2016 12:23 | WG902871 |
| Isopropylbenzene | ND | | 1.00 | 1 | 09/08/2016 12:23 | WG902871 |
| 2-Butanone (MEK) | ND | | 10.0 | 1 | 09/08/2016 12:23 | WG902871 |
| Methyl Acetate | ND | | 20.0 | 1 | 09/08/2016 12:23 | WG902871 |
| Methyl Cyclohexane | ND | | 1.00 | 1 | 09/08/2016 12:23 | WG902871 |
| Methylene Chloride | ND | | 5.00 | 1 | 09/08/2016 12:23 | WG902871 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 10.0 | 1 | 09/08/2016 12:23 | WG902871 |
| Methyl tert-butyl ether | ND | | 1.00 | 1 | 09/08/2016 12:23 | WG902871 |
| Styrene | ND | | 1.00 | 1 | 09/08/2016 12:23 | WG902871 |
| 1,1,2,2-Tetrachloroethane | ND | | 1.00 | 1 | 09/08/2016 12:23 | WG902871 |
| Tetrachloroethene | ND | | 1.00 | 1 | 09/08/2016 12:23 | WG902871 |
| Toluene | ND | | 5.00 | 1 | 09/08/2016 12:23 | WG902871 |
| 1,2,3-Trichlorobenzene | ND | | 1.00 | 1 | 09/08/2016 12:23 | WG902871 |
| 1,2,4-Trichlorobenzene | ND | | 1.00 | 1 | 09/08/2016 12:23 | WG902871 |
| 1,1,1-Trichloroethane | ND | | 1.00 | 1 | 09/08/2016 12:23 | WG902871 |
| 1,1,2-Trichloroethane | ND | | 1.00 | 1 | 09/08/2016 12:23 | WG902871 |
| Trichloroethene | ND | | 1.00 | 1 | 09/08/2016 12:23 | WG902871 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Trichlorofluoromethane | ND | | 5.00 | 1 | 09/08/2016 12:23 | WG902871 |
| 1,1,2-Trichlorotrifluoroethane | ND | | 1.00 | 1 | 09/08/2016 12:23 | WG902871 |
| Vinyl chloride | ND | | 1.00 | 1 | 09/08/2016 12:23 | WG902871 |
| Xylenes, Total | 3.66 | | 3.00 | 1 | 09/08/2016 12:23 | WG902871 |
| *(S) Toluene-d8* | *100* | | *90.0-115* | | *09/08/2016 12:23* | WG902871 |
| *(S) Dibromofluoromethane* | *92.6* | | *79.0-121* | | *09/08/2016 12:23* | WG902871 |
| *(S) a,a,a-Trifluorotoluene* | *107* | | *90.4-116* | | *09/08/2016 12:23* | WG902871 |
| *(S) 4-Bromofluorobenzene* | *106* | | *80.1-120* | | *09/08/2016 12:23* | WG902871 |

## EDB / DBCP by Method 8011

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Ethylene Dibromide | ND | | 0.0100 | 1 | 09/01/2016 21:49 | WG903771 |
| 1,2-Dibromo-3-Chloropropane | ND | | 0.0200 | 1 | 09/01/2016 21:49 | WG903771 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Biphenyl | ND | | 10.0 | 1 | 08/29/2016 17:56 | WG903057 |
| Bis(2-Ethylhexyl)phthalate | ND | | 3.00 | 1 | 08/29/2016 17:56 | WG903057 |
| Di-n-butyl phthalate | ND | | 3.00 | 1 | 08/29/2016 17:56 | WG903057 |
| Diethyl phthalate | ND | | 3.00 | 1 | 08/29/2016 17:56 | WG903057 |
| Pyridine | ND | | 10.0 | 1 | 08/29/2016 17:56 | WG903057 |
| Quinoline | ND | | 50.0 | 1 | 08/30/2016 14:28 | WG903057 |
| 2,4-Dimethylphenol | ND | | 10.0 | 1 | 08/29/2016 17:56 | WG903057 |
| 2,4-Dinitrophenol | ND | J4 | 10.0 | 1 | 08/29/2016 17:56 | WG903057 |
| 2-Methylphenol | ND | | 10.0 | 1 | 08/29/2016 17:56 | WG903057 |
| 3&4-Methyl Phenol | ND | | 10.0 | 1 | 08/29/2016 17:56 | WG903057 |
| 4-Nitrophenol | ND | | 10.0 | 1 | 08/29/2016 17:56 | WG903057 |
| Phenol | ND | | 10.0 | 1 | 08/29/2016 17:56 | WG903057 |
| *(S) 2-Fluorophenol* | *24.6* | | *10.0-77.9* | | *08/29/2016 17:56* | WG903057 |
| *(S) Phenol-d5* | *23.1* | | *5.00-70.1* | | *08/29/2016 17:56* | WG903057 |
| *(S) Nitrobenzene-d5* | *48.9* | | *21.8-123* | | *08/29/2016 17:56* | WG903057 |
| *(S) 2-Fluorobiphenyl* | *43.3* | | *29.5-131* | | *08/29/2016 17:56* | WG903057 |
| *(S) 2,4,6-Tribromophenol* | *66.2* | | *11.2-130* | | *08/29/2016 17:56* | WG903057 |
| *(S) p-Terphenyl-d14* | *49.2* | | *29.3-137* | | *08/29/2016 17:56* | WG903057 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Anthracene | 0.181 | | 0.0500 | 1 | 08/31/2016 04:31 | WG903328 |
| Acenaphthene | 0.186 | | 0.0500 | 1 | 08/31/2016 04:31 | WG903328 |
| Benzo(a)anthracene | 0.0622 | | 0.0500 | 1 | 08/31/2016 04:31 | WG903328 |
| Benzo(a)pyrene | ND | | 0.0500 | 1 | 08/31/2016 04:31 | WG903328 |
| Benzo(b)fluoranthene | ND | | 0.0500 | 1 | 08/31/2016 04:31 | WG903328 |
| Benzo(g,h,i)perylene | ND | | 0.0500 | 1 | 08/31/2016 04:31 | WG903328 |
| Benzo(k)fluoranthene | ND | | 0.0500 | 1 | 08/31/2016 04:31 | WG903328 |
| Chrysene | 0.0755 | | 0.0500 | 1 | 08/31/2016 04:31 | WG903328 |
| Dibenz(a,h)anthracene | ND | | 0.0500 | 1 | 08/31/2016 04:31 | WG903328 |
| Fluoranthene | 0.0798 | | 0.0500 | 1 | 08/31/2016 04:31 | WG903328 |
| Fluorene | 0.273 | | 0.0500 | 1 | 08/31/2016 04:31 | WG903328 |
| Indeno(1,2,3-cd)pyrene | ND | | 0.0500 | 1 | 08/31/2016 04:31 | WG903328 |
| Naphthalene | ND | | 0.250 | 1 | 08/31/2016 04:31 | WG903328 |
| Phenanthrene | 0.446 | | 0.0500 | 1 | 08/31/2016 04:31 | WG903328 |
| Pyrene | 0.227 | | 0.0500 | 1 | 08/31/2016 04:31 | WG903328 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

| Analyte | Result | Qualifier | RDL | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | ug/l | | ug/l | | date / time | |
| 2-Methylnaphthalene | ND | | 0.250 | 1 | 08/31/2016 04:31 | WG903328 |
| *(S) Nitrobenzene-d5* | *79.2* | | *33.8-179* | | *08/31/2016 04:31* | WG903328 |
| *(S) 2-Fluorobiphenyl* | *75.7* | | *55.5-150* | | *08/31/2016 04:31* | WG903328 |
| *(S) p-Terphenyl-d14* | *88.4* | | *46.2-163* | | *08/31/2016 04:31* | WG903328 |

## Metals (ICPMS) by Method 6020

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Cobalt,Dissolved | ND | | 2.00 | 1 | 09/01/2016 06:57 | WG903828 |
| Lead,Dissolved | ND | | 2.00 | 1 | 09/01/2016 06:57 | WG903828 |
| Nickel,Dissolved | ND | | 2.00 | 1 | 09/01/2016 06:57 | WG903828 |
| Vanadium,Dissolved | ND | | 5.00 | 1 | 09/01/2016 06:57 | WG903828 |
| Zinc,Dissolved | ND | | 25.0 | 1 | 09/01/2016 06:57 | WG903828 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Acetone | ND | | 50.0 | 1 | 09/02/2016 03:09 | WG902871 |
| Benzene | ND | | 1.00 | 1 | 09/02/2016 03:09 | WG902871 |
| Bromochloromethane | ND | | 1.00 | 1 | 09/02/2016 03:09 | WG902871 |
| Bromodichloromethane | ND | | 1.00 | 1 | 09/02/2016 03:09 | WG902871 |
| Bromoform | ND | | 1.00 | 1 | 09/02/2016 03:09 | WG902871 |
| Bromomethane | ND | | 5.00 | 1 | 09/02/2016 03:09 | WG902871 |
| Carbon disulfide | ND | | 1.00 | 1 | 09/02/2016 03:09 | WG902871 |
| Carbon tetrachloride | ND | J4 | 1.00 | 1 | 09/02/2016 03:09 | WG902871 |
| Chlorobenzene | ND | | 1.00 | 1 | 09/02/2016 03:09 | WG902871 |
| Chlorodibromomethane | ND | | 1.00 | 1 | 09/02/2016 03:09 | WG902871 |
| Chloroethane | ND | | 5.00 | 1 | 09/02/2016 03:09 | WG902871 |
| Chloroform | ND | | 5.00 | 1 | 09/02/2016 03:09 | WG902871 |
| Chloromethane | ND | | 2.50 | 1 | 09/02/2016 03:09 | WG902871 |
| Cyclohexane | ND | | 1.00 | 1 | 09/02/2016 03:09 | WG902871 |
| 1,2-Dibromo-3-Chloropropane | ND | | 5.00 | 1 | 09/02/2016 03:09 | WG902871 |
| 1,2-Dibromoethane | ND | | 1.00 | 1 | 09/02/2016 03:09 | WG902871 |
| 1,2-Dichlorobenzene | ND | | 1.00 | 1 | 09/02/2016 03:09 | WG902871 |
| 1,3-Dichlorobenzene | ND | | 1.00 | 1 | 09/02/2016 03:09 | WG902871 |
| 1,4-Dichlorobenzene | ND | | 1.00 | 1 | 09/02/2016 03:09 | WG902871 |
| Dichlorodifluoromethane | ND | | 5.00 | 1 | 09/02/2016 03:09 | WG902871 |
| 1,1-Dichloroethane | ND | | 1.00 | 1 | 09/02/2016 03:09 | WG902871 |
| 1,2-Dichloroethane | ND | | 1.00 | 1 | 09/02/2016 03:09 | WG902871 |
| 1,1-Dichloroethene | ND | | 1.00 | 1 | 09/02/2016 03:09 | WG902871 |
| cis-1,2-Dichloroethene | ND | | 1.00 | 1 | 09/02/2016 03:09 | WG902871 |
| trans-1,2-Dichloroethene | ND | | 1.00 | 1 | 09/02/2016 03:09 | WG902871 |
| 1,2-Dichloropropane | ND | | 1.00 | 1 | 09/02/2016 03:09 | WG902871 |
| cis-1,3-Dichloropropene | ND | | 1.00 | 1 | 09/02/2016 03:09 | WG902871 |
| trans-1,3-Dichloropropene | ND | J4 | 1.00 | 1 | 09/02/2016 03:09 | WG902871 |
| Ethylbenzene | ND | | 1.00 | 1 | 09/02/2016 03:09 | WG902871 |
| 2-Hexanone | ND | | 10.0 | 1 | 09/02/2016 03:09 | WG902871 |
| Isopropylbenzene | ND | | 1.00 | 1 | 09/02/2016 03:09 | WG902871 |
| 2-Butanone (MEK) | ND | | 10.0 | 1 | 09/02/2016 03:09 | WG902871 |
| Methyl Acetate | ND | | 20.0 | 1 | 09/02/2016 03:09 | WG902871 |
| Methyl Cyclohexane | ND | | 1.00 | 1 | 09/02/2016 03:09 | WG902871 |
| Methylene Chloride | ND | | 5.00 | 1 | 09/02/2016 03:09 | WG902871 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 10.0 | 1 | 09/02/2016 03:09 | WG902871 |
| Methyl tert-butyl ether | ND | | 1.00 | 1 | 09/02/2016 03:09 | WG902871 |
| Styrene | ND | | 1.00 | 1 | 09/02/2016 03:09 | WG902871 |
| 1,1,2,2-Tetrachloroethane | ND | | 1.00 | 1 | 09/02/2016 03:09 | WG902871 |
| Tetrachloroethene | ND | | 1.00 | 1 | 09/02/2016 03:09 | WG902871 |
| Toluene | ND | | 5.00 | 1 | 09/02/2016 03:09 | WG902871 |
| 1,2,3-Trichlorobenzene | ND | | 1.00 | 1 | 09/02/2016 03:09 | WG902871 |
| 1,2,4-Trichlorobenzene | ND | | 1.00 | 1 | 09/02/2016 03:09 | WG902871 |
| 1,1,1-Trichloroethane | ND | | 1.00 | 1 | 09/02/2016 03:09 | WG902871 |
| 1,1,2-Trichloroethane | ND | | 1.00 | 1 | 09/02/2016 03:09 | WG902871 |
| Trichloroethene | ND | | 1.00 | 1 | 09/02/2016 03:09 | WG902871 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Trichlorofluoromethane | ND | | 5.00 | 1 | 09/02/2016 03:09 | WG902871 |
| 1,1,2-Trichlorotrifluoroethane | ND | | 1.00 | 1 | 09/02/2016 03:09 | WG902871 |
| Vinyl chloride | ND | | 1.00 | 1 | 09/02/2016 03:09 | WG902871 |
| Xylenes, Total | 3.52 | | 3.00 | 1 | 09/02/2016 03:09 | WG902871 |
| *(S) Toluene-d8* | *101* | | *90.0-115* | | *09/02/2016 03:09* | WG902871 |
| *(S) Dibromofluoromethane* | *84.1* | | *79.0-121* | | *09/02/2016 03:09* | WG902871 |
| *(S) a,a,a-Trifluorotoluene* | *95.5* | | *90.4-116* | | *09/02/2016 03:09* | WG902871 |
| *(S) 4-Bromofluorobenzene* | *89.0* | | *80.1-120* | | *09/02/2016 03:09* | WG902871 |

## EDB / DBCP by Method 8011

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Ethylene Dibromide | ND | | 0.0100 | 1 | 09/01/2016 21:26 | WG903771 |
| 1,2-Dibromo-3-Chloropropane | ND | | 0.0200 | 1 | 09/01/2016 21:26 | WG903771 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Biphenyl | ND | | 10.0 | 1 | 08/29/2016 18:19 | WG903057 |
| Bis(2-Ethylhexyl)phthalate | ND | | 3.00 | 1 | 08/29/2016 18:19 | WG903057 |
| Di-n-butyl phthalate | ND | | 3.00 | 1 | 08/29/2016 18:19 | WG903057 |
| Diethyl phthalate | ND | | 3.00 | 1 | 08/29/2016 18:19 | WG903057 |
| Pyridine | ND | | 10.0 | 1 | 08/29/2016 18:19 | WG903057 |
| Quinoline | ND | | 50.0 | 1 | 08/30/2016 14:51 | WG903057 |
| 2,4-Dimethylphenol | ND | | 10.0 | 1 | 08/29/2016 18:19 | WG903057 |
| 2,4-Dinitrophenol | ND | J4 | 10.0 | 1 | 08/29/2016 18:19 | WG903057 |
| 2-Methylphenol | ND | | 10.0 | 1 | 08/29/2016 18:19 | WG903057 |
| 3&4-Methyl Phenol | ND | | 10.0 | 1 | 08/29/2016 18:19 | WG903057 |
| 4-Nitrophenol | ND | | 10.0 | 1 | 08/29/2016 18:19 | WG903057 |
| Phenol | ND | | 10.0 | 1 | 08/29/2016 18:19 | WG903057 |
| *(S) 2-Fluorophenol* | *38.6* | | *10.0-77.9* | | *08/29/2016 18:19* | WG903057 |
| *(S) Phenol-d5* | *28.8* | | *5.00-70.1* | | *08/29/2016 18:19* | WG903057 |
| *(S) Nitrobenzene-d5* | *71.6* | | *21.8-123* | | *08/29/2016 18:19* | WG903057 |
| *(S) 2-Fluorobiphenyl* | *72.0* | | *29.5-131* | | *08/29/2016 18:19* | WG903057 |
| *(S) 2,4,6-Tribromophenol* | *118* | | *11.2-130* | | *08/29/2016 18:19* | WG903057 |
| *(S) p-Terphenyl-d14* | *69.1* | | *29.3-137* | | *08/29/2016 18:19* | WG903057 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Anthracene | 0.152 | | 0.0500 | 1 | 08/31/2016 04:53 | WG903328 |
| Acenaphthene | 0.162 | | 0.0500 | 1 | 08/31/2016 04:53 | WG903328 |
| Benzo(a)anthracene | ND | | 0.0500 | 1 | 08/31/2016 04:53 | WG903328 |
| Benzo(a)pyrene | ND | | 0.0500 | 1 | 08/31/2016 04:53 | WG903328 |
| Benzo(b)fluoranthene | ND | | 0.0500 | 1 | 08/31/2016 04:53 | WG903328 |
| Benzo(g,h,i)perylene | ND | | 0.0500 | 1 | 08/31/2016 04:53 | WG903328 |
| Benzo(k)fluoranthene | ND | | 0.0500 | 1 | 08/31/2016 04:53 | WG903328 |
| Chrysene | ND | | 0.0500 | 1 | 08/31/2016 04:53 | WG903328 |
| Dibenz(a,h)anthracene | ND | | 0.0500 | 1 | 08/31/2016 04:53 | WG903328 |
| Fluoranthene | 0.0528 | | 0.0500 | 1 | 08/31/2016 04:53 | WG903328 |
| Fluorene | 0.244 | | 0.0500 | 1 | 08/31/2016 04:53 | WG903328 |
| Indeno(1,2,3-cd)pyrene | ND | | 0.0500 | 1 | 08/31/2016 04:53 | WG903328 |
| Naphthalene | ND | | 0.250 | 1 | 08/31/2016 04:53 | WG903328 |
| Phenanthrene | 0.362 | | 0.0500 | 1 | 08/31/2016 04:53 | WG903328 |
| Pyrene | 0.147 | | 0.0500 | 1 | 08/31/2016 04:53 | WG903328 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

| Analyte | Result | Qualifier | RDL | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | ug/l | | ug/l | | date / time | |
| 2-Methylnaphthalene | ND | | 0.250 | 1 | 08/31/2016 04:53 | WG903328 |
| *(S) Nitrobenzene-d5* | *77.4* | | *33.8-179* | | *08/31/2016 04:53* | WG903328 |
| *(S) 2-Fluorobiphenyl* | *73.2* | | *55.5-150* | | *08/31/2016 04:53* | WG903328 |
| *(S) p-Terphenyl-d14* | *85.2* | | *46.2-163* | | *08/31/2016 04:53* | WG903328 |

## Metals (ICPMS) by Method 6020

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Cobalt,Dissolved | ND | | 2.00 | 1 | 09/01/2016 07:00 | WG903828 |
| Lead,Dissolved | ND | | 2.00 | 1 | 09/01/2016 07:00 | WG903828 |
| Nickel,Dissolved | ND | | 2.00 | 1 | 09/01/2016 07:00 | WG903828 |
| Vanadium,Dissolved | ND | | 5.00 | 1 | 09/01/2016 07:00 | WG903828 |
| Zinc,Dissolved | ND | | 25.0 | 1 | 09/01/2016 07:00 | WG903828 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Acetone | ND | | 50.0 | 1 | 08/31/2016 16:03 | WG902871 |
| Benzene | ND | | 1.00 | 1 | 08/31/2016 16:03 | WG902871 |
| Bromochloromethane | ND | | 1.00 | 1 | 08/31/2016 16:03 | WG902871 |
| Bromodichloromethane | ND | | 1.00 | 1 | 08/31/2016 16:03 | WG902871 |
| Bromoform | ND | | 1.00 | 1 | 08/31/2016 16:03 | WG902871 |
| Bromomethane | ND | | 5.00 | 1 | 08/31/2016 16:03 | WG902871 |
| Carbon disulfide | ND | | 1.00 | 1 | 08/31/2016 16:03 | WG902871 |
| Carbon tetrachloride | ND | J4 | 1.00 | 1 | 08/31/2016 16:03 | WG902871 |
| Chlorobenzene | ND | | 1.00 | 1 | 08/31/2016 16:03 | WG902871 |
| Chlorodibromomethane | ND | | 1.00 | 1 | 08/31/2016 16:03 | WG902871 |
| Chloroethane | ND | | 5.00 | 1 | 08/31/2016 16:03 | WG902871 |
| Chloroform | ND | | 5.00 | 1 | 08/31/2016 16:03 | WG902871 |
| Chloromethane | ND | | 2.50 | 1 | 08/31/2016 16:03 | WG902871 |
| Cyclohexane | ND | | 1.00 | 1 | 08/31/2016 16:03 | WG902871 |
| 1,2-Dibromo-3-Chloropropane | ND | | 5.00 | 1 | 08/31/2016 16:03 | WG902871 |
| 1,2-Dibromoethane | ND | | 1.00 | 1 | 08/31/2016 16:03 | WG902871 |
| 1,2-Dichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 16:03 | WG902871 |
| 1,3-Dichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 16:03 | WG902871 |
| 1,4-Dichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 16:03 | WG902871 |
| Dichlorodifluoromethane | ND | | 5.00 | 1 | 08/31/2016 16:03 | WG902871 |
| 1,1-Dichloroethane | ND | | 1.00 | 1 | 08/31/2016 16:03 | WG902871 |
| 1,2-Dichloroethane | ND | | 1.00 | 1 | 08/31/2016 16:03 | WG902871 |
| 1,1-Dichloroethene | ND | | 1.00 | 1 | 08/31/2016 16:03 | WG902871 |
| cis-1,2-Dichloroethene | ND | | 1.00 | 1 | 08/31/2016 16:03 | WG902871 |
| trans-1,2-Dichloroethene | ND | | 1.00 | 1 | 08/31/2016 16:03 | WG902871 |
| 1,2-Dichloropropane | ND | | 1.00 | 1 | 08/31/2016 16:03 | WG902871 |
| cis-1,3-Dichloropropene | ND | | 1.00 | 1 | 08/31/2016 16:03 | WG902871 |
| trans-1,3-Dichloropropene | ND | J4 | 1.00 | 1 | 08/31/2016 16:03 | WG902871 |
| Ethylbenzene | ND | | 1.00 | 1 | 08/31/2016 16:03 | WG902871 |
| 2-Hexanone | ND | | 10.0 | 1 | 08/31/2016 16:03 | WG902871 |
| Isopropylbenzene | ND | | 1.00 | 1 | 08/31/2016 16:03 | WG902871 |
| 2-Butanone (MEK) | ND | | 10.0 | 1 | 08/31/2016 16:03 | WG902871 |
| Methyl Acetate | ND | | 20.0 | 1 | 08/31/2016 16:03 | WG902871 |
| Methyl Cyclohexane | ND | | 1.00 | 1 | 08/31/2016 16:03 | WG902871 |
| Methylene Chloride | ND | | 5.00 | 1 | 08/31/2016 16:03 | WG902871 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 10.0 | 1 | 08/31/2016 16:03 | WG902871 |
| Methyl tert-butyl ether | ND | | 1.00 | 1 | 08/31/2016 16:03 | WG902871 |
| Styrene | ND | | 1.00 | 1 | 08/31/2016 16:03 | WG902871 |
| 1,1,2,2-Tetrachloroethane | ND | | 1.00 | 1 | 08/31/2016 16:03 | WG902871 |
| Tetrachloroethene | ND | | 1.00 | 1 | 08/31/2016 16:03 | WG902871 |
| Toluene | ND | | 5.00 | 1 | 08/31/2016 16:03 | WG902871 |
| 1,2,3-Trichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 16:03 | WG902871 |
| 1,2,4-Trichlorobenzene | ND | | 1.00 | 1 | 08/31/2016 16:03 | WG902871 |
| 1,1,1-Trichloroethane | ND | | 1.00 | 1 | 08/31/2016 16:03 | WG902871 |
| 1,1,2-Trichloroethane | ND | | 1.00 | 1 | 08/31/2016 16:03 | WG902871 |
| Trichloroethene | ND | | 1.00 | 1 | 08/31/2016 16:03 | WG902871 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Trichlorofluoromethane | ND | | 5.00 | 1 | 08/31/2016 16:03 | WG902871 |
| 1,1,2-Trichlorotrifluoroethane | ND | | 1.00 | 1 | 08/31/2016 16:03 | WG902871 |
| Vinyl chloride | ND | | 1.00 | 1 | 08/31/2016 16:03 | WG902871 |
| Xylenes, Total | ND | | 3.00 | 1 | 08/31/2016 16:03 | WG902871 |
| *(S) Toluene-d8* | *100* | | *90.0-115* | | *08/31/2016 16:03* | WG902871 |
| *(S) Dibromofluoromethane* | *94.0* | | *79.0-121* | | *08/31/2016 16:03* | WG902871 |
| *(S) a,a,a-Trifluorotoluene* | *102* | | *90.4-116* | | *08/31/2016 16:03* | WG902871 |
| *(S) 4-Bromofluorobenzene* | *101* | | *80.1-120* | | *08/31/2016 16:03* | WG902871 |

## EDB / DBCP by Method 8011

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Ethylene Dibromide | ND | | 0.0100 | 1 | 09/02/2016 00:23 | WG903771 |
| 1,2-Dibromo-3-Chloropropane | ND | | 0.0200 | 1 | 09/02/2016 00:23 | WG903771 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Biphenyl | ND | | 10.0 | 1 | 08/29/2016 18:42 | WG903057 |
| Bis(2-Ethylhexyl)phthalate | ND | | 3.00 | 1 | 08/29/2016 18:42 | WG903057 |
| Di-n-butyl phthalate | ND | | 3.00 | 1 | 08/29/2016 18:42 | WG903057 |
| Diethyl phthalate | ND | | 3.00 | 1 | 08/29/2016 18:42 | WG903057 |
| Pyridine | ND | | 10.0 | 1 | 08/29/2016 18:42 | WG903057 |
| Quinoline | ND | | 50.0 | 1 | 08/30/2016 15:11 | WG903057 |
| 2,4-Dimethylphenol | ND | | 10.0 | 1 | 08/29/2016 18:42 | WG903057 |
| 2,4-Dinitrophenol | ND | J4 | 10.0 | 1 | 08/29/2016 18:42 | WG903057 |
| 2-Methylphenol | ND | | 10.0 | 1 | 08/29/2016 18:42 | WG903057 |
| 3&4-Methyl Phenol | ND | | 10.0 | 1 | 08/29/2016 18:42 | WG903057 |
| 4-Nitrophenol | ND | | 10.0 | 1 | 08/29/2016 18:42 | WG903057 |
| Phenol | ND | | 10.0 | 1 | 08/29/2016 18:42 | WG903057 |
| *(S) 2-Fluorophenol* | *30.2* | | *10.0-77.9* | | *08/29/2016 18:42* | WG903057 |
| *(S) Phenol-d5* | *19.3* | | *5.00-70.1* | | *08/29/2016 18:42* | WG903057 |
| *(S) Nitrobenzene-d5* | *69.0* | | *21.8-123* | | *08/29/2016 18:42* | WG903057 |
| *(S) 2-Fluorobiphenyl* | *69.5* | | *29.5-131* | | *08/29/2016 18:42* | WG903057 |
| *(S) 2,4,6-Tribromophenol* | *71.6* | | *11.2-130* | | *08/29/2016 18:42* | WG903057 |
| *(S) p-Terphenyl-d14* | *77.3* | | *29.3-137* | | *08/29/2016 18:42* | WG903057 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Anthracene | ND | | 0.0500 | 1 | 08/31/2016 05:15 | WG903328 |
| Acenaphthene | ND | | 0.0500 | 1 | 08/31/2016 05:15 | WG903328 |
| Benzo(a)anthracene | ND | | 0.0500 | 1 | 08/31/2016 05:15 | WG903328 |
| Benzo(a)pyrene | ND | | 0.0500 | 1 | 08/31/2016 05:15 | WG903328 |
| Benzo(b)fluoranthene | ND | | 0.0500 | 1 | 08/31/2016 05:15 | WG903328 |
| Benzo(g,h,i)perylene | ND | | 0.0500 | 1 | 08/31/2016 05:15 | WG903328 |
| Benzo(k)fluoranthene | ND | | 0.0500 | 1 | 08/31/2016 05:15 | WG903328 |
| Chrysene | ND | | 0.0500 | 1 | 08/31/2016 05:15 | WG903328 |
| Dibenz(a,h)anthracene | ND | | 0.0500 | 1 | 08/31/2016 05:15 | WG903328 |
| Fluoranthene | ND | | 0.0500 | 1 | 08/31/2016 05:15 | WG903328 |
| Fluorene | ND | | 0.0500 | 1 | 08/31/2016 05:15 | WG903328 |
| Indeno(1,2,3-cd)pyrene | ND | | 0.0500 | 1 | 08/31/2016 05:15 | WG903328 |
| Naphthalene | ND | | 0.250 | 1 | 08/31/2016 05:15 | WG903328 |
| Phenanthrene | ND | | 0.0500 | 1 | 08/31/2016 05:15 | WG903328 |
| Pyrene | ND | | 0.0500 | 1 | 08/31/2016 05:15 | WG903328 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

| Analyte | Result | Qualifier | RDL | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | ug/l | | ug/l | | date / time | |
| 2-Methylnaphthalene | ND | | 0.250 | 1 | 08/31/2016 05:15 | WG903328 |
| *(S) Nitrobenzene-d5* | *88.8* | | *33.8-179* | | *08/31/2016 05:15* | WG903328 |
| *(S) 2-Fluorobiphenyl* | *101* | | *55.5-150* | | *08/31/2016 05:15* | WG903328 |
| *(S) p-Terphenyl-d14* | *95.5* | | *46.2-163* | | *08/31/2016 05:15* | WG903328 |

## Metals (ICPMS) by Method 6020

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Cobalt,Dissolved | ND | | 2.00 | 1 | 09/01/2016 07:03 | WG903828 |
| Lead,Dissolved | ND | | 2.00 | 1 | 09/01/2016 07:03 | WG903828 |
| Nickel,Dissolved | ND | | 2.00 | 1 | 09/01/2016 07:03 | WG903828 |
| Vanadium,Dissolved | ND | | 5.00 | 1 | 09/01/2016 07:03 | WG903828 |
| Zinc,Dissolved | ND | | 25.0 | 1 | 09/01/2016 07:03 | WG903828 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Acetone | ND | | 50.0 | 1 | 09/03/2016 13:05 | WG904106 |
| Benzene | ND | | 1.00 | 1 | 09/03/2016 13:05 | WG904106 |
| Bromochloromethane | ND | | 1.00 | 1 | 09/03/2016 13:05 | WG904106 |
| Bromodichloromethane | ND | | 1.00 | 1 | 09/03/2016 13:05 | WG904106 |
| Bromoform | ND | | 1.00 | 1 | 09/03/2016 13:05 | WG904106 |
| Bromomethane | ND | | 5.00 | 1 | 09/03/2016 13:05 | WG904106 |
| Carbon disulfide | ND | | 1.00 | 1 | 09/03/2016 13:05 | WG904106 |
| Carbon tetrachloride | ND | | 1.00 | 1 | 09/03/2016 13:05 | WG904106 |
| Chlorobenzene | ND | | 1.00 | 1 | 09/03/2016 13:05 | WG904106 |
| Chlorodibromomethane | ND | | 1.00 | 1 | 09/03/2016 13:05 | WG904106 |
| Chloroethane | ND | | 5.00 | 1 | 09/03/2016 13:05 | WG904106 |
| Chloroform | ND | | 5.00 | 1 | 09/03/2016 13:05 | WG904106 |
| Chloromethane | ND | | 2.50 | 1 | 09/03/2016 13:05 | WG904106 |
| Cyclohexane | ND | | 1.00 | 1 | 09/03/2016 13:05 | WG904106 |
| 1,2-Dibromo-3-Chloropropane | ND | | 5.00 | 1 | 09/03/2016 13:05 | WG904106 |
| 1,2-Dibromoethane | ND | | 1.00 | 1 | 09/03/2016 13:05 | WG904106 |
| 1,2-Dichlorobenzene | ND | | 1.00 | 1 | 09/03/2016 13:05 | WG904106 |
| 1,3-Dichlorobenzene | ND | | 1.00 | 1 | 09/03/2016 13:05 | WG904106 |
| 1,4-Dichlorobenzene | ND | | 1.00 | 1 | 09/03/2016 13:05 | WG904106 |
| Dichlorodifluoromethane | ND | | 5.00 | 1 | 09/03/2016 13:05 | WG904106 |
| 1,1-Dichloroethane | ND | | 1.00 | 1 | 09/03/2016 13:05 | WG904106 |
| 1,2-Dichloroethane | ND | | 1.00 | 1 | 09/03/2016 13:05 | WG904106 |
| 1,1-Dichloroethene | ND | | 1.00 | 1 | 09/03/2016 13:05 | WG904106 |
| cis-1,2-Dichloroethene | ND | | 1.00 | 1 | 09/03/2016 13:05 | WG904106 |
| trans-1,2-Dichloroethene | ND | | 1.00 | 1 | 09/03/2016 13:05 | WG904106 |
| 1,2-Dichloropropane | ND | | 1.00 | 1 | 09/03/2016 13:05 | WG904106 |
| cis-1,3-Dichloropropene | ND | | 1.00 | 1 | 09/03/2016 13:05 | WG904106 |
| trans-1,3-Dichloropropene | ND | | 1.00 | 1 | 09/03/2016 13:05 | WG904106 |
| Ethylbenzene | ND | | 1.00 | 1 | 09/03/2016 13:05 | WG904106 |
| 2-Hexanone | ND | | 10.0 | 1 | 09/03/2016 13:05 | WG904106 |
| Isopropylbenzene | ND | | 1.00 | 1 | 09/03/2016 13:05 | WG904106 |
| 2-Butanone (MEK) | ND | | 10.0 | 1 | 09/03/2016 13:05 | WG904106 |
| Methyl Acetate | ND | | 20.0 | 1 | 09/03/2016 13:05 | WG904106 |
| Methyl Cyclohexane | ND | | 1.00 | 1 | 09/03/2016 13:05 | WG904106 |
| Methylene Chloride | ND | | 5.00 | 1 | 09/03/2016 13:05 | WG904106 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 10.0 | 1 | 09/03/2016 13:05 | WG904106 |
| Methyl tert-butyl ether | ND | | 1.00 | 1 | 09/03/2016 13:05 | WG904106 |
| Styrene | ND | | 1.00 | 1 | 09/03/2016 13:05 | WG904106 |
| 1,1,2,2-Tetrachloroethane | ND | | 1.00 | 1 | 09/03/2016 13:05 | WG904106 |
| Tetrachloroethene | ND | | 1.00 | 1 | 09/03/2016 13:05 | WG904106 |
| Toluene | ND | | 5.00 | 1 | 09/03/2016 13:05 | WG904106 |
| 1,2,3-Trichlorobenzene | ND | | 1.00 | 1 | 09/03/2016 13:05 | WG904106 |
| 1,2,4-Trichlorobenzene | ND | | 1.00 | 1 | 09/03/2016 13:05 | WG904106 |
| 1,1,1-Trichloroethane | ND | | 1.00 | 1 | 09/03/2016 13:05 | WG904106 |
| 1,1,2-Trichloroethane | ND | | 1.00 | 1 | 09/03/2016 13:05 | WG904106 |
| Trichloroethene | ND | | 1.00 | 1 | 09/03/2016 13:05 | WG904106 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Trichlorofluoromethane | ND | | 5.00 | 1 | 09/03/2016 13:05 | WG904106 |
| 1,1,2-Trichlorotrifluoroethane | ND | | 1.00 | 1 | 09/03/2016 13:05 | WG904106 |
| Vinyl chloride | ND | | 1.00 | 1 | 09/03/2016 13:05 | WG904106 |
| Xylenes, Total | ND | | 3.00 | 1 | 09/03/2016 13:05 | WG904106 |
| *(S) Toluene-d8* | *99.7* | | *90.0-115* | | *09/03/2016 13:05* | WG904106 |
| *(S) Dibromofluoromethane* | *81.2* | | *79.0-121* | | *09/03/2016 13:05* | WG904106 |
| *(S) a,a,a-Trifluorotoluene* | *99.5* | | *90.4-116* | | *09/03/2016 13:05* | WG904106 |
| *(S) 4-Bromofluorobenzene* | *104* | | *80.1-120* | | *09/03/2016 13:05* | WG904106 |

## EDB / DBCP by Method 8011

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Ethylene Dibromide | ND | | 0.0100 | 1 | 09/02/2016 00:34 | WG903771 |
| 1,2-Dibromo-3-Chloropropane | ND | | 0.0200 | 1 | 09/02/2016 00:34 | WG903771 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Biphenyl | ND | | 10.0 | 1 | 08/29/2016 19:06 | WG903057 |
| Bis(2-Ethylhexyl)phthalate | ND | | 3.00 | 1 | 08/29/2016 19:06 | WG903057 |
| Di-n-butyl phthalate | ND | | 3.00 | 1 | 08/29/2016 19:06 | WG903057 |
| Diethyl phthalate | ND | | 3.00 | 1 | 08/29/2016 19:06 | WG903057 |
| Pyridine | ND | | 10.0 | 1 | 08/29/2016 19:06 | WG903057 |
| Quinoline | ND | | 50.0 | 1 | 08/30/2016 15:30 | WG903057 |
| 2,4-Dimethylphenol | ND | | 10.0 | 1 | 08/29/2016 19:06 | WG903057 |
| 2,4-Dinitrophenol | ND | J4 | 10.0 | 1 | 08/29/2016 19:06 | WG903057 |
| 2-Methylphenol | ND | | 10.0 | 1 | 08/29/2016 19:06 | WG903057 |
| 3&4-Methyl Phenol | ND | | 10.0 | 1 | 08/29/2016 19:06 | WG903057 |
| 4-Nitrophenol | ND | | 10.0 | 1 | 08/29/2016 19:06 | WG903057 |
| Phenol | ND | | 10.0 | 1 | 08/29/2016 19:06 | WG903057 |
| *(S) 2-Fluorophenol* | *26.8* | | *10.0-77.9* | | *08/29/2016 19:06* | WG903057 |
| *(S) Phenol-d5* | *16.1* | | *5.00-70.1* | | *08/29/2016 19:06* | WG903057 |
| *(S) Nitrobenzene-d5* | *63.8* | | *21.8-123* | | *08/29/2016 19:06* | WG903057 |
| *(S) 2-Fluorobiphenyl* | *69.2* | | *29.5-131* | | *08/29/2016 19:06* | WG903057 |
| *(S) 2,4,6-Tribromophenol* | *88.7* | | *11.2-130* | | *08/29/2016 19:06* | WG903057 |
| *(S) p-Terphenyl-d14* | *73.8* | | *29.3-137* | | *08/29/2016 19:06* | WG903057 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Anthracene | ND | | 0.0500 | 1 | 08/31/2016 05:37 | WG903328 |
| Acenaphthene | ND | | 0.0500 | 1 | 08/31/2016 05:37 | WG903328 |
| Benzo(a)anthracene | ND | | 0.0500 | 1 | 08/31/2016 05:37 | WG903328 |
| Benzo(a)pyrene | ND | | 0.0500 | 1 | 08/31/2016 05:37 | WG903328 |
| Benzo(b)fluoranthene | ND | | 0.0500 | 1 | 08/31/2016 05:37 | WG903328 |
| Benzo(g,h,i)perylene | ND | | 0.0500 | 1 | 08/31/2016 05:37 | WG903328 |
| Benzo(k)fluoranthene | ND | | 0.0500 | 1 | 08/31/2016 05:37 | WG903328 |
| Chrysene | ND | | 0.0500 | 1 | 08/31/2016 05:37 | WG903328 |
| Dibenz(a,h)anthracene | ND | | 0.0500 | 1 | 08/31/2016 05:37 | WG903328 |
| Fluoranthene | ND | | 0.0500 | 1 | 08/31/2016 05:37 | WG903328 |
| Fluorene | ND | | 0.0500 | 1 | 08/31/2016 05:37 | WG903328 |
| Indeno(1,2,3-cd)pyrene | ND | | 0.0500 | 1 | 08/31/2016 05:37 | WG903328 |
| Naphthalene | ND | | 0.250 | 1 | 08/31/2016 05:37 | WG903328 |
| Phenanthrene | ND | | 0.0500 | 1 | 08/31/2016 05:37 | WG903328 |
| Pyrene | ND | | 0.0500 | 1 | 08/31/2016 05:37 | WG903328 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

| Analyte | Result | Qualifier | RDL | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | ug/l | | ug/l | | date / time | |
| 2-Methylnaphthalene | ND | | 0.250 | 1 | 08/31/2016 05:37 | WG903328 |
| *(S) Nitrobenzene-d5* | *87.7* | | *33.8-179* | | *08/31/2016 05:37* | WG903328 |
| *(S) 2-Fluorobiphenyl* | *99.7* | | *55.5-150* | | *08/31/2016 05:37* | WG903328 |
| *(S) p-Terphenyl-d14* | *89.7* | | *46.2-163* | | *08/31/2016 05:37* | WG903328 |

## Metals (ICPMS) by Method 6020

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Cobalt,Dissolved | 3.90 | | 2.00 | 1 | 09/01/2016 07:06 | WG903828 |
| Lead,Dissolved | ND | | 2.00 | 1 | 09/01/2016 07:06 | WG903828 |
| Nickel,Dissolved | 2.55 | B | 2.00 | 1 | 09/01/2016 07:06 | WG903828 |
| Vanadium,Dissolved | ND | | 5.00 | 1 | 09/01/2016 07:06 | WG903828 |
| Zinc,Dissolved | ND | | 25.0 | 1 | 09/01/2016 07:06 | WG903828 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Acetone | ND | | 50.0 | 1 | 09/03/2016 13:28 | WG904106 |
| Benzene | ND | | 1.00 | 1 | 09/03/2016 13:28 | WG904106 |
| Bromochloromethane | ND | | 1.00 | 1 | 09/03/2016 13:28 | WG904106 |
| Bromodichloromethane | ND | | 1.00 | 1 | 09/03/2016 13:28 | WG904106 |
| Bromoform | ND | | 1.00 | 1 | 09/03/2016 13:28 | WG904106 |
| Bromomethane | ND | | 5.00 | 1 | 09/03/2016 13:28 | WG904106 |
| Carbon disulfide | ND | | 1.00 | 1 | 09/03/2016 13:28 | WG904106 |
| Carbon tetrachloride | ND | | 1.00 | 1 | 09/03/2016 13:28 | WG904106 |
| Chlorobenzene | ND | | 1.00 | 1 | 09/03/2016 13:28 | WG904106 |
| Chlorodibromomethane | ND | | 1.00 | 1 | 09/03/2016 13:28 | WG904106 |
| Chloroethane | ND | | 5.00 | 1 | 09/03/2016 13:28 | WG904106 |
| Chloroform | ND | | 5.00 | 1 | 09/03/2016 13:28 | WG904106 |
| Chloromethane | ND | | 2.50 | 1 | 09/03/2016 13:28 | WG904106 |
| Cyclohexane | 1.24 | | 1.00 | 1 | 09/03/2016 13:28 | WG904106 |
| 1,2-Dibromo-3-Chloropropane | ND | | 5.00 | 1 | 09/03/2016 13:28 | WG904106 |
| 1,2-Dibromoethane | ND | | 1.00 | 1 | 09/03/2016 13:28 | WG904106 |
| 1,2-Dichlorobenzene | ND | | 1.00 | 1 | 09/03/2016 13:28 | WG904106 |
| 1,3-Dichlorobenzene | ND | | 1.00 | 1 | 09/03/2016 13:28 | WG904106 |
| 1,4-Dichlorobenzene | ND | | 1.00 | 1 | 09/03/2016 13:28 | WG904106 |
| Dichlorodifluoromethane | ND | | 5.00 | 1 | 09/03/2016 13:28 | WG904106 |
| 1,1-Dichloroethane | ND | | 1.00 | 1 | 09/03/2016 13:28 | WG904106 |
| 1,2-Dichloroethane | ND | | 1.00 | 1 | 09/03/2016 13:28 | WG904106 |
| 1,1-Dichloroethene | ND | | 1.00 | 1 | 09/03/2016 13:28 | WG904106 |
| cis-1,2-Dichloroethene | ND | | 1.00 | 1 | 09/03/2016 13:28 | WG904106 |
| trans-1,2-Dichloroethene | ND | | 1.00 | 1 | 09/03/2016 13:28 | WG904106 |
| 1,2-Dichloropropane | ND | | 1.00 | 1 | 09/03/2016 13:28 | WG904106 |
| cis-1,3-Dichloropropene | ND | | 1.00 | 1 | 09/03/2016 13:28 | WG904106 |
| trans-1,3-Dichloropropene | ND | | 1.00 | 1 | 09/03/2016 13:28 | WG904106 |
| Ethylbenzene | ND | | 1.00 | 1 | 09/03/2016 13:28 | WG904106 |
| 2-Hexanone | ND | | 10.0 | 1 | 09/03/2016 13:28 | WG904106 |
| Isopropylbenzene | ND | | 1.00 | 1 | 09/03/2016 13:28 | WG904106 |
| 2-Butanone (MEK) | ND | | 10.0 | 1 | 09/03/2016 13:28 | WG904106 |
| Methyl Acetate | ND | | 20.0 | 1 | 09/03/2016 13:28 | WG904106 |
| Methyl Cyclohexane | ND | | 1.00 | 1 | 09/03/2016 13:28 | WG904106 |
| Methylene Chloride | ND | | 5.00 | 1 | 09/03/2016 13:28 | WG904106 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 10.0 | 1 | 09/03/2016 13:28 | WG904106 |
| Methyl tert-butyl ether | ND | | 1.00 | 1 | 09/03/2016 13:28 | WG904106 |
| Styrene | ND | | 1.00 | 1 | 09/03/2016 13:28 | WG904106 |
| 1,1,2,2-Tetrachloroethane | ND | | 1.00 | 1 | 09/03/2016 13:28 | WG904106 |
| Tetrachloroethene | ND | | 1.00 | 1 | 09/03/2016 13:28 | WG904106 |
| Toluene | ND | | 5.00 | 1 | 09/03/2016 13:28 | WG904106 |
| 1,2,3-Trichlorobenzene | ND | | 1.00 | 1 | 09/03/2016 13:28 | WG904106 |
| 1,2,4-Trichlorobenzene | ND | | 1.00 | 1 | 09/03/2016 13:28 | WG904106 |
| 1,1,1-Trichloroethane | ND | | 1.00 | 1 | 09/03/2016 13:28 | WG904106 |
| 1,1,2-Trichloroethane | ND | | 1.00 | 1 | 09/03/2016 13:28 | WG904106 |
| Trichloroethene | ND | | 1.00 | 1 | 09/03/2016 13:28 | WG904106 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Trichlorofluoromethane | ND | | 5.00 | 1 | 09/03/2016 13:28 | WG904106 |
| 1,1,2-Trichlorotrifluoroethane | ND | | 1.00 | 1 | 09/03/2016 13:28 | WG904106 |
| Vinyl chloride | ND | | 1.00 | 1 | 09/03/2016 13:28 | WG904106 |
| Xylenes, Total | ND | | 3.00 | 1 | 09/03/2016 13:28 | WG904106 |
| *(S) Toluene-d8* | *101* | | *90.0-115* | | *09/03/2016 13:28* | WG904106 |
| *(S) Dibromofluoromethane* | *82.1* | | *79.0-121* | | *09/03/2016 13:28* | WG904106 |
| *(S) a,a,a-Trifluorotoluene* | *101* | | *90.4-116* | | *09/03/2016 13:28* | WG904106 |
| *(S) 4-Bromofluorobenzene* | *101* | | *80.1-120* | | *09/03/2016 13:28* | WG904106 |

## EDB / DBCP by Method 8011

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Ethylene Dibromide | ND | | 0.0100 | 1 | 09/02/2016 00:45 | WG903771 |
| 1,2-Dibromo-3-Chloropropane | ND | | 0.0200 | 1 | 09/02/2016 00:45 | WG903771 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Biphenyl | ND | | 10.0 | 1 | 08/29/2016 19:29 | WG903057 |
| Bis(2-Ethylhexyl)phthalate | ND | | 3.00 | 1 | 08/29/2016 19:29 | WG903057 |
| Di-n-butyl phthalate | ND | | 3.00 | 1 | 08/29/2016 19:29 | WG903057 |
| Diethyl phthalate | ND | | 3.00 | 1 | 08/29/2016 19:29 | WG903057 |
| Pyridine | ND | | 10.0 | 1 | 08/29/2016 19:29 | WG903057 |
| Quinoline | ND | | 50.0 | 1 | 08/30/2016 15:50 | WG903057 |
| 2,4-Dimethylphenol | ND | | 10.0 | 1 | 08/29/2016 19:29 | WG903057 |
| 2,4-Dinitrophenol | ND | J4 | 10.0 | 1 | 08/29/2016 19:29 | WG903057 |
| 2-Methylphenol | ND | | 10.0 | 1 | 08/29/2016 19:29 | WG903057 |
| 3&4-Methyl Phenol | ND | | 10.0 | 1 | 08/29/2016 19:29 | WG903057 |
| 4-Nitrophenol | ND | | 10.0 | 1 | 08/29/2016 19:29 | WG903057 |
| Phenol | ND | | 10.0 | 1 | 08/29/2016 19:29 | WG903057 |
| *(S) 2-Fluorophenol* | *38.2* | | *10.0-77.9* | | *08/29/2016 19:29* | WG903057 |
| *(S) Phenol-d5* | *27.2* | | *5.00-70.1* | | *08/29/2016 19:29* | WG903057 |
| *(S) Nitrobenzene-d5* | *78.0* | | *21.8-123* | | *08/29/2016 19:29* | WG903057 |
| *(S) 2-Fluorobiphenyl* | *71.9* | | *29.5-131* | | *08/29/2016 19:29* | WG903057 |
| *(S) 2,4,6-Tribromophenol* | *99.4* | | *11.2-130* | | *08/29/2016 19:29* | WG903057 |
| *(S) p-Terphenyl-d14* | *73.7* | | *29.3-137* | | *08/29/2016 19:29* | WG903057 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Anthracene | 0.0676 | | 0.0500 | 1 | 08/31/2016 05:59 | WG903328 |
| Acenaphthene | 0.0897 | | 0.0500 | 1 | 08/31/2016 05:59 | WG903328 |
| Benzo(a)anthracene | ND | | 0.0500 | 1 | 08/31/2016 05:59 | WG903328 |
| Benzo(a)pyrene | ND | | 0.0500 | 1 | 08/31/2016 05:59 | WG903328 |
| Benzo(b)fluoranthene | ND | | 0.0500 | 1 | 08/31/2016 05:59 | WG903328 |
| Benzo(g,h,i)perylene | ND | | 0.0500 | 1 | 08/31/2016 05:59 | WG903328 |
| Benzo(k)fluoranthene | ND | | 0.0500 | 1 | 08/31/2016 05:59 | WG903328 |
| Chrysene | ND | | 0.0500 | 1 | 08/31/2016 05:59 | WG903328 |
| Dibenz(a,h)anthracene | ND | | 0.0500 | 1 | 08/31/2016 05:59 | WG903328 |
| Fluoranthene | ND | | 0.0500 | 1 | 08/31/2016 05:59 | WG903328 |
| Fluorene | 0.131 | | 0.0500 | 1 | 08/31/2016 05:59 | WG903328 |
| Indeno(1,2,3-cd)pyrene | ND | | 0.0500 | 1 | 08/31/2016 05:59 | WG903328 |
| Naphthalene | ND | | 0.250 | 1 | 08/31/2016 05:59 | WG903328 |
| Phenanthrene | ND | | 0.0500 | 1 | 08/31/2016 05:59 | WG903328 |
| Pyrene | 0.0653 | | 0.0500 | 1 | 08/31/2016 05:59 | WG903328 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

| Analyte | Result | Qualifier | RDL | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | ug/l | | ug/l | | date / time | |
| 2-Methylnaphthalene | ND | | 0.250 | 1 | 08/31/2016 05:59 | WG903328 |
| *(S) Nitrobenzene-d5* | *94.6* | | *33.8-179* | | *08/31/2016 05:59* | WG903328 |
| *(S) 2-Fluorobiphenyl* | *98.9* | | *55.5-150* | | *08/31/2016 05:59* | WG903328 |
| *(S) p-Terphenyl-d14* | *89.8* | | *46.2-163* | | *08/31/2016 05:59* | WG903328 |

## Metals (ICPMS) by Method 6020

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Cobalt,Dissolved | 7.72 | | 2.00 | 1 | 09/01/2016 07:09 | WG903828 |
| Lead,Dissolved | ND | | 2.00 | 1 | 09/01/2016 07:09 | WG903828 |
| Nickel,Dissolved | 20.6 | | 2.00 | 1 | 09/01/2016 07:09 | WG903828 |
| Vanadium,Dissolved | ND | | 5.00 | 1 | 09/01/2016 07:09 | WG903828 |
| Zinc,Dissolved | 264 | | 25.0 | 1 | 09/01/2016 07:09 | WG903828 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Acetone | ND | | 50.0 | 1 | 09/03/2016 13:52 | WG904106 |
| Benzene | ND | | 1.00 | 1 | 09/03/2016 13:52 | WG904106 |
| Bromochloromethane | ND | | 1.00 | 1 | 09/03/2016 13:52 | WG904106 |
| Bromodichloromethane | ND | | 1.00 | 1 | 09/03/2016 13:52 | WG904106 |
| Bromoform | ND | | 1.00 | 1 | 09/03/2016 13:52 | WG904106 |
| Bromomethane | ND | | 5.00 | 1 | 09/03/2016 13:52 | WG904106 |
| Carbon disulfide | ND | | 1.00 | 1 | 09/03/2016 13:52 | WG904106 |
| Carbon tetrachloride | ND | | 1.00 | 1 | 09/03/2016 13:52 | WG904106 |
| Chlorobenzene | ND | | 1.00 | 1 | 09/03/2016 13:52 | WG904106 |
| Chlorodibromomethane | ND | | 1.00 | 1 | 09/03/2016 13:52 | WG904106 |
| Chloroethane | ND | | 5.00 | 1 | 09/03/2016 13:52 | WG904106 |
| Chloroform | ND | | 5.00 | 1 | 09/03/2016 13:52 | WG904106 |
| Chloromethane | ND | | 2.50 | 1 | 09/03/2016 13:52 | WG904106 |
| Cyclohexane | ND | | 1.00 | 1 | 09/03/2016 13:52 | WG904106 |
| 1,2-Dibromo-3-Chloropropane | ND | | 5.00 | 1 | 09/03/2016 13:52 | WG904106 |
| 1,2-Dibromoethane | ND | | 1.00 | 1 | 09/03/2016 13:52 | WG904106 |
| 1,2-Dichlorobenzene | ND | | 1.00 | 1 | 09/03/2016 13:52 | WG904106 |
| 1,3-Dichlorobenzene | ND | | 1.00 | 1 | 09/03/2016 13:52 | WG904106 |
| 1,4-Dichlorobenzene | ND | | 1.00 | 1 | 09/03/2016 13:52 | WG904106 |
| Dichlorodifluoromethane | ND | | 5.00 | 1 | 09/03/2016 13:52 | WG904106 |
| 1,1-Dichloroethane | ND | | 1.00 | 1 | 09/03/2016 13:52 | WG904106 |
| 1,2-Dichloroethane | ND | | 1.00 | 1 | 09/03/2016 13:52 | WG904106 |
| 1,1-Dichloroethene | ND | | 1.00 | 1 | 09/03/2016 13:52 | WG904106 |
| cis-1,2-Dichloroethene | ND | | 1.00 | 1 | 09/03/2016 13:52 | WG904106 |
| trans-1,2-Dichloroethene | ND | | 1.00 | 1 | 09/03/2016 13:52 | WG904106 |
| 1,2-Dichloropropane | ND | | 1.00 | 1 | 09/03/2016 13:52 | WG904106 |
| cis-1,3-Dichloropropene | ND | | 1.00 | 1 | 09/03/2016 13:52 | WG904106 |
| trans-1,3-Dichloropropene | ND | | 1.00 | 1 | 09/03/2016 13:52 | WG904106 |
| Ethylbenzene | ND | | 1.00 | 1 | 09/03/2016 13:52 | WG904106 |
| 2-Hexanone | ND | | 10.0 | 1 | 09/03/2016 13:52 | WG904106 |
| Isopropylbenzene | ND | | 1.00 | 1 | 09/03/2016 13:52 | WG904106 |
| 2-Butanone (MEK) | ND | | 10.0 | 1 | 09/03/2016 13:52 | WG904106 |
| Methyl Acetate | ND | | 20.0 | 1 | 09/03/2016 13:52 | WG904106 |
| Methyl Cyclohexane | ND | | 1.00 | 1 | 09/03/2016 13:52 | WG904106 |
| Methylene Chloride | ND | | 5.00 | 1 | 09/03/2016 13:52 | WG904106 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 10.0 | 1 | 09/03/2016 13:52 | WG904106 |
| Methyl tert-butyl ether | ND | | 1.00 | 1 | 09/03/2016 13:52 | WG904106 |
| Styrene | ND | | 1.00 | 1 | 09/03/2016 13:52 | WG904106 |
| 1,1,2,2-Tetrachloroethane | ND | | 1.00 | 1 | 09/03/2016 13:52 | WG904106 |
| Tetrachloroethene | ND | | 1.00 | 1 | 09/03/2016 13:52 | WG904106 |
| Toluene | ND | | 5.00 | 1 | 09/03/2016 13:52 | WG904106 |
| 1,2,3-Trichlorobenzene | ND | | 1.00 | 1 | 09/03/2016 13:52 | WG904106 |
| 1,2,4-Trichlorobenzene | ND | | 1.00 | 1 | 09/03/2016 13:52 | WG904106 |
| 1,1,1-Trichloroethane | ND | | 1.00 | 1 | 09/03/2016 13:52 | WG904106 |
| 1,1,2-Trichloroethane | ND | | 1.00 | 1 | 09/03/2016 13:52 | WG904106 |
| Trichloroethene | ND | | 1.00 | 1 | 09/03/2016 13:52 | WG904106 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Trichlorofluoromethane | ND | | 5.00 | 1 | 09/03/2016 13:52 | WG904106 |
| 1,1,2-Trichlorotrifluoroethane | ND | | 1.00 | 1 | 09/03/2016 13:52 | WG904106 |
| Vinyl chloride | ND | | 1.00 | 1 | 09/03/2016 13:52 | WG904106 |
| Xylenes, Total | ND | | 3.00 | 1 | 09/03/2016 13:52 | WG904106 |
| *(S) Toluene-d8* | *98.4* | | *90.0-115* | | *09/03/2016 13:52* | WG904106 |
| *(S) Dibromofluoromethane* | *83.8* | | *79.0-121* | | *09/03/2016 13:52* | WG904106 |
| *(S) a,a,a-Trifluorotoluene* | *99.7* | | *90.4-116* | | *09/03/2016 13:52* | WG904106 |
| *(S) 4-Bromofluorobenzene* | *102* | | *80.1-120* | | *09/03/2016 13:52* | WG904106 |

## EDB / DBCP by Method 8011

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Ethylene Dibromide | ND | | 0.0100 | 1 | 09/02/2016 00:56 | WG903771 |
| 1,2-Dibromo-3-Chloropropane | ND | | 0.0200 | 1 | 09/02/2016 00:56 | WG903771 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Biphenyl | ND | | 10.0 | 1 | 08/29/2016 19:52 | WG903057 |
| Bis(2-Ethylhexyl)phthalate | ND | | 3.00 | 1 | 08/29/2016 19:52 | WG903057 |
| Di-n-butyl phthalate | ND | | 3.00 | 1 | 08/29/2016 19:52 | WG903057 |
| Diethyl phthalate | ND | | 3.00 | 1 | 08/29/2016 19:52 | WG903057 |
| Pyridine | ND | | 10.0 | 1 | 08/29/2016 19:52 | WG903057 |
| Quinoline | ND | | 50.0 | 1 | 08/30/2016 16:10 | WG903057 |
| 2,4-Dimethylphenol | ND | | 10.0 | 1 | 08/29/2016 19:52 | WG903057 |
| 2,4-Dinitrophenol | ND | J4 | 10.0 | 1 | 08/29/2016 19:52 | WG903057 |
| 2-Methylphenol | ND | | 10.0 | 1 | 08/29/2016 19:52 | WG903057 |
| 3&4-Methyl Phenol | ND | | 10.0 | 1 | 08/29/2016 19:52 | WG903057 |
| 4-Nitrophenol | ND | | 10.0 | 1 | 08/29/2016 19:52 | WG903057 |
| Phenol | ND | | 10.0 | 1 | 08/29/2016 19:52 | WG903057 |
| *(S) 2-Fluorophenol* | *27.8* | | *10.0-77.9* | | *08/29/2016 19:52* | WG903057 |
| *(S) Phenol-d5* | *15.7* | | *5.00-70.1* | | *08/29/2016 19:52* | WG903057 |
| *(S) Nitrobenzene-d5* | *64.0* | | *21.8-123* | | *08/29/2016 19:52* | WG903057 |
| *(S) 2-Fluorobiphenyl* | *66.6* | | *29.5-131* | | *08/29/2016 19:52* | WG903057 |
| *(S) 2,4,6-Tribromophenol* | *95.9* | | *11.2-130* | | *08/29/2016 19:52* | WG903057 |
| *(S) p-Terphenyl-d14* | *65.6* | | *29.3-137* | | *08/29/2016 19:52* | WG903057 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Anthracene | ND | | 0.0500 | 1 | 08/31/2016 06:20 | WG903328 |
| Acenaphthene | ND | | 0.0500 | 1 | 08/31/2016 06:20 | WG903328 |
| Benzo(a)anthracene | ND | | 0.0500 | 1 | 08/31/2016 06:20 | WG903328 |
| Benzo(a)pyrene | ND | | 0.0500 | 1 | 08/31/2016 06:20 | WG903328 |
| Benzo(b)fluoranthene | ND | | 0.0500 | 1 | 08/31/2016 06:20 | WG903328 |
| Benzo(g,h,i)perylene | ND | | 0.0500 | 1 | 08/31/2016 06:20 | WG903328 |
| Benzo(k)fluoranthene | ND | | 0.0500 | 1 | 08/31/2016 06:20 | WG903328 |
| Chrysene | ND | | 0.0500 | 1 | 08/31/2016 06:20 | WG903328 |
| Dibenz(a,h)anthracene | ND | | 0.0500 | 1 | 08/31/2016 06:20 | WG903328 |
| Fluoranthene | ND | | 0.0500 | 1 | 08/31/2016 06:20 | WG903328 |
| Fluorene | ND | | 0.0500 | 1 | 08/31/2016 06:20 | WG903328 |
| Indeno(1,2,3-cd)pyrene | ND | | 0.0500 | 1 | 08/31/2016 06:20 | WG903328 |
| Naphthalene | ND | | 0.250 | 1 | 08/31/2016 06:20 | WG903328 |
| Phenanthrene | ND | | 0.0500 | 1 | 08/31/2016 06:20 | WG903328 |
| Pyrene | ND | | 0.0500 | 1 | 08/31/2016 06:20 | WG903328 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

| Analyte | Result | Qualifier | RDL | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | ug/l | | ug/l | | date / time | |
| 2-Methylnaphthalene | ND | | 0.250 | 1 | 08/31/2016 06:20 | WG903328 |
| *(S) Nitrobenzene-d5* | *90.3* | | *33.8-179* | | *08/31/2016 06:20* | WG903328 |
| *(S) 2-Fluorobiphenyl* | *98.0* | | *55.5-150* | | *08/31/2016 06:20* | WG903328 |
| *(S) p-Terphenyl-d14* | *87.1* | | *46.2-163* | | *08/31/2016 06:20* | WG903328 |

## Metals (ICPMS) by Method 6020

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Cobalt,Dissolved | ND | | 2.00 | 1 | 09/01/2016 07:12 | WG903828 |
| Lead,Dissolved | ND | | 2.00 | 1 | 09/01/2016 07:12 | WG903828 |
| Nickel,Dissolved | ND | | 2.00 | 1 | 09/01/2016 07:12 | WG903828 |
| Vanadium,Dissolved | ND | | 5.00 | 1 | 09/01/2016 07:12 | WG903828 |
| Zinc,Dissolved | ND | | 25.0 | 1 | 09/01/2016 07:12 | WG903828 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Acetone | ND | | 50.0 | 1 | 09/03/2016 14:15 | WG904106 |
| Benzene | ND | | 1.00 | 1 | 09/03/2016 14:15 | WG904106 |
| Bromochloromethane | ND | | 1.00 | 1 | 09/03/2016 14:15 | WG904106 |
| Bromodichloromethane | ND | | 1.00 | 1 | 09/03/2016 14:15 | WG904106 |
| Bromoform | ND | | 1.00 | 1 | 09/03/2016 14:15 | WG904106 |
| Bromomethane | ND | | 5.00 | 1 | 09/03/2016 14:15 | WG904106 |
| Carbon disulfide | ND | | 1.00 | 1 | 09/03/2016 14:15 | WG904106 |
| Carbon tetrachloride | ND | | 1.00 | 1 | 09/03/2016 14:15 | WG904106 |
| Chlorobenzene | ND | | 1.00 | 1 | 09/03/2016 14:15 | WG904106 |
| Chlorodibromomethane | ND | | 1.00 | 1 | 09/03/2016 14:15 | WG904106 |
| Chloroethane | ND | | 5.00 | 1 | 09/03/2016 14:15 | WG904106 |
| Chloroform | ND | | 5.00 | 1 | 09/03/2016 14:15 | WG904106 |
| Chloromethane | ND | | 2.50 | 1 | 09/03/2016 14:15 | WG904106 |
| Cyclohexane | ND | | 1.00 | 1 | 09/03/2016 14:15 | WG904106 |
| 1,2-Dibromo-3-Chloropropane | ND | | 5.00 | 1 | 09/03/2016 14:15 | WG904106 |
| 1,2-Dibromoethane | ND | | 1.00 | 1 | 09/03/2016 14:15 | WG904106 |
| 1,2-Dichlorobenzene | ND | | 1.00 | 1 | 09/03/2016 14:15 | WG904106 |
| 1,3-Dichlorobenzene | ND | | 1.00 | 1 | 09/03/2016 14:15 | WG904106 |
| 1,4-Dichlorobenzene | ND | | 1.00 | 1 | 09/03/2016 14:15 | WG904106 |
| Dichlorodifluoromethane | ND | | 5.00 | 1 | 09/03/2016 14:15 | WG904106 |
| 1,1-Dichloroethane | ND | | 1.00 | 1 | 09/03/2016 14:15 | WG904106 |
| 1,2-Dichloroethane | ND | | 1.00 | 1 | 09/03/2016 14:15 | WG904106 |
| 1,1-Dichloroethene | ND | | 1.00 | 1 | 09/03/2016 14:15 | WG904106 |
| cis-1,2-Dichloroethene | ND | | 1.00 | 1 | 09/03/2016 14:15 | WG904106 |
| trans-1,2-Dichloroethene | ND | | 1.00 | 1 | 09/03/2016 14:15 | WG904106 |
| 1,2-Dichloropropane | ND | | 1.00 | 1 | 09/03/2016 14:15 | WG904106 |
| cis-1,3-Dichloropropene | ND | | 1.00 | 1 | 09/03/2016 14:15 | WG904106 |
| trans-1,3-Dichloropropene | ND | | 1.00 | 1 | 09/03/2016 14:15 | WG904106 |
| Ethylbenzene | ND | | 1.00 | 1 | 09/03/2016 14:15 | WG904106 |
| 2-Hexanone | ND | | 10.0 | 1 | 09/03/2016 14:15 | WG904106 |
| Isopropylbenzene | ND | | 1.00 | 1 | 09/03/2016 14:15 | WG904106 |
| 2-Butanone (MEK) | ND | | 10.0 | 1 | 09/03/2016 14:15 | WG904106 |
| Methyl Acetate | ND | | 20.0 | 1 | 09/03/2016 14:15 | WG904106 |
| Methyl Cyclohexane | ND | | 1.00 | 1 | 09/03/2016 14:15 | WG904106 |
| Methylene Chloride | ND | | 5.00 | 1 | 09/03/2016 14:15 | WG904106 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 10.0 | 1 | 09/03/2016 14:15 | WG904106 |
| Methyl tert-butyl ether | ND | | 1.00 | 1 | 09/03/2016 14:15 | WG904106 |
| Styrene | ND | | 1.00 | 1 | 09/03/2016 14:15 | WG904106 |
| 1,1,2,2-Tetrachloroethane | ND | | 1.00 | 1 | 09/03/2016 14:15 | WG904106 |
| Tetrachloroethene | ND | | 1.00 | 1 | 09/03/2016 14:15 | WG904106 |
| Toluene | ND | | 5.00 | 1 | 09/03/2016 14:15 | WG904106 |
| 1,2,3-Trichlorobenzene | ND | | 1.00 | 1 | 09/03/2016 14:15 | WG904106 |
| 1,2,4-Trichlorobenzene | ND | | 1.00 | 1 | 09/03/2016 14:15 | WG904106 |
| 1,1,1-Trichloroethane | ND | | 1.00 | 1 | 09/03/2016 14:15 | WG904106 |
| 1,1,2-Trichloroethane | ND | | 1.00 | 1 | 09/03/2016 14:15 | WG904106 |
| Trichloroethene | ND | | 1.00 | 1 | 09/03/2016 14:15 | WG904106 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Trichlorofluoromethane | ND | | 5.00 | 1 | 09/03/2016 14:15 | WG904106 |
| 1,1,2-Trichlorotrifluoroethane | ND | | 1.00 | 1 | 09/03/2016 14:15 | WG904106 |
| Vinyl chloride | ND | | 1.00 | 1 | 09/03/2016 14:15 | WG904106 |
| Xylenes, Total | ND | | 3.00 | 1 | 09/03/2016 14:15 | WG904106 |
| *(S) Toluene-d8* | *99.2* | | *90.0-115* | | *09/03/2016 14:15* | WG904106 |
| *(S) Dibromofluoromethane* | *83.1* | | *79.0-121* | | *09/03/2016 14:15* | WG904106 |
| *(S) a,a,a-Trifluorotoluene* | *99.3* | | *90.4-116* | | *09/03/2016 14:15* | WG904106 |
| *(S) 4-Bromofluorobenzene* | *102* | | *80.1-120* | | *09/03/2016 14:15* | WG904106 |

## EDB / DBCP by Method 8011

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Ethylene Dibromide | ND | | 0.0100 | 1 | 09/02/2016 01:07 | WG903771 |
| 1,2-Dibromo-3-Chloropropane | ND | | 0.0200 | 1 | 09/02/2016 01:07 | WG903771 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Biphenyl | ND | | 10.0 | 1 | 08/30/2016 22:43 | WG903335 |
| Bis(2-Ethylhexyl)phthalate | ND | | 3.00 | 1 | 08/30/2016 22:43 | WG903335 |
| Di-n-butyl phthalate | ND | | 3.00 | 1 | 08/30/2016 22:43 | WG903335 |
| Diethyl phthalate | ND | | 3.00 | 1 | 08/30/2016 22:43 | WG903335 |
| Pyridine | ND | | 10.0 | 1 | 08/30/2016 22:43 | WG903335 |
| Quinoline | ND | J4 | 50.0 | 1 | 09/01/2016 16:21 | WG903335 |
| 2,4-Dimethylphenol | ND | | 10.0 | 1 | 08/30/2016 22:43 | WG903335 |
| 2,4-Dinitrophenol | ND | | 10.0 | 1 | 08/30/2016 22:43 | WG903335 |
| 2-Methylphenol | ND | | 10.0 | 1 | 08/30/2016 22:43 | WG903335 |
| 3&4-Methyl Phenol | ND | | 10.0 | 1 | 08/30/2016 22:43 | WG903335 |
| 4-Nitrophenol | ND | | 10.0 | 1 | 08/30/2016 22:43 | WG903335 |
| Phenol | ND | | 10.0 | 1 | 08/30/2016 22:43 | WG903335 |
| *(S) 2-Fluorophenol* | *35.1* | | *10.0-77.9* | | *08/30/2016 22:43* | WG903335 |
| *(S) Phenol-d5* | *29.2* | | *5.00-70.1* | | *08/30/2016 22:43* | WG903335 |
| *(S) Nitrobenzene-d5* | *47.8* | | *21.8-123* | | *08/30/2016 22:43* | WG903335 |
| *(S) 2-Fluorobiphenyl* | *53.8* | | *29.5-131* | | *08/30/2016 22:43* | WG903335 |
| *(S) 2,4,6-Tribromophenol* | *88.6* | | *11.2-130* | | *08/30/2016 22:43* | WG903335 |
| *(S) p-Terphenyl-d14* | *78.6* | | *29.3-137* | | *08/30/2016 22:43* | WG903335 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Anthracene | ND | | 0.0500 | 1 | 09/01/2016 06:44 | WG904136 |
| Acenaphthene | ND | | 0.0500 | 1 | 09/01/2016 06:44 | WG904136 |
| Benzo(a)anthracene | ND | | 0.0500 | 1 | 09/01/2016 06:44 | WG904136 |
| Benzo(a)pyrene | ND | | 0.0500 | 1 | 09/01/2016 06:44 | WG904136 |
| Benzo(b)fluoranthene | ND | | 0.0500 | 1 | 09/01/2016 06:44 | WG904136 |
| Benzo(g,h,i)perylene | ND | | 0.0500 | 1 | 09/01/2016 06:44 | WG904136 |
| Benzo(k)fluoranthene | ND | | 0.0500 | 1 | 09/01/2016 06:44 | WG904136 |
| Chrysene | ND | | 0.0500 | 1 | 09/01/2016 06:44 | WG904136 |
| Dibenz(a,h)anthracene | ND | | 0.0500 | 1 | 09/01/2016 06:44 | WG904136 |
| Fluoranthene | ND | | 0.0500 | 1 | 09/01/2016 06:44 | WG904136 |
| Fluorene | ND | | 0.0500 | 1 | 09/01/2016 06:44 | WG904136 |
| Indeno(1,2,3-cd)pyrene | ND | | 0.0500 | 1 | 09/01/2016 06:44 | WG904136 |
| Naphthalene | ND | | 0.250 | 1 | 09/01/2016 06:44 | WG904136 |
| Phenanthrene | ND | | 0.0500 | 1 | 09/01/2016 06:44 | WG904136 |
| Pyrene | ND | | 0.0500 | 1 | 09/01/2016 06:44 | WG904136 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| 2-Methylnaphthalene | ND | | 0.250 | 1 | 09/01/2016 06:44 | WG904136 |
| *(S) Nitrobenzene-d5* | *88.3* | | *33.8-179* | | *09/01/2016 06:44* | WG904136 |
| *(S) 2-Fluorobiphenyl* | *98.6* | | *55.5-150* | | *09/01/2016 06:44* | WG904136 |
| *(S) p-Terphenyl-d14* | *91.8* | | *46.2-163* | | *09/01/2016 06:44* | WG904136 |

## Metals (ICPMS) by Method 6020

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Cobalt,Dissolved | ND | | 2.00 | 1 | 09/01/2016 07:15 | WG903828 |
| Lead,Dissolved | ND | | 2.00 | 1 | 09/01/2016 07:15 | WG903828 |
| Nickel,Dissolved | ND | | 2.00 | 1 | 09/01/2016 07:15 | WG903828 |
| Vanadium,Dissolved | ND | | 5.00 | 1 | 09/01/2016 07:15 | WG903828 |
| Zinc,Dissolved | ND | | 25.0 | 1 | 09/01/2016 07:15 | WG903828 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Acetone | ND | | 50.0 | 1 | 09/01/2016 14:38 | WG902865 |
| Benzene | ND | | 1.00 | 1 | 09/01/2016 14:38 | WG902865 |
| Bromochloromethane | ND | | 1.00 | 1 | 09/01/2016 14:38 | WG902865 |
| Bromodichloromethane | ND | | 1.00 | 1 | 09/01/2016 14:38 | WG902865 |
| Bromoform | ND | | 1.00 | 1 | 09/01/2016 14:38 | WG902865 |
| Bromomethane | ND | | 5.00 | 1 | 09/01/2016 14:38 | WG902865 |
| Carbon disulfide | ND | | 1.00 | 1 | 09/01/2016 14:38 | WG902865 |
| Carbon tetrachloride | ND | | 1.00 | 1 | 09/01/2016 14:38 | WG902865 |
| Chlorobenzene | ND | | 1.00 | 1 | 09/01/2016 14:38 | WG902865 |
| Chlorodibromomethane | ND | | 1.00 | 1 | 09/01/2016 14:38 | WG902865 |
| Chloroethane | ND | | 5.00 | 1 | 09/01/2016 14:38 | WG902865 |
| Chloroform | ND | | 5.00 | 1 | 09/01/2016 14:38 | WG902865 |
| Chloromethane | ND | | 2.50 | 1 | 09/01/2016 14:38 | WG902865 |
| Cyclohexane | ND | | 1.00 | 1 | 09/01/2016 14:38 | WG902865 |
| 1,2-Dibromo-3-Chloropropane | ND | | 5.00 | 1 | 09/01/2016 14:38 | WG902865 |
| 1,2-Dibromoethane | ND | | 1.00 | 1 | 09/01/2016 14:38 | WG902865 |
| 1,2-Dichlorobenzene | ND | | 1.00 | 1 | 09/01/2016 14:38 | WG902865 |
| 1,3-Dichlorobenzene | ND | | 1.00 | 1 | 09/01/2016 14:38 | WG902865 |
| 1,4-Dichlorobenzene | ND | | 1.00 | 1 | 09/01/2016 14:38 | WG902865 |
| Dichlorodifluoromethane | ND | | 5.00 | 1 | 09/01/2016 14:38 | WG902865 |
| 1,1-Dichloroethane | ND | | 1.00 | 1 | 09/01/2016 14:38 | WG902865 |
| 1,2-Dichloroethane | ND | | 1.00 | 1 | 09/01/2016 14:38 | WG902865 |
| 1,1-Dichloroethene | ND | | 1.00 | 1 | 09/01/2016 14:38 | WG902865 |
| cis-1,2-Dichloroethene | ND | | 1.00 | 1 | 09/01/2016 14:38 | WG902865 |
| trans-1,2-Dichloroethene | ND | | 1.00 | 1 | 09/01/2016 14:38 | WG902865 |
| 1,2-Dichloropropane | ND | | 1.00 | 1 | 09/01/2016 14:38 | WG902865 |
| cis-1,3-Dichloropropene | ND | | 1.00 | 1 | 09/01/2016 14:38 | WG902865 |
| trans-1,3-Dichloropropene | ND | | 1.00 | 1 | 09/01/2016 14:38 | WG902865 |
| Ethylbenzene | ND | | 1.00 | 1 | 09/01/2016 14:38 | WG902865 |
| 2-Hexanone | ND | | 10.0 | 1 | 09/01/2016 14:38 | WG902865 |
| Isopropylbenzene | ND | | 1.00 | 1 | 09/01/2016 14:38 | WG902865 |
| 2-Butanone (MEK) | ND | | 10.0 | 1 | 09/01/2016 14:38 | WG902865 |
| Methyl Acetate | ND | | 20.0 | 1 | 09/01/2016 14:38 | WG902865 |
| Methyl Cyclohexane | ND | | 1.00 | 1 | 09/01/2016 14:38 | WG902865 |
| Methylene Chloride | ND | | 5.00 | 1 | 09/01/2016 14:38 | WG902865 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 10.0 | 1 | 09/01/2016 14:38 | WG902865 |
| Methyl tert-butyl ether | ND | | 1.00 | 1 | 09/01/2016 14:38 | WG902865 |
| Styrene | ND | | 1.00 | 1 | 09/01/2016 14:38 | WG902865 |
| 1,1,2,2-Tetrachloroethane | ND | | 1.00 | 1 | 09/01/2016 14:38 | WG902865 |
| Tetrachloroethene | ND | | 1.00 | 1 | 09/01/2016 14:38 | WG902865 |
| Toluene | ND | | 5.00 | 1 | 09/01/2016 14:38 | WG902865 |
| 1,2,3-Trichlorobenzene | ND | | 1.00 | 1 | 09/01/2016 14:38 | WG902865 |
| 1,2,4-Trichlorobenzene | ND | | 1.00 | 1 | 09/01/2016 14:38 | WG902865 |
| 1,1,1-Trichloroethane | ND | | 1.00 | 1 | 09/01/2016 14:38 | WG902865 |
| 1,1,2-Trichloroethane | ND | | 1.00 | 1 | 09/01/2016 14:38 | WG902865 |
| Trichloroethene | ND | | 1.00 | 1 | 09/01/2016 14:38 | WG902865 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Trichlorofluoromethane | ND | | 5.00 | 1 | 09/01/2016 14:38 | WG902865 |
| 1,1,2-Trichlorotrifluoroethane | ND | | 1.00 | 1 | 09/01/2016 14:38 | WG902865 |
| Vinyl chloride | ND | | 1.00 | 1 | 09/01/2016 14:38 | WG902865 |
| Xylenes, Total | ND | | 3.00 | 1 | 09/01/2016 14:38 | WG902865 |
| *(S) Toluene-d8* | *106* | | *90.0-115* | | *09/01/2016 14:38* | WG902865 |
| *(S) Dibromofluoromethane* | *101* | | *79.0-121* | | *09/01/2016 14:38* | WG902865 |
| *(S) a,a,a-Trifluorotoluene* | *103* | | *90.4-116* | | *09/01/2016 14:38* | WG902865 |
| *(S) 4-Bromofluorobenzene* | *95.7* | | *80.1-120* | | *09/01/2016 14:38* | WG902865 |

## EDB / DBCP by Method 8011

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Ethylene Dibromide | ND | | 0.0100 | 1 | 09/02/2016 01:18 | WG903771 |
| 1,2-Dibromo-3-Chloropropane | ND | | 0.0200 | 1 | 09/02/2016 01:18 | WG903771 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Biphenyl | ND | | 10.0 | 1 | 08/30/2016 23:07 | WG903335 |
| Bis(2-Ethylhexyl)phthalate | ND | | 3.00 | 1 | 08/30/2016 23:07 | WG903335 |
| Di-n-butyl phthalate | ND | | 3.00 | 1 | 08/30/2016 23:07 | WG903335 |
| Diethyl phthalate | ND | | 3.00 | 1 | 08/30/2016 23:07 | WG903335 |
| Pyridine | ND | | 10.0 | 1 | 08/30/2016 23:07 | WG903335 |
| Quinoline | ND | J4 | 50.0 | 1 | 09/01/2016 16:51 | WG903335 |
| 2,4-Dimethylphenol | ND | | 10.0 | 1 | 08/30/2016 23:07 | WG903335 |
| 2,4-Dinitrophenol | ND | | 10.0 | 1 | 08/30/2016 23:07 | WG903335 |
| 2-Methylphenol | ND | | 10.0 | 1 | 08/30/2016 23:07 | WG903335 |
| 3&4-Methyl Phenol | ND | | 10.0 | 1 | 08/30/2016 23:07 | WG903335 |
| 4-Nitrophenol | ND | | 10.0 | 1 | 08/30/2016 23:07 | WG903335 |
| Phenol | ND | | 10.0 | 1 | 08/30/2016 23:07 | WG903335 |
| *(S) 2-Fluorophenol* | *35.1* | | *10.0-77.9* | | *08/30/2016 23:07* | WG903335 |
| *(S) Phenol-d5* | *28.5* | | *5.00-70.1* | | *08/30/2016 23:07* | WG903335 |
| *(S) Nitrobenzene-d5* | *39.5* | | *21.8-123* | | *08/30/2016 23:07* | WG903335 |
| *(S) 2-Fluorobiphenyl* | *46.4* | | *29.5-131* | | *08/30/2016 23:07* | WG903335 |
| *(S) 2,4,6-Tribromophenol* | *84.6* | | *11.2-130* | | *08/30/2016 23:07* | WG903335 |
| *(S) p-Terphenyl-d14* | *82.0* | | *29.3-137* | | *08/30/2016 23:07* | WG903335 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Anthracene | ND | | 0.0500 | 1 | 09/01/2016 07:06 | WG904136 |
| Acenaphthene | ND | | 0.0500 | 1 | 09/01/2016 07:06 | WG904136 |
| Benzo(a)anthracene | ND | | 0.0500 | 1 | 09/01/2016 07:06 | WG904136 |
| Benzo(a)pyrene | ND | | 0.0500 | 1 | 09/01/2016 07:06 | WG904136 |
| Benzo(b)fluoranthene | ND | | 0.0500 | 1 | 09/01/2016 07:06 | WG904136 |
| Benzo(g,h,i)perylene | ND | | 0.0500 | 1 | 09/01/2016 07:06 | WG904136 |
| Benzo(k)fluoranthene | ND | | 0.0500 | 1 | 09/01/2016 07:06 | WG904136 |
| Chrysene | ND | | 0.0500 | 1 | 09/01/2016 07:06 | WG904136 |
| Dibenz(a,h)anthracene | ND | | 0.0500 | 1 | 09/01/2016 07:06 | WG904136 |
| Fluoranthene | ND | | 0.0500 | 1 | 09/01/2016 07:06 | WG904136 |
| Fluorene | ND | | 0.0500 | 1 | 09/01/2016 07:06 | WG904136 |
| Indeno(1,2,3-cd)pyrene | ND | | 0.0500 | 1 | 09/01/2016 07:06 | WG904136 |
| Naphthalene | ND | | 0.250 | 1 | 09/01/2016 07:06 | WG904136 |
| Phenanthrene | ND | | 0.0500 | 1 | 09/01/2016 07:06 | WG904136 |
| Pyrene | ND | | 0.0500 | 1 | 09/01/2016 07:06 | WG904136 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

| Analyte | Result | Qualifier | RDL | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | ug/l | | ug/l | | date / time | |
| 2-Methylnaphthalene | ND | | 0.250 | 1 | 09/01/2016 07:06 | WG904136 |
| *(S) Nitrobenzene-d5* | *85.2* | | *33.8-179* | | *09/01/2016 07:06* | WG904136 |
| *(S) 2-Fluorobiphenyl* | *98.3* | | *55.5-150* | | *09/01/2016 07:06* | WG904136 |
| *(S) p-Terphenyl-d14* | *87.2* | | *46.2-163* | | *09/01/2016 07:06* | WG904136 |

## Metals (ICPMS) by Method 6020

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Cobalt,Dissolved | ND | | 2.00 | 1 | 09/01/2016 07:18 | WG903828 |
| Lead,Dissolved | ND | | 2.00 | 1 | 09/01/2016 07:18 | WG903828 |
| Nickel,Dissolved | ND | | 2.00 | 1 | 09/01/2016 07:18 | WG903828 |
| Vanadium,Dissolved | ND | | 5.00 | 1 | 09/01/2016 07:18 | WG903828 |
| Zinc,Dissolved | ND | | 25.0 | 1 | 09/01/2016 07:18 | WG903828 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Acetone | 846 | | 50.0 | 1 | 09/01/2016 14:58 | WG902865 |
| Benzene | ND | | 1.00 | 1 | 09/01/2016 14:58 | WG902865 |
| Bromochloromethane | ND | | 1.00 | 1 | 09/01/2016 14:58 | WG902865 |
| Bromodichloromethane | ND | | 1.00 | 1 | 09/01/2016 14:58 | WG902865 |
| Bromoform | ND | | 1.00 | 1 | 09/01/2016 14:58 | WG902865 |
| Bromomethane | ND | | 5.00 | 1 | 09/01/2016 14:58 | WG902865 |
| Carbon disulfide | ND | | 1.00 | 1 | 09/01/2016 14:58 | WG902865 |
| Carbon tetrachloride | ND | | 1.00 | 1 | 09/01/2016 14:58 | WG902865 |
| Chlorobenzene | ND | | 1.00 | 1 | 09/01/2016 14:58 | WG902865 |
| Chlorodibromomethane | ND | | 1.00 | 1 | 09/01/2016 14:58 | WG902865 |
| Chloroethane | ND | | 5.00 | 1 | 09/01/2016 14:58 | WG902865 |
| Chloroform | ND | | 5.00 | 1 | 09/01/2016 14:58 | WG902865 |
| Chloromethane | ND | | 2.50 | 1 | 09/01/2016 14:58 | WG902865 |
| Cyclohexane | 2.84 | | 1.00 | 1 | 09/01/2016 14:58 | WG902865 |
| 1,2-Dibromo-3-Chloropropane | ND | | 5.00 | 1 | 09/01/2016 14:58 | WG902865 |
| 1,2-Dibromoethane | ND | | 1.00 | 1 | 09/01/2016 14:58 | WG902865 |
| 1,2-Dichlorobenzene | ND | | 1.00 | 1 | 09/01/2016 14:58 | WG902865 |
| 1,3-Dichlorobenzene | ND | | 1.00 | 1 | 09/01/2016 14:58 | WG902865 |
| 1,4-Dichlorobenzene | ND | | 1.00 | 1 | 09/01/2016 14:58 | WG902865 |
| Dichlorodifluoromethane | ND | | 5.00 | 1 | 09/01/2016 14:58 | WG902865 |
| 1,1-Dichloroethane | ND | | 1.00 | 1 | 09/01/2016 14:58 | WG902865 |
| 1,2-Dichloroethane | ND | | 1.00 | 1 | 09/01/2016 14:58 | WG902865 |
| 1,1-Dichloroethene | ND | | 1.00 | 1 | 09/01/2016 14:58 | WG902865 |
| cis-1,2-Dichloroethene | ND | | 1.00 | 1 | 09/01/2016 14:58 | WG902865 |
| trans-1,2-Dichloroethene | ND | | 1.00 | 1 | 09/01/2016 14:58 | WG902865 |
| 1,2-Dichloropropane | ND | | 1.00 | 1 | 09/01/2016 14:58 | WG902865 |
| cis-1,3-Dichloropropene | ND | | 1.00 | 1 | 09/01/2016 14:58 | WG902865 |
| trans-1,3-Dichloropropene | ND | | 1.00 | 1 | 09/01/2016 14:58 | WG902865 |
| Ethylbenzene | ND | | 1.00 | 1 | 09/01/2016 14:58 | WG902865 |
| 2-Hexanone | ND | | 10.0 | 1 | 09/01/2016 14:58 | WG902865 |
| Isopropylbenzene | 1.27 | | 1.00 | 1 | 09/01/2016 14:58 | WG902865 |
| 2-Butanone (MEK) | 427 | | 10.0 | 1 | 09/01/2016 14:58 | WG902865 |
| Methyl Acetate | ND | | 20.0 | 1 | 09/01/2016 14:58 | WG902865 |
| Methyl Cyclohexane | 8.13 | | 1.00 | 1 | 09/01/2016 14:58 | WG902865 |
| Methylene Chloride | ND | | 5.00 | 1 | 09/01/2016 14:58 | WG902865 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 10.0 | 1 | 09/01/2016 14:58 | WG902865 |
| Methyl tert-butyl ether | ND | | 1.00 | 1 | 09/01/2016 14:58 | WG902865 |
| Styrene | ND | | 1.00 | 1 | 09/01/2016 14:58 | WG902865 |
| 1,1,2,2-Tetrachloroethane | ND | | 1.00 | 1 | 09/01/2016 14:58 | WG902865 |
| Tetrachloroethene | ND | | 1.00 | 1 | 09/01/2016 14:58 | WG902865 |
| Toluene | ND | | 5.00 | 1 | 09/01/2016 14:58 | WG902865 |
| 1,2,3-Trichlorobenzene | ND | | 1.00 | 1 | 09/01/2016 14:58 | WG902865 |
| 1,2,4-Trichlorobenzene | ND | | 1.00 | 1 | 09/01/2016 14:58 | WG902865 |
| 1,1,1-Trichloroethane | ND | | 1.00 | 1 | 09/01/2016 14:58 | WG902865 |
| 1,1,2-Trichloroethane | ND | | 1.00 | 1 | 09/01/2016 14:58 | WG902865 |
| Trichloroethene | ND | | 1.00 | 1 | 09/01/2016 14:58 | WG902865 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Trichlorofluoromethane | ND | | 5.00 | 1 | 09/01/2016 14:58 | WG902865 |
| 1,1,2-Trichlorotrifluoroethane | ND | | 1.00 | 1 | 09/01/2016 14:58 | WG902865 |
| Vinyl chloride | ND | | 1.00 | 1 | 09/01/2016 14:58 | WG902865 |
| Xylenes, Total | ND | | 3.00 | 1 | 09/01/2016 14:58 | WG902865 |
| *(S) Toluene-d8* | *106* | | *90.0-115* | | *09/01/2016 14:58* | WG902865 |
| *(S) Dibromofluoromethane* | *101* | | *79.0-121* | | *09/01/2016 14:58* | WG902865 |
| *(S) a,a,a-Trifluorotoluene* | *97.9* | | *90.4-116* | | *09/01/2016 14:58* | WG902865 |
| *(S) 4-Bromofluorobenzene* | *94.4* | | *80.1-120* | | *09/01/2016 14:58* | WG902865 |

## EDB / DBCP by Method 8011

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Ethylene Dibromide | ND | | 0.0100 | 1 | 09/02/2016 02:46 | WG903773 |
| 1,2-Dibromo-3-Chloropropane | ND | | 0.0200 | 1 | 09/02/2016 02:46 | WG903773 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Biphenyl | ND | | 500 | 50 | 08/30/2016 23:30 | WG903335 |
| Bis(2-Ethylhexyl)phthalate | ND | | 150 | 50 | 08/30/2016 23:30 | WG903335 |
| Di-n-butyl phthalate | ND | | 150 | 50 | 08/30/2016 23:30 | WG903335 |
| Diethyl phthalate | ND | | 150 | 50 | 08/30/2016 23:30 | WG903335 |
| Pyridine | ND | | 500 | 50 | 08/30/2016 23:30 | WG903335 |
| Quinoline | ND | J4 | 2500 | 50 | 09/01/2016 17:10 | WG903335 |
| 2,4-Dimethylphenol | ND | | 500 | 50 | 08/30/2016 23:30 | WG903335 |
| 2,4-Dinitrophenol | ND | | 500 | 50 | 08/30/2016 23:30 | WG903335 |
| 2-Methylphenol | ND | | 500 | 50 | 08/30/2016 23:30 | WG903335 |
| 3&4-Methyl Phenol | ND | | 500 | 50 | 08/30/2016 23:30 | WG903335 |
| 4-Nitrophenol | ND | | 500 | 50 | 08/30/2016 23:30 | WG903335 |
| Phenol | ND | | 500 | 50 | 08/30/2016 23:30 | WG903335 |
| *(S) 2-Fluorophenol* | *44.7* | J7 | *10.0-77.9* | | *08/30/2016 23:30* | WG903335 |
| *(S) Phenol-d5* | *8.96* | J7 | *5.00-70.1* | | *08/30/2016 23:30* | WG903335 |
| *(S) Nitrobenzene-d5* | *16.8* | J7 | *21.8-123* | | *08/30/2016 23:30* | WG903335 |
| *(S) 2-Fluorobiphenyl* | *36.2* | J7 | *29.5-131* | | *08/30/2016 23:30* | WG903335 |
| *(S) 2,4,6-Tribromophenol* | *64.7* | J7 | *11.2-130* | | *08/30/2016 23:30* | WG903335 |
| *(S) p-Terphenyl-d14* | *17.8* | J7 | *29.3-137* | | *08/30/2016 23:30* | WG903335 |

**Sample Narrative:**

8270C L856076-22 WG903335: Cannot run at lower dilution due to viscosity of extract

8270C L856076-22 WG903335: Dilution due to matrix

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Anthracene | ND | | 0.334 | 6.67 | 09/01/2016 14:22 | WG904136 |
| Acenaphthene | 0.836 | | 0.334 | 6.67 | 09/01/2016 14:22 | WG904136 |
| Benzo(a)anthracene | 1.27 | | 0.334 | 6.67 | 09/01/2016 14:22 | WG904136 |
| Benzo(a)pyrene | 2.88 | | 0.334 | 6.67 | 09/01/2016 14:22 | WG904136 |
| Benzo(b)fluoranthene | ND | | 0.334 | 6.67 | 09/01/2016 14:22 | WG904136 |
| Benzo(g,h,i)perylene | 4.85 | | 0.334 | 6.67 | 09/01/2016 14:22 | WG904136 |
| Benzo(k)fluoranthene | ND | | 0.334 | 6.67 | 09/01/2016 14:22 | WG904136 |
| Chrysene | 0.778 | | 0.334 | 6.67 | 09/01/2016 14:22 | WG904136 |
| Dibenz(a,h)anthracene | 1.52 | | 0.334 | 6.67 | 09/01/2016 14:22 | WG904136 |
| Fluoranthene | 0.518 | | 0.334 | 6.67 | 09/01/2016 14:22 | WG904136 |
| Fluorene | 0.382 | | 0.334 | 6.67 | 09/01/2016 14:22 | WG904136 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Indeno(1,2,3-cd)pyrene | 1.31 | | 0.334 | 6.67 | 09/01/2016 14:22 | WG904136 |
| Naphthalene | ND | | 1.67 | 6.67 | 09/01/2016 14:22 | WG904136 |
| Phenanthrene | ND | | 0.334 | 6.67 | 09/01/2016 14:22 | WG904136 |
| Pyrene | 3.17 | | 0.334 | 6.67 | 09/01/2016 14:22 | WG904136 |
| 2-Methylnaphthalene | ND | | 1.67 | 6.67 | 09/01/2016 14:22 | WG904136 |
| *(S) Nitrobenzene-d5* | *106* | | *33.8-179* | | *09/01/2016 14:22* | WG904136 |
| *(S) 2-Fluorobiphenyl* | *91.7* | | *55.5-150* | | *09/01/2016 14:22* | WG904136 |
| *(S) p-Terphenyl-d14* | *79.7* | | *46.2-163* | | *09/01/2016 14:22* | WG904136 |

## Total Solids by Method 2540 G-2011

| Analyte | Result | Qualifier | Dilution | Analysis | Batch |
|---|---|---|---|---|---|
| | % | | | date / time | |
| Total Solids | 64.6 | | 1 | 08/29/2016 09:03 | WG902905 |

## Metals (ICP) by Method 6010B

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Cobalt | ND | | 1.55 | 1 | 08/31/2016 00:29 | WG903104 |
| Lead | 24.9 | | 0.774 | 1 | 08/31/2016 00:29 | WG903104 |
| Nickel | 10.5 | | 3.10 | 1 | 08/31/2016 00:29 | WG903104 |
| Vanadium | 63.8 | | 3.10 | 1 | 08/31/2016 00:29 | WG903104 |
| Zinc | 44.8 | | 7.74 | 1 | 08/31/2016 00:29 | WG903104 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Benzene | ND | | 0.00183 | 1.18 | 09/03/2016 18:12 | WG903957 |
| sec-Butylbenzene | ND | | 0.00183 | 1.18 | 09/03/2016 18:12 | WG903957 |
| tert-Butylbenzene | ND | | 0.00183 | 1.18 | 09/03/2016 18:12 | WG903957 |
| Cyclohexane | ND | | 0.00183 | 1.18 | 09/03/2016 18:12 | WG903957 |
| 1,2-Dibromoethane | ND | | 0.00183 | 1.18 | 09/03/2016 18:12 | WG903957 |
| n-Hexane | ND | | 0.0183 | 1.18 | 09/03/2016 18:12 | WG903957 |
| 1,2-Dichloroethane | ND | | 0.00183 | 1.18 | 09/03/2016 18:12 | WG903957 |
| Ethylbenzene | ND | | 0.00183 | 1.18 | 09/03/2016 18:12 | WG903957 |
| Isopropylbenzene | ND | | 0.0183 | 1.18 | 09/03/2016 18:12 | WG903957 |
| Methyl tert-butyl ether | ND | | 0.00183 | 1.18 | 09/03/2016 18:12 | WG903957 |
| Toluene | ND | | 0.00914 | 1.18 | 09/03/2016 18:12 | WG903957 |
| 1,2,4-Trimethylbenzene | ND | | 0.00183 | 1.18 | 09/03/2016 18:12 | WG903957 |
| 1,3,5-Trimethylbenzene | ND | | 0.00183 | 1.18 | 09/03/2016 18:12 | WG903957 |
| Xylenes, Total | ND | | 0.00548 | 1.18 | 09/03/2016 18:12 | WG903957 |
| *(S) Toluene-d8* | *104* | | *88.7-115* | | *09/03/2016 18:12* | WG903957 |
| *(S) Dibromofluoromethane* | *94.0* | | *76.3-123* | | *09/03/2016 18:12* | WG903957 |
| *(S) α,α,α-Trifluorotoluene* | *104* | | *87.2-117* | | *09/03/2016 18:12* | WG903957 |
| *(S) 4-Bromofluorobenzene* | *98.6* | | *69.7-129* | | *09/03/2016 18:12* | WG903957 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Acenaphthene | ND | | 0.102 | 2 | 08/30/2016 19:40 | WG903324 |
| Anthracene | ND | | 0.102 | 2 | 08/30/2016 19:40 | WG903324 |
| Benzo(a)anthracene | ND | | 0.102 | 2 | 08/30/2016 19:40 | WG903324 |
| Benzo(b)fluoranthene | ND | | 0.102 | 2 | 08/30/2016 19:40 | WG903324 |
| Benzo(k)fluoranthene | ND | | 0.102 | 2 | 08/30/2016 19:40 | WG903324 |
| Benzo(g,h,i)perylene | ND | | 0.102 | 2 | 08/30/2016 19:40 | WG903324 |
| Benzo(a)pyrene | ND | | 0.102 | 2 | 08/30/2016 19:40 | WG903324 |
| Biphenyl | ND | | 1.03 | 2 | 08/30/2016 19:40 | WG903324 |
| Chrysene | ND | | 0.102 | 2 | 08/30/2016 19:40 | WG903324 |
| Dibenz(a,h)anthracene | ND | | 0.102 | 2 | 08/30/2016 19:40 | WG903324 |
| Fluoranthene | ND | | 0.102 | 2 | 08/30/2016 19:40 | WG903324 |
| Fluorene | ND | | 0.102 | 2 | 08/30/2016 19:40 | WG903324 |
| Indeno(1,2,3-cd)pyrene | ND | | 0.102 | 2 | 08/30/2016 19:40 | WG903324 |
| 2-Methylnaphthalene | 0.122 | | 0.102 | 2 | 08/30/2016 19:40 | WG903324 |
| Naphthalene | ND | | 0.102 | 2 | 08/30/2016 19:40 | WG903324 |
| Phenanthrene | ND | | 0.102 | 2 | 08/30/2016 19:40 | WG903324 |
| Pyridine | ND | | 1.03 | 2 | 08/30/2016 19:40 | WG903324 |
| Bis(2-ethylhexyl)phthalate | ND | | 1.03 | 2 | 08/30/2016 19:40 | WG903324 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result (dry) mg/kg | Qualifier | RDL (dry) mg/kg | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Di-n-butyl phthalate | ND | | 1.03 | 2 | 08/30/2016 19:40 | WG903324 |
| Diethyl phthalate | ND | | 1.03 | 2 | 08/30/2016 19:40 | WG903324 |
| Pyrene | ND | | 0.102 | 2 | 08/30/2016 19:40 | WG903324 |
| 2,4-Dimethylphenol | ND | | 1.03 | 2 | 08/30/2016 19:40 | WG903324 |
| 2,4-Dinitrophenol | ND | | 1.03 | 2 | 08/30/2016 19:40 | WG903324 |
| 2-Methylphenol | ND | | 1.03 | 2 | 08/30/2016 19:40 | WG903324 |
| 3&4-Methyl Phenol | ND | | 1.03 | 2 | 08/30/2016 19:40 | WG903324 |
| 4-Nitrophenol | ND | | 1.03 | 2 | 08/30/2016 19:40 | WG903324 |
| Phenol | ND | | 1.03 | 2 | 08/30/2016 19:40 | WG903324 |
| Quinoline | ND | J4 | 1.03 | 2 | 08/31/2016 18:40 | WG903324 |
| *(S) 2-Fluorophenol* | *47.9* | | *21.1-116* | | *08/30/2016 19:40* | WG903324 |
| *(S) Phenol-d5* | *55.2* | | *26.3-121* | | *08/30/2016 19:40* | WG903324 |
| *(S) Nitrobenzene-d5* | *65.4* | | *21.9-129* | | *08/30/2016 19:40* | WG903324 |
| *(S) 2-Fluorobiphenyl* | *55.8* | | *34.9-129* | | *08/30/2016 19:40* | WG903324 |
| *(S) 2,4,6-Tribromophenol* | *49.4* | | *21.6-142* | | *08/30/2016 19:40* | WG903324 |
| *(S) p-Terphenyl-d14* | *37.5* | | *21.5-128* | | *08/30/2016 19:40* | WG903324 |

Sample Narrative:

8270C L856076-23 WG903324: Dilution due to matrix

## Total Solids by Method 2540 G-2011

| Analyte | Result | Qualifier | Dilution | Analysis | Batch |
|---|---|---|---|---|---|
| | % | | | date / time | |
| Total Solids | 71.2 | | 1 | 08/29/2016 09:03 | WG902905 |

## Metals (ICP) by Method 6010B

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Cobalt | 1.70 | | 1.40 | 1 | 08/31/2016 00:32 | WG903104 |
| Lead | 13.6 | | 0.702 | 1 | 08/31/2016 00:32 | WG903104 |
| Nickel | 4.38 | | 2.81 | 1 | 08/31/2016 00:32 | WG903104 |
| Vanadium | 9.88 | | 2.81 | 1 | 08/31/2016 00:32 | WG903104 |
| Zinc | 20.6 | | 7.02 | 1 | 08/31/2016 00:32 | WG903104 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Benzene | 0.00470 | | 0.00140 | 1 | 09/01/2016 18:40 | WG903957 |
| sec-Butylbenzene | ND | | 0.00140 | 1 | 09/01/2016 18:40 | WG903957 |
| tert-Butylbenzene | 0.0246 | | 0.00140 | 1 | 09/01/2016 18:40 | WG903957 |
| Cyclohexane | 0.00402 | | 0.00140 | 1 | 09/01/2016 18:40 | WG903957 |
| 1,2-Dibromoethane | ND | | 0.00140 | 1 | 09/01/2016 18:40 | WG903957 |
| n-Hexane | ND | | 0.0140 | 1 | 09/01/2016 18:40 | WG903957 |
| 1,2-Dichloroethane | ND | | 0.00140 | 1 | 09/01/2016 18:40 | WG903957 |
| Ethylbenzene | ND | | 0.00140 | 1 | 09/01/2016 18:40 | WG903957 |
| Isopropylbenzene | ND | | 0.0140 | 1 | 09/01/2016 18:40 | WG903957 |
| Methyl tert-butyl ether | ND | | 0.00140 | 1 | 09/01/2016 18:40 | WG903957 |
| Toluene | ND | | 0.00702 | 1 | 09/01/2016 18:40 | WG903957 |
| 1,2,4-Trimethylbenzene | ND | | 0.00140 | 1 | 09/01/2016 18:40 | WG903957 |
| 1,3,5-Trimethylbenzene | ND | | 0.00140 | 1 | 09/01/2016 18:40 | WG903957 |
| Xylenes, Total | ND | | 0.00421 | 1 | 09/01/2016 18:40 | WG903957 |
| *(S) Toluene-d8* | *109* | | *88.7-115* | | *09/01/2016 18:40* | WG903957 |
| *(S) Dibromofluoromethane* | *113* | | *76.3-123* | | *09/01/2016 18:40* | WG903957 |
| *(S) α,α,α-Trifluorotoluene* | *91.8* | | *87.2-117* | | *09/01/2016 18:40* | WG903957 |
| *(S) 4-Bromofluorobenzene* | *94.4* | | *69.7-129* | | *09/01/2016 18:40* | WG903957 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Acenaphthene | ND | | 0.232 | 5 | 08/30/2016 21:14 | WG903324 |
| Anthracene | ND | | 0.232 | 5 | 08/30/2016 21:14 | WG903324 |
| Benzo(a)anthracene | ND | | 0.232 | 5 | 08/30/2016 21:14 | WG903324 |
| Benzo(b)fluoranthene | ND | | 0.232 | 5 | 08/30/2016 21:14 | WG903324 |
| Benzo(k)fluoranthene | ND | | 0.232 | 5 | 08/30/2016 21:14 | WG903324 |
| Benzo(g,h,i)perylene | ND | | 0.232 | 5 | 08/30/2016 21:14 | WG903324 |
| Benzo(a)pyrene | ND | | 0.232 | 5 | 08/30/2016 21:14 | WG903324 |
| Biphenyl | ND | | 2.34 | 5 | 08/30/2016 21:14 | WG903324 |
| Chrysene | ND | | 0.232 | 5 | 08/30/2016 21:14 | WG903324 |
| Dibenz(a,h)anthracene | ND | | 0.232 | 5 | 08/30/2016 21:14 | WG903324 |
| Fluoranthene | ND | | 0.232 | 5 | 08/30/2016 21:14 | WG903324 |
| Fluorene | ND | | 0.232 | 5 | 08/30/2016 21:14 | WG903324 |
| Indeno(1,2,3-cd)pyrene | ND | | 0.232 | 5 | 08/30/2016 21:14 | WG903324 |
| 2-Methylnaphthalene | ND | | 0.232 | 5 | 08/30/2016 21:14 | WG903324 |
| Naphthalene | ND | | 0.232 | 5 | 08/30/2016 21:14 | WG903324 |
| Phenanthrene | ND | | 0.232 | 5 | 08/30/2016 21:14 | WG903324 |
| Pyridine | ND | | 2.34 | 5 | 08/30/2016 21:14 | WG903324 |
| Bis(2-ethylhexyl)phthalate | ND | | 2.34 | 5 | 08/30/2016 21:14 | WG903324 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result (dry) mg/kg | Qualifier | RDL (dry) mg/kg | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Di-n-butyl phthalate | ND | | 2.34 | 5 | 08/30/2016 21:14 | WG903324 |
| Diethyl phthalate | ND | | 2.34 | 5 | 08/30/2016 21:14 | WG903324 |
| Pyrene | ND | | 0.232 | 5 | 08/30/2016 21:14 | WG903324 |
| 2,4-Dimethylphenol | ND | | 2.34 | 5 | 08/30/2016 21:14 | WG903324 |
| 2,4-Dinitrophenol | ND | | 2.34 | 5 | 08/30/2016 21:14 | WG903324 |
| 2-Methylphenol | ND | | 2.34 | 5 | 08/30/2016 21:14 | WG903324 |
| 3&4-Methyl Phenol | ND | | 2.34 | 5 | 08/30/2016 21:14 | WG903324 |
| 4-Nitrophenol | ND | | 2.34 | 5 | 08/30/2016 21:14 | WG903324 |
| Phenol | ND | | 2.34 | 5 | 08/30/2016 21:14 | WG903324 |
| Quinoline | ND | J4 | 2.34 | 5 | 08/31/2016 19:00 | WG903324 |
| *(S) 2-Fluorophenol* | *62.6* | | *21.1-116* | | *08/30/2016 21:14* | WG903324 |
| *(S) Phenol-d5* | *63.7* | | *26.3-121* | | *08/30/2016 21:14* | WG903324 |
| *(S) Nitrobenzene-d5* | *64.2* | | *21.9-129* | | *08/30/2016 21:14* | WG903324 |
| *(S) 2-Fluorobiphenyl* | *53.5* | | *34.9-129* | | *08/30/2016 21:14* | WG903324 |
| *(S) 2,4,6-Tribromophenol* | *68.5* | | *21.6-142* | | *08/30/2016 21:14* | WG903324 |
| *(S) p-Terphenyl-d14* | *40.7* | | *21.5-128* | | *08/30/2016 21:14* | WG903324 |

Sample Narrative:

8270C L856076-24 WG903324: Dilution due to matrix

## Total Solids by Method 2540 G-2011

| Analyte | Result | Qualifier | Dilution | Analysis | Batch |
|---|---|---|---|---|---|
| | % | | | date / time | |
| Total Solids | 81.7 | | 1 | 08/29/2016 09:03 | WG902905 |

## Metals (ICP) by Method 6010B

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Cobalt | 5.98 | | 1.22 | 1 | 08/31/2016 00:40 | WG903104 |
| Lead | 68.6 | | 0.612 | 1 | 08/31/2016 00:40 | WG903104 |
| Nickel | 14.5 | | 2.45 | 1 | 08/31/2016 00:40 | WG903104 |
| Vanadium | 39.6 | | 2.45 | 1 | 08/31/2016 00:40 | WG903104 |
| Zinc | 65.5 | | 6.12 | 1 | 08/31/2016 00:40 | WG903104 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Benzene | ND | | 0.00122 | 1 | 09/01/2016 19:00 | WG903957 |
| sec-Butylbenzene | ND | | 0.00122 | 1 | 09/01/2016 19:00 | WG903957 |
| tert-Butylbenzene | ND | | 0.00122 | 1 | 09/01/2016 19:00 | WG903957 |
| Cyclohexane | ND | | 0.00122 | 1 | 09/01/2016 19:00 | WG903957 |
| 1,2-Dibromoethane | ND | | 0.00122 | 1 | 09/01/2016 19:00 | WG903957 |
| n-Hexane | ND | | 0.0122 | 1 | 09/01/2016 19:00 | WG903957 |
| 1,2-Dichloroethane | ND | | 0.00122 | 1 | 09/01/2016 19:00 | WG903957 |
| Ethylbenzene | ND | | 0.00122 | 1 | 09/01/2016 19:00 | WG903957 |
| Isopropylbenzene | ND | | 0.0122 | 1 | 09/01/2016 19:00 | WG903957 |
| Methyl tert-butyl ether | ND | | 0.00122 | 1 | 09/01/2016 19:00 | WG903957 |
| Toluene | ND | | 0.00612 | 1 | 09/01/2016 19:00 | WG903957 |
| 1,2,4-Trimethylbenzene | ND | | 0.00122 | 1 | 09/01/2016 19:00 | WG903957 |
| 1,3,5-Trimethylbenzene | ND | | 0.00122 | 1 | 09/01/2016 19:00 | WG903957 |
| Xylenes, Total | ND | | 0.00367 | 1 | 09/01/2016 19:00 | WG903957 |
| *(S) Toluene-d8* | *110* | | *88.7-115* | | *09/01/2016 19:00* | WG903957 |
| *(S) Dibromofluoromethane* | *113* | | *76.3-123* | | *09/01/2016 19:00* | WG903957 |
| *(S) α,α,α-Trifluorotoluene* | *91.2* | | *87.2-117* | | *09/01/2016 19:00* | WG903957 |
| *(S) 4-Bromofluorobenzene* | *95.4* | | *69.7-129* | | *09/01/2016 19:00* | WG903957 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Acenaphthene | ND | | 0.202 | 5 | 08/30/2016 21:38 | WG903324 |
| Anthracene | ND | | 0.202 | 5 | 08/30/2016 21:38 | WG903324 |
| Benzo(a)anthracene | ND | | 0.202 | 5 | 08/30/2016 21:38 | WG903324 |
| Benzo(b)fluoranthene | ND | | 0.202 | 5 | 08/30/2016 21:38 | WG903324 |
| Benzo(k)fluoranthene | ND | | 0.202 | 5 | 08/30/2016 21:38 | WG903324 |
| Benzo(g,h,i)perylene | ND | | 0.202 | 5 | 08/30/2016 21:38 | WG903324 |
| Benzo(a)pyrene | ND | | 0.202 | 5 | 08/30/2016 21:38 | WG903324 |
| Biphenyl | ND | | 2.04 | 5 | 08/30/2016 21:38 | WG903324 |
| Chrysene | ND | | 0.202 | 5 | 08/30/2016 21:38 | WG903324 |
| Dibenz(a,h)anthracene | ND | | 0.202 | 5 | 08/30/2016 21:38 | WG903324 |
| Fluoranthene | ND | | 0.202 | 5 | 08/30/2016 21:38 | WG903324 |
| Fluorene | ND | | 0.202 | 5 | 08/30/2016 21:38 | WG903324 |
| Indeno(1,2,3-cd)pyrene | ND | | 0.202 | 5 | 08/30/2016 21:38 | WG903324 |
| 2-Methylnaphthalene | ND | | 0.202 | 5 | 08/30/2016 21:38 | WG903324 |
| Naphthalene | ND | | 0.202 | 5 | 08/30/2016 21:38 | WG903324 |
| Phenanthrene | ND | | 0.202 | 5 | 08/30/2016 21:38 | WG903324 |
| Pyridine | ND | | 2.04 | 5 | 08/30/2016 21:38 | WG903324 |
| Bis(2-ethylhexyl)phthalate | ND | | 2.04 | 5 | 08/30/2016 21:38 | WG903324 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result (dry) mg/kg | Qualifier | RDL (dry) mg/kg | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Di-n-butyl phthalate | ND | | 2.04 | 5 | 08/30/2016 21:38 | WG903324 |
| Diethyl phthalate | ND | | 2.04 | 5 | 08/30/2016 21:38 | WG903324 |
| Pyrene | ND | | 0.202 | 5 | 08/30/2016 21:38 | WG903324 |
| 2,4-Dimethylphenol | ND | | 2.04 | 5 | 08/30/2016 21:38 | WG903324 |
| 2,4-Dinitrophenol | ND | | 2.04 | 5 | 08/30/2016 21:38 | WG903324 |
| 2-Methylphenol | ND | | 2.04 | 5 | 08/30/2016 21:38 | WG903324 |
| 3&4-Methyl Phenol | ND | | 2.04 | 5 | 08/30/2016 21:38 | WG903324 |
| 4-Nitrophenol | ND | | 2.04 | 5 | 08/30/2016 21:38 | WG903324 |
| Phenol | ND | | 2.04 | 5 | 08/30/2016 21:38 | WG903324 |
| Quinoline | ND | J4 | 2.04 | 5 | 08/31/2016 19:19 | WG903324 |
| *(S) 2-Fluorophenol* | *63.9* | | *21.1-116* | | *08/30/2016 21:38* | WG903324 |
| *(S) Phenol-d5* | *64.0* | | *26.3-121* | | *08/30/2016 21:38* | WG903324 |
| *(S) Nitrobenzene-d5* | *63.2* | | *21.9-129* | | *08/30/2016 21:38* | WG903324 |
| *(S) 2-Fluorobiphenyl* | *60.7* | | *34.9-129* | | *08/30/2016 21:38* | WG903324 |
| *(S) 2,4,6-Tribromophenol* | *64.3* | | *21.6-142* | | *08/30/2016 21:38* | WG903324 |
| *(S) p-Terphenyl-d14* | *52.4* | | *21.5-128* | | *08/30/2016 21:38* | WG903324 |

Sample Narrative:

8270C L856076-25 WG903324: Dilution due to matrix

## Total Solids by Method 2540 G-2011

| Analyte | Result | Qualifier | Dilution | Analysis | Batch |
|---|---|---|---|---|---|
| | % | | | date / time | |
| Total Solids | 76.5 | | 1 | 08/29/2016 09:04 | WG902905 |

## Metals (ICP) by Method 6010B

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Cobalt | 3.51 | | 1.31 | 1 | 08/31/2016 00:43 | WG903104 |
| Lead | 75.3 | | 0.654 | 1 | 08/31/2016 00:43 | WG903104 |
| Nickel | 29.9 | | 2.62 | 1 | 08/31/2016 00:43 | WG903104 |
| Vanadium | 41.6 | | 2.62 | 1 | 08/31/2016 00:43 | WG903104 |
| Zinc | 123 | | 6.54 | 1 | 08/31/2016 00:43 | WG903104 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Benzene | 0.00228 | | 0.00131 | 1 | 09/03/2016 17:32 | WG903957 |
| sec-Butylbenzene | ND | | 0.00131 | 1 | 09/03/2016 17:32 | WG903957 |
| tert-Butylbenzene | ND | | 0.00131 | 1 | 09/03/2016 17:32 | WG903957 |
| Cyclohexane | ND | | 0.00131 | 1 | 09/03/2016 17:32 | WG903957 |
| 1,2-Dibromoethane | ND | | 0.00131 | 1 | 09/03/2016 17:32 | WG903957 |
| n-Hexane | ND | | 0.0131 | 1 | 09/03/2016 17:32 | WG903957 |
| 1,2-Dichloroethane | ND | | 0.00131 | 1 | 09/03/2016 17:32 | WG903957 |
| Ethylbenzene | ND | | 0.00131 | 1 | 09/03/2016 17:32 | WG903957 |
| Isopropylbenzene | ND | | 0.0131 | 1 | 09/03/2016 17:32 | WG903957 |
| Methyl tert-butyl ether | ND | | 0.00131 | 1 | 09/03/2016 17:32 | WG903957 |
| Toluene | ND | | 0.00654 | 1 | 09/03/2016 17:32 | WG903957 |
| 1,2,4-Trimethylbenzene | ND | | 0.00131 | 1 | 09/03/2016 17:32 | WG903957 |
| 1,3,5-Trimethylbenzene | ND | | 0.00131 | 1 | 09/03/2016 17:32 | WG903957 |
| Xylenes, Total | ND | | 0.00392 | 1 | 09/03/2016 17:32 | WG903957 |
| *(S) Toluene-d8* | *105* | | *88.7-115* | | *09/03/2016 17:32* | WG903957 |
| *(S) Dibromofluoromethane* | *107* | | *76.3-123* | | *09/03/2016 17:32* | WG903957 |
| *(S) a,a,a-Trifluorotoluene* | *99.1* | | *87.2-117* | | *09/03/2016 17:32* | WG903957 |
| *(S) 4-Bromofluorobenzene* | *86.8* | | *69.7-129* | | *09/03/2016 17:32* | WG903957 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Acenaphthene | ND | | 0.431 | 10 | 08/30/2016 22:01 | WG903324 |
| Anthracene | ND | | 0.431 | 10 | 08/30/2016 22:01 | WG903324 |
| Benzo(a)anthracene | 0.566 | | 0.431 | 10 | 08/30/2016 22:01 | WG903324 |
| Benzo(b)fluoranthene | 0.846 | | 0.431 | 10 | 08/30/2016 22:01 | WG903324 |
| Benzo(k)fluoranthene | ND | | 0.431 | 10 | 08/30/2016 22:01 | WG903324 |
| Benzo(g,h,i)perylene | ND | | 0.431 | 10 | 08/30/2016 22:01 | WG903324 |
| Benzo(a)pyrene | 0.702 | | 0.431 | 10 | 08/30/2016 22:01 | WG903324 |
| Biphenyl | ND | | 4.35 | 10 | 08/30/2016 22:01 | WG903324 |
| Chrysene | 0.567 | | 0.431 | 10 | 08/30/2016 22:01 | WG903324 |
| Dibenz(a,h)anthracene | ND | | 0.431 | 10 | 08/30/2016 22:01 | WG903324 |
| Fluoranthene | 0.645 | | 0.431 | 10 | 08/30/2016 22:01 | WG903324 |
| Fluorene | ND | | 0.431 | 10 | 08/30/2016 22:01 | WG903324 |
| Indeno(1,2,3-cd)pyrene | ND | | 0.431 | 10 | 08/30/2016 22:01 | WG903324 |
| 2-Methylnaphthalene | ND | | 0.431 | 10 | 08/30/2016 22:01 | WG903324 |
| Naphthalene | ND | | 0.431 | 10 | 08/30/2016 22:01 | WG903324 |
| Phenanthrene | ND | | 0.431 | 10 | 08/30/2016 22:01 | WG903324 |
| Pyridine | ND | | 4.35 | 10 | 08/30/2016 22:01 | WG903324 |
| Bis(2-ethylhexyl)phthalate | ND | | 4.35 | 10 | 08/30/2016 22:01 | WG903324 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result (dry) mg/kg | Qualifier | RDL (dry) mg/kg | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Di-n-butyl phthalate | ND | | 4.35 | 10 | 08/30/2016 22:01 | WG903324 |
| Diethyl phthalate | ND | | 4.35 | 10 | 08/30/2016 22:01 | WG903324 |
| Pyrene | 0.650 | | 0.431 | 10 | 08/30/2016 22:01 | WG903324 |
| 2,4-Dimethylphenol | ND | | 4.35 | 10 | 08/30/2016 22:01 | WG903324 |
| 2,4-Dinitrophenol | ND | | 4.35 | 10 | 08/30/2016 22:01 | WG903324 |
| 2-Methylphenol | ND | | 4.35 | 10 | 08/30/2016 22:01 | WG903324 |
| 3&4-Methyl Phenol | ND | | 4.35 | 10 | 08/30/2016 22:01 | WG903324 |
| 4-Nitrophenol | ND | | 4.35 | 10 | 08/30/2016 22:01 | WG903324 |
| Phenol | ND | | 4.35 | 10 | 08/30/2016 22:01 | WG903324 |
| Quinoline | ND | J4 | 4.35 | 10 | 08/31/2016 19:39 | WG903324 |
| *(S) 2-Fluorophenol* | *62.1* | | *21.1-116* | | *08/30/2016 22:01* | WG903324 |
| *(S) Phenol-d5* | *65.0* | | *26.3-121* | | *08/30/2016 22:01* | WG903324 |
| *(S) Nitrobenzene-d5* | *75.3* | | *21.9-129* | | *08/30/2016 22:01* | WG903324 |
| *(S) 2-Fluorobiphenyl* | *70.0* | | *34.9-129* | | *08/30/2016 22:01* | WG903324 |
| *(S) 2,4,6-Tribromophenol* | *56.9* | | *21.6-142* | | *08/30/2016 22:01* | WG903324 |
| *(S) p-Terphenyl-d14* | *57.8* | | *21.5-128* | | *08/30/2016 22:01* | WG903324 |

## Total Solids by Method 2540 G-2011

| Analyte | Result | Qualifier | Dilution | Analysis | Batch |
|---|---|---|---|---|---|
| | % | | | date / time | |
| Total Solids | 95.4 | | 1 | 08/29/2016 09:20 | WG902930 |

## Metals (ICP) by Method 6010B

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Cobalt | 3.04 | | 1.05 | 1 | 08/31/2016 00:45 | WG903104 |
| Lead | 76.9 | | 0.524 | 1 | 08/31/2016 00:45 | WG903104 |
| Nickel | 12.5 | | 2.10 | 1 | 08/31/2016 00:45 | WG903104 |
| Vanadium | 26.0 | | 2.10 | 1 | 08/31/2016 00:45 | WG903104 |
| Zinc | 68.6 | | 5.24 | 1 | 08/31/2016 00:45 | WG903104 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Benzene | 0.00149 | | 0.00108 | 1.03 | 09/03/2016 17:52 | WG903957 |
| sec-Butylbenzene | ND | | 0.00108 | 1.03 | 09/03/2016 17:52 | WG903957 |
| tert-Butylbenzene | ND | | 0.00108 | 1.03 | 09/03/2016 17:52 | WG903957 |
| Cyclohexane | ND | | 0.00108 | 1.03 | 09/03/2016 17:52 | WG903957 |
| 1,2-Dibromoethane | ND | | 0.00108 | 1.03 | 09/03/2016 17:52 | WG903957 |
| n-Hexane | ND | | 0.0108 | 1.03 | 09/03/2016 17:52 | WG903957 |
| 1,2-Dichloroethane | ND | | 0.00108 | 1.03 | 09/03/2016 17:52 | WG903957 |
| Ethylbenzene | ND | | 0.00108 | 1.03 | 09/03/2016 17:52 | WG903957 |
| Isopropylbenzene | ND | | 0.0108 | 1.03 | 09/03/2016 17:52 | WG903957 |
| Methyl tert-butyl ether | ND | | 0.00108 | 1.03 | 09/03/2016 17:52 | WG903957 |
| Toluene | ND | | 0.00540 | 1.03 | 09/03/2016 17:52 | WG903957 |
| 1,2,4-Trimethylbenzene | ND | | 0.00108 | 1.03 | 09/03/2016 17:52 | WG903957 |
| 1,3,5-Trimethylbenzene | ND | | 0.00108 | 1.03 | 09/03/2016 17:52 | WG903957 |
| Xylenes, Total | ND | | 0.00324 | 1.03 | 09/03/2016 17:52 | WG903957 |
| *(S) Toluene-d8* | *107* | | *88.7-115* | | *09/03/2016 17:52* | WG903957 |
| *(S) Dibromofluoromethane* | *115* | | *76.3-123* | | *09/03/2016 17:52* | WG903957 |
| *(S) a,a,a-Trifluorotoluene* | *101* | | *87.2-117* | | *09/03/2016 17:52* | WG903957 |
| *(S) 4-Bromofluorobenzene* | *97.0* | | *69.7-129* | | *09/03/2016 17:52* | WG903957 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Acenaphthene | ND | | 3.46 | 100 | 08/30/2016 23:11 | WG903324 |
| Anthracene | ND | | 3.46 | 100 | 08/30/2016 23:11 | WG903324 |
| Benzo(a)anthracene | ND | | 3.46 | 100 | 08/30/2016 23:11 | WG903324 |
| Benzo(b)fluoranthene | 6.45 | | 3.46 | 100 | 08/30/2016 23:11 | WG903324 |
| Benzo(k)fluoranthene | ND | | 3.46 | 100 | 08/30/2016 23:11 | WG903324 |
| Benzo(g,h,i)perylene | ND | | 3.46 | 100 | 08/30/2016 23:11 | WG903324 |
| Benzo(a)pyrene | ND | | 3.46 | 100 | 08/30/2016 23:11 | WG903324 |
| Biphenyl | ND | | 34.9 | 100 | 08/30/2016 23:11 | WG903324 |
| Chrysene | 3.85 | | 3.46 | 100 | 08/30/2016 23:11 | WG903324 |
| Dibenz(a,h)anthracene | ND | | 3.46 | 100 | 08/30/2016 23:11 | WG903324 |
| Fluoranthene | ND | | 3.46 | 100 | 08/30/2016 23:11 | WG903324 |
| Fluorene | ND | | 3.46 | 100 | 08/30/2016 23:11 | WG903324 |
| Indeno(1,2,3-cd)pyrene | ND | | 3.46 | 100 | 08/30/2016 23:11 | WG903324 |
| 2-Methylnaphthalene | ND | | 3.46 | 100 | 08/30/2016 23:11 | WG903324 |
| Naphthalene | ND | | 3.46 | 100 | 08/30/2016 23:11 | WG903324 |
| Phenanthrene | ND | | 3.46 | 100 | 08/30/2016 23:11 | WG903324 |
| Pyridine | ND | | 34.9 | 100 | 08/30/2016 23:11 | WG903324 |
| Bis(2-ethylhexyl)phthalate | ND | | 34.9 | 100 | 08/30/2016 23:11 | WG903324 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result (dry) mg/kg | Qualifier | RDL (dry) mg/kg | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Di-n-butyl phthalate | ND | | 34.9 | 100 | 08/30/2016 23:11 | WG903324 |
| Diethyl phthalate | ND | | 34.9 | 100 | 08/30/2016 23:11 | WG903324 |
| Pyrene | ND | | 3.46 | 100 | 08/30/2016 23:11 | WG903324 |
| 2,4-Dimethylphenol | ND | | 34.9 | 100 | 08/30/2016 23:11 | WG903324 |
| 2,4-Dinitrophenol | ND | | 34.9 | 100 | 08/30/2016 23:11 | WG903324 |
| 2-Methylphenol | ND | | 34.9 | 100 | 08/30/2016 23:11 | WG903324 |
| 3&4-Methyl Phenol | ND | | 34.9 | 100 | 08/30/2016 23:11 | WG903324 |
| 4-Nitrophenol | ND | | 34.9 | 100 | 08/30/2016 23:11 | WG903324 |
| Phenol | ND | | 34.9 | 100 | 08/30/2016 23:11 | WG903324 |
| Quinoline | ND | J4 | 34.9 | 100 | 08/31/2016 20:18 | WG903324 |
| *(S) 2-Fluorophenol* | *52.8* | J7 | *21.1-116* | | *08/30/2016 23:11* | WG903324 |
| *(S) Phenol-d5* | *55.9* | J7 | *26.3-121* | | *08/30/2016 23:11* | WG903324 |
| *(S) Nitrobenzene-d5* | *76.1* | J7 | *21.9-129* | | *08/30/2016 23:11* | WG903324 |
| *(S) 2-Fluorobiphenyl* | *63.9* | J7 | *34.9-129* | | *08/30/2016 23:11* | WG903324 |
| *(S) 2,4,6-Tribromophenol* | *49.9* | J7 | *21.6-142* | | *08/30/2016 23:11* | WG903324 |
| *(S) p-Terphenyl-d14* | *73.2* | J7 | *21.5-128* | | *08/30/2016 23:11* | WG903324 |

Sample Narrative:

8270C L856076-27 WG903324: Dilution due to matrix

## Total Solids by Method 2540 G-2011

| Analyte | Result | Qualifier | Dilution | Analysis | Batch |
|---|---|---|---|---|---|
| | % | | | date / time | |
| Total Solids | 96.0 | | 1 | 08/29/2016 09:21 | WG902930 |

## Metals (ICP) by Method 6010B

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Cobalt | 5.11 | | 1.04 | 1 | 08/31/2016 00:48 | WG903104 |
| Lead | 186 | | 0.521 | 1 | 08/31/2016 00:48 | WG903104 |
| Nickel | 10.3 | | 2.08 | 1 | 08/31/2016 00:48 | WG903104 |
| Vanadium | 26.2 | | 2.08 | 1 | 08/31/2016 00:48 | WG903104 |
| Zinc | 134 | | 5.21 | 1 | 08/31/2016 00:48 | WG903104 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Benzene | 0.0678 | | 0.00104 | 1 | 09/01/2016 19:59 | WG903957 |
| sec-Butylbenzene | ND | | 0.00104 | 1 | 09/01/2016 19:59 | WG903957 |
| tert-Butylbenzene | ND | | 0.00104 | 1 | 09/01/2016 19:59 | WG903957 |
| Cyclohexane | ND | | 0.00104 | 1 | 09/01/2016 19:59 | WG903957 |
| 1,2-Dibromoethane | ND | | 0.00104 | 1 | 09/01/2016 19:59 | WG903957 |
| n-Hexane | ND | | 0.0104 | 1 | 09/01/2016 19:59 | WG903957 |
| 1,2-Dichloroethane | ND | | 0.00104 | 1 | 09/01/2016 19:59 | WG903957 |
| Ethylbenzene | ND | | 0.00104 | 1 | 09/01/2016 19:59 | WG903957 |
| Isopropylbenzene | ND | | 0.0104 | 1 | 09/01/2016 19:59 | WG903957 |
| Methyl tert-butyl ether | ND | | 0.00104 | 1 | 09/01/2016 19:59 | WG903957 |
| Toluene | ND | | 0.00521 | 1 | 09/01/2016 19:59 | WG903957 |
| 1,2,4-Trimethylbenzene | ND | | 0.00104 | 1 | 09/01/2016 19:59 | WG903957 |
| 1,3,5-Trimethylbenzene | ND | | 0.00104 | 1 | 09/01/2016 19:59 | WG903957 |
| Xylenes, Total | ND | | 0.00312 | 1 | 09/01/2016 19:59 | WG903957 |
| *(S) Toluene-d8* | *110* | | *88.7-115* | | *09/01/2016 19:59* | WG903957 |
| *(S) Dibromofluoromethane* | *114* | | *76.3-123* | | *09/01/2016 19:59* | WG903957 |
| *(S) α,α,α-Trifluorotoluene* | *93.0* | | *87.2-117* | | *09/01/2016 19:59* | WG903957 |
| *(S) 4-Bromofluorobenzene* | *94.7* | | *69.7-129* | | *09/01/2016 19:59* | WG903957 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Acenaphthene | ND | | 0.0344 | 1 | 08/30/2016 18:54 | WG903324 |
| Anthracene | ND | | 0.0344 | 1 | 08/30/2016 18:54 | WG903324 |
| Benzo(a)anthracene | 0.0498 | | 0.0344 | 1 | 08/30/2016 18:54 | WG903324 |
| Benzo(b)fluoranthene | 0.0867 | | 0.0344 | 1 | 08/30/2016 18:54 | WG903324 |
| Benzo(k)fluoranthene | ND | | 0.0344 | 1 | 08/30/2016 18:54 | WG903324 |
| Benzo(g,h,i)perylene | 0.0382 | | 0.0344 | 1 | 08/30/2016 18:54 | WG903324 |
| Benzo(a)pyrene | 0.0665 | | 0.0344 | 1 | 08/30/2016 18:54 | WG903324 |
| Biphenyl | ND | | 0.347 | 1 | 08/30/2016 18:54 | WG903324 |
| Chrysene | 0.0528 | | 0.0344 | 1 | 08/30/2016 18:54 | WG903324 |
| Dibenz(a,h)anthracene | ND | | 0.0344 | 1 | 08/30/2016 18:54 | WG903324 |
| Fluoranthene | 0.0452 | | 0.0344 | 1 | 08/30/2016 18:54 | WG903324 |
| Fluorene | ND | | 0.0344 | 1 | 08/30/2016 18:54 | WG903324 |
| Indeno(1,2,3-cd)pyrene | 0.0350 | | 0.0344 | 1 | 08/30/2016 18:54 | WG903324 |
| 2-Methylnaphthalene | ND | | 0.0344 | 1 | 08/30/2016 18:54 | WG903324 |
| Naphthalene | ND | | 0.0344 | 1 | 08/30/2016 18:54 | WG903324 |
| Phenanthrene | ND | | 0.0344 | 1 | 08/30/2016 18:54 | WG903324 |
| Pyridine | ND | | 0.347 | 1 | 08/30/2016 18:54 | WG903324 |
| Bis(2-ethylhexyl)phthalate | ND | | 0.347 | 1 | 08/30/2016 18:54 | WG903324 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result (dry) mg/kg | Qualifier | RDL (dry) mg/kg | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Di-n-butyl phthalate | ND | | 0.347 | 1 | 08/30/2016 18:54 | WG903324 |
| Diethyl phthalate | ND | | 0.347 | 1 | 08/30/2016 18:54 | WG903324 |
| Pyrene | 0.0462 | | 0.0344 | 1 | 08/30/2016 18:54 | WG903324 |
| 2,4-Dimethylphenol | ND | | 0.347 | 1 | 08/30/2016 18:54 | WG903324 |
| 2,4-Dinitrophenol | ND | | 0.347 | 1 | 08/30/2016 18:54 | WG903324 |
| 2-Methylphenol | ND | | 0.347 | 1 | 08/30/2016 18:54 | WG903324 |
| 3&4-Methyl Phenol | ND | | 0.347 | 1 | 08/30/2016 18:54 | WG903324 |
| 4-Nitrophenol | ND | | 0.347 | 1 | 08/30/2016 18:54 | WG903324 |
| Phenol | ND | | 0.347 | 1 | 08/30/2016 18:54 | WG903324 |
| Quinoline | ND | J4 | 0.347 | 1 | 08/31/2016 18:01 | WG903324 |
| *(S) 2-Fluorophenol* | *69.3* | | *21.1-116* | | *08/30/2016 18:54* | WG903324 |
| *(S) Phenol-d5* | *71.7* | | *26.3-121* | | *08/30/2016 18:54* | WG903324 |
| *(S) Nitrobenzene-d5* | *68.3* | | *21.9-129* | | *08/30/2016 18:54* | WG903324 |
| *(S) 2-Fluorobiphenyl* | *59.6* | | *34.9-129* | | *08/30/2016 18:54* | WG903324 |
| *(S) 2,4,6-Tribromophenol* | *77.7* | | *21.6-142* | | *08/30/2016 18:54* | WG903324 |
| *(S) p-Terphenyl-d14* | *47.9* | | *21.5-128* | | *08/30/2016 18:54* | WG903324 |

## Total Solids by Method 2540 G-2011

| Analyte | Result | Qualifier | Dilution | Analysis | Batch |
|---|---|---|---|---|---|
| | % | | | date / time | |
| Total Solids | 71.4 | | 1 | 08/29/2016 09:21 | WG902930 |

## Metals (ICP) by Method 6010B

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Cobalt | 5.53 | | 1.40 | 1 | 08/31/2016 00:51 | WG903104 |
| Lead | 20.3 | | 0.700 | 1 | 08/31/2016 00:51 | WG903104 |
| Nickel | 14.8 | | 2.80 | 1 | 08/31/2016 00:51 | WG903104 |
| Vanadium | 50.8 | | 2.80 | 1 | 08/31/2016 00:51 | WG903104 |
| Zinc | 64.3 | | 7.00 | 1 | 08/31/2016 00:51 | WG903104 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Benzene | 0.00188 | | 0.00140 | 1 | 09/01/2016 20:19 | WG903957 |
| sec-Butylbenzene | ND | | 0.00140 | 1 | 09/01/2016 20:19 | WG903957 |
| tert-Butylbenzene | ND | | 0.00140 | 1 | 09/01/2016 20:19 | WG903957 |
| Cyclohexane | ND | | 0.00140 | 1 | 09/01/2016 20:19 | WG903957 |
| 1,2-Dibromoethane | ND | | 0.00140 | 1 | 09/01/2016 20:19 | WG903957 |
| n-Hexane | ND | | 0.0140 | 1 | 09/01/2016 20:19 | WG903957 |
| 1,2-Dichloroethane | ND | | 0.00140 | 1 | 09/01/2016 20:19 | WG903957 |
| Ethylbenzene | ND | | 0.00140 | 1 | 09/01/2016 20:19 | WG903957 |
| Isopropylbenzene | ND | | 0.0140 | 1 | 09/01/2016 20:19 | WG903957 |
| Methyl tert-butyl ether | ND | | 0.00140 | 1 | 09/01/2016 20:19 | WG903957 |
| Toluene | ND | | 0.00700 | 1 | 09/01/2016 20:19 | WG903957 |
| 1,2,4-Trimethylbenzene | ND | | 0.00140 | 1 | 09/01/2016 20:19 | WG903957 |
| 1,3,5-Trimethylbenzene | ND | | 0.00140 | 1 | 09/01/2016 20:19 | WG903957 |
| Xylenes, Total | ND | | 0.00420 | 1 | 09/01/2016 20:19 | WG903957 |
| *(S) Toluene-d8* | *110* | | *88.7-115* | | *09/01/2016 20:19* | WG903957 |
| *(S) Dibromofluoromethane* | *113* | | *76.3-123* | | *09/01/2016 20:19* | WG903957 |
| *(S) α,α,α-Trifluorotoluene* | *93.1* | | *87.2-117* | | *09/01/2016 20:19* | WG903957 |
| *(S) 4-Bromofluorobenzene* | *92.8* | | *69.7-129* | | *09/01/2016 20:19* | WG903957 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Acenaphthene | ND | | 0.0462 | 1 | 08/30/2016 19:17 | WG903324 |
| Anthracene | ND | | 0.0462 | 1 | 08/30/2016 19:17 | WG903324 |
| Benzo(a)anthracene | 0.0684 | | 0.0462 | 1 | 08/30/2016 19:17 | WG903324 |
| Benzo(b)fluoranthene | 0.103 | | 0.0462 | 1 | 08/30/2016 19:17 | WG903324 |
| Benzo(k)fluoranthene | ND | | 0.0462 | 1 | 08/30/2016 19:17 | WG903324 |
| Benzo(g,h,i)perylene | 0.0495 | | 0.0462 | 1 | 08/30/2016 19:17 | WG903324 |
| Benzo(a)pyrene | 0.0826 | | 0.0462 | 1 | 08/30/2016 19:17 | WG903324 |
| Biphenyl | ND | | 0.466 | 1 | 08/30/2016 19:17 | WG903324 |
| Chrysene | 0.0697 | | 0.0462 | 1 | 08/30/2016 19:17 | WG903324 |
| Dibenz(a,h)anthracene | ND | | 0.0462 | 1 | 08/30/2016 19:17 | WG903324 |
| Fluoranthene | 0.0987 | | 0.0462 | 1 | 08/30/2016 19:17 | WG903324 |
| Fluorene | ND | | 0.0462 | 1 | 08/30/2016 19:17 | WG903324 |
| Indeno(1,2,3-cd)pyrene | ND | | 0.0462 | 1 | 08/30/2016 19:17 | WG903324 |
| 2-Methylnaphthalene | ND | | 0.0462 | 1 | 08/30/2016 19:17 | WG903324 |
| Naphthalene | ND | | 0.0462 | 1 | 08/30/2016 19:17 | WG903324 |
| Phenanthrene | ND | | 0.0462 | 1 | 08/30/2016 19:17 | WG903324 |
| Pyridine | ND | | 0.466 | 1 | 08/30/2016 19:17 | WG903324 |
| Bis(2-ethylhexyl)phthalate | ND | | 0.466 | 1 | 08/30/2016 19:17 | WG903324 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result (dry) mg/kg | Qualifier | RDL (dry) mg/kg | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Di-n-butyl phthalate | ND | | 0.466 | 1 | 08/30/2016 19:17 | WG903324 |
| Diethyl phthalate | ND | | 0.466 | 1 | 08/30/2016 19:17 | WG903324 |
| Pyrene | 0.0896 | | 0.0462 | 1 | 08/30/2016 19:17 | WG903324 |
| 2,4-Dimethylphenol | ND | | 0.466 | 1 | 08/30/2016 19:17 | WG903324 |
| 2,4-Dinitrophenol | ND | | 0.466 | 1 | 08/30/2016 19:17 | WG903324 |
| 2-Methylphenol | ND | | 0.466 | 1 | 08/30/2016 19:17 | WG903324 |
| 3&4-Methyl Phenol | ND | | 0.466 | 1 | 08/30/2016 19:17 | WG903324 |
| 4-Nitrophenol | ND | | 0.466 | 1 | 08/30/2016 19:17 | WG903324 |
| Phenol | ND | | 0.466 | 1 | 08/30/2016 19:17 | WG903324 |
| Quinoline | ND | J4 | 0.466 | 1 | 08/31/2016 18:21 | WG903324 |
| *(S) 2-Fluorophenol* | *63.3* | | *21.1-116* | | *08/30/2016 19:17* | WG903324 |
| *(S) Phenol-d5* | *68.3* | | *26.3-121* | | *08/30/2016 19:17* | WG903324 |
| *(S) Nitrobenzene-d5* | *64.8* | | *21.9-129* | | *08/30/2016 19:17* | WG903324 |
| *(S) 2-Fluorobiphenyl* | *64.2* | | *34.9-129* | | *08/30/2016 19:17* | WG903324 |
| *(S) 2,4,6-Tribromophenol* | *76.2* | | *21.6-142* | | *08/30/2016 19:17* | WG903324 |
| *(S) p-Terphenyl-d14* | *57.2* | | *21.5-128* | | *08/30/2016 19:17* | WG903324 |

## Total Solids by Method 2540 G-2011

| Analyte | Result | Qualifier | Dilution | Analysis | Batch |
|---|---|---|---|---|---|
| | % | | | date / time | |
| Total Solids | 82.1 | | 1 | 08/29/2016 09:21 | WG902930 |

## Metals (ICP) by Method 6010B

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Cobalt | 3.00 | | 1.22 | 1 | 08/31/2016 00:54 | WG903104 |
| Lead | 70.8 | | 0.609 | 1 | 08/31/2016 00:54 | WG903104 |
| Nickel | 16.0 | | 2.44 | 1 | 08/31/2016 00:54 | WG903104 |
| Vanadium | 69.5 | | 2.44 | 1 | 08/31/2016 00:54 | WG903104 |
| Zinc | 119 | | 6.09 | 1 | 08/31/2016 00:54 | WG903104 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Benzene | 0.00276 | | 0.00122 | 1 | 09/01/2016 20:40 | WG903957 |
| sec-Butylbenzene | ND | | 0.00122 | 1 | 09/01/2016 20:40 | WG903957 |
| tert-Butylbenzene | ND | | 0.00122 | 1 | 09/01/2016 20:40 | WG903957 |
| Cyclohexane | ND | | 0.00122 | 1 | 09/01/2016 20:40 | WG903957 |
| 1,2-Dibromoethane | ND | | 0.00122 | 1 | 09/01/2016 20:40 | WG903957 |
| n-Hexane | ND | | 0.0122 | 1 | 09/01/2016 20:40 | WG903957 |
| 1,2-Dichloroethane | ND | | 0.00122 | 1 | 09/01/2016 20:40 | WG903957 |
| Ethylbenzene | ND | | 0.00122 | 1 | 09/01/2016 20:40 | WG903957 |
| Isopropylbenzene | ND | | 0.0122 | 1 | 09/01/2016 20:40 | WG903957 |
| Methyl tert-butyl ether | ND | | 0.00122 | 1 | 09/01/2016 20:40 | WG903957 |
| Toluene | ND | | 0.00609 | 1 | 09/01/2016 20:40 | WG903957 |
| 1,2,4-Trimethylbenzene | ND | | 0.00122 | 1 | 09/01/2016 20:40 | WG903957 |
| 1,3,5-Trimethylbenzene | ND | | 0.00122 | 1 | 09/01/2016 20:40 | WG903957 |
| Xylenes, Total | ND | | 0.00365 | 1 | 09/01/2016 20:40 | WG903957 |
| *(S) Toluene-d8* | *106* | | *88.7-115* | | *09/01/2016 20:40* | WG903957 |
| *(S) Dibromofluoromethane* | *115* | | *76.3-123* | | *09/01/2016 20:40* | WG903957 |
| *(S) a,a,a-Trifluorotoluene* | *88.9* | | *87.2-117* | | *09/01/2016 20:40* | WG903957 |
| *(S) 4-Bromofluorobenzene* | *83.6* | | *69.7-129* | | *09/01/2016 20:40* | WG903957 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Acenaphthene | ND | | 0.402 | 10 | 08/30/2016 22:24 | WG903324 |
| Anthracene | ND | | 0.402 | 10 | 08/30/2016 22:24 | WG903324 |
| Benzo(a)anthracene | 0.551 | | 0.402 | 10 | 08/30/2016 22:24 | WG903324 |
| Benzo(b)fluoranthene | 0.803 | | 0.402 | 10 | 08/30/2016 22:24 | WG903324 |
| Benzo(k)fluoranthene | ND | | 0.402 | 10 | 08/30/2016 22:24 | WG903324 |
| Benzo(g,h,i)perylene | ND | | 0.402 | 10 | 08/30/2016 22:24 | WG903324 |
| Benzo(a)pyrene | 0.683 | | 0.402 | 10 | 08/30/2016 22:24 | WG903324 |
| Biphenyl | ND | | 4.06 | 10 | 08/30/2016 22:24 | WG903324 |
| Chrysene | 0.523 | | 0.402 | 10 | 08/30/2016 22:24 | WG903324 |
| Dibenz(a,h)anthracene | ND | | 0.402 | 10 | 08/30/2016 22:24 | WG903324 |
| Fluoranthene | 0.599 | | 0.402 | 10 | 08/30/2016 22:24 | WG903324 |
| Fluorene | ND | | 0.402 | 10 | 08/30/2016 22:24 | WG903324 |
| Indeno(1,2,3-cd)pyrene | ND | | 0.402 | 10 | 08/30/2016 22:24 | WG903324 |
| 2-Methylnaphthalene | ND | | 0.402 | 10 | 08/30/2016 22:24 | WG903324 |
| Naphthalene | ND | | 0.402 | 10 | 08/30/2016 22:24 | WG903324 |
| Phenanthrene | ND | | 0.402 | 10 | 08/30/2016 22:24 | WG903324 |
| Pyridine | ND | | 4.06 | 10 | 08/30/2016 22:24 | WG903324 |
| Bis(2-ethylhexyl)phthalate | ND | | 4.06 | 10 | 08/30/2016 22:24 | WG903324 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result (dry) mg/kg | Qualifier | RDL (dry) mg/kg | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Di-n-butyl phthalate | ND | | 4.06 | 10 | 08/30/2016 22:24 | WG903324 |
| Diethyl phthalate | ND | | 4.06 | 10 | 08/30/2016 22:24 | WG903324 |
| Pyrene | 0.603 | | 0.402 | 10 | 08/30/2016 22:24 | WG903324 |
| 2,4-Dimethylphenol | ND | | 4.06 | 10 | 08/30/2016 22:24 | WG903324 |
| 2,4-Dinitrophenol | ND | | 4.06 | 10 | 08/30/2016 22:24 | WG903324 |
| 2-Methylphenol | ND | | 4.06 | 10 | 08/30/2016 22:24 | WG903324 |
| 3&4-Methyl Phenol | ND | | 4.06 | 10 | 08/30/2016 22:24 | WG903324 |
| 4-Nitrophenol | ND | | 4.06 | 10 | 08/30/2016 22:24 | WG903324 |
| Phenol | ND | | 4.06 | 10 | 08/30/2016 22:24 | WG903324 |
| Quinoline | ND | J4 | 4.06 | 10 | 08/31/2016 19:58 | WG903324 |
| *(S) 2-Fluorophenol* | *55.6* | | *21.1-116* | | *08/30/2016 22:24* | WG903324 |
| *(S) Phenol-d5* | *58.5* | | *26.3-121* | | *08/30/2016 22:24* | WG903324 |
| *(S) Nitrobenzene-d5* | *65.5* | | *21.9-129* | | *08/30/2016 22:24* | WG903324 |
| *(S) 2-Fluorobiphenyl* | *60.1* | | *34.9-129* | | *08/30/2016 22:24* | WG903324 |
| *(S) 2,4,6-Tribromophenol* | *62.0* | | *21.6-142* | | *08/30/2016 22:24* | WG903324 |
| *(S) p-Terphenyl-d14* | *55.0* | | *21.5-128* | | *08/30/2016 22:24* | WG903324 |

## Method Blank (MB)

(MB) R3159788-1 08/29/16 09:02

| Analyte | MB Result % | MB Qualifier | MB MDL % | MB RDL % |
|---|---|---|---|---|
| Total Solids | 0.000100 | | | |

## L856061-15 Original Sample (OS) • Duplicate (DUP)

(OS) L856061-15 08/29/16 09:02 • (DUP) R3159788-3 08/29/16 09:02

| Analyte | Original Result % | DUP Result % | Dilution | DUP RPD % | DUP Qualifier | DUP RPD Limits % |
|---|---|---|---|---|---|---|
| Total Solids | 83.6 | 83.6 | 1 | 0.0111 | | 5 |

## Laboratory Control Sample (LCS)

(LCS) R3159788-2 08/29/16 09:02

| Analyte | Spike Amount % | LCS Result % | LCS Rec. % | Rec. Limits % | LCS Qualifier |
|---|---|---|---|---|---|
| Total Solids | 50.0 | 50.0 | 99.9 | 85.0-115 | |

## Method Blank (MB)

(MB) R3159808-1 08/29/16 09:20

| Analyte | MB Result % | MB Qualifier | MB MDL % | MB RDL % |
|---|---|---|---|---|
| Total Solids | 0.000400 | | | |

## L856089-02 Original Sample (OS) • Duplicate (DUP)

(OS) L856089-02 08/29/16 09:21 • (DUP) R3159808-3 08/29/16 09:21

| Analyte | Original Result % | DUP Result % | Dilution | DUP RPD % | DUP Qualifier | DUP RPD Limits % |
|---|---|---|---|---|---|---|
| Total Solids | 76.8 | 77.5 | 1 | 0.960 | | 5 |

## Laboratory Control Sample (LCS)

(LCS) R3159808-2 08/29/16 09:20

| Analyte | Spike Amount % | LCS Result % | LCS Rec. % | Rec. Limits % | LCS Qualifier |
|---|---|---|---|---|---|
| Total Solids | 50.0 | 50.0 | 100 | 85.0-115 | |

## Method Blank (MB)

(MB) R3160413-1 08/31/16 00:09

| Analyte | MB Result mg/kg | MB Qualifier | MB MDL mg/kg | MB RDL mg/kg |
|---|---|---|---|---|
| Cobalt | U | | 0.23 | 1.00 |
| Lead | U | | 0.19 | 0.500 |
| Nickel | U | | 0.49 | 2.00 |
| Vanadium | U | | 0.24 | 2.00 |
| Zinc | U | | 0.59 | 5.00 |

## Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3160413-2 08/31/16 00:11 • (LCSD) R3160413-3 08/31/16 00:14

| Analyte | Spike Amount mg/kg | LCS Result mg/kg | LCSD Result mg/kg | LCS Rec. % | LCSD Rec. % | Rec. Limits % | LCS Qualifier | LCSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|
| Cobalt | 100 | 106 | 103 | 106 | 103 | 80-120 | | | 3 | 20 |
| Lead | 100 | 103 | 100 | 103 | 100 | 80-120 | | | 3 | 20 |
| Nickel | 100 | 104 | 101 | 104 | 101 | 80-120 | | | 3 | 20 |
| Vanadium | 100 | 104 | 101 | 104 | 101 | 80-120 | | | 2 | 20 |
| Zinc | 100 | 103 | 101 | 103 | 101 | 80-120 | | | 2 | 20 |

## L856118-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L856118-04 08/31/16 00:16 • (MS) R3160413-6 08/31/16 00:24 • (MSD) R3160413-7 08/31/16 00:26

| Analyte | Spike Amount (dry) mg/kg | Original Result (dry) mg/kg | MS Result (dry) mg/kg | MSD Result (dry) mg/kg | MS Rec. % | MSD Rec. % | Dilution | Rec. Limits % | MS Qualifier | MSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cobalt | 122 | 7.59 | 148 | 148 | 115 | 115 | 1 | 75-125 | | | 0 | 20 |
| Lead | 122 | 10.7 | 148 | 143 | 112 | 108 | 1 | 75-125 | | | 4 | 20 |
| Nickel | 122 | 13.0 | 150 | 146 | 112 | 109 | 1 | 75-125 | | | 3 | 20 |
| Vanadium | 122 | 21.8 | 159 | 154 | 112 | 108 | 1 | 75-125 | | | 3 | 20 |
| Zinc | 122 | 33.0 | 165 | 161 | 108 | 105 | 1 | 75-125 | | | 2 | 20 |

## Method Blank (MB)

(MB) R3160361-1 08/30/16 16:03

| Analyte | MB Result | MB Qualifier | MB MDL | MB RDL |
|---|---|---|---|---|
| | ug/l | | ug/l | ug/l |
| Cobalt,Dissolved | U | | 0.260 | 2.00 |
| Lead,Dissolved | U | | 0.240 | 2.00 |
| Nickel,Dissolved | 0.895 | J | 0.350 | 2.00 |
| Vanadium,Dissolved | U | | 0.180 | 5.00 |
| Zinc,Dissolved | U | | 2.56 | 25.0 |

## Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3160361-2 08/30/16 16:06 • (LCSD) R3160361-3 08/30/16 16:09

| Analyte | Spike Amount | LCS Result | LCSD Result | LCS Rec. | LCSD Rec. | Rec. Limits | LCS Qualifier | LCSD Qualifier | RPD | RPD Limits |
|---|---|---|---|---|---|---|---|---|---|---|
| | ug/l | ug/l | ug/l | % | % | % | | | % | % |
| Cobalt,Dissolved | 50.0 | 53.0 | 52.7 | 106 | 105 | 80-120 | | | 1 | 20 |
| Lead,Dissolved | 50.0 | 49.7 | 51.0 | 99 | 102 | 80-120 | | | 3 | 20 |
| Nickel,Dissolved | 50.0 | 53.7 | 53.4 | 107 | 107 | 80-120 | | | 1 | 20 |
| Vanadium,Dissolved | 50.0 | 50.6 | 50.0 | 101 | 100 | 80-120 | | | 1 | 20 |
| Zinc,Dissolved | 50.0 | 51.7 | 55.9 | 103 | 112 | 80-120 | | | 8 | 20 |

## L855536-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L855536-01 08/30/16 16:12 • (MS) R3160361-5 08/30/16 16:18 • (MSD) R3160361-6 08/30/16 16:21

| Analyte | Spike Amount | Original Result | MS Result | MSD Result | MS Rec. | MSD Rec. | Dilution | Rec. Limits | MS Qualifier | MSD Qualifier | RPD | RPD Limits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ug/l | ug/l | ug/l | ug/l | % | % | | % | | | % | % |
| Lead,Dissolved | 50.0 | ND | 52.7 | 50.1 | 105 | 100 | 1 | 75-125 | | | 5 | 20 |
| Nickel,Dissolved | 50.0 | ND | 55.7 | 53.3 | 110 | 105 | 1 | 75-125 | | | 4 | 20 |
| Vanadium,Dissolved | 50.0 | ND | 52.2 | 50.0 | 104 | 100 | 1 | 75-125 | | | 4 | 20 |
| Zinc,Dissolved | 50.0 | ND | 54.1 | 52.0 | 108 | 104 | 1 | 75-125 | | | 4 | 20 |

## Method Blank (MB)

(MB) R3160787-1 09/01/16 06:20

| Analyte | MB Result | MB Qualifier | MB MDL | MB RDL |
|---|---|---|---|---|
| | ug/l | | ug/l | ug/l |
| Cobalt,Dissolved | U | | 0.260 | 2.00 |
| Lead,Dissolved | 0.324 | J | 0.240 | 2.00 |
| Nickel,Dissolved | 0.895 | J | 0.350 | 2.00 |
| Vanadium,Dissolved | U | | 0.180 | 5.00 |
| Zinc,Dissolved | U | | 2.56 | 25.0 |

## Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3160787-2 09/01/16 06:23 • (LCSD) R3160787-3 09/01/16 06:26

| Analyte | Spike Amount | LCS Result | LCSD Result | LCS Rec. | LCSD Rec. | Rec. Limits | LCS Qualifier | LCSD Qualifier | RPD | RPD Limits |
|---|---|---|---|---|---|---|---|---|---|---|
| | ug/l | ug/l | ug/l | % | % | % | | | % | % |
| Cobalt,Dissolved | 50.0 | 52.6 | 53.1 | 105 | 106 | 80-120 | | | 1 | 20 |
| Lead,Dissolved | 50.0 | 49.7 | 49.8 | 99 | 100 | 80-120 | | | 0 | 20 |
| Nickel,Dissolved | 50.0 | 53.5 | 52.7 | 107 | 105 | 80-120 | | | 2 | 20 |
| Vanadium,Dissolved | 50.0 | 50.1 | 50.9 | 100 | 102 | 80-120 | | | 2 | 20 |
| Zinc,Dissolved | 50.0 | 51.0 | 53.0 | 102 | 106 | 80-120 | | | 4 | 20 |

## L856076-12 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L856076-12 09/01/16 06:29 • (MS) R3160787-5 09/01/16 06:35 • (MSD) R3160787-6 09/01/16 06:38

| Analyte | Spike Amount | Original Result | MS Result | MSD Result | MS Rec. | MSD Rec. | Dilution | Rec. Limits | MS Qualifier | MSD Qualifier | RPD | RPD Limits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ug/l | ug/l | ug/l | ug/l | % | % | | % | | | % | % |
| Cobalt,Dissolved | 50.0 | ND | 53.1 | 53.2 | 106 | 106 | 1 | 75-125 | | | 0 | 20 |
| Lead,Dissolved | 50.0 | ND | 49.9 | 50.1 | 100 | 100 | 1 | 75-125 | | | 0 | 20 |
| Nickel,Dissolved | 50.0 | ND | 53.7 | 53.4 | 105 | 105 | 1 | 75-125 | | | 0 | 20 |
| Vanadium,Dissolved | 50.0 | ND | 50.8 | 50.9 | 102 | 102 | 1 | 75-125 | | | 0 | 20 |
| Zinc,Dissolved | 50.0 | ND | 53.3 | 53.9 | 107 | 108 | 1 | 75-125 | | | 1 | 20 |

## Method Blank (MB)

(MB) R3160938-3 09/01/16 08:08

| Analyte | MB Result | MB Qualifier | MB MDL | MB RDL |
|---|---|---|---|---|
| | ug/l | | ug/l | ug/l |
| Acetone | U | | 10.0 | 50.0 |
| Benzene | U | | 0.331 | 1.00 |
| Bromodichloromethane | U | | 0.380 | 1.00 |
| Bromochloromethane | U | | 0.520 | 1.00 |
| Bromoform | U | | 0.469 | 1.00 |
| Bromomethane | U | | 0.866 | 5.00 |
| Carbon disulfide | U | | 0.275 | 1.00 |
| Carbon tetrachloride | U | | 0.379 | 1.00 |
| Chlorobenzene | U | | 0.348 | 1.00 |
| Chlorodibromomethane | U | | 0.327 | 1.00 |
| Chloroethane | U | | 0.453 | 5.00 |
| Chloroform | U | | 0.324 | 5.00 |
| Chloromethane | U | | 0.276 | 2.50 |
| Cyclohexane | U | | 0.390 | 1.00 |
| 1,2-Dibromo-3-Chloropropane | U | | 1.33 | 5.00 |
| 1,2-Dibromoethane | U | | 0.381 | 1.00 |
| 1,2-Dichlorobenzene | U | | 0.349 | 1.00 |
| 1,3-Dichlorobenzene | U | | 0.220 | 1.00 |
| 1,4-Dichlorobenzene | U | | 0.274 | 1.00 |
| Dichlorodifluoromethane | U | | 0.551 | 5.00 |
| 1,1-Dichloroethane | U | | 0.259 | 1.00 |
| 1,2-Dichloroethane | U | | 0.361 | 1.00 |
| 1,1-Dichloroethene | U | | 0.398 | 1.00 |
| cis-1,2-Dichloroethene | U | | 0.260 | 1.00 |
| trans-1,2-Dichloroethene | U | | 0.396 | 1.00 |
| 1,2-Dichloropropane | U | | 0.306 | 1.00 |
| cis-1,3-Dichloropropene | U | | 0.418 | 1.00 |
| trans-1,3-Dichloropropene | U | | 0.419 | 1.00 |
| Ethylbenzene | U | | 0.384 | 1.00 |
| 2-Hexanone | U | | 3.82 | 10.0 |
| Isopropylbenzene | U | | 0.326 | 1.00 |
| 2-Butanone (MEK) | U | | 3.93 | 10.0 |
| Methyl Acetate | U | | 4.30 | 20.0 |
| Methyl Cyclohexane | U | | 0.380 | 1.00 |
| Methylene Chloride | U | | 1.00 | 5.00 |
| 4-Methyl-2-pentanone (MIBK) | U | | 2.14 | 10.0 |
| Methyl tert-butyl ether | U | | 0.367 | 1.00 |
| Tetrachloroethene | U | | 0.372 | 1.00 |
| Styrene | U | | 0.307 | 1.00 |
| 1,1,2,2-Tetrachloroethane | U | | 0.130 | 1.00 |

## Method Blank (MB)

(MB) R3160938-3 09/01/16 08:08

| Analyte | MB Result ug/l | MB Qualifier | MB MDL ug/l | MB RDL ug/l |
|---|---|---|---|---|
| Toluene | U | | 0.780 | 5.00 |
| 1,1,2-Trichlorotrifluoroethane | U | | 0.303 | 1.00 |
| 1,2,3-Trichlorobenzene | 0.386 | J | 0.230 | 1.00 |
| Trichloroethene | U | | 0.398 | 1.00 |
| 1,2,4-Trichlorobenzene | U | | 0.355 | 1.00 |
| 1,1,1-Trichloroethane | U | | 0.319 | 1.00 |
| 1,1,2-Trichloroethane | U | | 0.383 | 1.00 |
| Trichlorofluoromethane | U | | 1.20 | 5.00 |
| Vinyl chloride | U | | 0.259 | 1.00 |
| Xylenes, Total | U | | 1.06 | 3.00 |
| *(S) Toluene-d8* | *106* | | | *90.0-115* |
| *(S) Dibromofluoromethane* | *99.8* | | | *79.0-121* |
| *(S) 4-Bromofluorobenzene* | *96.8* | | | *80.1-120* |
| *(S) a,a,a-Trifluorotoluene* | *104* | | | *90.4-116* |

## Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3160938-1 09/01/16 04:02 • (LCSD) R3160938-2 09/01/16 04:23

| Analyte | Spike Amount ug/l | LCS Result ug/l | LCSD Result ug/l | LCS Rec. % | LCSD Rec. % | Rec. Limits % | LCS Qualifier | LCSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|
| Acetone | 125 | 107 | 97.9 | 86.0 | 78.3 | 28.7-175 | | | 9.34 | 20.9 |
| Benzene | 25.0 | 24.4 | 23.7 | 97.5 | 94.9 | 73.0-122 | | | 2.72 | 20 |
| Bromodichloromethane | 25.0 | 25.5 | 24.5 | 102 | 97.8 | 75.5-121 | | | 4.01 | 20 |
| Bromochloromethane | 25.0 | 26.1 | 25.1 | 104 | 101 | 78.9-123 | | | 3.60 | 20 |
| Bromoform | 25.0 | 30.5 | 28.1 | 122 | 113 | 71.5-131 | | | 8.25 | 20 |
| Bromomethane | 25.0 | 32.4 | 30.9 | 129 | 124 | 22.4-187 | | | 4.48 | 20 |
| Carbon disulfide | 25.0 | 24.9 | 24.0 | 99.6 | 96.2 | 53.0-134 | | | 3.48 | 20 |
| Carbon tetrachloride | 25.0 | 23.7 | 22.1 | 94.8 | 88.4 | 70.9-129 | | | 7.04 | 20 |
| Chlorobenzene | 25.0 | 25.9 | 24.5 | 104 | 97.9 | 79.7-122 | | | 5.72 | 20 |
| Chlorodibromomethane | 25.0 | 28.5 | 26.9 | 114 | 108 | 78.2-124 | | | 5.71 | 20 |
| Chloroethane | 25.0 | 30.5 | 29.9 | 122 | 120 | 41.2-153 | | | 1.81 | 20 |
| Chloroform | 25.0 | 24.5 | 23.9 | 98.0 | 95.7 | 73.2-125 | | | 2.34 | 20 |
| Chloromethane | 25.0 | 27.1 | 26.1 | 108 | 105 | 55.8-134 | | | 3.59 | 20 |
| 1,2-Dibromo-3-Chloropropane | 25.0 | 26.1 | 25.9 | 105 | 104 | 64.8-131 | | | 0.940 | 20 |
| 1,2-Dibromoethane | 25.0 | 27.0 | 25.1 | 108 | 100 | 79.8-122 | | | 7.20 | 20 |
| 1,2-Dichlorobenzene | 25.0 | 24.8 | 24.7 | 99.4 | 99.0 | 84.7-118 | | | 0.400 | 20 |
| 1,3-Dichlorobenzene | 25.0 | 25.3 | 23.8 | 101 | 95.1 | 77.6-127 | | | 6.24 | 20 |
| 1,4-Dichlorobenzene | 25.0 | 24.2 | 23.9 | 96.7 | 95.7 | 82.2-114 | | | 1.08 | 20 |
| Dichlorodifluoromethane | 25.0 | 31.1 | 29.8 | 124 | 119 | 56.0-134 | | | 4.03 | 20 |

## Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3160938-1 09/01/16 04:02 • (LCSD) R3160938-2 09/01/16 04:23

| Analyte | Spike Amount ug/l | LCS Result ug/l | LCSD Result ug/l | LCS Rec. % | LCSD Rec. % | Rec. Limits % | LCS Qualifier | LCSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|
| 1,1-Dichloroethane | 25.0 | 25.3 | 24.2 | 101 | 96.7 | 71.7-127 | | | 4.60 | 20 |
| 1,2-Dichloroethane | 25.0 | 26.5 | 25.2 | 106 | 101 | 65.3-126 | | | 5.19 | 20 |
| 1,1-Dichloroethene | 25.0 | 27.7 | 26.7 | 111 | 107 | 59.9-137 | | | 3.67 | 20 |
| cis-1,2-Dichloroethene | 25.0 | 25.0 | 23.9 | 100 | 95.5 | 77.3-122 | | | 4.70 | 20 |
| trans-1,2-Dichloroethene | 25.0 | 24.3 | 23.6 | 97.2 | 94.3 | 72.6-125 | | | 2.96 | 20 |
| 1,2-Dichloropropane | 25.0 | 26.6 | 25.1 | 106 | 100 | 77.4-125 | | | 5.98 | 20 |
| cis-1,3-Dichloropropene | 25.0 | 26.4 | 25.3 | 106 | 101 | 77.7-124 | | | 4.21 | 20 |
| trans-1,3-Dichloropropene | 25.0 | 27.7 | 26.4 | 111 | 105 | 73.5-127 | | | 4.97 | 20 |
| Ethylbenzene | 25.0 | 25.3 | 24.0 | 101 | 96.0 | 80.9-121 | | | 5.43 | 20 |
| 2-Hexanone | 125 | 134 | 123 | 107 | 98.1 | 59.4-151 | | | 8.52 | 20 |
| Isopropylbenzene | 25.0 | 24.9 | 23.8 | 99.5 | 95.2 | 81.6-124 | | | 4.46 | 20 |
| 2-Butanone (MEK) | 125 | 127 | 116 | 101 | 93.1 | 46.4-155 | | | 8.31 | 20 |
| Methylene Chloride | 25.0 | 23.4 | 22.5 | 93.6 | 90.1 | 69.5-120 | | | 3.79 | 20 |
| 4-Methyl-2-pentanone (MIBK) | 125 | 155 | 145 | 124 | 116 | 63.3-138 | | | 6.50 | 20 |
| Methyl tert-butyl ether | 25.0 | 25.2 | 23.8 | 101 | 95.1 | 70.1-125 | | | 5.65 | 20 |
| Styrene | 25.0 | 26.5 | 25.4 | 106 | 102 | 79.9-124 | | | 4.20 | 20 |
| 1,1,2,2-Tetrachloroethane | 25.0 | 26.9 | 25.4 | 108 | 102 | 79.3-123 | | | 5.80 | 20 |
| Tetrachloroethene | 25.0 | 26.9 | 25.0 | 108 | 100 | 73.5-130 | | | 7.28 | 20 |
| Toluene | 25.0 | 25.1 | 24.0 | 100 | 96.0 | 77.9-116 | | | 4.52 | 20 |
| 1,1,2-Trichlorotrifluoroethane | 25.0 | 26.5 | 26.3 | 106 | 105 | 62.0-141 | | | 0.680 | 20 |
| 1,2,3-Trichlorobenzene | 25.0 | 23.8 | 24.0 | 95.0 | 95.9 | 75.7-134 | | | 0.890 | 20 |
| 1,2,4-Trichlorobenzene | 25.0 | 23.6 | 23.5 | 94.2 | 93.9 | 76.1-136 | | | 0.390 | 20 |
| 1,1,1-Trichloroethane | 25.0 | 24.5 | 23.7 | 98.1 | 94.9 | 71.1-129 | | | 3.27 | 20 |
| 1,1,2-Trichloroethane | 25.0 | 26.6 | 24.6 | 107 | 98.4 | 81.6-120 | | | 7.95 | 20 |
| Trichloroethene | 25.0 | 26.8 | 25.6 | 107 | 102 | 79.5-121 | | | 4.63 | 20 |
| Trichlorofluoromethane | 25.0 | 28.0 | 27.6 | 112 | 110 | 49.1-157 | | | 1.28 | 20 |
| Vinyl chloride | 25.0 | 28.0 | 27.8 | 112 | 111 | 61.5-134 | | | 0.950 | 20 |
| Xylenes, Total | 75.0 | 76.0 | 71.5 | 101 | 95.4 | 79.2-122 | | | 6.08 | 20 |
| *(S) Toluene-d8* | | | | *104* | *103* | *90.0-115* | | | | |
| *(S) Dibromofluoromethane* | | | | *101* | *101* | *79.0-121* | | | | |
| *(S) 4-Bromofluorobenzene* | | | | *93.7* | *90.8* | *80.1-120* | | | | |
| *(S) a,a,a-Trifluorotoluene* | | | | *101* | *99.0* | *90.4-116* | | | | |

## L855855-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L855855-01 09/01/16 09:50 • (MS) R3160938-4 09/01/16 10:11 • (MSD) R3160938-5 09/01/16 10:31

| Analyte | Spike Amount ug/l | Original Result ug/l | MS Result ug/l | MSD Result ug/l | MS Rec. % | MSD Rec. % | Dilution | Rec. Limits % | MS Qualifier | MSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acetone | 125 | U | 60.3 | 61.0 | 48.2 | 48.8 | 1 | 25.0-156 | | | 1.17 | 21.5 |
| Benzene | 25.0 | U | 24.1 | 24.6 | 96.2 | 98.6 | 1 | 58.6-133 | | | 2.43 | 20 |
| Bromodichloromethane | 25.0 | U | 25.1 | 25.8 | 101 | 103 | 1 | 69.2-127 | | | 2.63 | 20 |
| Bromochloromethane | 25.0 | U | 25.8 | 26.3 | 103 | 105 | 1 | 74.4-128 | | | 1.89 | 20 |
| Bromoform | 25.0 | U | 28.5 | 30.0 | 114 | 120 | 1 | 66.3-140 | | | 5.21 | 20 |
| Bromomethane | 25.0 | U | 31.0 | 33.1 | 124 | 132 | 1 | 16.6-183 | | | 6.68 | 20.5 |
| Carbon disulfide | 25.0 | U | 23.7 | 24.1 | 94.8 | 96.6 | 1 | 34.9-138 | | | 1.81 | 20 |
| Carbon tetrachloride | 25.0 | U | 23.2 | 23.5 | 93.0 | 94.2 | 1 | 60.6-139 | | | 1.27 | 20 |
| Chlorobenzene | 25.0 | U | 24.8 | 25.9 | 99.0 | 104 | 1 | 70.1-130 | | | 4.59 | 20 |
| Chlorodibromomethane | 25.0 | U | 27.4 | 28.7 | 110 | 115 | 1 | 71.6-132 | | | 4.60 | 20 |
| Chloroethane | 25.0 | U | 30.4 | 31.3 | 122 | 125 | 1 | 33.3-155 | | | 3.01 | 20 |
| Chloroform | 25.0 | U | 24.5 | 24.8 | 98.0 | 99.0 | 1 | 66.1-133 | | | 1.02 | 20 |
| Chloromethane | 25.0 | U | 26.7 | 27.8 | 107 | 111 | 1 | 40.7-139 | | | 4.00 | 20 |
| 1,2-Dibromo-3-Chloropropane | 25.0 | U | 25.1 | 27.0 | 100 | 108 | 1 | 63.9-142 | | | 7.34 | 20.2 |
| 1,2-Dibromoethane | 25.0 | U | 25.9 | 27.1 | 104 | 109 | 1 | 73.8-131 | | | 4.76 | 20 |
| 1,2-Dichlorobenzene | 25.0 | U | 24.6 | 25.6 | 98.4 | 102 | 1 | 77.4-127 | | | 4.08 | 20 |
| 1,3-Dichlorobenzene | 25.0 | U | 24.5 | 25.9 | 97.8 | 104 | 1 | 67.9-136 | | | 5.74 | 20 |
| 1,4-Dichlorobenzene | 25.0 | U | 24.2 | 25.4 | 96.8 | 102 | 1 | 74.4-123 | | | 4.90 | 20 |
| Dichlorodifluoromethane | 25.0 | U | 31.1 | 31.9 | 124 | 127 | 1 | 42.2-146 | | | 2.49 | 20 |
| 1,1-Dichloroethane | 25.0 | U | 24.9 | 25.7 | 99.7 | 103 | 1 | 64.0-134 | | | 3.06 | 20 |
| 1,2-Dichloroethane | 25.0 | U | 26.3 | 26.7 | 105 | 107 | 1 | 60.7-132 | | | 1.75 | 20 |
| 1,1-Dichloroethene | 25.0 | U | 27.4 | 27.6 | 110 | 110 | 1 | 48.8-144 | | | 0.750 | 20 |
| cis-1,2-Dichloroethene | 25.0 | 17.7 | 43.0 | 43.6 | 101 | 104 | 1 | 60.6-136 | | | 1.46 | 20 |
| trans-1,2-Dichloroethene | 25.0 | U | 24.2 | 24.6 | 96.9 | 98.4 | 1 | 61.0-132 | | | 1.53 | 20 |
| 1,2-Dichloropropane | 25.0 | U | 26.2 | 26.7 | 105 | 107 | 1 | 69.7-130 | | | 1.86 | 20 |
| cis-1,3-Dichloropropene | 25.0 | U | 26.1 | 26.7 | 105 | 107 | 1 | 71.1-129 | | | 2.17 | 20 |
| trans-1,3-Dichloropropene | 25.0 | U | 26.8 | 27.6 | 107 | 110 | 1 | 66.3-136 | | | 2.89 | 20 |
| Ethylbenzene | 25.0 | U | 24.2 | 25.6 | 96.7 | 102 | 1 | 62.7-136 | | | 5.82 | 20 |
| 2-Hexanone | 125 | U | 114 | 117 | 91.1 | 93.6 | 1 | 59.4-154 | | | 2.62 | 20.1 |
| Isopropylbenzene | 25.0 | U | 23.9 | 25.3 | 95.4 | 101 | 1 | 67.4-136 | | | 5.72 | 20 |
| 2-Butanone (MEK) | 125 | U | 102 | 102 | 81.2 | 81.6 | 1 | 45.0-156 | | | 0.400 | 20.8 |
| Methylene Chloride | 25.0 | U | 23.0 | 23.4 | 92.1 | 93.6 | 1 | 61.5-125 | | | 1.63 | 20 |
| 4-Methyl-2-pentanone (MIBK) | 125 | U | 150 | 151 | 120 | 121 | 1 | 60.7-150 | | | 0.910 | 20 |
| Methyl tert-butyl ether | 25.0 | U | 24.6 | 25.1 | 98.4 | 101 | 1 | 61.4-136 | | | 2.12 | 20 |
| Styrene | 25.0 | U | 25.9 | 27.4 | 103 | 110 | 1 | 68.2-133 | | | 5.76 | 20 |
| 1,1,2,2-Tetrachloroethane | 25.0 | U | 25.7 | 26.9 | 103 | 108 | 1 | 64.9-145 | | | 4.59 | 20 |
| Tetrachloroethene | 25.0 | U | 25.8 | 27.2 | 103 | 109 | 1 | 57.4-141 | | | 5.10 | 20 |
| Toluene | 25.0 | U | 24.6 | 25.2 | 98.4 | 101 | 1 | 67.8-124 | | | 2.46 | 20 |
| 1,1,2-Trichlorotrifluoroethane | 25.0 | U | 26.7 | 26.8 | 107 | 107 | 1 | 53.7-150 | | | 0.290 | 20 |
| 1,2,3-Trichlorobenzene | 25.0 | U | 24.0 | 26.0 | 95.9 | 104 | 1 | 65.7-143 | | | 8.00 | 20 |

## L855855-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L855855-01 09/01/16 09:50 • (MS) R3160938-4 09/01/16 10:11 • (MSD) R3160938-5 09/01/16 10:31

| Analyte | Spike Amount ug/l | Original Result ug/l | MS Result ug/l | MSD Result ug/l | MS Rec. % | MSD Rec. % | Dilution | Rec. Limits % | MS Qualifier | MSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1,2,4-Trichlorobenzene | 25.0 | U | 23.5 | 25.4 | 93.8 | 102 | 1 | 67.0-146 | | | 8.05 | 20 |
| 1,1,1-Trichloroethane | 25.0 | U | 24.0 | 24.7 | 96.1 | 98.7 | 1 | 58.7-134 | | | 2.65 | 20 |
| 1,1,2-Trichloroethane | 25.0 | U | 25.7 | 26.4 | 103 | 105 | 1 | 74.1-130 | | | 2.53 | 20 |
| Trichloroethene | 25.0 | 2.54 | 28.2 | 28.8 | 102 | 105 | 1 | 48.9-148 | | | 2.16 | 20 |
| Trichlorofluoromethane | 25.0 | U | 28.7 | 29.8 | 115 | 119 | 1 | 39.9-165 | | | 3.53 | 20 |
| Vinyl chloride | 25.0 | 0.379 | 28.3 | 28.9 | 112 | 114 | 1 | 44.3-143 | | | 2.00 | 20 |
| Xylenes, Total | 75.0 | U | 72.6 | 76.8 | 96.8 | 102 | 1 | 65.6-133 | | | 5.71 | 20 |
| *(S) Toluene-d8* | | | | | *104* | *105* | | *90.0-115* | | | | |
| *(S) Dibromofluoromethane* | | | | | *102* | *103* | | *79.0-121* | | | | |
| *(S) 4-Bromofluorobenzene* | | | | | *91.7* | *93.9* | | *80.1-120* | | | | |
| *(S) a,a,a-Trifluorotoluene* | | | | | *99.4* | *100* | | *90.4-116* | | | | |

## Method Blank (MB)

(MB) R3160614-3 08/31/16 13:33

| Analyte | MB Result ug/l | MB Qualifier | MB MDL ug/l | MB RDL ug/l |
|---|---|---|---|---|
| Acetone | U | | 10.0 | 50.0 |
| Benzene | U | | 0.331 | 1.00 |
| Bromodichloromethane | U | | 0.380 | 1.00 |
| Bromochloromethane | U | | 0.520 | 1.00 |
| Bromoform | U | | 0.469 | 1.00 |
| Bromomethane | U | | 0.866 | 5.00 |
| Carbon disulfide | U | | 0.275 | 1.00 |
| Carbon tetrachloride | U | | 0.379 | 1.00 |
| Chlorobenzene | U | | 0.348 | 1.00 |
| Chlorodibromomethane | U | | 0.327 | 1.00 |
| Chloroethane | U | | 0.453 | 5.00 |
| Chloroform | U | | 0.324 | 5.00 |
| Chloromethane | 1.45 | J | 0.276 | 2.50 |
| Cyclohexane | U | | 0.390 | 1.00 |
| 1,2-Dibromo-3-Chloropropane | U | | 1.33 | 5.00 |
| 1,2-Dibromoethane | U | | 0.381 | 1.00 |
| 1,2-Dichlorobenzene | U | | 0.349 | 1.00 |
| 1,3-Dichlorobenzene | U | | 0.220 | 1.00 |
| 1,4-Dichlorobenzene | U | | 0.274 | 1.00 |
| Dichlorodifluoromethane | U | | 0.551 | 5.00 |
| 1,1-Dichloroethane | U | | 0.259 | 1.00 |
| 1,2-Dichloroethane | U | | 0.361 | 1.00 |
| 1,1-Dichloroethene | U | | 0.398 | 1.00 |
| cis-1,2-Dichloroethene | U | | 0.260 | 1.00 |
| trans-1,2-Dichloroethene | U | | 0.396 | 1.00 |
| 1,2-Dichloropropane | U | | 0.306 | 1.00 |
| cis-1,3-Dichloropropene | U | | 0.418 | 1.00 |
| trans-1,3-Dichloropropene | U | | 0.419 | 1.00 |
| Ethylbenzene | U | | 0.384 | 1.00 |
| 2-Hexanone | U | | 3.82 | 10.0 |
| Isopropylbenzene | U | | 0.326 | 1.00 |
| 2-Butanone (MEK) | U | | 3.93 | 10.0 |
| Methyl Acetate | U | | 4.30 | 20.0 |
| Methyl Cyclohexane | U | | 0.380 | 1.00 |
| Methylene Chloride | U | | 1.00 | 5.00 |
| 4-Methyl-2-pentanone (MIBK) | U | | 2.14 | 10.0 |
| Methyl tert-butyl ether | U | | 0.367 | 1.00 |
| Styrene | U | | 0.307 | 1.00 |
| 1,1,2,2-Tetrachloroethane | U | | 0.130 | 1.00 |
| Tetrachloroethene | U | | 0.372 | 1.00 |

## Method Blank (MB)

(MB) R3160614-3 08/31/16 13:33

| Analyte | MB Result ug/l | MB Qualifier | MB MDL ug/l | MB RDL ug/l |
|---|---|---|---|---|
| Toluene | U | | 0.780 | 5.00 |
| 1,1,2-Trichlorotrifluoroethane | U | | 0.303 | 1.00 |
| 1,2,3-Trichlorobenzene | 0.288 | J | 0.230 | 1.00 |
| 1,2,4-Trichlorobenzene | U | | 0.355 | 1.00 |
| 1,1,1-Trichloroethane | U | | 0.319 | 1.00 |
| 1,1,2-Trichloroethane | U | | 0.383 | 1.00 |
| Trichloroethene | U | | 0.398 | 1.00 |
| Trichlorofluoromethane | U | | 1.20 | 5.00 |
| Vinyl chloride | U | | 0.259 | 1.00 |
| Xylenes, Total | U | | 1.06 | 3.00 |
| *(S) Toluene-d8* | *101* | | | *90.0-115* |
| *(S) Dibromofluoromethane* | *94.7* | | | *79.0-121* |
| *(S) a,a,a-Trifluorotoluene* | *103* | | | *90.4-116* |
| *(S) 4-Bromofluorobenzene* | *102* | | | *80.1-120* |

## Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3160614-1 08/31/16 12:27 • (LCSD) R3160614-2 08/31/16 12:49

| Analyte | Spike Amount ug/l | LCS Result ug/l | LCSD Result ug/l | LCS Rec. % | LCSD Rec. % | Rec. Limits % | LCS Qualifier | LCSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|
| Acetone | 125 | 117 | 117 | 93.6 | 93.8 | 28.7-175 | | | 0.210 | 20.9 |
| Benzene | 25.0 | 20.3 | 20.8 | 81.2 | 83.3 | 73.0-122 | | | 2.57 | 20 |
| Bromodichloromethane | 25.0 | 20.4 | 20.9 | 81.6 | 83.7 | 75.5-121 | | | 2.49 | 20 |
| Bromochloromethane | 25.0 | 20.1 | 20.5 | 80.5 | 82.1 | 78.9-123 | | | 2.00 | 20 |
| Bromoform | 25.0 | 23.5 | 24.7 | 94.0 | 98.7 | 71.5-131 | | | 4.79 | 20 |
| Bromomethane | 25.0 | 16.2 | 18.1 | 64.6 | 72.5 | 22.4-187 | | | 11.5 | 20 |
| Carbon disulfide | 25.0 | 19.6 | 20.3 | 78.4 | 81.2 | 53.0-134 | | | 3.51 | 20 |
| Carbon tetrachloride | 25.0 | 17.0 | 17.5 | 68.0 | 70.0 | 70.9-129 | J4 | J4 | 2.95 | 20 |
| Chlorobenzene | 25.0 | 23.4 | 24.1 | 93.6 | 96.5 | 79.7-122 | | | 3.01 | 20 |
| Chlorodibromomethane | 25.0 | 23.7 | 24.3 | 94.9 | 97.3 | 78.2-124 | | | 2.52 | 20 |
| Chloroethane | 25.0 | 19.4 | 20.6 | 77.5 | 82.3 | 41.2-153 | | | 5.91 | 20 |
| Chloroform | 25.0 | 20.4 | 21.0 | 81.5 | 83.9 | 73.2-125 | | | 2.87 | 20 |
| Chloromethane | 25.0 | 15.4 | 14.4 | 61.6 | 57.7 | 55.8-134 | | | 6.52 | 20 |
| 1,2-Dibromo-3-Chloropropane | 25.0 | 25.8 | 25.9 | 103 | 104 | 64.8-131 | | | 0.580 | 20 |
| 1,2-Dibromoethane | 25.0 | 23.4 | 24.9 | 93.6 | 99.8 | 79.8-122 | | | 6.40 | 20 |
| 1,2-Dichlorobenzene | 25.0 | 23.0 | 23.3 | 91.9 | 93.2 | 84.7-118 | | | 1.50 | 20 |
| 1,3-Dichlorobenzene | 25.0 | 21.6 | 22.6 | 86.5 | 90.4 | 77.6-127 | | | 4.36 | 20 |
| 1,4-Dichlorobenzene | 25.0 | 22.2 | 22.2 | 89.0 | 88.9 | 82.2-114 | | | 0.130 | 20 |
| Dichlorodifluoromethane | 25.0 | 18.8 | 18.9 | 75.1 | 75.5 | 56.0-134 | | | 0.600 | 20 |

## Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3160614-1 08/31/16 12:27 • (LCSD) R3160614-2 08/31/16 12:49

| Analyte | Spike Amount ug/l | LCS Result ug/l | LCSD Result ug/l | LCS Rec. % | LCSD Rec. % | Rec. Limits % | LCS Qualifier | LCSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|
| 1,1-Dichloroethane | 25.0 | 20.6 | 21.3 | 82.6 | 85.2 | 71.7-127 | | | 3.10 | 20 |
| 1,2-Dichloroethane | 25.0 | 19.7 | 20.3 | 78.8 | 81.1 | 65.3-126 | | | 2.84 | 20 |
| 1,1-Dichloroethene | 25.0 | 21.2 | 21.5 | 84.6 | 86.2 | 59.9-137 | | | 1.84 | 20 |
| cis-1,2-Dichloroethene | 25.0 | 20.3 | 21.4 | 81.0 | 85.5 | 77.3-122 | | | 5.37 | 20 |
| trans-1,2-Dichloroethene | 25.0 | 20.9 | 21.3 | 83.7 | 85.0 | 72.6-125 | | | 1.61 | 20 |
| 1,2-Dichloropropane | 25.0 | 22.1 | 23.4 | 88.6 | 93.5 | 77.4-125 | | | 5.42 | 20 |
| cis-1,3-Dichloropropene | 25.0 | 21.5 | 21.8 | 85.9 | 87.1 | 77.7-124 | | | 1.33 | 20 |
| trans-1,3-Dichloropropene | 25.0 | 17.7 | 18.0 | 70.9 | 71.8 | 73.5-127 | J4 | J4 | 1.27 | 20 |
| Ethylbenzene | 25.0 | 22.3 | 23.4 | 89.0 | 93.5 | 80.9-121 | | | 4.88 | 20 |
| 2-Hexanone | 125 | 127 | 132 | 102 | 105 | 59.4-151 | | | 3.67 | 20 |
| Isopropylbenzene | 25.0 | 22.1 | 22.9 | 88.2 | 91.6 | 81.6-124 | | | 3.74 | 20 |
| 2-Butanone (MEK) | 125 | 122 | 128 | 97.8 | 102 | 46.4-155 | | | 4.59 | 20 |
| Methylene Chloride | 25.0 | 20.3 | 21.1 | 81.3 | 84.5 | 69.5-120 | | | 3.92 | 20 |
| 4-Methyl-2-pentanone (MIBK) | 125 | 127 | 132 | 101 | 105 | 63.3-138 | | | 3.96 | 20 |
| Methyl tert-butyl ether | 25.0 | 20.6 | 21.3 | 82.3 | 85.4 | 70.1-125 | | | 3.68 | 20 |
| Styrene | 25.0 | 24.3 | 24.3 | 97.2 | 97.1 | 79.9-124 | | | 0.0900 | 20 |
| 1,1,2,2-Tetrachloroethane | 25.0 | 23.4 | 24.5 | 93.7 | 98.1 | 79.3-123 | | | 4.54 | 20 |
| Tetrachloroethene | 25.0 | 23.4 | 24.1 | 93.6 | 96.4 | 73.5-130 | | | 2.95 | 20 |
| Toluene | 25.0 | 21.4 | 21.8 | 85.8 | 87.4 | 77.9-116 | | | 1.89 | 20 |
| 1,1,2-Trichlorotrifluoroethane | 25.0 | 21.0 | 21.8 | 84.2 | 87.2 | 62.0-141 | | | 3.46 | 20 |
| 1,2,3-Trichlorobenzene | 25.0 | 23.7 | 23.5 | 94.7 | 93.9 | 75.7-134 | | | 0.850 | 20 |
| 1,2,4-Trichlorobenzene | 25.0 | 24.4 | 24.8 | 97.7 | 99.0 | 76.1-136 | | | 1.35 | 20 |
| 1,1,1-Trichloroethane | 25.0 | 20.5 | 20.6 | 81.9 | 82.6 | 71.1-129 | | | 0.810 | 20 |
| 1,1,2-Trichloroethane | 25.0 | 23.0 | 23.6 | 92.0 | 94.2 | 81.6-120 | | | 2.34 | 20 |
| Trichloroethene | 25.0 | 22.6 | 22.9 | 90.3 | 91.6 | 79.5-121 | | | 1.50 | 20 |
| Trichlorofluoromethane | 25.0 | 19.9 | 20.7 | 79.6 | 82.8 | 49.1-157 | | | 3.93 | 20 |
| Vinyl chloride | 25.0 | 21.5 | 21.9 | 86.1 | 87.6 | 61.5-134 | | | 1.81 | 20 |
| Xylenes, Total | 75.0 | 68.7 | 70.7 | 91.6 | 94.2 | 79.2-122 | | | 2.86 | 20 |
| *(S) Toluene-d8* | | | | *102* | *101* | *90.0-115* | | | | |
| *(S) Dibromofluoromethane* | | | | *92.9* | *93.8* | *79.0-121* | | | | |
| *(S) α,α,α-Trifluorotoluene* | | | | *103* | *103* | *90.4-116* | | | | |
| *(S) 4-Bromofluorobenzene* | | | | *99.3* | *101* | *80.1-120* | | | | |

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

## Method Blank (MB)

(MB) R3161650-3 09/03/16 12:20

| Analyte | MB Result ug/l | MB Qualifier | MB MDL ug/l | MB RDL ug/l |
|---|---|---|---|---|
| Acetone | U | | 10.0 | 50.0 |
| Benzene | U | | 0.331 | 1.00 |
| Bromodichloromethane | U | | 0.380 | 1.00 |
| Bromochloromethane | U | | 0.520 | 1.00 |
| Bromoform | U | | 0.469 | 1.00 |
| Bromomethane | U | | 0.866 | 5.00 |
| Carbon disulfide | U | | 0.275 | 1.00 |
| Carbon tetrachloride | U | | 0.379 | 1.00 |
| Chlorobenzene | U | | 0.348 | 1.00 |
| Chlorodibromomethane | U | | 0.327 | 1.00 |
| Chloroethane | U | | 0.453 | 5.00 |
| Chloroform | U | | 0.324 | 5.00 |
| Chloromethane | U | | 0.276 | 2.50 |
| Cyclohexane | U | | 0.390 | 1.00 |
| 1,2-Dibromo-3-Chloropropane | U | | 1.33 | 5.00 |
| 1,2-Dibromoethane | U | | 0.381 | 1.00 |
| 1,2-Dichlorobenzene | U | | 0.349 | 1.00 |
| 1,3-Dichlorobenzene | U | | 0.220 | 1.00 |
| 1,4-Dichlorobenzene | U | | 0.274 | 1.00 |
| Dichlorodifluoromethane | U | | 0.551 | 5.00 |
| 1,1-Dichloroethane | U | | 0.259 | 1.00 |
| 1,2-Dichloroethane | U | | 0.361 | 1.00 |
| 1,1-Dichloroethene | U | | 0.398 | 1.00 |
| cis-1,2-Dichloroethene | U | | 0.260 | 1.00 |
| trans-1,2-Dichloroethene | U | | 0.396 | 1.00 |
| 1,2-Dichloropropane | U | | 0.306 | 1.00 |
| cis-1,3-Dichloropropene | U | | 0.418 | 1.00 |
| trans-1,3-Dichloropropene | U | | 0.419 | 1.00 |
| Ethylbenzene | U | | 0.384 | 1.00 |
| 2-Hexanone | U | | 3.82 | 10.0 |
| Isopropylbenzene | U | | 0.326 | 1.00 |
| 2-Butanone (MEK) | U | | 3.93 | 10.0 |
| Methyl Acetate | U | | 4.30 | 20.0 |
| Methyl Cyclohexane | U | | 0.380 | 1.00 |
| Methylene Chloride | U | | 1.00 | 5.00 |
| 4-Methyl-2-pentanone (MIBK) | U | | 2.14 | 10.0 |
| Methyl tert-butyl ether | U | | 0.367 | 1.00 |
| Styrene | U | | 0.307 | 1.00 |
| 1,1,2,2-Tetrachloroethane | U | | 0.130 | 1.00 |
| Tetrachloroethene | U | | 0.372 | 1.00 |

## Method Blank (MB)

(MB) R3161650-3 09/03/16 12:20

| Analyte | MB Result | MB Qualifier | MB MDL | MB RDL |
|---|---|---|---|---|
| | ug/l | | ug/l | ug/l |
| Toluene | U | | 0.780 | 5.00 |
| 1,1,2-Trichlorotrifluoroethane | U | | 0.303 | 1.00 |
| 1,2,3-Trichlorobenzene | U | | 0.230 | 1.00 |
| 1,2,4-Trichlorobenzene | U | | 0.355 | 1.00 |
| 1,1,1-Trichloroethane | U | | 0.319 | 1.00 |
| 1,1,2-Trichloroethane | U | | 0.383 | 1.00 |
| Trichloroethene | U | | 0.398 | 1.00 |
| Trichlorofluoromethane | U | | 1.20 | 5.00 |
| Vinyl chloride | U | | 0.259 | 1.00 |
| Xylenes, Total | U | | 1.06 | 3.00 |
| *(S) Toluene-d8* | *99.2* | | | *90.0-115* |
| *(S) Dibromofluoromethane* | *83.3* | | | *79.0-121* |
| *(S) a,a,a-Trifluorotoluene* | *99.3* | | | *90.4-116* |
| *(S) 4-Bromofluorobenzene* | *105* | | | *80.1-120* |

## Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3161650-1 09/03/16 11:09 • (LCSD) R3161650-2 09/03/16 11:33

| Analyte | Spike Amount | LCS Result | LCSD Result | LCS Rec. | LCSD Rec. | Rec. Limits | LCS Qualifier | LCSD Qualifier | RPD | RPD Limits |
|---|---|---|---|---|---|---|---|---|---|---|
| | ug/l | ug/l | ug/l | % | % | % | | | % | % |
| Acetone | 125 | 108 | 113 | 86.3 | 90.5 | 28.7-175 | | | 4.81 | 20.9 |
| Benzene | 25.0 | 22.3 | 23.0 | 89.3 | 92.1 | 73.0-122 | | | 3.19 | 20 |
| Bromodichloromethane | 25.0 | 24.5 | 25.1 | 98.0 | 100 | 75.5-121 | | | 2.34 | 20 |
| Bromochloromethane | 25.0 | 22.8 | 23.0 | 91.0 | 92.0 | 78.9-123 | | | 1.07 | 20 |
| Bromoform | 25.0 | 23.5 | 24.1 | 94.0 | 96.4 | 71.5-131 | | | 2.55 | 20 |
| Bromomethane | 25.0 | 12.1 | 13.4 | 48.5 | 53.7 | 22.4-187 | | | 10.1 | 20 |
| Carbon disulfide | 25.0 | 23.1 | 23.5 | 92.3 | 94.0 | 53.0-134 | | | 1.89 | 20 |
| Carbon tetrachloride | 25.0 | 19.6 | 20.2 | 78.6 | 80.8 | 70.9-129 | | | 2.82 | 20 |
| Chlorobenzene | 25.0 | 26.0 | 26.8 | 104 | 107 | 79.7-122 | | | 3.10 | 20 |
| Chlorodibromomethane | 25.0 | 25.7 | 26.7 | 103 | 107 | 78.2-124 | | | 3.60 | 20 |
| Chloroethane | 25.0 | 21.6 | 19.7 | 86.3 | 79.0 | 41.2-153 | | | 8.85 | 20 |
| Chloroform | 25.0 | 22.7 | 23.3 | 90.8 | 93.3 | 73.2-125 | | | 2.73 | 20 |
| Chloromethane | 25.0 | 19.3 | 19.1 | 77.3 | 76.4 | 55.8-134 | | | 1.20 | 20 |
| 1,2-Dibromo-3-Chloropropane | 25.0 | 23.0 | 24.6 | 92.0 | 98.4 | 64.8-131 | | | 6.66 | 20 |
| 1,2-Dibromoethane | 25.0 | 25.0 | 26.5 | 99.8 | 106 | 79.8-122 | | | 6.08 | 20 |
| 1,2-Dichlorobenzene | 25.0 | 24.7 | 25.1 | 99.0 | 101 | 84.7-118 | | | 1.60 | 20 |
| 1,3-Dichlorobenzene | 25.0 | 24.8 | 25.6 | 99.1 | 102 | 77.6-127 | | | 3.24 | 20 |
| 1,4-Dichlorobenzene | 25.0 | 23.9 | 24.6 | 95.4 | 98.5 | 82.2-114 | | | 3.17 | 20 |
| Dichlorodifluoromethane | 25.0 | 20.4 | 20.5 | 81.4 | 82.2 | 56.0-134 | | | 0.890 | 20 |

## Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3161650-1 09/03/16 11:09 • (LCSD) R3161650-2 09/03/16 11:33

| Analyte | Spike Amount ug/l | LCS Result ug/l | LCSD Result ug/l | LCS Rec. % | LCSD Rec. % | Rec. Limits % | LCS Qualifier | LCSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|
| 1,1-Dichloroethane | 25.0 | 23.0 | 23.5 | 92.2 | 94.0 | 71.7-127 | | | 1.93 | 20 |
| 1,2-Dichloroethane | 25.0 | 22.8 | 23.6 | 91.2 | 94.3 | 65.3-126 | | | 3.36 | 20 |
| 1,1-Dichloroethene | 25.0 | 21.7 | 21.7 | 86.6 | 86.8 | 59.9-137 | | | 0.180 | 20 |
| cis-1,2-Dichloroethene | 25.0 | 23.5 | 24.0 | 94.0 | 96.1 | 77.3-122 | | | 2.16 | 20 |
| trans-1,2-Dichloroethene | 25.0 | 23.0 | 23.5 | 92.1 | 94.0 | 72.6-125 | | | 2.04 | 20 |
| 1,2-Dichloropropane | 25.0 | 25.0 | 25.3 | 100 | 101 | 77.4-125 | | | 1.37 | 20 |
| cis-1,3-Dichloropropene | 25.0 | 25.2 | 25.7 | 101 | 103 | 77.7-124 | | | 1.94 | 20 |
| trans-1,3-Dichloropropene | 25.0 | 26.6 | 27.3 | 107 | 109 | 73.5-127 | | | 2.36 | 20 |
| Ethylbenzene | 25.0 | 25.4 | 26.2 | 102 | 105 | 80.9-121 | | | 3.12 | 20 |
| 2-Hexanone | 125 | 128 | 135 | 103 | 108 | 59.4-151 | | | 4.92 | 20 |
| Isopropylbenzene | 25.0 | 25.7 | 26.4 | 103 | 106 | 81.6-124 | | | 2.73 | 20 |
| 2-Butanone (MEK) | 125 | 117 | 125 | 93.7 | 100 | 46.4-155 | | | 6.51 | 20 |
| Methylene Chloride | 25.0 | 20.0 | 20.7 | 80.0 | 82.8 | 69.5-120 | | | 3.44 | 20 |
| 4-Methyl-2-pentanone (MIBK) | 125 | 119 | 122 | 95.3 | 97.7 | 63.3-138 | | | 2.53 | 20 |
| Methyl tert-butyl ether | 25.0 | 19.5 | 20.3 | 78.2 | 81.1 | 70.1-125 | | | 3.67 | 20 |
| Styrene | 25.0 | 27.2 | 27.7 | 109 | 111 | 79.9-124 | | | 1.95 | 20 |
| 1,1,2,2-Tetrachloroethane | 25.0 | 22.7 | 23.4 | 91.0 | 93.6 | 79.3-123 | | | 2.88 | 20 |
| Tetrachloroethene | 25.0 | 23.8 | 24.5 | 95.4 | 98.2 | 73.5-130 | | | 2.88 | 20 |
| Toluene | 25.0 | 23.7 | 24.1 | 95.0 | 96.3 | 77.9-116 | | | 1.40 | 20 |
| 1,1,2-Trichlorotrifluoroethane | 25.0 | 21.3 | 21.5 | 85.4 | 86.1 | 62.0-141 | | | 0.900 | 20 |
| 1,2,3-Trichlorobenzene | 25.0 | 22.6 | 23.6 | 90.4 | 94.4 | 75.7-134 | | | 4.40 | 20 |
| 1,2,4-Trichlorobenzene | 25.0 | 23.0 | 23.8 | 91.8 | 95.1 | 76.1-136 | | | 3.54 | 20 |
| 1,1,1-Trichloroethane | 25.0 | 22.6 | 23.2 | 90.6 | 92.9 | 71.1-129 | | | 2.49 | 20 |
| 1,1,2-Trichloroethane | 25.0 | 24.9 | 24.9 | 99.6 | 99.8 | 81.6-120 | | | 0.180 | 20 |
| Trichloroethene | 25.0 | 26.1 | 26.3 | 104 | 105 | 79.5-121 | | | 0.620 | 20 |
| Trichlorofluoromethane | 25.0 | 19.8 | 21.0 | 79.2 | 84.0 | 49.1-157 | | | 5.89 | 20 |
| Vinyl chloride | 25.0 | 20.4 | 20.5 | 81.4 | 81.9 | 61.5-134 | | | 0.610 | 20 |
| Xylenes, Total | 75.0 | 76.1 | 78.3 | 101 | 104 | 79.2-122 | | | 2.87 | 20 |
| *(S) Toluene-d8* | | | | *100* | *99.4* | *90.0-115* | | | | |
| *(S) Dibromofluoromethane* | | | | *82.5* | *84.2* | *79.0-121* | | | | |
| *(S) α,α,α-Trifluorotoluene* | | | | *98.7* | *98.3* | *90.4-116* | | | | |
| *(S) 4-Bromofluorobenzene* | | | | *104* | *103* | *80.1-120* | | | | |

## L856599-11 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L856599-11 09/03/16 20:30 • (MS) R3161650-4 09/03/16 20:54 • (MSD) R3161650-5 09/03/16 21:17

| Analyte | Spike Amount ug/l | Original Result ug/l | MS Result ug/l | MSD Result ug/l | MS Rec. % | MSD Rec. % | Dilution | Rec. Limits % | MS Qualifier | MSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acetone | 125 | ND | 3020 | 3340 | 48.3 | 53.4 | 50 | 25.0-156 | | | 10.2 | 21.5 |
| Benzene | 25.0 | ND | 1110 | 1180 | 88.5 | 94.8 | 50 | 58.6-133 | | | 6.78 | 20 |
| Bromodichloromethane | 25.0 | ND | 1180 | 1290 | 94.1 | 103 | 50 | 69.2-127 | | | 9.40 | 20 |
| Bromochloromethane | 25.0 | ND | 1040 | 1100 | 83.5 | 87.8 | 50 | 74.4-128 | | | 5.05 | 20 |
| Bromoform | 25.0 | ND | 1120 | 1180 | 89.9 | 94.7 | 50 | 66.3-140 | | | 5.21 | 20 |
| Bromomethane | 25.0 | ND | 695 | 839 | 55.6 | 67.1 | 50 | 16.6-183 | | | 18.8 | 20.5 |
| Carbon disulfide | 25.0 | ND | 1070 | 1140 | 85.6 | 91.4 | 50 | 34.9-138 | | | 6.60 | 20 |
| Carbon tetrachloride | 25.0 | ND | 942 | 1050 | 75.4 | 84.1 | 50 | 60.6-139 | | | 11.0 | 20 |
| Chlorobenzene | 25.0 | ND | 1240 | 1320 | 99.6 | 106 | 50 | 70.1-130 | | | 5.87 | 20 |
| Chlorodibromomethane | 25.0 | ND | 1230 | 1280 | 98.4 | 102 | 50 | 71.6-132 | | | 3.87 | 20 |
| Chloroethane | 25.0 | ND | 1270 | 1340 | 102 | 107 | 50 | 33.3-155 | | | 5.42 | 20 |
| Chloroform | 25.0 | ND | 1090 | 1180 | 86.8 | 94.0 | 50 | 66.1-133 | | | 8.00 | 20 |
| Chloromethane | 25.0 | ND | 977 | 1050 | 78.2 | 84.1 | 50 | 40.7-139 | | | 7.28 | 20 |
| 1,2-Dibromo-3-Chloropropane | 25.0 | ND | 1160 | 1300 | 92.7 | 104 | 50 | 63.9-142 | | | 11.2 | 20.2 |
| 1,2-Dibromoethane | 25.0 | ND | 1240 | 1320 | 99.3 | 105 | 50 | 73.8-131 | | | 5.86 | 20 |
| 1,2-Dichlorobenzene | 25.0 | ND | 1170 | 1270 | 93.9 | 102 | 50 | 77.4-127 | | | 7.85 | 20 |
| 1,3-Dichlorobenzene | 25.0 | ND | 1180 | 1260 | 94.0 | 101 | 50 | 67.9-136 | | | 7.30 | 20 |
| 1,4-Dichlorobenzene | 25.0 | ND | 1160 | 1230 | 92.5 | 98.6 | 50 | 74.4-123 | | | 6.44 | 20 |
| Dichlorodifluoromethane | 25.0 | ND | 1230 | 1320 | 98.1 | 105 | 50 | 42.2-146 | | | 7.13 | 20 |
| 1,1-Dichloroethane | 25.0 | ND | 1150 | 1220 | 90.5 | 96.1 | 50 | 64.0-134 | | | 5.88 | 20 |
| 1,2-Dichloroethane | 25.0 | ND | 1120 | 1220 | 90.0 | 97.4 | 50 | 60.7-132 | | | 7.95 | 20 |
| 1,1-Dichloroethene | 25.0 | ND | 1060 | 1140 | 84.7 | 91.6 | 50 | 48.8-144 | | | 7.74 | 20 |
| cis-1,2-Dichloroethene | 25.0 | 16900 | 19400 | 19000 | 195 | 165 | 50 | 60.6-136 | E V | E V | 2.01 | 20 |
| trans-1,2-Dichloroethene | 25.0 | 74.6 | 1200 | 1280 | 90.3 | 96.3 | 50 | 61.0-132 | | | 6.05 | 20 |
| 1,2-Dichloropropane | 25.0 | ND | 1180 | 1310 | 94.6 | 104 | 50 | 69.7-130 | | | 9.94 | 20 |
| cis-1,3-Dichloropropene | 25.0 | ND | 1180 | 1310 | 94.8 | 105 | 50 | 71.1-129 | | | 10.2 | 20 |
| trans-1,3-Dichloropropene | 25.0 | ND | 1270 | 1400 | 102 | 112 | 50 | 66.3-136 | | | 9.92 | 20 |
| Ethylbenzene | 25.0 | ND | 1240 | 1310 | 98.9 | 105 | 50 | 62.7-136 | | | 5.90 | 20 |
| 2-Hexanone | 125 | ND | 5420 | 5840 | 86.8 | 93.5 | 50 | 59.4-154 | | | 7.42 | 20.1 |
| Isopropylbenzene | 25.0 | ND | 1230 | 1310 | 98.1 | 105 | 50 | 67.4-136 | | | 6.82 | 20 |
| 2-Butanone (MEK) | 125 | ND | 4610 | 5030 | 73.7 | 80.4 | 50 | 45.0-156 | | | 8.66 | 20.8 |
| Methylene Chloride | 25.0 | ND | 996 | 1050 | 79.7 | 84.2 | 50 | 61.5-125 | | | 5.51 | 20 |
| 4-Methyl-2-pentanone (MIBK) | 125 | ND | 5840 | 6480 | 93.4 | 104 | 50 | 60.7-150 | | | 10.4 | 20 |
| Methyl tert-butyl ether | 25.0 | ND | 952 | 1030 | 76.2 | 82.2 | 50 | 61.4-136 | | | 7.65 | 20 |
| Styrene | 25.0 | ND | 1310 | 1380 | 105 | 111 | 50 | 68.2-133 | | | 5.48 | 20 |
| 1,1,2,2-Tetrachloroethane | 25.0 | ND | 1180 | 1250 | 94.0 | 100 | 50 | 64.9-145 | | | 6.52 | 20 |
| Tetrachloroethene | 25.0 | 426 | 1670 | 1700 | 99.6 | 102 | 50 | 57.4-141 | | | 1.71 | 20 |
| Toluene | 25.0 | ND | 1170 | 1260 | 93.3 | 101 | 50 | 67.8-124 | | | 7.50 | 20 |
| 1,1,2-Trichlorotrifluoroethane | 25.0 | ND | 1060 | 1140 | 85.1 | 91.0 | 50 | 53.7-150 | | | 6.67 | 20 |
| 1,2,3-Trichlorobenzene | 25.0 | ND | 1050 | 1190 | 84.0 | 95.6 | 50 | 65.7-143 | | | 12.9 | 20 |

## L856599-11 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L856599-11 09/03/16 20:30 • (MS) R3161650-4 09/03/16 20:54 • (MSD) R3161650-5 09/03/16 21:17

| Analyte | Spike Amount ug/l | Original Result ug/l | MS Result ug/l | MSD Result ug/l | MS Rec. % | MSD Rec. % | Dilution | Rec. Limits % | MS Qualifier | MSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1,2,4-Trichlorobenzene | 25.0 | ND | 1080 | 1160 | 86.6 | 92.9 | 50 | 67.0-146 | | | 6.97 | 20 |
| 1,1,1-Trichloroethane | 25.0 | ND | 1100 | 1200 | 88.2 | 95.9 | 50 | 58.7-134 | | | 8.35 | 20 |
| 1,1,2-Trichloroethane | 25.0 | ND | 1180 | 1260 | 94.3 | 101 | 50 | 74.1-130 | | | 6.48 | 20 |
| Trichloroethene | 25.0 | 832 | 2170 | 2220 | 107 | 111 | 50 | 48.9-148 | | | 2.30 | 20 |
| Trichlorofluoromethane | 25.0 | ND | 1070 | 1170 | 85.9 | 93.4 | 50 | 39.9-165 | | | 8.38 | 20 |
| Vinyl chloride | 25.0 | 218 | 1430 | 1490 | 97.2 | 102 | 50 | 44.3-143 | | | 4.14 | 20 |
| Xylenes, Total | 75.0 | ND | 3710 | 3920 | 99.0 | 105 | 50 | 65.6-133 | | | 5.53 | 20 |
| *(S) Toluene-d8* | | | | | *98.9* | *101* | | *90.0-115* | | | | |
| *(S) Dibromofluoromethane* | | | | | *83.7* | *84.2* | | *79.0-121* | | | | |
| *(S) α,α,α-Trifluorotoluene* | | | | | *98.3* | *98.7* | | *90.4-116* | | | | |
| *(S) 4-Bromofluorobenzene* | | | | | *102* | *102* | | *80.1-120* | | | | |

## L856599-09 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L856599-09 09/07/16 03:49 • (MS) R3161781-1 09/07/16 04:09 • (MSD) R3161781-2 09/07/16 04:29

| Analyte | Spike Amount ug/l | Original Result ug/l | MS Result ug/l | MSD Result ug/l | MS Rec. % | MSD Rec. % | Dilution | Rec. Limits % | MS Qualifier | MSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acetone | 125 | ND | 112 | 115 | 89.7 | 92.1 | 1 | 25.0-156 | | | 2.64 | 21.5 |
| Benzene | 25.0 | ND | 26.4 | 28.1 | 103 | 109 | 1 | 58.6-133 | | | 6.07 | 20 |
| Bromodichloromethane | 25.0 | ND | 28.0 | 28.8 | 112 | 115 | 1 | 69.2-127 | | | 2.84 | 20 |
| Bromochloromethane | 25.0 | ND | 27.0 | 27.3 | 108 | 109 | 1 | 74.4-128 | | | 1.29 | 20 |
| Bromoform | 25.0 | ND | 26.9 | 28.6 | 108 | 114 | 1 | 66.3-140 | | | 6.29 | 20 |
| Bromomethane | 25.0 | ND | 23.9 | 25.2 | 95.4 | 101 | 1 | 16.6-183 | | | 5.42 | 20.5 |
| Carbon disulfide | 25.0 | ND | 21.4 | 21.8 | 85.7 | 87.3 | 1 | 34.9-138 | | | 1.81 | 20 |
| Carbon tetrachloride | 25.0 | ND | 23.7 | 24.7 | 95.0 | 98.7 | 1 | 60.6-139 | | | 3.86 | 20 |
| Chlorobenzene | 25.0 | ND | 25.9 | 27.7 | 104 | 111 | 1 | 70.1-130 | | | 6.57 | 20 |
| Chlorodibromomethane | 25.0 | ND | 27.4 | 28.8 | 110 | 115 | 1 | 71.6-132 | | | 5.05 | 20 |
| Chloroethane | 25.0 | ND | 24.5 | 26.3 | 98.1 | 105 | 1 | 33.3-155 | | | 6.93 | 20 |
| Chloroform | 25.0 | ND | 27.0 | 28.2 | 108 | 113 | 1 | 66.1-133 | | | 4.57 | 20 |
| Chloromethane | 25.0 | ND | 37.6 | 19.2 | 150 | 76.6 | 1 | 40.7-139 | J5 | J3 | 65.0 | 20 |
| 1,2-Dibromo-3-Chloropropane | 25.0 | ND | 25.6 | 26.2 | 102 | 105 | 1 | 63.9-142 | | | 2.42 | 20.2 |
| 1,2-Dibromoethane | 25.0 | ND | 26.0 | 27.5 | 104 | 110 | 1 | 73.8-131 | | | 5.54 | 20 |
| 1,2-Dichlorobenzene | 25.0 | ND | 26.8 | 27.6 | 107 | 110 | 1 | 77.4-127 | | | 2.86 | 20 |
| 1,3-Dichlorobenzene | 25.0 | ND | 26.2 | 27.7 | 105 | 111 | 1 | 67.9-136 | | | 5.43 | 20 |
| 1,4-Dichlorobenzene | 25.0 | ND | 25.5 | 26.6 | 102 | 106 | 1 | 74.4-123 | | | 4.12 | 20 |
| Dichlorodifluoromethane | 25.0 | ND | 32.1 | 33.9 | 128 | 136 | 1 | 42.2-146 | | | 5.37 | 20 |
| 1,1-Dichloroethane | 25.0 | ND | 27.8 | 28.4 | 111 | 114 | 1 | 64.0-134 | | | 2.25 | 20 |
| 1,2-Dichloroethane | 25.0 | ND | 25.9 | 27.0 | 103 | 108 | 1 | 60.7-132 | | | 4.28 | 20 |
| 1,1-Dichloroethene | 25.0 | ND | 27.0 | 27.3 | 108 | 109 | 1 | 48.8-144 | | | 1.00 | 20 |

## L856599-09 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L856599-09 09/07/16 03:49 • (MS) R3161781-1 09/07/16 04:09 • (MSD) R3161781-2 09/07/16 04:29

| Analyte | Spike Amount ug/l | Original Result ug/l | MS Result ug/l | MSD Result ug/l | MS Rec. % | MSD Rec. % | Dilution | Rec. Limits % | MS Qualifier | MSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| cis-1,2-Dichloroethene | 25.0 | ND | 26.3 | 27.2 | 104 | 107 | 1 | 60.6-136 | | | 3.33 | 20 |
| trans-1,2-Dichloroethene | 25.0 | ND | 25.3 | 25.6 | 101 | 102 | 1 | 61.0-132 | | | 0.970 | 20 |
| 1,2-Dichloropropane | 25.0 | ND | 29.5 | 30.7 | 118 | 123 | 1 | 69.7-130 | | | 3.98 | 20 |
| cis-1,3-Dichloropropene | 25.0 | ND | 27.5 | 29.0 | 110 | 116 | 1 | 71.1-129 | | | 5.57 | 20 |
| trans-1,3-Dichloropropene | 25.0 | ND | 27.2 | 28.6 | 109 | 114 | 1 | 66.3-136 | | | 5.21 | 20 |
| Ethylbenzene | 25.0 | ND | 24.9 | 26.5 | 99.5 | 106 | 1 | 62.7-136 | | | 6.47 | 20 |
| 2-Hexanone | 125 | ND | 123 | 132 | 98.1 | 106 | 1 | 59.4-154 | | | 7.52 | 20.1 |
| Isopropylbenzene | 25.0 | ND | 25.8 | 27.0 | 103 | 108 | 1 | 67.4-136 | | | 4.57 | 20 |
| 2-Butanone (MEK) | 125 | ND | 104 | 109 | 83.1 | 87.2 | 1 | 45.0-156 | | | 4.81 | 20.8 |
| Methylene Chloride | 25.0 | ND | 29.3 | 30.1 | 102 | 105 | 1 | 61.5-125 | | | 2.69 | 20 |
| 4-Methyl-2-pentanone (MIBK) | 125 | ND | 147 | 152 | 118 | 121 | 1 | 60.7-150 | | | 3.12 | 20 |
| Methyl tert-butyl ether | 25.0 | ND | 22.8 | 23.3 | 91.2 | 93.3 | 1 | 61.4-136 | | | 2.36 | 20 |
| Styrene | 25.0 | ND | 25.8 | 26.8 | 103 | 107 | 1 | 68.2-133 | | | 3.76 | 20 |
| 1,1,2,2-Tetrachloroethane | 25.0 | ND | 27.1 | 27.9 | 108 | 112 | 1 | 64.9-145 | | | 3.12 | 20 |
| Tetrachloroethene | 25.0 | ND | 24.7 | 25.9 | 98.9 | 104 | 1 | 57.4-141 | | | 4.82 | 20 |
| Toluene | 25.0 | ND | 25.2 | 26.4 | 101 | 105 | 1 | 67.8-124 | | | 4.52 | 20 |
| 1,1,2-Trichlorotrifluoroethane | 25.0 | ND | 28.5 | 30.1 | 114 | 121 | 1 | 53.7-150 | | | 5.65 | 20 |
| 1,2,3-Trichlorobenzene | 25.0 | ND | 25.1 | 25.8 | 100 | 103 | 1 | 65.7-143 | | | 2.69 | 20 |
| 1,2,4-Trichlorobenzene | 25.0 | ND | 25.3 | 26.0 | 101 | 104 | 1 | 67.0-146 | | | 2.69 | 20 |
| 1,1,1-Trichloroethane | 25.0 | ND | 26.3 | 27.9 | 105 | 112 | 1 | 58.7-134 | | | 5.84 | 20 |
| 1,1,2-Trichloroethane | 25.0 | ND | 26.3 | 28.1 | 105 | 112 | 1 | 74.1-130 | | | 6.58 | 20 |
| Trichloroethene | 25.0 | ND | 26.4 | 27.3 | 106 | 109 | 1 | 48.9-148 | | | 3.15 | 20 |
| Trichlorofluoromethane | 25.0 | ND | 27.8 | 29.3 | 111 | 117 | 1 | 39.9-165 | | | 5.46 | 20 |
| Vinyl chloride | 25.0 | ND | 24.7 | 26.0 | 98.9 | 104 | 1 | 44.3-143 | | | 4.90 | 20 |
| Xylenes, Total | 75.0 | ND | 75.1 | 78.8 | 100 | 105 | 1 | 65.6-133 | | | 4.87 | 20 |
| *(S) Toluene-d8* | | | | | *107* | *106* | | *90.0-115* | | | | |
| *(S) Dibromofluoromethane* | | | | | *104* | *102* | | *79.0-121* | | | | |
| *(S) a,a,a-Trifluorotoluene* | | | | | *99.9* | *98.4* | | *90.4-116* | | | | |
| *(S) 4-Bromofluorobenzene* | | | | | *94.2* | *94.8* | | *80.1-120* | | | | |

## Method Blank (MB)

(MB) R3160882-3 09/01/16 12:32

| Analyte | MB Result mg/kg | MB Qualifier | MB MDL mg/kg | MB RDL mg/kg |
|---|---|---|---|---|
| Benzene | U | | 0.000270 | 0.00100 |
| sec-Butylbenzene | U | | 0.000201 | 0.00100 |
| tert-Butylbenzene | U | | 0.000206 | 0.00100 |
| Cyclohexane | U | | 0.000350 | 0.00100 |
| 1,2-Dibromoethane | U | | 0.000343 | 0.00100 |
| 1,2-Dichloroethane | U | | 0.000265 | 0.00100 |
| Ethylbenzene | U | | 0.000297 | 0.00100 |
| n-Hexane | U | | 0.000290 | 0.0100 |
| Isopropylbenzene | U | | 0.000243 | 0.0100 |
| Methyl tert-butyl ether | U | | 0.000212 | 0.00100 |
| Toluene | U | | 0.000434 | 0.00500 |
| 1,2,4-Trimethylbenzene | U | | 0.000211 | 0.00100 |
| 1,3,5-Trimethylbenzene | U | | 0.000266 | 0.00100 |
| Xylenes, Total | U | | 0.000698 | 0.00300 |
| *(S) Toluene-d8* | *109* | | | *88.7-115* |
| *(S) Dibromofluoromethane* | *109* | | | *76.3-123* |
| *(S) α,α,α-Trifluorotoluene* | *93.3* | | | *87.2-117* |
| *(S) 4-Bromofluorobenzene* | *96.9* | | | *69.7-129* |

## Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3160882-1 09/01/16 11:11 • (LCSD) R3160882-2 09/01/16 11:31

| Analyte | Spike Amount mg/kg | LCS Result mg/kg | LCSD Result mg/kg | LCS Rec. % | LCSD Rec. % | Rec. Limits % | LCS Qualifier | LCSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|
| Benzene | 0.0250 | 0.0270 | 0.0269 | 108 | 108 | 72.6-120 | | | 0.290 | 20 |
| sec-Butylbenzene | 0.0250 | 0.0230 | 0.0226 | 92.0 | 90.3 | 77.8-129 | | | 1.83 | 20 |
| tert-Butylbenzene | 0.0250 | 0.0223 | 0.0220 | 89.3 | 88.2 | 77.2-129 | | | 1.29 | 20 |
| 1,2-Dibromoethane | 0.0250 | 0.0245 | 0.0242 | 98.0 | 96.7 | 78.7-123 | | | 1.34 | 20 |
| 1,2-Dichloroethane | 0.0250 | 0.0267 | 0.0264 | 107 | 106 | 67.2-121 | | | 1.13 | 20 |
| Ethylbenzene | 0.0250 | 0.0225 | 0.0222 | 90.0 | 88.6 | 78.6-124 | | | 1.49 | 20 |
| n-Hexane | 0.0250 | 0.0254 | 0.0251 | 102 | 101 | 59.9-125 | | | 0.960 | 20 |
| Isopropylbenzene | 0.0250 | 0.0224 | 0.0222 | 89.6 | 88.7 | 79.4-126 | | | 1.05 | 20 |
| Methyl tert-butyl ether | 0.0250 | 0.0274 | 0.0268 | 110 | 107 | 70.2-122 | | | 2.08 | 20 |
| Toluene | 0.0250 | 0.0247 | 0.0243 | 98.8 | 97.2 | 76.7-116 | | | 1.63 | 20 |
| 1,2,4-Trimethylbenzene | 0.0250 | 0.0226 | 0.0225 | 90.3 | 89.9 | 77.1-124 | | | 0.350 | 20 |
| 1,3,5-Trimethylbenzene | 0.0250 | 0.0225 | 0.0222 | 89.9 | 88.8 | 79.0-125 | | | 1.26 | 20 |
| Xylenes, Total | 0.0750 | 0.0665 | 0.0660 | 88.6 | 87.9 | 78.1-123 | | | 0.780 | 20 |
| *(S) Toluene-d8* | | | | *109* | *108* | *88.7-115* | | | | |
| *(S) Dibromofluoromethane* | | | | *110* | *109* | *76.3-123* | | | | |

## Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3160882-1 09/01/16 11:11 • (LCSD) R3160882-2 09/01/16 11:31

| Analyte | Spike Amount mg/kg | LCS Result mg/kg | LCSD Result mg/kg | LCS Rec. % | LCSD Rec. % | Rec. Limits % | LCS Qualifier | LCSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|
| *(S) α,α,α-Trifluorotoluene* | | | | *92.8* | *92.9* | *87.2-117* | | | | |
| *(S) 4-Bromofluorobenzene* | | | | *95.9* | *96.7* | *69.7-129* | | | | |

## L856076-23 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L856076-23 09/03/16 18:12 • (MS) R3161366-1 09/03/16 18:33 • (MSD) R3161366-2 09/03/16 18:53

| Analyte | Spike Amount (dry) mg/kg | Original Result (dry) mg/kg | MS Result (dry) mg/kg | MSD Result (dry) mg/kg | MS Rec. % | MSD Rec. % | Dilution | Rec. Limits % | MS Qualifier | MSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Benzene | 0.0387 | ND | 0.0391 | 0.0359 | 84.3 | 77.4 | 1.18 | 47.8-131 | | | 8.42 | 22.8 |
| sec-Butylbenzene | 0.0387 | ND | 0.0354 | 0.0328 | 77.5 | 71.7 | 1.18 | 31.0-142 | | | 7.77 | 34.7 |
| tert-Butylbenzene | 0.0387 | ND | 0.0369 | 0.0338 | 80.7 | 74.0 | 1.18 | 36.9-142 | | | 8.67 | 31.7 |
| 1,2-Dibromoethane | 0.0387 | ND | 0.0323 | 0.0327 | 70.8 | 71.6 | 1.18 | 50.2-133 | | | 1.19 | 23.6 |
| 1,2-Dichloroethane | 0.0387 | ND | 0.0363 | 0.0303 | 79.5 | 66.4 | 1.18 | 47.1-129 | | | 18.0 | 22.7 |
| Ethylbenzene | 0.0387 | ND | 0.0354 | 0.0361 | 77.5 | 79.1 | 1.18 | 44.8-135 | | | 2.13 | 26.9 |
| n-Hexane | 0.0387 | ND | 0.0370 | 0.0349 | 69.4 | 64.8 | 1.18 | 26.0-123 | | | 5.86 | 40 |
| Isopropylbenzene | 0.0387 | ND | 0.0371 | 0.0382 | 81.2 | 83.7 | 1.18 | 41.9-139 | | | 3.06 | 29.3 |
| Methyl tert-butyl ether | 0.0387 | ND | 0.0377 | 0.0337 | 82.6 | 73.8 | 1.18 | 50.4-131 | | | 11.2 | 24.8 |
| Toluene | 0.0387 | ND | 0.0356 | 0.0354 | 78.0 | 77.4 | 1.18 | 47.8-127 | | | 0.740 | 24.3 |
| 1,2,4-Trimethylbenzene | 0.0387 | ND | 0.0318 | 0.0279 | 69.6 | 61.1 | 1.18 | 32.9-139 | | | 13.0 | 30.6 |
| 1,3,5-Trimethylbenzene | 0.0387 | ND | 0.0339 | 0.0304 | 74.3 | 66.5 | 1.18 | 37.1-138 | | | 11.1 | 30.6 |
| Xylenes, Total | 0.116 | ND | 0.103 | 0.104 | 74.9 | 76.2 | 1.18 | 42.7-135 | | | 1.71 | 26.6 |
| *(S) Toluene-d8* | | | | | *105* | *106* | | *88.7-115* | | | | |
| *(S) Dibromofluoromethane* | | | | | *103* | *94.0* | | *76.3-123* | | | | |
| *(S) α,α,α-Trifluorotoluene* | | | | | *101* | *106* | | *87.2-117* | | | | |
| *(S) 4-Bromofluorobenzene* | | | | | *95.1* | *86.8* | | *69.7-129* | | | | |

## Method Blank (MB)

(MB) R3161174-1 09/01/16 21:04

| Analyte | MB Result | MB Qualifier | MB MDL | MB RDL |
|---|---|---|---|---|
| | ug/l | | ug/l | ug/l |
| Ethylene Dibromide | U | | 0.00240 | 0.0100 |
| 1,2-Dibromo-3-Chloropropane | U | | 0.00430 | 0.0200 |

## L856076-14 Original Sample (OS) • Duplicate (DUP)

(OS) L856076-14 09/01/16 21:49 • (DUP) R3161174-3 09/01/16 21:38

| Analyte | Original Result | DUP Result | Dilution | DUP RPD | DUP Qualifier | DUP RPD Limits |
|---|---|---|---|---|---|---|
| | ug/l | ug/l | | % | | % |
| Ethylene Dibromide | ND | 0.000 | 1 | 0.000 | | 20 |
| 1,2-Dibromo-3-Chloropropane | ND | 0.000 | 1 | 0.000 | | 20 |

## Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3161174-4 09/01/16 23:28 • (LCSD) R3161174-5 09/02/16 01:29

| Analyte | Spike Amount | LCS Result | LCSD Result | LCS Rec. | LCSD Rec. | Rec. Limits | LCS Qualifier | LCSD Qualifier | RPD | RPD Limits |
|---|---|---|---|---|---|---|---|---|---|---|
| | ug/l | ug/l | ug/l | % | % | % | | | % | % |
| Ethylene Dibromide | 0.250 | 0.225 | 0.239 | 90.1 | 95.7 | 60.0-140 | | | 6.05 | 20 |
| 1,2-Dibromo-3-Chloropropane | 0.250 | 0.238 | 0.262 | 95.2 | 105 | 60.0-140 | | | 9.55 | 20 |

## L856076-15 Original Sample (OS) • Matrix Spike (MS)

(OS) L856076-15 09/01/16 21:26 • (MS) R3161174-2 09/01/16 21:16

| Analyte | Spike Amount | Original Result | MS Result | MS Rec. | Dilution | Rec. Limits | MS Qualifier |
|---|---|---|---|---|---|---|---|
| | ug/l | ug/l | ug/l | % | | % | |
| Ethylene Dibromide | 0.100 | ND | 0.117 | 117 | 1 | 60.0-140 | |
| 1,2-Dibromo-3-Chloropropane | 0.100 | ND | 0.112 | 112 | 1 | 60.0-140 | |

## Method Blank (MB)

(MB) R3161175-1 09/02/16 01:51

| Analyte | MB Result | MB Qualifier | MB MDL | MB RDL |
|---|---|---|---|---|
| | ug/l | | ug/l | ug/l |
| Ethylene Dibromide | U | | 0.00240 | 0.0100 |
| 1,2-Dibromo-3-Chloropropane | U | | 0.00430 | 0.0200 |

## L856577-04 Original Sample (OS) • Duplicate (DUP)

(OS) L856577-04 09/02/16 02:35 • (DUP) R3161175-3 09/02/16 02:24

| Analyte | Original Result | DUP Result | Dilution | DUP RPD | DUP Qualifier | DUP RPD Limits |
|---|---|---|---|---|---|---|
| | ug/l | ug/l | | % | | % |
| Ethylene Dibromide | U | 0.000 | 1 | 0.000 | | 20 |
| 1,2-Dibromo-3-Chloropropane | U | 0.000 | 1 | 0.000 | | 20 |

## Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3161175-4 09/02/16 04:15 • (LCSD) R3161175-5 09/02/16 06:16

| Analyte | Spike Amount | LCS Result | LCSD Result | LCS Rec. | LCSD Rec. | Rec. Limits | LCS Qualifier | LCSD Qualifier | RPD | RPD Limits |
|---|---|---|---|---|---|---|---|---|---|---|
| | ug/l | ug/l | ug/l | % | % | % | | | % | % |
| Ethylene Dibromide | 0.250 | 0.233 | 0.250 | 93.4 | 100 | 60.0-140 | | | 6.83 | 20 |
| 1,2-Dibromo-3-Chloropropane | 0.250 | 0.252 | 0.242 | 101 | 97.0 | 60.0-140 | | | 3.91 | 20 |

## L856577-05 Original Sample (OS) • Matrix Spike (MS)

(OS) L856577-05 09/02/16 02:13 • (MS) R3161175-2 09/02/16 02:02

| Analyte | Spike Amount | Original Result | MS Result | MS Rec. | Dilution | Rec. Limits | MS Qualifier |
|---|---|---|---|---|---|---|---|
| | ug/l | ug/l | ug/l | % | | % | |
| Ethylene Dibromide | 0.100 | U | 0.106 | 106 | 1 | 60.0-140 | |
| 1,2-Dibromo-3-Chloropropane | 0.100 | U | 0.103 | 103 | 1 | 60.0-140 | |

## Method Blank (MB)

(MB) R3160903-3 09/01/16 06:59

| Analyte | MB Result ug/l | MB Qualifier | MB MDL ug/l | MB RDL ug/l |
|---|---|---|---|---|
| Biphenyl | U | | 0.325 | 10.0 |
| Bis(2-ethylhexyl)phthalate | 12.1 | | 0.709 | 3.00 |
| Di-n-butyl phthalate | 0.282 | J | 0.266 | 3.00 |
| Diethyl phthalate | U | | 0.282 | 3.00 |
| Pyridine | U | | 1.37 | 10.0 |
| 2-Methylphenol | U | | 0.312 | 10.0 |
| 3&4-Methyl Phenol | U | | 0.266 | 10.0 |
| 2,4-Dimethylphenol | U | | 0.624 | 10.0 |
| 2,4-Dinitrophenol | U | | 3.25 | 10.0 |
| 4-Nitrophenol | U | | 2.01 | 10.0 |
| Phenol | U | | 0.334 | 10.0 |
| *(S) Nitrobenzene-d5* | *61.9* | | | *21.8-123* |
| *(S) 2-Fluorobiphenyl* | *66.9* | | | *29.5-131* |
| *(S) p-Terphenyl-d14* | *73.8* | | | *29.3-137* |
| *(S) Phenol-d5* | *37.6* | | | *5.00-70.1* |
| *(S) 2-Fluorophenol* | *55.7* | | | *10.0-77.9* |
| *(S) 2,4,6-Tribromophenol* | *91.0* | | | *11.2-130* |

## Method Blank (MB)

(MB) R3161247-2 09/01/16 13:42

| Analyte | MB Result ug/l | MB Qualifier | MB MDL ug/l | MB RDL ug/l |
|---|---|---|---|---|
| Quinoline | U | | 6.78 | 50.0 |

## Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3160903-1 09/01/16 05:49 • (LCSD) R3160903-2 09/01/16 06:12

| Analyte | Spike Amount ug/l | LCS Result ug/l | LCSD Result ug/l | LCS Rec. % | LCSD Rec. % | Rec. Limits % | LCS Qualifier | LCSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|
| Biphenyl | 50.0 | 36.6 | 35.9 | 73.2 | 71.8 | 38.0-103 | | | 1.84 | 20.1 |
| Bis(2-ethylhexyl)phthalate | 50.0 | 36.3 | 35.6 | 72.6 | 71.2 | 36.9-134 | | | 1.97 | 23.6 |
| Di-n-butyl phthalate | 50.0 | 40.6 | 39.7 | 81.2 | 79.5 | 41.8-120 | | | 2.11 | 20.2 |
| Diethyl phthalate | 50.0 | 41.2 | 40.9 | 82.5 | 81.8 | 36.5-129 | | | 0.880 | 20 |
| Pyridine | 50.0 | 16.1 | 15.2 | 32.2 | 30.5 | 13.5-58.9 | | | 5.44 | 32.5 |
| 2-Methylphenol | 50.0 | 35.4 | 34.3 | 70.7 | 68.7 | 26.4-86.9 | | | 2.93 | 26.5 |
| 3&4-Methyl Phenol | 50.0 | 36.2 | 35.2 | 72.3 | 70.4 | 27.9-92.0 | | | 2.72 | 27 |
| 2,4-Dimethylphenol | 50.0 | 41.9 | 41.0 | 83.7 | 82.0 | 31.9-107 | | | 2.14 | 25.7 |
| 2,4-Dinitrophenol | 50.0 | 24.7 | 25.9 | 49.4 | 51.9 | 24.2-128 | | | 4.92 | 20.5 |

## Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3160903-1 09/01/16 05:49 • (LCSD) R3160903-2 09/01/16 06:12

| Analyte | Spike Amount ug/l | LCS Result ug/l | LCSD Result ug/l | LCS Rec. % | LCSD Rec. % | Rec. Limits % | LCS Qualifier | LCSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|
| 4-Nitrophenol | 50.0 | 19.2 | 20.3 | 38.3 | 40.5 | 10.0-52.7 | | | 5.53 | 40 |
| Phenol | 50.0 | 21.2 | 22.0 | 42.4 | 44.1 | 10.0-57.9 | | | 3.96 | 35 |
| *(S) Nitrobenzene-d5* | | | | *70.5* | *74.0* | *21.8-123* | | | | |
| *(S) 2-Fluorobiphenyl* | | | | *81.2* | *73.7* | *29.5-131* | | | | |
| *(S) p-Terphenyl-d14* | | | | *84.1* | *73.9* | *29.3-137* | | | | |
| *(S) Phenol-d5* | | | | *41.2* | *39.8* | *5.00-70.1* | | | | |
| *(S) 2-Fluorophenol* | | | | *55.2* | *56.7* | *10.0-77.9* | | | | |
| *(S) 2,4,6-Tribromophenol* | | | | *124* | *119* | *11.2-130* | | | | |

## Laboratory Control Sample (LCS)

(LCS) R3161247-1 09/01/16 13:23

| Analyte | Spike Amount ug/l | LCS Result ug/l | LCS Rec. % | Rec. Limits % | LCS Qualifier |
|---|---|---|---|---|---|
| Quinoline | 50.0 | 39.0 | 78.0 | 60.0-140 | |

## Method Blank (MB)

(MB) R3160015-3 08/29/16 12:52

| Analyte | MB Result ug/l | MB Qualifier | MB MDL ug/l | MB RDL ug/l |
|---|---|---|---|---|
| Biphenyl | U | | 0.325 | 10.0 |
| Bis(2-ethylhexyl)phthalate | 0.981 | J | 0.709 | 3.00 |
| Di-n-butyl phthalate | 0.320 | J | 0.266 | 3.00 |
| Diethyl phthalate | U | | 0.282 | 3.00 |
| Pyridine | U | | 1.37 | 10.0 |
| 2-Methylphenol | U | | 0.312 | 10.0 |
| 3&4-Methyl Phenol | U | | 0.266 | 10.0 |
| 2,4-Dimethylphenol | U | | 0.624 | 10.0 |
| 2,4-Dinitrophenol | U | | 3.25 | 10.0 |
| 4-Nitrophenol | U | | 2.01 | 10.0 |
| Phenol | U | | 0.334 | 10.0 |
| *(S) Nitrobenzene-d5* | *65.8* | | | *21.8-123* |
| *(S) 2-Fluorobiphenyl* | *66.5* | | | *29.5-131* |
| *(S) p-Terphenyl-d14* | *87.5* | | | *29.3-137* |
| *(S) Phenol-d5* | *13.3* | | | *5.00-70.1* |
| *(S) 2-Fluorophenol* | *19.5* | | | *10.0-77.9* |
| *(S) 2,4,6-Tribromophenol* | *81.4* | | | *11.2-130* |

## Method Blank (MB)

(MB) R3160664-2 08/30/16 11:10

| Analyte | MB Result ug/l | MB Qualifier | MB MDL ug/l | MB RDL ug/l |
|---|---|---|---|---|
| Quinoline | U | | 6.78 | 50.0 |

## Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3160015-1 08/29/16 12:05 • (LCSD) R3160015-2 08/29/16 12:29

| Analyte | Spike Amount ug/l | LCS Result ug/l | LCSD Result ug/l | LCS Rec. % | LCSD Rec. % | Rec. Limits % | LCS Qualifier | LCSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|
| Biphenyl | 50.0 | 37.1 | 38.5 | 74.2 | 77.1 | 38.0-103 | | | 3.84 | 20.1 |
| Bis(2-ethylhexyl)phthalate | 50.0 | 36.8 | 38.8 | 73.6 | 77.6 | 36.9-134 | | | 5.28 | 23.6 |
| Di-n-butyl phthalate | 50.0 | 42.1 | 45.5 | 84.1 | 90.9 | 41.8-120 | | | 7.73 | 20.2 |
| Diethyl phthalate | 50.0 | 42.8 | 44.1 | 85.6 | 88.2 | 36.5-129 | | | 2.97 | 20 |
| Pyridine | 50.0 | 15.2 | 14.0 | 30.5 | 27.9 | 13.5-58.9 | | | 8.67 | 32.5 |
| 2-Methylphenol | 50.0 | 21.1 | 25.9 | 42.2 | 51.8 | 26.4-86.9 | | | 20.3 | 26.5 |
| 3&4-Methyl Phenol | 50.0 | 20.5 | 24.1 | 41.0 | 48.1 | 27.9-92.0 | | | 16.1 | 27 |
| 2,4-Dimethylphenol | 50.0 | 33.7 | 36.8 | 67.5 | 73.7 | 31.9-107 | | | 8.81 | 25.7 |
| 2,4-Dinitrophenol | 50.0 | 6.16 | 5.26 | 12.3 | 10.5 | 24.2-128 | J4 | J4 | 15.8 | 20.5 |

## Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3160015-1 08/29/16 12:05 • (LCSD) R3160015-2 08/29/16 12:29

| Analyte | Spike Amount ug/l | LCS Result ug/l | LCSD Result ug/l | LCS Rec. % | LCSD Rec. % | Rec. Limits % | LCS Qualifier | LCSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|
| 4-Nitrophenol | 50.0 | 7.92 | 8.37 | 15.8 | 16.7 | 10.0-52.7 | | | 5.43 | 40 |
| Phenol | 50.0 | 8.56 | 9.57 | 17.1 | 19.1 | 10.0-57.9 | | | 11.2 | 35 |
| *(S) Nitrobenzene-d5* | | | | *73.8* | *78.0* | *21.8-123* | | | | |
| *(S) 2-Fluorobiphenyl* | | | | *71.0* | *77.1* | *29.5-131* | | | | |
| *(S) p-Terphenyl-d14* | | | | *79.6* | *82.7* | *29.3-137* | | | | |
| *(S) Phenol-d5* | | | | *15.1* | *19.1* | *5.00-70.1* | | | | |
| *(S) 2-Fluorophenol* | | | | *25.3* | *30.7* | *10.0-77.9* | | | | |
| *(S) 2,4,6-Tribromophenol* | | | | *103* | *119* | *11.2-130* | | | | |

## Laboratory Control Sample (LCS)

(LCS) R3160664-1 08/30/16 10:51

| Analyte | Spike Amount ug/l | LCS Result ug/l | LCS Rec. % | Rec. Limits % | LCS Qualifier |
|---|---|---|---|---|---|
| Quinoline | 50.0 | 42.1 | 84.1 | 60.0-140 | |

## Method Blank (MB)

(MB) R3160509-3 08/30/16 17:18

| Analyte | MB Result ug/l | MB Qualifier | MB MDL ug/l | MB RDL ug/l |
|---|---|---|---|---|
| Biphenyl | U | | 0.325 | 10.0 |
| Bis(2-ethylhexyl)phthalate | 1.12 | J | 0.709 | 3.00 |
| Di-n-butyl phthalate | 0.690 | J | 0.266 | 3.00 |
| Diethyl phthalate | U | | 0.282 | 3.00 |
| Pyridine | U | | 1.37 | 10.0 |
| 2-Methylphenol | U | | 0.312 | 10.0 |
| 3&4-Methyl Phenol | U | | 0.266 | 10.0 |
| 2,4-Dimethylphenol | U | | 0.624 | 10.0 |
| 2,4-Dinitrophenol | U | | 3.25 | 10.0 |
| 4-Nitrophenol | U | | 2.01 | 10.0 |
| Phenol | U | | 0.334 | 10.0 |
| *(S) Nitrobenzene-d5* | *38.7* | | | *21.8-123* |
| *(S) 2-Fluorobiphenyl* | *48.7* | | | *29.5-131* |
| *(S) p-Terphenyl-d14* | *81.3* | | | *29.3-137* |
| *(S) Phenol-d5* | *22.0* | | | *5.00-70.1* |
| *(S) 2-Fluorophenol* | *28.6* | | | *10.0-77.9* |
| *(S) 2,4,6-Tribromophenol* | *88.0* | | | *11.2-130* |

## Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3160509-1 08/30/16 16:32 • (LCSD) R3160509-2 08/30/16 16:55

| Analyte | Spike Amount ug/l | LCS Result ug/l | LCSD Result ug/l | LCS Rec. % | LCSD Rec. % | Rec. Limits % | LCS Qualifier | LCSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|
| Biphenyl | 50.0 | 27.6 | 28.3 | 55.2 | 56.7 | 38.0-103 | | | 2.65 | 20.1 |
| Bis(2-ethylhexyl)phthalate | 50.0 | 34.8 | 35.5 | 69.6 | 71.1 | 36.9-134 | | | 2.15 | 23.6 |
| Di-n-butyl phthalate | 50.0 | 37.0 | 37.5 | 74.1 | 75.0 | 41.8-120 | | | 1.21 | 20.2 |
| Diethyl phthalate | 50.0 | 35.9 | 36.7 | 71.9 | 73.5 | 36.5-129 | | | 2.21 | 20 |
| Pyridine | 50.0 | 8.59 | 8.74 | 17.2 | 17.5 | 13.5-58.9 | | | 1.71 | 32.5 |
| 2-Methylphenol | 50.0 | 20.9 | 21.4 | 41.9 | 42.7 | 26.4-86.9 | | | 2.05 | 26.5 |
| 3&4-Methyl Phenol | 50.0 | 25.5 | 25.1 | 51.0 | 50.1 | 27.9-92.0 | | | 1.71 | 27 |
| 2,4-Dimethylphenol | 50.0 | 27.5 | 30.4 | 55.1 | 60.8 | 31.9-107 | | | 9.93 | 25.7 |
| 2,4-Dinitrophenol | 50.0 | 19.5 | 18.9 | 39.0 | 37.8 | 24.2-128 | | | 3.03 | 20.5 |
| 4-Nitrophenol | 50.0 | 18.8 | 17.5 | 37.5 | 34.9 | 10.0-52.7 | | | 7.05 | 40 |
| Phenol | 50.0 | 14.3 | 13.1 | 28.5 | 26.2 | 10.0-57.9 | | | 8.53 | 35 |
| *(S) Nitrobenzene-d5* | | | | *44.9* | *52.5* | *21.8-123* | | | | |
| *(S) 2-Fluorobiphenyl* | | | | *58.5* | *58.6* | *29.5-131* | | | | |
| *(S) p-Terphenyl-d14* | | | | *79.1* | *73.9* | *29.3-137* | | | | |
| *(S) Phenol-d5* | | | | *27.0* | *26.0* | *5.00-70.1* | | | | |
| *(S) 2-Fluorophenol* | | | | *32.9* | *37.0* | *10.0-77.9* | | | | |

## Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3160509-1 08/30/16 16:32 • (LCSD) R3160509-2 08/30/16 16:55

| Analyte | Spike Amount ug/l | LCS Result ug/l | LCSD Result ug/l | LCS Rec. % | LCSD Rec. % | Rec. Limits % | LCS Qualifier | LCSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|
| *(S) 2,4,6-Tribromophenol* | | | | *111* | *99.8* | *11.2-130* | | | | |

## Method Blank (MB)

(MB) R3160358-3 08/30/16 14:32

| Analyte | MB Result mg/kg | MB Qualifier | MB MDL mg/kg | MB RDL mg/kg |
|---|---|---|---|---|
| Acenaphthene | U | | 0.00642 | 0.0330 |
| Anthracene | U | | 0.00632 | 0.0330 |
| Benzo(a)anthracene | U | | 0.00428 | 0.0330 |
| Benzo(b)fluoranthene | U | | 0.00695 | 0.0330 |
| Benzo(k)fluoranthene | U | | 0.00582 | 0.0330 |
| Benzo(g,h,i)perylene | U | | 0.00721 | 0.0330 |
| Benzo(a)pyrene | U | | 0.00548 | 0.0330 |
| Biphenyl | U | | 0.00588 | 0.333 |
| Chrysene | U | | 0.00555 | 0.0330 |
| Dibenz(a,h)anthracene | U | | 0.00821 | 0.0330 |
| Fluoranthene | U | | 0.00496 | 0.0330 |
| Fluorene | U | | 0.00682 | 0.0330 |
| Indeno(1,2,3-cd)pyrene | U | | 0.00772 | 0.0330 |
| 2-Methylnaphthalene | U | | 0.00861 | 0.0330 |
| Naphthalene | U | | 0.00889 | 0.0330 |
| Phenanthrene | U | | 0.00528 | 0.0330 |
| Bis(2-ethylhexyl)phthalate | U | | 0.0120 | 0.333 |
| Di-n-butyl phthalate | U | | 0.0109 | 0.333 |
| Diethyl phthalate | U | | 0.00691 | 0.333 |
| Pyrene | U | | 0.0123 | 0.0330 |
| Pyridine | U | | 0.0628 | 0.333 |
| 2-Methylphenol | U | | 0.00986 | 0.333 |
| 3&4-Methyl Phenol | U | | 0.00783 | 0.333 |
| 2,4-Dimethylphenol | U | | 0.0471 | 0.333 |
| 2,4-Dinitrophenol | U | | 0.0980 | 0.333 |
| 4-Nitrophenol | U | | 0.0525 | 0.333 |
| Phenol | U | | 0.00695 | 0.333 |
| *(S) Nitrobenzene-d5* | *73.2* | | | *21.9-129* |
| *(S) 2-Fluorobiphenyl* | *75.2* | | | *34.9-129* |
| *(S) p-Terphenyl-d14* | *76.4* | | | *21.5-128* |
| *(S) Phenol-d5* | *78.8* | | | *26.3-121* |
| *(S) 2-Fluorophenol* | *76.8* | | | *21.1-116* |
| *(S) 2,4,6-Tribromophenol* | *76.8* | | | *21.6-142* |

## Method Blank (MB)

(MB) R3160825-2 08/31/16 10:56

| Analyte | MB Result mg/kg | MB Qualifier | MB MDL mg/kg | MB RDL mg/kg |
|---|---|---|---|---|
| Quinoline | U | | 0.0574 | 0.333 |

## Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3160358-1 08/30/16 13:45 • (LCSD) R3160358-2 08/30/16 14:08

| Analyte | Spike Amount mg/kg | LCS Result mg/kg | LCSD Result mg/kg | LCS Rec. % | LCSD Rec. % | Rec. Limits % | LCS Qualifier | LCSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | 0.667 | 0.539 | 0.556 | 80.7 | 83.4 | 48.9-107 | | | 3.19 | 20 |
| Anthracene | 0.667 | 0.558 | 0.575 | 83.7 | 86.2 | 52.0-112 | | | 3.00 | 20 |
| Benzo(a)anthracene | 0.667 | 0.557 | 0.570 | 83.5 | 85.5 | 52.3-106 | | | 2.41 | 20 |
| Benzo(b)fluoranthene | 0.667 | 0.536 | 0.560 | 80.4 | 84.0 | 51.3-106 | | | 4.37 | 20 |
| Benzo(k)fluoranthene | 0.667 | 0.541 | 0.549 | 81.1 | 82.4 | 52.9-107 | | | 1.59 | 20 |
| Benzo(g,h,i)perylene | 0.667 | 0.579 | 0.594 | 86.8 | 89.0 | 45.8-108 | | | 2.61 | 20 |
| Benzo(a)pyrene | 0.667 | 0.550 | 0.575 | 82.5 | 86.2 | 51.9-106 | | | 4.39 | 20 |
| Biphenyl | 0.667 | 0.510 | 0.522 | 76.4 | 78.2 | 45.6-103 | | | 2.32 | 20 |
| Chrysene | 0.667 | 0.548 | 0.568 | 82.1 | 85.1 | 54.4-110 | | | 3.56 | 20 |
| Dibenz(a,h)anthracene | 0.667 | 0.581 | 0.598 | 87.2 | 89.6 | 45.7-111 | | | 2.74 | 20 |
| Fluoranthene | 0.667 | 0.575 | 0.580 | 86.2 | 86.9 | 53.7-110 | | | 0.870 | 20 |
| Fluorene | 0.667 | 0.540 | 0.554 | 80.9 | 83.0 | 51.1-109 | | | 2.57 | 20 |
| Indeno(1,2,3-cd)pyrene | 0.667 | 0.583 | 0.600 | 87.4 | 90.0 | 47.5-109 | | | 2.90 | 20 |
| 2-Methylnaphthalene | 0.667 | 0.532 | 0.556 | 79.7 | 83.4 | 48.0-101 | | | 4.44 | 20 |
| Naphthalene | 0.667 | 0.490 | 0.505 | 73.4 | 75.7 | 43.4-103 | | | 3.12 | 20 |
| Phenanthrene | 0.667 | 0.537 | 0.545 | 80.6 | 81.7 | 51.6-107 | | | 1.33 | 20 |
| Bis(2-ethylhexyl)phthalate | 0.667 | 0.602 | 0.614 | 90.2 | 92.1 | 48.1-116 | | | 2.05 | 20.5 |
| Di-n-butyl phthalate | 0.667 | 0.581 | 0.600 | 87.0 | 90.0 | 49.7-113 | | | 3.30 | 20 |
| Diethyl phthalate | 0.667 | 0.584 | 0.591 | 87.5 | 88.6 | 52.0-112 | | | 1.27 | 20 |
| Pyrene | 0.667 | 0.554 | 0.564 | 83.0 | 84.5 | 47.1-108 | | | 1.79 | 20 |
| Pyridine | 0.667 | 0.237 | 0.217 | 35.6 | 32.5 | 10.0-90.0 | | | 8.85 | 38.3 |
| 2-Methylphenol | 0.667 | 0.494 | 0.517 | 74.0 | 77.5 | 42.4-100 | | | 4.59 | 20 |
| 3&4-Methyl Phenol | 0.667 | 0.565 | 0.597 | 84.7 | 89.5 | 50.5-115 | | | 5.47 | 20 |
| 2,4-Dimethylphenol | 0.667 | 0.495 | 0.518 | 74.3 | 77.7 | 42.2-110 | | | 4.48 | 20 |
| 2,4-Dinitrophenol | 0.667 | 0.382 | 0.356 | 57.3 | 53.4 | 10.0-105 | | | 7.12 | 36.5 |
| 4-Nitrophenol | 0.667 | 0.609 | 0.630 | 91.4 | 94.4 | 34.8-109 | | | 3.32 | 20 |
| Phenol | 0.667 | 0.495 | 0.522 | 74.3 | 78.2 | 41.5-106 | | | 5.17 | 20 |
| *(S) Nitrobenzene-d5* | | | | *72.0* | *75.5* | *21.9-129* | | | | |
| *(S) 2-Fluorobiphenyl* | | | | *75.0* | *77.6* | *34.9-129* | | | | |
| *(S) p-Terphenyl-d14* | | | | *81.9* | *84.1* | *21.5-128* | | | | |
| *(S) Phenol-d5* | | | | *74.4* | *77.4* | *26.3-121* | | | | |
| *(S) 2-Fluorophenol* | | | | *74.3* | *75.8* | *21.1-116* | | | | |

## Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3160358-1 08/30/16 13:45 • (LCSD) R3160358-2 08/30/16 14:08

| Analyte | Spike Amount mg/kg | LCS Result mg/kg | LCSD Result mg/kg | LCS Rec. % | LCSD Rec. % | Rec. Limits % | LCS Qualifier | LCSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|
| *(S) 2,4,6-Tribromophenol* | | | | *83.9* | *86.6* | *21.6-142* | | | | |

## Laboratory Control Sample (LCS)

(LCS) R3160825-1 08/31/16 10:36

| Analyte | Spike Amount mg/kg | LCS Result mg/kg | LCS Rec. % | Rec. Limits % | LCS Qualifier |
|---|---|---|---|---|---|
| Quinoline | 0.667 | 0.397 | 59.5 | 60.0-140 | J4 |

## L856444-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L856444-04 08/30/16 16:29 • (MS) R3160358-4 08/30/16 16:53 • (MSD) R3160358-5 08/30/16 17:16

| Analyte | Spike Amount mg/kg | Original Result mg/kg | MS Result mg/kg | MSD Result mg/kg | MS Rec. % | MSD Rec. % | Dilution | Rec. Limits % | MS Qualifier | MSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | 0.667 | 0.0866 | 0.556 | 0.756 | 70.3 | 100 | 1 | 32.2-134 | | J3 | 30.6 | 27.3 |
| Anthracene | 0.667 | 0.150 | 0.568 | 1.04 | 62.6 | 134 | 1 | 32.3-137 | | J3 | 59.1 | 28.4 |
| Benzo(a)anthracene | 0.667 | 0.628 | 0.643 | 2.21 | 2.18 | 236 | 1 | 33.3-124 | J6 | E J3 J5 | 110 | 29 |
| Benzo(b)fluoranthene | 0.667 | 0.855 | 0.648 | 2.38 | 0.000 | 228 | 1 | 23.3-133 | J6 | E J3 J5 | 114 | 30.3 |
| Benzo(k)fluoranthene | 0.667 | 0.237 | 0.510 | 1.09 | 40.8 | 128 | 1 | 31.0-129 | | J3 | 72.7 | 26.7 |
| Benzo(g,h,i)perylene | 0.667 | 0.320 | 0.525 | 0.925 | 30.7 | 90.7 | 1 | 10.0-127 | | J3 | 55.2 | 31.9 |
| Benzo(a)pyrene | 0.667 | 0.543 | 0.607 | 1.75 | 9.59 | 181 | 1 | 28.2-128 | J6 | E J3 J5 | 97.0 | 28.4 |
| Biphenyl | 0.667 | ND | 0.504 | 0.516 | 73.9 | 75.7 | 1 | 38.5-118 | | | 2.37 | 28.9 |
| Chrysene | 0.667 | 0.711 | 0.641 | 2.10 | 0.000 | 209 | 1 | 36.3-129 | J6 | E J3 J5 | 107 | 28 |
| Dibenz(a,h)anthracene | 0.667 | 0.109 | 0.524 | 0.575 | 62.1 | 69.8 | 1 | 10.5-128 | | | 9.30 | 29.5 |
| Fluoranthene | 0.667 | 1.42 | 0.814 | 3.88 | 0.000 | 368 | 1 | 27.9-138 | J6 | E J3 J5 | 131 | 26.9 |
| Fluorene | 0.667 | 0.0683 | 0.538 | 0.699 | 70.4 | 94.6 | 1 | 34.0-133 | | | 26.1 | 27.1 |
| Indeno(1,2,3-cd)pyrene | 0.667 | 0.316 | 0.552 | 0.969 | 35.5 | 97.9 | 1 | 10.0-128 | | J3 | 54.8 | 31.5 |
| 2-Methylnaphthalene | 0.667 | 0.0482 | 0.537 | 0.578 | 73.4 | 79.4 | 1 | 28.7-128 | | | 7.20 | 30.7 |
| Naphthalene | 0.667 | 0.0739 | 0.501 | 0.533 | 64.0 | 68.8 | 1 | 36.4-121 | | | 6.22 | 27.2 |
| Phenanthrene | 0.667 | 0.748 | 0.637 | 2.30 | 0.000 | 232 | 1 | 30.8-137 | J6 | E J3 J5 | 113 | 26.5 |
| Bis(2-ethylhexyl)phthalate | 0.667 | ND | 0.504 | 0.514 | 75.5 | 77.0 | 1 | 21.8-141 | | | 2.00 | 35.2 |
| Di-n-butyl phthalate | 0.667 | ND | 0.532 | 0.551 | 79.8 | 82.6 | 1 | 32.2-133 | | | 3.47 | 25.9 |
| Diethyl phthalate | 0.667 | ND | 0.566 | 0.580 | 84.8 | 86.9 | 1 | 39.4-136 | | | 2.42 | 25.5 |
| Pyrene | 0.667 | 1.04 | 0.734 | 3.04 | 0.000 | 301 | 1 | 24.1-130 | J6 | E J3 J5 | 122 | 29.9 |
| Pyridine | 0.667 | ND | 0.434 | 0.417 | 65.1 | 62.5 | 1 | 10.0-111 | | | 4.14 | 30.5 |
| 2-Methylphenol | 0.667 | ND | 0.502 | 0.489 | 75.3 | 73.4 | 1 | 30.3-118 | | | 2.56 | 25.1 |
| 3&4-Methyl Phenol | 0.667 | ND | 0.582 | 0.564 | 87.2 | 84.5 | 1 | 33.3-141 | | | 3.11 | 25.7 |
| 2,4-Dimethylphenol | 0.667 | ND | 0.499 | 0.490 | 74.8 | 73.5 | 1 | 12.3-149 | | | 1.86 | 32.3 |
| 2,4-Dinitrophenol | 0.667 | ND | 0.323 | 0.327 | 48.4 | 49.0 | 1 | 10.0-121 | | | 1.29 | 39.4 |

## L856444-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L856444-04 08/30/16 16:29 • (MS) R3160358-4 08/30/16 16:53 • (MSD) R3160358-5 08/30/16 17:16

| Analyte | Spike Amount mg/kg | Original Result mg/kg | MS Result mg/kg | MSD Result mg/kg | MS Rec. % | MSD Rec. % | Dilution | Rec. Limits % | MS Qualifier | MSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4-Nitrophenol | 0.667 | ND | 0.598 | 0.611 | 89.7 | 91.6 | 1 | 20.0-133 | | | 2.08 | 30.2 |
| Phenol | 0.667 | ND | 0.499 | 0.490 | 74.8 | 73.5 | 1 | 25.1-130 | | | 1.71 | 29.6 |
| *(S) Nitrobenzene-d5* | | | | | *71.7* | *72.4* | | *21.9-129* | | | | |
| *(S) 2-Fluorobiphenyl* | | | | | *72.1* | *74.6* | | *34.9-129* | | | | |
| *(S) p-Terphenyl-d14* | | | | | *70.2* | *71.7* | | *21.5-128* | | | | |
| *(S) Phenol-d5* | | | | | *74.3* | *72.0* | | *26.3-121* | | | | |
| *(S) 2-Fluorophenol* | | | | | *73.4* | *70.5* | | *21.1-116* | | | | |
| *(S) 2,4,6-Tribromophenol* | | | | | *85.4* | *85.4* | | *21.6-142* | | | | |

## Method Blank (MB)

(MB) R3160470-3 08/31/16 00:53

| Analyte | MB Result ug/l | MB Qualifier | MB MDL ug/l | MB RDL ug/l |
|---|---|---|---|---|
| Anthracene | U | | 0.0140 | 0.0500 |
| Acenaphthene | U | | 0.0100 | 0.0500 |
| Benzo(a)anthracene | U | | 0.00410 | 0.0500 |
| Benzo(a)pyrene | U | | 0.0116 | 0.0500 |
| Benzo(b)fluoranthene | 0.00286 | J | 0.00212 | 0.0500 |
| Benzo(g,h,i)perylene | 0.00412 | J | 0.00227 | 0.0500 |
| Benzo(k)fluoranthene | U | | 0.0136 | 0.0500 |
| Chrysene | U | | 0.0108 | 0.0500 |
| Dibenz(a,h)anthracene | U | | 0.00396 | 0.0500 |
| Fluoranthene | U | | 0.0157 | 0.0500 |
| Fluorene | U | | 0.00850 | 0.0500 |
| Indeno(1,2,3-cd)pyrene | U | | 0.0148 | 0.0500 |
| Naphthalene | U | | 0.0198 | 0.250 |
| Phenanthrene | U | | 0.00820 | 0.0500 |
| Pyrene | U | | 0.0117 | 0.0500 |
| 2-Methylnaphthalene | U | | 0.00902 | 0.250 |
| *(S) Nitrobenzene-d5* | *98.7* | | | *33.8-179* |
| *(S) 2-Fluorobiphenyl* | *104* | | | *55.5-150* |
| *(S) p-Terphenyl-d14* | *97.9* | | | *46.2-163* |

## Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3160470-1 08/31/16 00:10 • (LCSD) R3160470-2 08/31/16 00:32

| Analyte | Spike Amount ug/l | LCS Result ug/l | LCSD Result ug/l | LCS Rec. % | LCSD Rec. % | Rec. Limits % | LCS Qualifier | LCSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|
| Anthracene | 2.00 | 1.98 | 2.23 | 99.0 | 111 | 68.9-153 | | | 11.7 | 20 |
| Acenaphthene | 2.00 | 2.02 | 2.24 | 101 | 112 | 67.7-153 | | | 10.3 | 20 |
| Benzo(a)anthracene | 2.00 | 2.03 | 2.23 | 102 | 111 | 63.1-147 | | | 9.35 | 20 |
| Benzo(a)pyrene | 2.00 | 2.13 | 2.38 | 106 | 119 | 62.2-150 | | | 11.1 | 20 |
| Benzo(b)fluoranthene | 2.00 | 1.94 | 2.15 | 97.0 | 107 | 58.4-148 | | | 10.2 | 20 |
| Benzo(g,h,i)perylene | 2.00 | 2.23 | 2.41 | 111 | 121 | 57.4-152 | | | 8.13 | 20 |
| Benzo(k)fluoranthene | 2.00 | 1.95 | 2.18 | 97.5 | 109 | 60.5-154 | | | 11.0 | 20 |
| Chrysene | 2.00 | 1.99 | 2.21 | 99.5 | 110 | 64.8-155 | | | 10.4 | 20 |
| Dibenz(a,h)anthracene | 2.00 | 2.15 | 2.27 | 107 | 113 | 53.5-153 | | | 5.43 | 20 |
| Fluoranthene | 2.00 | 2.10 | 2.31 | 105 | 115 | 68.6-153 | | | 9.36 | 20 |
| Fluorene | 2.00 | 2.00 | 2.19 | 100 | 109 | 67.3-141 | | | 8.97 | 20 |
| Indeno(1,2,3-cd)pyrene | 2.00 | 2.16 | 2.31 | 108 | 115 | 57.0-155 | | | 6.75 | 20 |
| Naphthalene | 2.00 | 1.99 | 2.17 | 99.5 | 108 | 66.7-135 | | | 8.58 | 20 |
| Phenanthrene | 2.00 | 1.98 | 2.21 | 99.0 | 110 | 64.3-143 | | | 10.8 | 20 |

## Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3160470-1 08/31/16 00:10 • (LCSD) R3160470-2 08/31/16 00:32

| Analyte | Spike Amount ug/l | LCS Result ug/l | LCSD Result ug/l | LCS Rec. % | LCSD Rec. % | Rec. Limits % | LCS Qualifier | LCSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|
| Pyrene | 2.00 | 2.32 | 2.60 | 116 | 130 | 60.2-154 | | | 11.1 | 20 |
| 2-Methylnaphthalene | 2.00 | 2.01 | 2.19 | 101 | 109 | 67.6-143 | | | 8.27 | 20 |
| *(S) Nitrobenzene-d5* | | | | *95.4* | *106* | *33.8-179* | | | | |
| *(S) 2-Fluorobiphenyl* | | | | *103* | *112* | *55.5-150* | | | | |
| *(S) p-Terphenyl-d14* | | | | *92.4* | *101* | *46.2-163* | | | | |

## Method Blank (MB)

(MB) R3160848-3 09/01/16 06:22

| Analyte | MB Result ug/l | MB Qualifier | MB MDL ug/l | MB RDL ug/l |
|---|---|---|---|---|
| Anthracene | U | | 0.0140 | 0.0500 |
| Acenaphthene | U | | 0.0100 | 0.0500 |
| Benzo(a)anthracene | 0.00773 | J | 0.00410 | 0.0500 |
| Benzo(a)pyrene | U | | 0.0116 | 0.0500 |
| Benzo(b)fluoranthene | 0.00403 | J | 0.00212 | 0.0500 |
| Benzo(g,h,i)perylene | 0.00398 | J | 0.00227 | 0.0500 |
| Benzo(k)fluoranthene | U | | 0.0136 | 0.0500 |
| Chrysene | U | | 0.0108 | 0.0500 |
| Dibenz(a,h)anthracene | U | | 0.00396 | 0.0500 |
| Fluoranthene | U | | 0.0157 | 0.0500 |
| Fluorene | U | | 0.00850 | 0.0500 |
| Indeno(1,2,3-cd)pyrene | U | | 0.0148 | 0.0500 |
| Naphthalene | U | | 0.0198 | 0.250 |
| Phenanthrene | U | | 0.00820 | 0.0500 |
| Pyrene | U | | 0.0117 | 0.0500 |
| 2-Methylnaphthalene | U | | 0.00902 | 0.250 |
| *(S) Nitrobenzene-d5* | *84.5* | | | *33.8-179* |
| *(S) 2-Fluorobiphenyl* | *94.0* | | | *55.5-150* |
| *(S) p-Terphenyl-d14* | *82.3* | | | *46.2-163* |

## Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3160848-1 09/01/16 05:39 • (LCSD) R3160848-2 09/01/16 06:00

| Analyte | Spike Amount ug/l | LCS Result ug/l | LCSD Result ug/l | LCS Rec. % | LCSD Rec. % | Rec. Limits % | LCS Qualifier | LCSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|
| Anthracene | 2.00 | 2.07 | 2.13 | 104 | 107 | 68.9-153 | | | 2.72 | 20 |
| Acenaphthene | 2.00 | 1.98 | 2.05 | 99.2 | 103 | 67.7-153 | | | 3.43 | 20 |
| Benzo(a)anthracene | 2.00 | 2.05 | 2.13 | 103 | 107 | 63.1-147 | | | 3.63 | 20 |
| Benzo(a)pyrene | 2.00 | 2.20 | 2.29 | 110 | 115 | 62.2-150 | | | 4.06 | 20 |
| Benzo(b)fluoranthene | 2.00 | 1.94 | 2.17 | 96.9 | 109 | 58.4-148 | | | 11.4 | 20 |
| Benzo(g,h,i)perylene | 2.00 | 2.02 | 2.03 | 101 | 101 | 57.4-152 | | | 0.190 | 20 |
| Benzo(k)fluoranthene | 2.00 | 2.06 | 2.02 | 103 | 101 | 60.5-154 | | | 1.60 | 20 |
| Chrysene | 2.00 | 2.05 | 2.17 | 103 | 109 | 64.8-155 | | | 5.58 | 20 |
| Dibenz(a,h)anthracene | 2.00 | 2.03 | 2.04 | 102 | 102 | 53.5-153 | | | 0.530 | 20 |
| Fluoranthene | 2.00 | 2.10 | 2.15 | 105 | 107 | 68.6-153 | | | 2.09 | 20 |
| Fluorene | 2.00 | 1.97 | 2.05 | 98.6 | 102 | 67.3-141 | | | 3.71 | 20 |
| Indeno(1,2,3-cd)pyrene | 2.00 | 2.01 | 2.02 | 101 | 101 | 57.0-155 | | | 0.420 | 20 |
| Naphthalene | 2.00 | 1.89 | 1.95 | 94.3 | 97.4 | 66.7-135 | | | 3.22 | 20 |
| Phenanthrene | 2.00 | 2.07 | 2.12 | 104 | 106 | 64.3-143 | | | 2.26 | 20 |

## Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3160848-1 09/01/16 05:39 • (LCSD) R3160848-2 09/01/16 06:00

| Analyte | Spike Amount ug/l | LCS Result ug/l | LCSD Result ug/l | LCS Rec. % | LCSD Rec. % | Rec. Limits % | LCS Qualifier | LCSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|
| Pyrene | 2.00 | 2.33 | 2.44 | 116 | 122 | 60.2-154 | | | 4.73 | 20 |
| 2-Methylnaphthalene | 2.00 | 1.91 | 1.98 | 95.7 | 99.1 | 67.6-143 | | | 3.45 | 20 |
| *(S) Nitrobenzene-d5* | | | | *91.3* | *92.1* | *33.8-179* | | | | |
| *(S) 2-Fluorobiphenyl* | | | | *98.2* | *103* | *55.5-150* | | | | |
| *(S) p-Terphenyl-d14* | | | | *90.4* | *93.9* | *46.2-163* | | | | |

## L856301-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L856301-04 09/01/16 11:06 • (MS) R3160848-4 09/01/16 11:28 • (MSD) R3160848-5 09/01/16 11:50

| Analyte | Spike Amount ug/l | Original Result ug/l | MS Result ug/l | MSD Result ug/l | MS Rec. % | MSD Rec. % | Dilution | Rec. Limits % | MS Qualifier | MSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Anthracene | 2.00 | ND | 2.13 | 2.07 | 107 | 103 | 1 | 68.9-153 | | | 3.02 | 20 |
| Acenaphthene | 2.00 | ND | 2.09 | 2.05 | 104 | 103 | 1 | 67.7-141 | | | 1.73 | 20 |
| Benzo(a)anthracene | 2.00 | ND | 2.03 | 1.94 | 101 | 96.5 | 1 | 63.1-147 | | | 4.71 | 20 |
| Benzo(a)pyrene | 2.00 | ND | 2.06 | 1.96 | 103 | 98.1 | 1 | 62.2-150 | | | 4.78 | 20 |
| Benzo(b)fluoranthene | 2.00 | ND | 1.82 | 1.73 | 90.0 | 85.0 | 1 | 58.4-148 | | | 5.58 | 20 |
| Benzo(g,h,i)perylene | 2.00 | ND | 1.92 | 1.80 | 94.8 | 88.9 | 1 | 57.4-152 | | | 6.35 | 20 |
| Benzo(k)fluoranthene | 2.00 | ND | 1.96 | 1.85 | 98.0 | 92.4 | 1 | 60.5-154 | | | 5.79 | 20 |
| Chrysene | 2.00 | ND | 2.07 | 1.99 | 103 | 98.8 | 1 | 64.8-155 | | | 3.82 | 20 |
| Dibenz(a,h)anthracene | 2.00 | ND | 1.88 | 1.77 | 93.8 | 88.2 | 1 | 53.5-153 | | | 6.10 | 20 |
| Fluoranthene | 2.00 | ND | 2.25 | 2.16 | 110 | 106 | 1 | 68.6-153 | | | 3.86 | 20 |
| Fluorene | 2.00 | ND | 2.04 | 1.98 | 102 | 98.8 | 1 | 67.3-141 | | | 3.23 | 20 |
| Indeno(1,2,3-cd)pyrene | 2.00 | ND | 1.80 | 1.66 | 90.0 | 83.0 | 1 | 57.0-155 | | | 8.18 | 20 |
| Naphthalene | 2.00 | ND | 1.99 | 2.00 | 98.6 | 99.0 | 1 | 66.7-135 | | | 0.390 | 20 |
| Phenanthrene | 2.00 | ND | 2.14 | 2.07 | 106 | 102 | 1 | 64.3-143 | | | 3.19 | 20 |
| Pyrene | 2.00 | ND | 2.48 | 2.39 | 122 | 117 | 1 | 60.2-154 | | | 3.73 | 20 |
| 2-Methylnaphthalene | 2.00 | ND | 2.05 | 2.05 | 102 | 102 | 1 | 67.6-143 | | | 0.0300 | 20 |
| *(S) Nitrobenzene-d5* | | | | | *95.5* | *92.7* | | *33.8-179* | | | | |
| *(S) 2-Fluorobiphenyl* | | | | | *105* | *103* | | *55.5-150* | | | | |
| *(S) p-Terphenyl-d14* | | | | | *90.7* | *86.1* | | *46.2-163* | | | | |

## Abbreviations and Definitions

| | |
|---|---|
| SDG | Sample Delivery Group. |
| MDL | Method Detection Limit. |
| RDL | Reported Detection Limit. |
| ND | Not detected at the Reporting Limit (or MDL where applicable). |
| U | Not detected at the Reporting Limit (or MDL where applicable). |
| RPD | Relative Percent Difference. |
| (dry) | Results are reported based on the dry weight of the sample. [this will only be present on a dry report basis for soils]. |
| Original Sample | The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG. |
| (S) | Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media. |
| Rec. | Recovery. |

| Qualifier | Description |
|---|---|
| B | The same analyte is found in the associated blank. |
| E | The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL). |
| J | The identification of the analyte is acceptable; the reported value is an estimate. |
| J1 | Surrogate recovery limits have been exceeded; values are outside upper control limits. |
| J3 | The associated batch QC was outside the established quality control range for precision. |
| J4 | The associated batch QC was outside the established quality control range for accuracy. |
| J5 | The sample matrix interfered with the ability to make any accurate determination; spike value is high. |
| J6 | The sample matrix interfered with the ability to make any accurate determination; spike value is low. |
| J7 | Surrogate recovery cannot be used for control limit evaluation due to dilution. |
| V | The sample concentration is too high to evaluate accurate spike recoveries. |

ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our "one location" design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be **YOUR LAB OF CHOICE.**
***** Not all certifications held by the laboratory are applicable to the results reported in the attached report.

## State Accreditations

| | | | |
|---|---|---|---|
| Alabama | 40660 | Nevada | TN-03-2002-34 |
| Alaska | UST-080 | New Hampshire | 2975 |
| Arizona | AZ0612 | New Jersey–NELAP | TN002 |
| Arkansas | 88-0469 | New Mexico | TN00003 |
| California | 01157CA | New York | 11742 |
| Colorado | TN00003 | North Carolina | Env375 |
| Conneticut | PH-0197 | North Carolina [1] | DW21704 |
| Florida | E87487 | North Carolina [2] | 41 |
| Georgia | NELAP | North Dakota | R-140 |
| Georgia [1] | 923 | Ohio–VAP | CL0069 |
| Idaho | TN00003 | Oklahoma | 9915 |
| Illinois | 200008 | Oregon | TN200002 |
| Indiana | C-TN-01 | Pennsylvania | 68-02979 |
| Iowa | 364 | Rhode Island | 221 |
| Kansas | E-10277 | South Carolina | 84004 |
| Kentucky [1] | 90010 | South Dakota | n/a |
| Kentucky [2] | 16 | Tennessee [1 4] | 2006 |
| Louisiana | AI30792 | Texas | T 104704245-07-TX |
| Maine | TN0002 | Texas [5] | LAB0152 |
| Maryland | 324 | Utah | 6157585858 |
| Massachusetts | M-TN003 | Vermont | VT2006 |
| Michigan | 9958 | Virginia | 109 |
| Minnesota | 047-999-395 | Washington | C1915 |
| Mississippi | TN00003 | West Virginia | 233 |
| Missouri | 340 | Wisconsin | 9980939910 |
| Montana | CERT0086 | Wyoming | A2LA |
| Nebraska | NE-OS-15-05 | | |

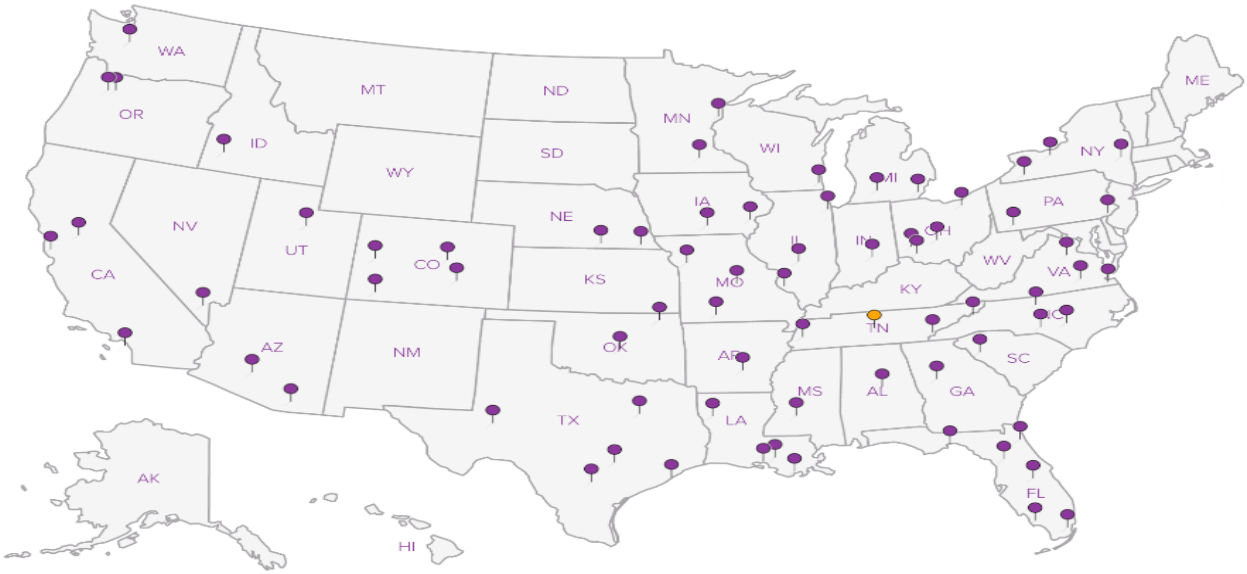
## Third Party & Federal Accreditations

| | | | |
|---|---|---|---|
| A2LA – ISO 17025 | 1461.01 | AIHA | 100789 |
| A2LA – ISO 17025 [5] | 1461.02 | DOD | 1461.01 |
| Canada | 1461.01 | USDA | S-67674 |
| EPA–Crypto | TN00003 | | |

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [n/a] Accreditation not applicable

## Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. **ESC Lab Sciences performs all testing at our central laboratory.**



Company Name/Address:
**Aquaterra Technologies - S/E**
122 South Church Street
West Chester, PA 19382

Billing Information:
Accounts Payable
122 South Church Street
West Chester, PA 19382

Report to: Michael Sarcinello / Andrew Klingbeil

Email To: ms@aquaterra-tech.com, andrew.kl

Project Description: AOI8

City/State Collected:

Phone: (610) 431-5733
Fax:

Client Project # 213402435

Lab Project # SUNAQUA-AOI8

Collected by (print): Dave Hopkins

Site/Facility ID # Phila Refinery (AOI-8)

P.O. #

Collected by (signature):

Immediately Packed on Ice N ____ Y ____

**Rush?** (Lab MUST Be Notified)
___ Same Day .....200%
___ Next Day .....100%
___ Two Day .....50%
___ Three Day .....25%

Date Results Needed

Email? ___No ___Yes
FAX? ___No ___Yes

| Sample ID | Comp/Grab | Matrix * | Depth | Date | Time | No. of Cntrs | EVERGREENCOMP |
|---|---|---|---|---|---|---|---|
| TRIP BLANK | — | GW | | 6/15/16 | — | 1 | X |
| N-64-20160825-WG | Grab | GW | | 8/25/16 | 0825 | 10 | X |
| PZ-507-20160825-WG | | GW | | | 0915 | | X |
| RW-501-20160825-WG | | GW | | | 1055 | | X |
| RW-501-20160825-WG-DUP | | GW | | | 1055 | | X |
| PZ-504-20160825-WG | | GW | | | 1035 | | X |
| N-29-20160825-WG | | GW | | | 1310 | | X |
| | | GW | | | | | |
| | | GW | | | | | |
| | | GW | | | | | |

Analysis / Container / Preservative

Chain of Custody Page 1 of 1

ESC LABORATORY SCIENCES
YOUR LAB OF CHOICE
12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# 856076

A021

Acctnum: SUNAQUA
Template: T115068
Prelogin: P565108
TSR: Mark Beasley
Cooler:
Shipped Via:

| Rem./Contaminant | Sample # (lab only) |
|---|---|
| | 01 |
| | 02 |
| | 03 |
| | 04 |
| | 05 |
| | 06 |
| | 07 |

* Matrix: SS - Soil GW - Groundwater WW - WasteWater DW - Drinking Water OT - Other_____

Remarks: EVERGREENCOMP = 2-40ml HCL, 3-40ml NaThi, 2-40ml NP, 2-100ml NP, 1-250ml HDPE NP

pH _____ Temp _____
Flow _____ Other _____

| Relinquished by : (Signature) | Date: | Time: | Received by: (Signature) |
|---|---|---|---|
| | 8/25/16 | 1430 | |
| Relinquished by : (Signature) | Date: | Time: | Received by: (Signature) |
| | | | |
| Relinquished by : (Signature) | Date: | Time: | Received for lab by: (Signature) |
| | | | |

Samples returned via: ☐ UPS ☐ FedEx ☐ Courier ☑ SWA

Temp: 3.6 °C Bottles Received: 25

Date: 8.26.16 Time: 0980

Hold #

Condition: (lab use only) OK

COC Seal Intact: ____ Y ____ N ____ NA

pH Checked: NCF:

Company Name/Address:
**Aquaterra Technologies - S/E**
122 South Church Street
West Chester, PA 19382

Billing Information:
Accounts Payable
122 South Church Street
West Chester, PA 19382

Report to: Michael Sarcinello / Andrew Klingbeil

Email To: ms@aquaterra-tech.com, andrew.kl

Project Description: AOI8

City/State Collected:

Phone: (610) 431-5733
Fax:

Client Project #

Lab Project # SUNAQUA-AOI8

Collected by (print): Karl McGarry

Site/Facility ID # PES-AOI-8

P.O. #

Collected by (signature):

Immediately Packed on Ice N ____ Y ✓

**Rush?** (Lab MUST Be Notified)
___ Same Day .....200%
___ Next Day .....100%
___ Two Day .....50%
___ Three Day .....25%

Date Results Needed

Email? ___No ___Yes
FAX? ___No ___Yes

| Sample ID | Comp/Grab | Matrix * | Depth | Date | Time | No. of Cntrs | EVERGREENCOMP | | | | | | | | | Rem./Contaminant | Sample # (lab only) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N-122-20160825-WG | G | GW | | 8.25.16 | 940 | 18 | X | | | | | | | | | | 08 |
| N-150-20160825-WG | G | GW | | 8.25.16 | 840 | 10 | X | | | | | | | | | | 09 |
| N-94-20160825-WG | G | GW | | 8.25.16 | 1225 | 10 | X | | | | | | | | | | 10 |
| N-143-20160825-WG | G | GW | | 8.25.16 | 1355 | 10 | X | | | | | | | | | | 11 |
| AOI8-Equipment Blank-20160825 | G | GW | | 8.25.16 | 1330 | 10 | X | | | | | | | | | | 12 |
| AOI8-Field Blank-20160825 | G | GW | | 8.25.16 | 1330 | 10 | X | | | | | | | | | | 13 |
| | | GW | | | | | | | | | | | | | | | |
| | | GW | | | | | | | | | | | | | | | |
| | | GW | | | | | | | | | | | | | | | |
| | | GW | | | | | | | | | | | | | | | |

Analysis / Container / Preservative

Chain of Custody Page 2 of 4

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Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# 857076

Table #

Acctnum: SUNAQUA
Template: T115068
Prelogin: P565108
TSR: Mark Beasley
Cooler:
Shipped Via:

* Matrix: SS - Soil GW - Groundwater WW - WasteWater DW - Drinking Water OT - Other_____

pH _____ Temp _____

Remarks: EVERGREENCOMP = 2-40ml HCL, 3-40ml NaThi, 2-40ml NP, 2-100ml NP, 1-250ml HDPE NP

Flow _____ Other _____

Hold #

| Relinquished by : (Signature) | Date: | Time: | Received by: (Signature) |
|---|---|---|---|
| | 8/25/16 | 14:30 | |
| Relinquished by : (Signature) | Date: | Time: | Received by: (Signature) |
| | | | |
| Relinquished by : (Signature) | Date: | Time: | Received for lab by: (Signature) |
| | | | |

Samples returned via: ☐ UPS ☐ FedEx ☐ Courier ☒ SWA

Temp: 3.6 °C Bottles Received: 251

Date: 8.26.16 Time: 0900

Condition: a (lab use only)

COC Seal Intact: ____Y ____N ____NA

pH Checked: NCF:

Company Name/Address:
**Aquaterra Technologies - S/E**
122 South Church Street
West Chester, PA 19382

Billing Information:
Accounts Payable
122 South Church Street
West Chester, PA 19382

Report to: Michael Sarcinello / Andrew Klingbeil

Email To: ms@aquaterra-tech.com, andrew kl

Project Description: AOI8

City/State Collected:

Phone: (610) 431-5733
Fax:

Client Project #

Lab Project # SUNAQUA-AOI8

Collected by (print): Robert Drewicz

Site/Facility ID #

P.O. #

Collected by (signature): Rob Drewicz

Immediately Packed on Ice N ___ Y ✓

*Rush?* (Lab MUST Be Notified)
___ Same Day .....200%
___ Next Day .....100%
___ Two Day .....50%
___ Three Day .....25%

Date Results Needed

Email? ___No ___Yes
FAX? ___No ___Yes

Analysis / Container / Preservative

Chain of Custody Page 2 of 4

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12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# 858076

Table #

Acctnum: SUNAQUA
Template: T115068
Prelogin: P565108
TSR: Mark Beasley
Cooler:
Shipped Via:

| Sample ID | Comp/Grab | Matrix * | Depth | Date | Time | No. of Cntrs | EVERGREENCOMP | Rem./Contaminant | Sample # (lab only) |
|---|---|---|---|---|---|---|---|---|---|
| N-132-20160825-WG | Grab | GW | | 08/25/16 | 10:00 | 10 | X | | 14 |
| N-132-20160825-WG-DUP | Grab | GW | | 08/25/16 | 10:10 | 10 | X | | 15 |
| AOI8-EQUIPMENTBLANK-20160825 | Grab | GW | | 08/25/16 | 10:30 | 10 | X | | 16 |
| AOI8-FIELDBLANK-20160825 | Grab | GW | | 08/25/16 | 10:40 | 10 | X | | 17 |
| N-109-20160825-WG | Grab | GW | | 08/25/16 | 12:10 | 10 | X | | 18 |
| N37-20160825-wg | Grab | GW | | 8/25/16 | 0815 | 10 | X | | 19 |
| AOI8 Fieldblank-20160825 | Grab | GW | | 8/25/16 | 0830 | 10 | X | | 20 |
| AOI8 equipmentblank-20160825 | Grab | GW | | 8/25/16 | 0840 | 10 | X | | 21 |
| N36-20160825-wg | Grab | GW | | 8/25/16 | 1020 | 10 | X | | 22 |
| | | GW | | | | | | | |

* Matrix: **SS** - Soil **GW** - Groundwater **WW** - WasteWater **DW** - Drinking Water **OT** - Other_____

pH _____ Temp _____

Remarks: **EVERGREENCOMP = 2-40ml HCL, 3-40ml NaThi, 2-40ml NP, 2-100ml NP, 1-250ml HDPE NP**

Flow _____ Other _____

Hold #

| Relinquished by : (Signature) | Date: | Time: | Received by: (Signature) |
|---|---|---|---|
| Rob Drewicz | 08/25/16 | 14:30 | |
| Relinquished by : (Signature) | Date: | Time: | Received by: (Signature) |
| | | | |
| Relinquished by : (Signature) | Date: | Time: | Received for lab by: (Signature) |
| | | | |

Samples returned via: ☐ UPS ☐ FedEx ☐ Courier ☐ ESLWA

Temp: 3.6 °C Bottles Received: 25

Date: 8.26.16 Time: 0900

Condition: (lab use only) OK

COC Seal Intact: ___ Y ___ N ___ NA

pH Checked: NCF:

Company Name/Address:
**Aquaterra Technologies - S/E**
122 South Church Street
West Chester, PA 19382

Billing Information:
**Accounts Payable**
122 South Church Street
West Chester, PA 19382

Report to: ANDREW KLINGBEIL
**Michael Sarcinello / ~~Michael Newton~~**

Email To: ANDREW.KLINGBEIL@STANTEC.COM
**ms@aquaterra-tech.com, Michael.N**

Project Description: **AOI8**

City/State Collected: PHILADELPHIA PA

Phone: **(610) 431-5733**
Fax:

Client Project #

Lab Project #
**SUNAQUA-AOI8**

Collected by (print): SHANN SYKES

Site/Facility ID #

P.O. #

Collected by (signature):

Immediately Packed on Ice N ___ Y X

***Rush?*** (Lab MUST Be Notified)
___ Same Day .....200%
___ Next Day .....100%
___ Two Day .....50%
___ Three Day .....25%

Date Results Needed

Email? ___No ___Yes
FAX? ___No ___Yes

| Sample ID | Comp/Grab | Matrix * | Depth | Date | Time | No. of Cntrs | EVERGREENCOMP - 3 - 40ml 5035 vials + 2 - 4oz jar | | | | | | | | | Rem./Contaminant | Sample # (lab only) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AOI8-BH-16-074-0-2-20160825 | G | SS | 0-2' | 8/25/16 | 855 | 5 | X | | | | | | | | | | 23 |
| AOI8-BH-16-074-6-8-20160825 | G | SS | 6-8' | 8/25/16 | 910 | 5 | X | | | | | | | | | | 24 |
| AOI8-BH-16-075-0-2-20160825 | G | SS | 0-2' | 8/25/16 | 1055 | 5 | X | | | | | | | | | | 25 |
| AOI8-BH-16-075-4-6-20160825 | G | SS | 4-6' | 8/25/16 | 1110 | 5 | X | | | | | | | | | | 26 |
| AOI8-BH-16-076-0-2-20160825 | G | SS | 0-2' | 8/25/16 | 1310 | 5 | X | | | | | | | | | | 27 |
| AOI8-BH-16-076-4-6-20160825 | G | SS | 4-6' | 8/25/16 | 1330 | 5 | X | | | | | | | | | | 28 |
| AOI8-BH-16-077-0-2-20160825 | G | SS | 0-2' | 8/25/16 | 1140 | 5 | X | | | | | | | | | | 29 |
| AOI8-BH-16-077-4-6-20160825 | G | SS | 4-6' | 8/25/16 | 1200 | 5 | X | | | | | | | | | | 30 |
| | | SS | | | | | | | | | | | | | | | |
| | | SS | | | | | | | | | | | | | | | |

Analysis / Container / Preservative

Chain of Custody Page ___ of ___

ESC LABSCIENCES
YOUR LAB OF CHOICE
12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# 856076
Table #
Acctnum: SUNAQUA
Template: T113711
Prelogin: P560320
TSR: Mark Beasley
Cooler:
Shipped Via:

* Matrix: **SS** - Soil **GW** - Groundwater **WW** - WasteWater **DW** - Drinking Water **OT** - Other_____

Remarks:

pH _____ Temp _____
Flow _____ Other _____

Hold #

Samples returned via: ☐ UPS ☐ FedEx ☐ Courier ☒ SWA

Condition: (lab use only)
TUBE=E160325E

Temp: 36 °C Bottles Received: 25

COC Seal Intact: ___Y ___N ___NA

pH Checked: NCF:

| Relinquished by : (Signature) | Date: | Time: | Received by: (Signature) |
|---|---|---|---|
| AQUATERRA | 8/25/16 | 1430 | |
| Relinquished by : (Signature) | Date: | Time: | Received by: (Signature) |
| Relinquished by : (Signature) | Date: | Time: | Received for lab by: (Signature) |

Date: 8.26.16 Time: 0900

ESC
L·A·B S·C·I·E·N·C·E·S
YOUR LAB OF CHOICE

# Cooler Receipt Checklist

Client: SUNAQUA SDG# 856076

Cooler Received/Opened On: 8/26/2016 By Nikki Farmer

Temperature Upon Receipt: 3.6 °c

(Signature)

| Cooler Receipt Check List | Yes | No | N/A |
|---|---|---|---|
| Were custody seals on outside of cooler and intact? | | | ✓ |
| Were custody papers properly filled out (ink, signed, etc.)? | ✓ | | |
| Did all bottles arrive in good condition? | ✓ | | |
| Were correct bottles used for the analyses requested? | ✓ | | |
| Was sufficient amount of sample sent in each bottle? | ✓ | | |
| Were correct preservatives used? | | | ✓ |
| Were all applicable sample containers checked for preservation? (Any samples not in accepted pH range noted on COC .) | | | ✓ |
| If applicable, was an observable VOA headspace present? | | ✓ | |
| Non Conformance Generated? (If yes see attached NCF) | | ✓ | |

# ANALYTICAL REPORT

January 04, 2017

## Aquaterra Technologies, Inc. - S/E

| | |
|---|---|
| Sample Delivery Group: | L859570 |
| Samples Received: | 09/14/2016 |
| Project Number: | |
| Description: | AOI-8 |

Report To: Michael Sarcinello
122 South Church Street
West Chester, PA 19382

Entire Report Reviewed By:

Mark W. Beasley
Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.

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## AOI8-BH-16-038-0-2-20160912 L859570-01 Solid

Collected by: Luke M.
Collected date/time: 09/12/16 09:00
Received date/time: 09/14/16 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| Metals (ICP) by Method 6010B | WG909293 | 1 | 09/19/16 18:28 | 09/20/16 13:34 | ST |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG908317 | 100 | 09/15/16 21:56 | 09/19/16 16:21 | SNR |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG908317 | 200 | 09/15/16 21:56 | 09/19/16 16:45 | SNR |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG908317 | 500 | 09/15/16 21:56 | 09/20/16 14:01 | SNR |
| Total Solids by Method 2540 G-2011 | WG908118 | 1 | 09/16/16 17:44 | 09/16/16 17:54 | KDW |
| Volatile Organic Compounds (GC/MS) by Method 8260B | WG909325 | 117 | 09/21/16 18:12 | 09/24/16 00:53 | ACG |
| Volatile Organic Compounds (GC/MS) by Method 8260B | WG909325 | 1170 | 09/21/16 18:12 | 09/26/16 05:05 | JHH |

## AOI8-BH-16-038-10-12-20160912 L859570-02 Solid

Collected by: Luke M.
Collected date/time: 09/12/16 11:00
Received date/time: 09/14/16 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| Metals (ICP) by Method 6010B | WG909293 | 1 | 09/19/16 18:28 | 09/20/16 13:37 | ST |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG908317 | 1 | 09/15/16 21:56 | 09/18/16 16:18 | SNR |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG908317 | 1 | 09/15/16 21:56 | 09/19/16 13:00 | SNR |
| Total Solids by Method 2540 G-2011 | WG908118 | 1 | 09/16/16 17:44 | 09/16/16 17:54 | KDW |
| Volatile Organic Compounds (GC/MS) by Method 8260B | WG909325 | 19.75 | 09/21/16 18:12 | 09/24/16 01:15 | ACG |

## AOI8-BH-16-044-0-2-20160912 L859570-03 Solid

Collected by: Luke M.
Collected date/time: 09/12/16 12:00
Received date/time: 09/14/16 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| Metals (ICP) by Method 6010B | WG909293 | 1 | 09/19/16 18:28 | 09/20/16 13:45 | ST |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG908317 | 5 | 09/15/16 21:56 | 09/18/16 22:57 | SNR |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG908317 | 5 | 09/15/16 21:56 | 09/19/16 15:36 | SNR |
| Total Solids by Method 2540 G-2011 | WG908118 | 1 | 09/16/16 17:44 | 09/16/16 17:54 | KDW |
| Volatile Organic Compounds (GC/MS) by Method 8260B | WG909325 | 1 | 09/21/16 18:12 | 09/26/16 04:42 | JHH |

## AOI8-BH-16-044-10-12-20160912 L859570-04 Solid

Collected by: Luke M.
Collected date/time: 09/12/16 13:00
Received date/time: 09/14/16 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| Metals (ICP) by Method 6010B | WG909293 | 1 | 09/19/16 18:28 | 09/20/16 13:47 | ST |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG908317 | 1 | 09/15/16 21:56 | 09/18/16 20:27 | SNR |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG908317 | 10 | 09/15/16 21:56 | 09/19/16 14:41 | SNR |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG908317 | 10 | 09/15/16 21:56 | 09/19/16 15:18 | SNR |
| Total Solids by Method 2540 G-2011 | WG908120 | 1 | 09/16/16 16:34 | 09/16/16 16:43 | KDW |
| Volatile Organic Compounds (GC/MS) by Method 8260B | WG909325 | 24 | 09/21/16 18:12 | 09/24/16 01:59 | ACG |

## AOI8-BH-16-058-0-2-20160912 L859570-05 Solid

Collected by: Luke M.
Collected date/time: 09/12/16 14:00
Received date/time: 09/14/16 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| Metals (ICP) by Method 6010B | WG909293 | 1 | 09/19/16 18:28 | 09/20/16 13:50 | ST |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG908317 | 1 | 09/15/16 21:56 | 09/18/16 19:12 | SNR |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG908317 | 1 | 09/15/16 21:56 | 09/19/16 14:27 | SNR |
| Total Solids by Method 2540 G-2011 | WG908120 | 1 | 09/16/16 16:34 | 09/16/16 16:43 | KDW |
| Volatile Organic Compounds (GC/MS) by Method 8260B | WG909325 | 1 | 09/21/16 18:12 | 09/24/16 02:21 | ACG |

## AOI8-BH-16-058-12-14-20160912 L859570-06 Solid

Collected by: Luke M.
Collected date/time: 09/12/16 15:00
Received date/time: 09/14/16 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| Metals (ICP) by Method 6010B | WG909293 | 1 | 09/19/16 18:28 | 09/20/16 13:52 | ST |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG908317 | 1 | 09/15/16 21:56 | 09/18/16 20:52 | SNR |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG908317 | 1 | 09/15/16 21:56 | 09/19/16 15:01 | SNR |
| Total Solids by Method 2540 G-2011 | WG908120 | 1 | 09/16/16 16:34 | 09/16/16 16:43 | KDW |
| Volatile Organic Compounds (GC/MS) by Method 8260B | WG909325 | 1 | 09/21/16 18:12 | 09/24/16 02:43 | ACG |

## AOI8-BH-16-051-0-2-20160913 L859570-07 Solid

Collected by: Luke M.
Collected date/time: 09/13/16 09:00
Received date/time: 09/14/16 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| Metals (ICP) by Method 6010B | WG909293 | 1 | 09/19/16 18:28 | 09/20/16 13:55 | ST |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG908317 | 1 | 09/15/16 21:56 | 09/18/16 16:43 | SNR |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG908317 | 1 | 09/15/16 21:56 | 09/19/16 13:18 | SNR |
| Total Solids by Method 2540 G-2011 | WG908120 | 1 | 09/16/16 16:34 | 09/16/16 16:43 | KDW |
| Volatile Organic Compounds (GC/MS) by Method 8260B | WG909325 | 1 | 09/21/16 18:12 | 09/24/16 03:05 | ACG |

## AOI8-BH-16-051-12-14-20160913 L859570-08 Solid

Collected by: Luke M.
Collected date/time: 09/13/16 11:00
Received date/time: 09/14/16 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| Metals (ICP) by Method 6010B | WG909293 | 1 | 09/19/16 18:28 | 09/20/16 13:58 | ST |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG908317 | 1 | 09/15/16 21:56 | 09/18/16 17:08 | SNR |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG908317 | 1 | 09/15/16 21:56 | 09/19/16 13:35 | SNR |
| Total Solids by Method 2540 G-2011 | WG908120 | 1 | 09/16/16 16:34 | 09/16/16 16:43 | KDW |
| Volatile Organic Compounds (GC/MS) by Method 8260B | WG909325 | 1 | 09/21/16 18:12 | 09/24/16 03:28 | ACG |

## AOI8-BH-16-062-0-2-20160913 L859570-09 Solid

Collected by: Luke M.
Collected date/time: 09/13/16 12:00
Received date/time: 09/14/16 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| Metals (ICP) by Method 6010B | WG909293 | 1 | 09/19/16 18:28 | 09/20/16 14:00 | ST |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG908317 | 1 | 09/15/16 21:56 | 09/18/16 18:48 | SNR |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG908317 | 1 | 09/15/16 21:56 | 09/19/16 14:09 | SNR |
| Total Solids by Method 2540 G-2011 | WG908120 | 1 | 09/16/16 16:34 | 09/16/16 16:43 | KDW |
| Volatile Organic Compounds (GC/MS) by Method 8260B | WG909325 | 1 | 09/21/16 18:12 | 09/24/16 03:50 | ACG |

## AOI8-BH-16-062-12-14-20160913 L859570-10 Solid

Collected by: Luke M.
Collected date/time: 09/13/16 13:00
Received date/time: 09/14/16 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| Metals (ICP) by Method 6010B | WG909293 | 1 | 09/19/16 18:28 | 09/20/16 14:03 | ST |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG908317 | 1 | 09/15/16 21:56 | 09/18/16 20:02 | SNR |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG908317 | 1 | 09/15/16 21:56 | 09/19/16 14:44 | SNR |
| Total Solids by Method 2540 G-2011 | WG908120 | 1 | 09/16/16 16:34 | 09/16/16 16:43 | KDW |
| Volatile Organic Compounds (GC/MS) by Method 8260B | WG909327 | 1 | 09/21/16 23:47 | 09/24/16 15:09 | HJF |

## AOI8-BH-16-073-0-2-20160913 L859570-11 Solid

Collected by: Luke M.
Collected date/time: 09/13/16 00:00
Received date/time: 09/14/16 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| Metals (ICP) by Method 6010B | WG909293 | 1 | 09/19/16 18:28 | 09/20/16 14:06 | ST |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG908317 | 10 | 09/15/16 21:56 | 09/19/16 15:06 | SNR |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG908317 | 10 | 09/15/16 21:56 | 09/19/16 16:10 | SNR |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG908317 | 100 | 09/15/16 21:56 | 09/20/16 12:46 | SNR |
| Total Solids by Method 2540 G-2011 | WG908120 | 1 | 09/16/16 16:34 | 09/16/16 16:43 | KDW |
| Volatile Organic Compounds (GC/MS) by Method 8260B | WG909327 | 24.5 | 09/21/16 23:47 | 09/24/16 03:18 | HJF |

## AOI8-BH-16-073-12-14-20160913 L859570-12 Solid

Collected by: Luke M.
Collected date/time: 09/13/16 14:00
Received date/time: 09/14/16 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| Metals (ICP) by Method 6010B | WG909293 | 1 | 09/19/16 18:28 | 09/20/16 14:08 | ST |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG908317 | 100 | 09/15/16 21:56 | 09/19/16 16:46 | SNR |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG908317 | 50 | 09/15/16 21:56 | 09/19/16 15:56 | SNR |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C | WG908317 | 50 | 09/15/16 21:56 | 09/19/16 16:27 | SNR |
| Total Solids by Method 2540 G-2011 | WG908120 | 1 | 09/16/16 16:34 | 09/16/16 16:43 | KDW |
| Volatile Organic Compounds (GC/MS) by Method 8260B | WG909327 | 885 | 09/21/16 23:47 | 09/24/16 15:30 | HJF |

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times. All MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Mark W. Beasley
Technical Service Representative

## Total Solids by Method 2540 G-2011

| Analyte | Result | Qualifier | Dilution | Analysis | Batch |
|---|---|---|---|---|---|
| | % | | | date / time | |
| Total Solids | 74.0 | | 1 | 09/16/2016 17:54 | WG908118 |

## Metals (ICP) by Method 6010B

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Cobalt | 16.7 | | 1.35 | 1 | 09/20/2016 13:34 | WG909293 |
| Lead | 1420 | | 0.676 | 1 | 09/20/2016 13:34 | WG909293 |
| Nickel | 82.0 | | 2.70 | 1 | 09/20/2016 13:34 | WG909293 |
| Vanadium | 212 | | 2.70 | 1 | 09/20/2016 13:34 | WG909293 |
| Zinc | 953 | | 6.76 | 1 | 09/20/2016 13:34 | WG909293 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Benzene | 1.86 | | 0.158 | 117 | 09/24/2016 00:53 | WG909325 |
| sec-Butylbenzene | 2.39 | | 0.158 | 117 | 09/24/2016 00:53 | WG909325 |
| tert-Butylbenzene | 17.9 | | 0.158 | 117 | 09/24/2016 00:53 | WG909325 |
| Cyclohexane | 1.16 | | 0.158 | 117 | 09/24/2016 00:53 | WG909325 |
| 1,2-Dibromoethane | ND | | 0.158 | 117 | 09/24/2016 00:53 | WG909325 |
| n-Hexane | ND | | 1.58 | 117 | 09/24/2016 00:53 | WG909325 |
| 1,2-Dichloroethane | ND | | 0.158 | 117 | 09/24/2016 00:53 | WG909325 |
| Ethylbenzene | 0.355 | | 0.158 | 117 | 09/24/2016 00:53 | WG909325 |
| Isopropylbenzene | 2.90 | | 1.58 | 117 | 09/24/2016 00:53 | WG909325 |
| Methyl tert-butyl ether | ND | | 0.158 | 117 | 09/24/2016 00:53 | WG909325 |
| Toluene | 1.17 | | 0.791 | 117 | 09/24/2016 00:53 | WG909325 |
| 1,2,4-Trimethylbenzene | 51.8 | | 1.58 | 1170 | 09/26/2016 05:05 | WG909325 |
| 1,3,5-Trimethylbenzene | 10.8 | | 0.158 | 117 | 09/24/2016 00:53 | WG909325 |
| Xylenes, Total | 6.54 | | 0.475 | 117 | 09/24/2016 00:53 | WG909325 |
| *(S) Toluene-d8* | *104* | | *88.7-115* | | *09/24/2016 00:53* | WG909325 |
| *(S) Toluene-d8* | *107* | | *88.7-115* | | *09/26/2016 05:05* | WG909325 |
| *(S) Dibromofluoromethane* | *93.5* | | *76.3-123* | | *09/26/2016 05:05* | WG909325 |
| *(S) Dibromofluoromethane* | *95.5* | | *76.3-123* | | *09/24/2016 00:53* | WG909325 |
| *(S) a,a,a-Trifluorotoluene* | *113* | | *87.2-117* | | *09/24/2016 00:53* | WG909325 |
| *(S) a,a,a-Trifluorotoluene* | *103* | | *87.2-117* | | *09/26/2016 05:05* | WG909325 |
| *(S) 4-Bromofluorobenzene* | *102* | | *69.7-129* | | *09/26/2016 05:05* | WG909325 |
| *(S) 4-Bromofluorobenzene* | *106* | | *69.7-129* | | *09/24/2016 00:53* | WG909325 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Acenaphthene | 16.2 | | 4.46 | 100 | 09/19/2016 16:21 | WG908317 |
| Anthracene | 4.51 | | 4.46 | 100 | 09/19/2016 16:21 | WG908317 |
| Benzo(a)anthracene | ND | | 22.3 | 500 | 09/20/2016 14:01 | WG908317 |
| Benzo(b)fluoranthene | ND | | 4.46 | 100 | 09/19/2016 16:21 | WG908317 |
| Benzo(k)fluoranthene | ND | | 4.46 | 100 | 09/19/2016 16:21 | WG908317 |
| Benzo(g,h,i)perylene | ND | | 4.46 | 100 | 09/19/2016 16:21 | WG908317 |
| Benzo(a)pyrene | ND | | 4.46 | 100 | 09/19/2016 16:21 | WG908317 |
| Biphenyl | ND | | 45.0 | 100 | 09/19/2016 16:21 | WG908317 |
| Chrysene | ND | | 22.3 | 500 | 09/20/2016 14:01 | WG908317 |
| Dibenz(a,h)anthracene | ND | | 4.46 | 100 | 09/19/2016 16:21 | WG908317 |
| Fluoranthene | 5.10 | | 4.46 | 100 | 09/19/2016 16:21 | WG908317 |
| Fluorene | 19.0 | | 4.46 | 100 | 09/19/2016 16:21 | WG908317 |
| Indeno(1,2,3-cd)pyrene | ND | | 4.46 | 100 | 09/19/2016 16:21 | WG908317 |
| 2-Methylnaphthalene | 149 | | 4.46 | 100 | 09/19/2016 16:21 | WG908317 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result (dry) mg/kg | Qualifier | RDL (dry) mg/kg | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Naphthalene | 16.9 | | 4.46 | 100 | 09/19/2016 16:21 | WG908317 |
| Phenanthrene | 54.3 | | 4.46 | 100 | 09/19/2016 16:21 | WG908317 |
| Pyridine | ND | | 45.0 | 100 | 09/19/2016 16:21 | WG908317 |
| Bis(2-ethylhexyl)phthalate | ND | | 225 | 500 | 09/20/2016 14:01 | WG908317 |
| Di-n-butyl phthalate | ND | | 45.0 | 100 | 09/19/2016 16:21 | WG908317 |
| Diethyl phthalate | ND | | 45.0 | 100 | 09/19/2016 16:21 | WG908317 |
| Pyrene | ND | | 22.3 | 500 | 09/20/2016 14:01 | WG908317 |
| 2,4-Dimethylphenol | ND | | 45.0 | 100 | 09/19/2016 16:21 | WG908317 |
| 2,4-Dinitrophenol | ND | | 45.0 | 100 | 09/19/2016 16:21 | WG908317 |
| 2-Methylphenol | ND | | 45.0 | 100 | 09/19/2016 16:21 | WG908317 |
| 3&4-Methyl Phenol | ND | | 45.0 | 100 | 09/19/2016 16:21 | WG908317 |
| 4-Nitrophenol | ND | | 45.0 | 100 | 09/19/2016 16:21 | WG908317 |
| Phenol | ND | | 45.0 | 100 | 09/19/2016 16:21 | WG908317 |
| Quinoline | ND | | 90.1 | 200 | 09/19/2016 16:45 | WG908317 |
| *(S) 2-Fluorophenol* | *66.5* | J7 | *21.1-116* | | *09/19/2016 16:21* | WG908317 |
| *(S) 2-Fluorophenol* | *47.3* | J7 | *21.1-116* | | *09/20/2016 14:01* | WG908317 |
| *(S) Phenol-d5* | *99.2* | J7 | *26.3-121* | | *09/20/2016 14:01* | WG908317 |
| *(S) Phenol-d5* | *170* | J7 | *26.3-121* | | *09/19/2016 16:21* | WG908317 |
| *(S) Nitrobenzene-d5* | *114* | J7 | *21.9-129* | | *09/19/2016 16:21* | WG908317 |
| *(S) Nitrobenzene-d5* | *404* | J7 | *21.9-129* | | *09/20/2016 14:01* | WG908317 |
| *(S) 2-Fluorobiphenyl* | *55.1* | J7 | *34.9-129* | | *09/20/2016 14:01* | WG908317 |
| *(S) 2-Fluorobiphenyl* | *393* | J7 | *34.9-129* | | *09/19/2016 16:21* | WG908317 |
| *(S) 2,4,6-Tribromophenol* | *69.0* | J7 | *21.6-142* | | *09/19/2016 16:21* | WG908317 |
| *(S) 2,4,6-Tribromophenol* | *0.000* | J7 | *21.6-142* | | *09/20/2016 14:01* | WG908317 |
| *(S) p-Terphenyl-d14* | *43.0* | J7 | *21.5-128* | | *09/20/2016 14:01* | WG908317 |
| *(S) p-Terphenyl-d14* | *121* | J7 | *21.5-128* | | *09/19/2016 16:21* | WG908317 |

Sample Narrative:

8270C L859570-01 WG908317: Dilution due to matrix

8270C L859570-01 WG908317: IS/SURR failed on lower dilution.

## Total Solids by Method 2540 G-2011

| Analyte | Result | Qualifier | Dilution | Analysis | Batch |
|---|---|---|---|---|---|
| | % | | | date / time | |
| Total Solids | 85.0 | | 1 | 09/16/2016 17:54 | WG908118 |

## Metals (ICP) by Method 6010B

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Cobalt | 4.85 | | 1.18 | 1 | 09/20/2016 13:37 | WG909293 |
| Lead | 14.6 | | 0.588 | 1 | 09/20/2016 13:37 | WG909293 |
| Nickel | 13.2 | | 2.35 | 1 | 09/20/2016 13:37 | WG909293 |
| Vanadium | 34.8 | | 2.35 | 1 | 09/20/2016 13:37 | WG909293 |
| Zinc | 40.4 | | 5.88 | 1 | 09/20/2016 13:37 | WG909293 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Benzene | ND | | 0.0232 | 19.75 | 09/24/2016 01:15 | WG909325 |
| sec-Butylbenzene | 1.03 | | 0.0232 | 19.75 | 09/24/2016 01:15 | WG909325 |
| tert-Butylbenzene | 0.105 | | 0.0232 | 19.75 | 09/24/2016 01:15 | WG909325 |
| Cyclohexane | 1.48 | | 0.0232 | 19.75 | 09/24/2016 01:15 | WG909325 |
| 1,2-Dibromoethane | ND | | 0.0232 | 19.75 | 09/24/2016 01:15 | WG909325 |
| n-Hexane | ND | | 0.232 | 19.75 | 09/24/2016 01:15 | WG909325 |
| 1,2-Dichloroethane | ND | | 0.0232 | 19.75 | 09/24/2016 01:15 | WG909325 |
| Ethylbenzene | 0.0445 | | 0.0232 | 19.75 | 09/24/2016 01:15 | WG909325 |
| Isopropylbenzene | 0.655 | | 0.232 | 19.75 | 09/24/2016 01:15 | WG909325 |
| Methyl tert-butyl ether | ND | | 0.0232 | 19.75 | 09/24/2016 01:15 | WG909325 |
| Toluene | ND | | 0.116 | 19.75 | 09/24/2016 01:15 | WG909325 |
| 1,2,4-Trimethylbenzene | 2.01 | | 0.0232 | 19.75 | 09/24/2016 01:15 | WG909325 |
| 1,3,5-Trimethylbenzene | 0.0962 | | 0.0232 | 19.75 | 09/24/2016 01:15 | WG909325 |
| Xylenes, Total | 0.110 | | 0.0697 | 19.75 | 09/24/2016 01:15 | WG909325 |
| *(S) Toluene-d8* | *101* | | *88.7-115* | | *09/24/2016 01:15* | WG909325 |
| *(S) Dibromofluoromethane* | *94.9* | | *76.3-123* | | *09/24/2016 01:15* | WG909325 |
| *(S) α,α,α-Trifluorotoluene* | *109* | | *87.2-117* | | *09/24/2016 01:15* | WG909325 |
| *(S) 4-Bromofluorobenzene* | *157* | J1 | *69.7-129* | | *09/24/2016 01:15* | WG909325 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Acenaphthene | 0.0417 | | 0.0388 | 1 | 09/18/2016 16:18 | WG908317 |
| Anthracene | ND | | 0.0388 | 1 | 09/18/2016 16:18 | WG908317 |
| Benzo(a)anthracene | ND | | 0.0388 | 1 | 09/18/2016 16:18 | WG908317 |
| Benzo(b)fluoranthene | ND | | 0.0388 | 1 | 09/18/2016 16:18 | WG908317 |
| Benzo(k)fluoranthene | ND | | 0.0388 | 1 | 09/18/2016 16:18 | WG908317 |
| Benzo(g,h,i)perylene | ND | | 0.0388 | 1 | 09/18/2016 16:18 | WG908317 |
| Benzo(a)pyrene | ND | | 0.0388 | 1 | 09/18/2016 16:18 | WG908317 |
| Biphenyl | ND | | 0.392 | 1 | 09/18/2016 16:18 | WG908317 |
| Chrysene | ND | | 0.0388 | 1 | 09/18/2016 16:18 | WG908317 |
| Dibenz(a,h)anthracene | ND | | 0.0388 | 1 | 09/18/2016 16:18 | WG908317 |
| Fluoranthene | ND | | 0.0388 | 1 | 09/18/2016 16:18 | WG908317 |
| Fluorene | ND | | 0.0388 | 1 | 09/18/2016 16:18 | WG908317 |
| Indeno(1,2,3-cd)pyrene | ND | | 0.0388 | 1 | 09/18/2016 16:18 | WG908317 |
| 2-Methylnaphthalene | 0.509 | | 0.0388 | 1 | 09/18/2016 16:18 | WG908317 |
| Naphthalene | 0.0927 | | 0.0388 | 1 | 09/18/2016 16:18 | WG908317 |
| Phenanthrene | 0.0787 | | 0.0388 | 1 | 09/18/2016 16:18 | WG908317 |
| Pyridine | ND | | 0.392 | 1 | 09/18/2016 16:18 | WG908317 |
| Bis(2-ethylhexyl)phthalate | ND | | 0.392 | 1 | 09/18/2016 16:18 | WG908317 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result (dry) mg/kg | Qualifier | RDL (dry) mg/kg | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Di-n-butyl phthalate | ND | | 0.392 | 1 | 09/18/2016 16:18 | WG908317 |
| Diethyl phthalate | ND | | 0.392 | 1 | 09/18/2016 16:18 | WG908317 |
| Pyrene | ND | | 0.0388 | 1 | 09/18/2016 16:18 | WG908317 |
| 2,4-Dimethylphenol | ND | | 0.392 | 1 | 09/18/2016 16:18 | WG908317 |
| 2,4-Dinitrophenol | ND | | 0.392 | 1 | 09/18/2016 16:18 | WG908317 |
| 2-Methylphenol | ND | | 0.392 | 1 | 09/18/2016 16:18 | WG908317 |
| 3&4-Methyl Phenol | ND | | 0.392 | 1 | 09/18/2016 16:18 | WG908317 |
| 4-Nitrophenol | ND | | 0.392 | 1 | 09/18/2016 16:18 | WG908317 |
| Phenol | ND | | 0.392 | 1 | 09/18/2016 16:18 | WG908317 |
| Quinoline | ND | | 0.392 | 1 | 09/19/2016 13:00 | WG908317 |
| *(S) 2-Fluorophenol* | *54.8* | | *21.1-116* | | *09/18/2016 16:18* | WG908317 |
| *(S) Phenol-d5* | *59.2* | | *26.3-121* | | *09/18/2016 16:18* | WG908317 |
| *(S) Nitrobenzene-d5* | *66.3* | | *21.9-129* | | *09/18/2016 16:18* | WG908317 |
| *(S) 2-Fluorobiphenyl* | *61.1* | | *34.9-129* | | *09/18/2016 16:18* | WG908317 |
| *(S) 2,4,6-Tribromophenol* | *97.8* | | *21.6-142* | | *09/18/2016 16:18* | WG908317 |
| *(S) p-Terphenyl-d14* | *57.7* | | *21.5-128* | | *09/18/2016 16:18* | WG908317 |

## Total Solids by Method 2540 G-2011

| Analyte | Result | Qualifier | Dilution | Analysis | Batch |
|---|---|---|---|---|---|
| | % | | | date / time | |
| Total Solids | 81.7 | | 1 | 09/16/2016 17:54 | WG908118 |

## Metals (ICP) by Method 6010B

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Cobalt | 6.83 | | 1.22 | 1 | 09/20/2016 13:45 | WG909293 |
| Lead | 349 | | 0.612 | 1 | 09/20/2016 13:45 | WG909293 |
| Nickel | 40.5 | | 2.45 | 1 | 09/20/2016 13:45 | WG909293 |
| Vanadium | 111 | | 2.45 | 1 | 09/20/2016 13:45 | WG909293 |
| Zinc | 84.5 | | 6.12 | 1 | 09/20/2016 13:45 | WG909293 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Benzene | ND | | 0.00122 | 1 | 09/26/2016 04:42 | WG909325 |
| sec-Butylbenzene | ND | | 0.00122 | 1 | 09/26/2016 04:42 | WG909325 |
| tert-Butylbenzene | ND | | 0.00122 | 1 | 09/26/2016 04:42 | WG909325 |
| Cyclohexane | ND | | 0.00122 | 1 | 09/26/2016 04:42 | WG909325 |
| 1,2-Dibromoethane | ND | | 0.00122 | 1 | 09/26/2016 04:42 | WG909325 |
| n-Hexane | ND | | 0.0122 | 1 | 09/26/2016 04:42 | WG909325 |
| 1,2-Dichloroethane | ND | | 0.00122 | 1 | 09/26/2016 04:42 | WG909325 |
| Ethylbenzene | ND | | 0.00122 | 1 | 09/26/2016 04:42 | WG909325 |
| Isopropylbenzene | ND | | 0.0122 | 1 | 09/26/2016 04:42 | WG909325 |
| Methyl tert-butyl ether | ND | | 0.00122 | 1 | 09/26/2016 04:42 | WG909325 |
| Toluene | ND | | 0.00612 | 1 | 09/26/2016 04:42 | WG909325 |
| 1,2,4-Trimethylbenzene | ND | | 0.00122 | 1 | 09/26/2016 04:42 | WG909325 |
| 1,3,5-Trimethylbenzene | ND | | 0.00122 | 1 | 09/26/2016 04:42 | WG909325 |
| Xylenes, Total | ND | | 0.00367 | 1 | 09/26/2016 04:42 | WG909325 |
| *(S) Toluene-d8* | *106* | | *88.7-115* | | *09/26/2016 04:42* | WG909325 |
| *(S) Dibromofluoromethane* | *99.4* | | *76.3-123* | | *09/26/2016 04:42* | WG909325 |
| *(S) α,α,α-Trifluorotoluene* | *99.9* | | *87.2-117* | | *09/26/2016 04:42* | WG909325 |
| *(S) 4-Bromofluorobenzene* | *95.7* | | *69.7-129* | | *09/26/2016 04:42* | WG909325 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Acenaphthene | ND | | 0.202 | 5 | 09/18/2016 22:57 | WG908317 |
| Anthracene | ND | | 0.202 | 5 | 09/18/2016 22:57 | WG908317 |
| Benzo(a)anthracene | ND | | 0.202 | 5 | 09/18/2016 22:57 | WG908317 |
| Benzo(b)fluoranthene | ND | | 0.202 | 5 | 09/18/2016 22:57 | WG908317 |
| Benzo(k)fluoranthene | ND | | 0.202 | 5 | 09/18/2016 22:57 | WG908317 |
| Benzo(g,h,i)perylene | 0.217 | | 0.202 | 5 | 09/18/2016 22:57 | WG908317 |
| Benzo(a)pyrene | ND | | 0.202 | 5 | 09/18/2016 22:57 | WG908317 |
| Biphenyl | ND | | 2.04 | 5 | 09/18/2016 22:57 | WG908317 |
| Chrysene | ND | | 0.202 | 5 | 09/18/2016 22:57 | WG908317 |
| Dibenz(a,h)anthracene | ND | | 0.202 | 5 | 09/18/2016 22:57 | WG908317 |
| Fluoranthene | ND | | 0.202 | 5 | 09/18/2016 22:57 | WG908317 |
| Fluorene | ND | | 0.202 | 5 | 09/18/2016 22:57 | WG908317 |
| Indeno(1,2,3-cd)pyrene | ND | | 0.202 | 5 | 09/18/2016 22:57 | WG908317 |
| 2-Methylnaphthalene | ND | | 0.202 | 5 | 09/18/2016 22:57 | WG908317 |
| Naphthalene | ND | | 0.202 | 5 | 09/18/2016 22:57 | WG908317 |
| Phenanthrene | 0.226 | | 0.202 | 5 | 09/18/2016 22:57 | WG908317 |
| Pyridine | ND | | 2.04 | 5 | 09/18/2016 22:57 | WG908317 |
| Bis(2-ethylhexyl)phthalate | ND | | 2.04 | 5 | 09/18/2016 22:57 | WG908317 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result (dry) mg/kg | Qualifier | RDL (dry) mg/kg | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Di-n-butyl phthalate | ND | | 2.04 | 5 | 09/18/2016 22:57 | WG908317 |
| Diethyl phthalate | ND | | 2.04 | 5 | 09/18/2016 22:57 | WG908317 |
| Pyrene | ND | | 0.202 | 5 | 09/18/2016 22:57 | WG908317 |
| 2,4-Dimethylphenol | ND | | 2.04 | 5 | 09/18/2016 22:57 | WG908317 |
| 2,4-Dinitrophenol | ND | | 2.04 | 5 | 09/18/2016 22:57 | WG908317 |
| 2-Methylphenol | ND | | 2.04 | 5 | 09/18/2016 22:57 | WG908317 |
| 3&4-Methyl Phenol | ND | | 2.04 | 5 | 09/18/2016 22:57 | WG908317 |
| 4-Nitrophenol | ND | | 2.04 | 5 | 09/18/2016 22:57 | WG908317 |
| Phenol | ND | | 2.04 | 5 | 09/18/2016 22:57 | WG908317 |
| Quinoline | ND | | 2.04 | 5 | 09/19/2016 15:36 | WG908317 |
| *(S) 2-Fluorophenol* | *52.5* | | *21.1-116* | | *09/18/2016 22:57* | WG908317 |
| *(S) Phenol-d5* | *52.0* | | *26.3-121* | | *09/18/2016 22:57* | WG908317 |
| *(S) Nitrobenzene-d5* | *49.7* | | *21.9-129* | | *09/18/2016 22:57* | WG908317 |
| *(S) 2-Fluorobiphenyl* | *52.7* | | *34.9-129* | | *09/18/2016 22:57* | WG908317 |
| *(S) 2,4,6-Tribromophenol* | *64.8* | | *21.6-142* | | *09/18/2016 22:57* | WG908317 |
| *(S) p-Terphenyl-d14* | *48.3* | | *21.5-128* | | *09/18/2016 22:57* | WG908317 |

Sample Narrative:

8270C L859570-03 WG908317: Dilution due to matrix

## Total Solids by Method 2540 G-2011

| Analyte | Result | Qualifier | Dilution | Analysis | Batch |
|---|---|---|---|---|---|
| | % | | | date / time | |
| Total Solids | 90.6 | | 1 | 09/16/2016 16:43 | WG908120 |

## Metals (ICP) by Method 6010B

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Cobalt | 2.70 | | 1.10 | 1 | 09/20/2016 13:47 | WG909293 |
| Lead | 4.10 | | 0.552 | 1 | 09/20/2016 13:47 | WG909293 |
| Nickel | 18.2 | | 2.21 | 1 | 09/20/2016 13:47 | WG909293 |
| Vanadium | 15.4 | | 2.21 | 1 | 09/20/2016 13:47 | WG909293 |
| Zinc | 15.6 | B | 5.52 | 1 | 09/20/2016 13:47 | WG909293 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Benzene | ND | | 0.0265 | 24 | 09/24/2016 01:59 | WG909325 |
| sec-Butylbenzene | ND | | 0.0265 | 24 | 09/24/2016 01:59 | WG909325 |
| tert-Butylbenzene | 0.0966 | | 0.0265 | 24 | 09/24/2016 01:59 | WG909325 |
| Cyclohexane | ND | | 0.0265 | 24 | 09/24/2016 01:59 | WG909325 |
| 1,2-Dibromoethane | ND | | 0.0265 | 24 | 09/24/2016 01:59 | WG909325 |
| n-Hexane | ND | | 0.265 | 24 | 09/24/2016 01:59 | WG909325 |
| 1,2-Dichloroethane | ND | | 0.0265 | 24 | 09/24/2016 01:59 | WG909325 |
| Ethylbenzene | ND | | 0.0265 | 24 | 09/24/2016 01:59 | WG909325 |
| Isopropylbenzene | ND | | 0.265 | 24 | 09/24/2016 01:59 | WG909325 |
| Methyl tert-butyl ether | ND | | 0.0265 | 24 | 09/24/2016 01:59 | WG909325 |
| Toluene | ND | | 0.132 | 24 | 09/24/2016 01:59 | WG909325 |
| 1,2,4-Trimethylbenzene | ND | | 0.0265 | 24 | 09/24/2016 01:59 | WG909325 |
| 1,3,5-Trimethylbenzene | ND | | 0.0265 | 24 | 09/24/2016 01:59 | WG909325 |
| Xylenes, Total | ND | | 0.0794 | 24 | 09/24/2016 01:59 | WG909325 |
| *(S) Toluene-d8* | *102* | | *88.7-115* | | *09/24/2016 01:59* | WG909325 |
| *(S) Dibromofluoromethane* | *93.8* | | *76.3-123* | | *09/24/2016 01:59* | WG909325 |
| *(S) a,a,a-Trifluorotoluene* | *115* | | *87.2-117* | | *09/24/2016 01:59* | WG909325 |
| *(S) 4-Bromofluorobenzene* | *75.8* | | *69.7-129* | | *09/24/2016 01:59* | WG909325 |

**Sample Narrative:**

8260B L859570-04 WG909325: Non-target compounds too high to run at a lower dilution.

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Acenaphthene | 0.143 | | 0.0364 | 1 | 09/18/2016 20:27 | WG908317 |
| Anthracene | ND | | 0.364 | 10 | 09/19/2016 14:41 | WG908317 |
| Benzo(a)anthracene | ND | | 0.364 | 10 | 09/19/2016 14:41 | WG908317 |
| Benzo(b)fluoranthene | ND | | 0.0364 | 1 | 09/18/2016 20:27 | WG908317 |
| Benzo(k)fluoranthene | ND | | 0.0364 | 1 | 09/18/2016 20:27 | WG908317 |
| Benzo(g,h,i)perylene | ND | | 0.0364 | 1 | 09/18/2016 20:27 | WG908317 |
| Benzo(a)pyrene | ND | | 0.0364 | 1 | 09/18/2016 20:27 | WG908317 |
| Biphenyl | ND | | 0.367 | 1 | 09/18/2016 20:27 | WG908317 |
| Chrysene | ND | | 0.364 | 10 | 09/19/2016 14:41 | WG908317 |
| Dibenz(a,h)anthracene | ND | | 0.0364 | 1 | 09/18/2016 20:27 | WG908317 |
| Fluoranthene | ND | | 0.364 | 10 | 09/19/2016 14:41 | WG908317 |
| Fluorene | 0.117 | | 0.0364 | 1 | 09/18/2016 20:27 | WG908317 |
| Indeno(1,2,3-cd)pyrene | ND | | 0.0364 | 1 | 09/18/2016 20:27 | WG908317 |
| 2-Methylnaphthalene | ND | | 0.0364 | 1 | 09/18/2016 20:27 | WG908317 |
| Naphthalene | ND | | 0.0364 | 1 | 09/18/2016 20:27 | WG908317 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result (dry) mg/kg | Qualifier | RDL (dry) mg/kg | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Phenanthrene | ND | | 0.364 | 10 | 09/19/2016 14:41 | WG908317 |
| Pyridine | ND | | 0.367 | 1 | 09/18/2016 20:27 | WG908317 |
| Bis(2-ethylhexyl)phthalate | ND | | 3.67 | 10 | 09/19/2016 14:41 | WG908317 |
| Di-n-butyl phthalate | ND | | 3.67 | 10 | 09/19/2016 14:41 | WG908317 |
| Diethyl phthalate | ND | | 0.367 | 1 | 09/18/2016 20:27 | WG908317 |
| Pyrene | ND | | 0.364 | 10 | 09/19/2016 14:41 | WG908317 |
| 2,4-Dimethylphenol | ND | | 0.367 | 1 | 09/18/2016 20:27 | WG908317 |
| 2,4-Dinitrophenol | ND | | 0.367 | 1 | 09/18/2016 20:27 | WG908317 |
| 2-Methylphenol | ND | | 0.367 | 1 | 09/18/2016 20:27 | WG908317 |
| 3&4-Methyl Phenol | ND | | 0.367 | 1 | 09/18/2016 20:27 | WG908317 |
| 4-Nitrophenol | ND | | 0.367 | 1 | 09/18/2016 20:27 | WG908317 |
| Phenol | ND | | 0.367 | 1 | 09/18/2016 20:27 | WG908317 |
| Quinoline | ND | | 3.67 | 10 | 09/19/2016 15:18 | WG908317 |
| *(S) 2-Fluorophenol* | *51.8* | | *21.1-116* | | *09/18/2016 20:27* | WG908317 |
| *(S) 2-Fluorophenol* | *57.4* | | *21.1-116* | | *09/19/2016 14:41* | WG908317 |
| *(S) Phenol-d5* | *63.3* | | *26.3-121* | | *09/19/2016 14:41* | WG908317 |
| *(S) Phenol-d5* | *57.1* | | *26.3-121* | | *09/18/2016 20:27* | WG908317 |
| *(S) Nitrobenzene-d5* | *62.5* | | *21.9-129* | | *09/18/2016 20:27* | WG908317 |
| *(S) Nitrobenzene-d5* | *71.8* | | *21.9-129* | | *09/19/2016 14:41* | WG908317 |
| *(S) 2-Fluorobiphenyl* | *69.0* | | *34.9-129* | | *09/19/2016 14:41* | WG908317 |
| *(S) 2-Fluorobiphenyl* | *53.3* | | *34.9-129* | | *09/18/2016 20:27* | WG908317 |
| *(S) 2,4,6-Tribromophenol* | *101* | | *21.6-142* | | *09/18/2016 20:27* | WG908317 |
| *(S) 2,4,6-Tribromophenol* | *83.9* | | *21.6-142* | | *09/19/2016 14:41* | WG908317 |
| *(S) p-Terphenyl-d14* | *69.6* | | *21.5-128* | | *09/19/2016 14:41* | WG908317 |
| *(S) p-Terphenyl-d14* | *64.4* | | *21.5-128* | | *09/18/2016 20:27* | WG908317 |

Sample Narrative:

8270C L859570-04 WG908317: IS/SURR failed on lower dilution.

8270C L859570-04 WG908317: Dilution due to matrix

## Total Solids by Method 2540 G-2011

| Analyte | Result | Qualifier | Dilution | Analysis | Batch |
|---|---|---|---|---|---|
| | % | | | date / time | |
| Total Solids | 78.4 | | 1 | 09/16/2016 16:43 | WG908120 |

## Metals (ICP) by Method 6010B

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Cobalt | 9.65 | | 1.28 | 1 | 09/20/2016 13:50 | WG909293 |
| Lead | 121 | | 0.638 | 1 | 09/20/2016 13:50 | WG909293 |
| Nickel | 14.9 | | 2.55 | 1 | 09/20/2016 13:50 | WG909293 |
| Vanadium | 35.9 | | 2.55 | 1 | 09/20/2016 13:50 | WG909293 |
| Zinc | 74.5 | | 6.38 | 1 | 09/20/2016 13:50 | WG909293 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Benzene | ND | | 0.00128 | 1 | 09/24/2016 02:21 | WG909325 |
| sec-Butylbenzene | ND | | 0.00128 | 1 | 09/24/2016 02:21 | WG909325 |
| tert-Butylbenzene | ND | | 0.00128 | 1 | 09/24/2016 02:21 | WG909325 |
| Cyclohexane | 0.00180 | | 0.00128 | 1 | 09/24/2016 02:21 | WG909325 |
| 1,2-Dibromoethane | ND | | 0.00128 | 1 | 09/24/2016 02:21 | WG909325 |
| n-Hexane | ND | | 0.0128 | 1 | 09/24/2016 02:21 | WG909325 |
| 1,2-Dichloroethane | ND | | 0.00128 | 1 | 09/24/2016 02:21 | WG909325 |
| Ethylbenzene | ND | | 0.00128 | 1 | 09/24/2016 02:21 | WG909325 |
| Isopropylbenzene | ND | | 0.0128 | 1 | 09/24/2016 02:21 | WG909325 |
| Methyl tert-butyl ether | ND | | 0.00128 | 1 | 09/24/2016 02:21 | WG909325 |
| Toluene | ND | | 0.00638 | 1 | 09/24/2016 02:21 | WG909325 |
| 1,2,4-Trimethylbenzene | ND | | 0.00128 | 1 | 09/24/2016 02:21 | WG909325 |
| 1,3,5-Trimethylbenzene | ND | | 0.00128 | 1 | 09/24/2016 02:21 | WG909325 |
| Xylenes, Total | ND | | 0.00383 | 1 | 09/24/2016 02:21 | WG909325 |
| *(S) Toluene-d8* | *107* | | *88.7-115* | | *09/24/2016 02:21* | WG909325 |
| *(S) Dibromofluoromethane* | *98.6* | | *76.3-123* | | *09/24/2016 02:21* | WG909325 |
| *(S) α,α,α-Trifluorotoluene* | *103* | | *87.2-117* | | *09/24/2016 02:21* | WG909325 |
| *(S) 4-Bromofluorobenzene* | *94.5* | | *69.7-129* | | *09/24/2016 02:21* | WG909325 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Acenaphthene | ND | | 0.0421 | 1 | 09/18/2016 19:12 | WG908317 |
| Anthracene | ND | | 0.0421 | 1 | 09/18/2016 19:12 | WG908317 |
| Benzo(a)anthracene | ND | | 0.0421 | 1 | 09/18/2016 19:12 | WG908317 |
| Benzo(b)fluoranthene | 0.0591 | | 0.0421 | 1 | 09/18/2016 19:12 | WG908317 |
| Benzo(k)fluoranthene | ND | | 0.0421 | 1 | 09/18/2016 19:12 | WG908317 |
| Benzo(g,h,i)perylene | ND | | 0.0421 | 1 | 09/18/2016 19:12 | WG908317 |
| Benzo(a)pyrene | 0.0426 | | 0.0421 | 1 | 09/18/2016 19:12 | WG908317 |
| Biphenyl | ND | | 0.425 | 1 | 09/18/2016 19:12 | WG908317 |
| Chrysene | ND | | 0.0421 | 1 | 09/18/2016 19:12 | WG908317 |
| Dibenz(a,h)anthracene | ND | | 0.0421 | 1 | 09/18/2016 19:12 | WG908317 |
| Fluoranthene | ND | | 0.0421 | 1 | 09/18/2016 19:12 | WG908317 |
| Fluorene | ND | | 0.0421 | 1 | 09/18/2016 19:12 | WG908317 |
| Indeno(1,2,3-cd)pyrene | ND | | 0.0421 | 1 | 09/18/2016 19:12 | WG908317 |
| 2-Methylnaphthalene | ND | | 0.0421 | 1 | 09/18/2016 19:12 | WG908317 |
| Naphthalene | ND | | 0.0421 | 1 | 09/18/2016 19:12 | WG908317 |
| Phenanthrene | ND | | 0.0421 | 1 | 09/18/2016 19:12 | WG908317 |
| Pyridine | ND | | 0.425 | 1 | 09/18/2016 19:12 | WG908317 |
| Bis(2-ethylhexyl)phthalate | ND | | 0.425 | 1 | 09/18/2016 19:12 | WG908317 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result (dry) mg/kg | Qualifier | RDL (dry) mg/kg | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Di-n-butyl phthalate | ND | | 0.425 | 1 | 09/18/2016 19:12 | WG908317 |
| Diethyl phthalate | ND | | 0.425 | 1 | 09/18/2016 19:12 | WG908317 |
| Pyrene | ND | | 0.0421 | 1 | 09/18/2016 19:12 | WG908317 |
| 2,4-Dimethylphenol | ND | | 0.425 | 1 | 09/18/2016 19:12 | WG908317 |
| 2,4-Dinitrophenol | ND | | 0.425 | 1 | 09/18/2016 19:12 | WG908317 |
| 2-Methylphenol | ND | | 0.425 | 1 | 09/18/2016 19:12 | WG908317 |
| 3&4-Methyl Phenol | ND | | 0.425 | 1 | 09/18/2016 19:12 | WG908317 |
| 4-Nitrophenol | ND | | 0.425 | 1 | 09/18/2016 19:12 | WG908317 |
| Phenol | ND | | 0.425 | 1 | 09/18/2016 19:12 | WG908317 |
| Quinoline | ND | | 0.425 | 1 | 09/19/2016 14:27 | WG908317 |
| *(S) 2-Fluorophenol* | *46.3* | | *21.1-116* | | *09/18/2016 19:12* | WG908317 |
| *(S) Phenol-d5* | *51.7* | | *26.3-121* | | *09/18/2016 19:12* | WG908317 |
| *(S) Nitrobenzene-d5* | *57.7* | | *21.9-129* | | *09/18/2016 19:12* | WG908317 |
| *(S) 2-Fluorobiphenyl* | *59.0* | | *34.9-129* | | *09/18/2016 19:12* | WG908317 |
| *(S) 2,4,6-Tribromophenol* | *74.3* | | *21.6-142* | | *09/18/2016 19:12* | WG908317 |
| *(S) p-Terphenyl-d14* | *42.8* | | *21.5-128* | | *09/18/2016 19:12* | WG908317 |

## Total Solids by Method 2540 G-2011

| Analyte | Result | Qualifier | Dilution | Analysis | Batch |
|---|---|---|---|---|---|
| | % | | | date / time | |
| Total Solids | 75.5 | | 1 | 09/16/2016 16:43 | WG908120 |

## Metals (ICP) by Method 6010B

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Cobalt | 5.03 | | 1.32 | 1 | 09/20/2016 13:52 | WG909293 |
| Lead | 371 | | 0.662 | 1 | 09/20/2016 13:52 | WG909293 |
| Nickel | 12.7 | | 2.65 | 1 | 09/20/2016 13:52 | WG909293 |
| Vanadium | 28.6 | | 2.65 | 1 | 09/20/2016 13:52 | WG909293 |
| Zinc | 149 | | 6.62 | 1 | 09/20/2016 13:52 | WG909293 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Benzene | 0.00494 | | 0.00132 | 1 | 09/24/2016 02:43 | WG909325 |
| sec-Butylbenzene | ND | | 0.00132 | 1 | 09/24/2016 02:43 | WG909325 |
| tert-Butylbenzene | ND | | 0.00132 | 1 | 09/24/2016 02:43 | WG909325 |
| Cyclohexane | ND | | 0.00132 | 1 | 09/24/2016 02:43 | WG909325 |
| 1,2-Dibromoethane | ND | | 0.00132 | 1 | 09/24/2016 02:43 | WG909325 |
| n-Hexane | ND | | 0.0132 | 1 | 09/24/2016 02:43 | WG909325 |
| 1,2-Dichloroethane | ND | | 0.00132 | 1 | 09/24/2016 02:43 | WG909325 |
| Ethylbenzene | ND | | 0.00132 | 1 | 09/24/2016 02:43 | WG909325 |
| Isopropylbenzene | ND | | 0.0132 | 1 | 09/24/2016 02:43 | WG909325 |
| Methyl tert-butyl ether | ND | | 0.00132 | 1 | 09/24/2016 02:43 | WG909325 |
| Toluene | ND | | 0.00662 | 1 | 09/24/2016 02:43 | WG909325 |
| 1,2,4-Trimethylbenzene | ND | | 0.00132 | 1 | 09/24/2016 02:43 | WG909325 |
| 1,3,5-Trimethylbenzene | ND | | 0.00132 | 1 | 09/24/2016 02:43 | WG909325 |
| Xylenes, Total | ND | | 0.00397 | 1 | 09/24/2016 02:43 | WG909325 |
| *(S) Toluene-d8* | *107* | | *88.7-115* | | *09/24/2016 02:43* | WG909325 |
| *(S) Dibromofluoromethane* | *97.9* | | *76.3-123* | | *09/24/2016 02:43* | WG909325 |
| *(S) a,a,a-Trifluorotoluene* | *100* | | *87.2-117* | | *09/24/2016 02:43* | WG909325 |
| *(S) 4-Bromofluorobenzene* | *97.3* | | *69.7-129* | | *09/24/2016 02:43* | WG909325 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Acenaphthene | ND | | 0.0437 | 1 | 09/18/2016 20:52 | WG908317 |
| Anthracene | 0.0735 | | 0.0437 | 1 | 09/18/2016 20:52 | WG908317 |
| Benzo(a)anthracene | 0.528 | | 0.0437 | 1 | 09/18/2016 20:52 | WG908317 |
| Benzo(b)fluoranthene | 0.747 | | 0.0437 | 1 | 09/18/2016 20:52 | WG908317 |
| Benzo(k)fluoranthene | 0.230 | | 0.0437 | 1 | 09/18/2016 20:52 | WG908317 |
| Benzo(g,h,i)perylene | 0.168 | | 0.0437 | 1 | 09/18/2016 20:52 | WG908317 |
| Benzo(a)pyrene | 0.545 | | 0.0437 | 1 | 09/18/2016 20:52 | WG908317 |
| Biphenyl | ND | | 0.441 | 1 | 09/18/2016 20:52 | WG908317 |
| Chrysene | 0.464 | | 0.0437 | 1 | 09/18/2016 20:52 | WG908317 |
| Dibenz(a,h)anthracene | 0.0681 | | 0.0437 | 1 | 09/18/2016 20:52 | WG908317 |
| Fluoranthene | 0.968 | | 0.0437 | 1 | 09/18/2016 20:52 | WG908317 |
| Fluorene | ND | | 0.0437 | 1 | 09/18/2016 20:52 | WG908317 |
| Indeno(1,2,3-cd)pyrene | 0.181 | | 0.0437 | 1 | 09/18/2016 20:52 | WG908317 |
| 2-Methylnaphthalene | ND | | 0.0437 | 1 | 09/18/2016 20:52 | WG908317 |
| Naphthalene | ND | | 0.0437 | 1 | 09/18/2016 20:52 | WG908317 |
| Phenanthrene | 0.258 | | 0.0437 | 1 | 09/18/2016 20:52 | WG908317 |
| Pyridine | ND | | 0.441 | 1 | 09/18/2016 20:52 | WG908317 |
| Bis(2-ethylhexyl)phthalate | ND | | 0.441 | 1 | 09/18/2016 20:52 | WG908317 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result (dry) mg/kg | Qualifier | RDL (dry) mg/kg | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Di-n-butyl phthalate | ND | | 0.441 | 1 | 09/18/2016 20:52 | WG908317 |
| Diethyl phthalate | ND | | 0.441 | 1 | 09/18/2016 20:52 | WG908317 |
| Pyrene | 0.705 | | 0.0437 | 1 | 09/18/2016 20:52 | WG908317 |
| 2,4-Dimethylphenol | ND | | 0.441 | 1 | 09/18/2016 20:52 | WG908317 |
| 2,4-Dinitrophenol | ND | | 0.441 | 1 | 09/18/2016 20:52 | WG908317 |
| 2-Methylphenol | ND | | 0.441 | 1 | 09/18/2016 20:52 | WG908317 |
| 3&4-Methyl Phenol | ND | | 0.441 | 1 | 09/18/2016 20:52 | WG908317 |
| 4-Nitrophenol | ND | | 0.441 | 1 | 09/18/2016 20:52 | WG908317 |
| Phenol | ND | | 0.441 | 1 | 09/18/2016 20:52 | WG908317 |
| Quinoline | ND | | 0.441 | 1 | 09/19/2016 15:01 | WG908317 |
| *(S) 2-Fluorophenol* | *43.3* | | *21.1-116* | | *09/18/2016 20:52* | WG908317 |
| *(S) Phenol-d5* | *46.5* | | *26.3-121* | | *09/18/2016 20:52* | WG908317 |
| *(S) Nitrobenzene-d5* | *50.4* | | *21.9-129* | | *09/18/2016 20:52* | WG908317 |
| *(S) 2-Fluorobiphenyl* | *53.1* | | *34.9-129* | | *09/18/2016 20:52* | WG908317 |
| *(S) 2,4,6-Tribromophenol* | *73.1* | | *21.6-142* | | *09/18/2016 20:52* | WG908317 |
| *(S) p-Terphenyl-d14* | *34.7* | | *21.5-128* | | *09/18/2016 20:52* | WG908317 |

## Total Solids by Method 2540 G-2011

| Analyte | Result | Qualifier | Dilution | Analysis | Batch |
|---|---|---|---|---|---|
| | % | | | date / time | |
| Total Solids | 76.5 | | 1 | 09/16/2016 16:43 | WG908120 |

## Metals (ICP) by Method 6010B

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Cobalt | 6.49 | | 1.31 | 1 | 09/20/2016 13:55 | WG909293 |
| Lead | 10.3 | | 0.654 | 1 | 09/20/2016 13:55 | WG909293 |
| Nickel | 14.7 | | 2.61 | 1 | 09/20/2016 13:55 | WG909293 |
| Vanadium | 35.5 | | 2.61 | 1 | 09/20/2016 13:55 | WG909293 |
| Zinc | 39.5 | | 6.54 | 1 | 09/20/2016 13:55 | WG909293 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Benzene | ND | | 0.00131 | 1 | 09/24/2016 03:05 | WG909325 |
| sec-Butylbenzene | ND | | 0.00131 | 1 | 09/24/2016 03:05 | WG909325 |
| tert-Butylbenzene | ND | | 0.00131 | 1 | 09/24/2016 03:05 | WG909325 |
| Cyclohexane | ND | | 0.00131 | 1 | 09/24/2016 03:05 | WG909325 |
| 1,2-Dibromoethane | ND | | 0.00131 | 1 | 09/24/2016 03:05 | WG909325 |
| n-Hexane | ND | | 0.0131 | 1 | 09/24/2016 03:05 | WG909325 |
| 1,2-Dichloroethane | ND | | 0.00131 | 1 | 09/24/2016 03:05 | WG909325 |
| Ethylbenzene | ND | | 0.00131 | 1 | 09/24/2016 03:05 | WG909325 |
| Isopropylbenzene | ND | | 0.0131 | 1 | 09/24/2016 03:05 | WG909325 |
| Methyl tert-butyl ether | ND | | 0.00131 | 1 | 09/24/2016 03:05 | WG909325 |
| Toluene | ND | | 0.00654 | 1 | 09/24/2016 03:05 | WG909325 |
| 1,2,4-Trimethylbenzene | ND | | 0.00131 | 1 | 09/24/2016 03:05 | WG909325 |
| 1,3,5-Trimethylbenzene | ND | | 0.00131 | 1 | 09/24/2016 03:05 | WG909325 |
| Xylenes, Total | ND | | 0.00392 | 1 | 09/24/2016 03:05 | WG909325 |
| *(S) Toluene-d8* | *105* | | *88.7-115* | | *09/24/2016 03:05* | WG909325 |
| *(S) Dibromofluoromethane* | *96.9* | | *76.3-123* | | *09/24/2016 03:05* | WG909325 |
| *(S) α,α,α-Trifluorotoluene* | *99.0* | | *87.2-117* | | *09/24/2016 03:05* | WG909325 |
| *(S) 4-Bromofluorobenzene* | *99.4* | | *69.7-129* | | *09/24/2016 03:05* | WG909325 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Acenaphthene | ND | | 0.0431 | 1 | 09/18/2016 16:43 | WG908317 |
| Anthracene | ND | | 0.0431 | 1 | 09/18/2016 16:43 | WG908317 |
| Benzo(a)anthracene | ND | | 0.0431 | 1 | 09/18/2016 16:43 | WG908317 |
| Benzo(b)fluoranthene | ND | | 0.0431 | 1 | 09/18/2016 16:43 | WG908317 |
| Benzo(k)fluoranthene | ND | | 0.0431 | 1 | 09/18/2016 16:43 | WG908317 |
| Benzo(g,h,i)perylene | ND | | 0.0431 | 1 | 09/18/2016 16:43 | WG908317 |
| Benzo(a)pyrene | ND | | 0.0431 | 1 | 09/18/2016 16:43 | WG908317 |
| Biphenyl | ND | | 0.435 | 1 | 09/18/2016 16:43 | WG908317 |
| Chrysene | ND | | 0.0431 | 1 | 09/18/2016 16:43 | WG908317 |
| Dibenz(a,h)anthracene | ND | | 0.0431 | 1 | 09/18/2016 16:43 | WG908317 |
| Fluoranthene | ND | | 0.0431 | 1 | 09/18/2016 16:43 | WG908317 |
| Fluorene | ND | | 0.0431 | 1 | 09/18/2016 16:43 | WG908317 |
| Indeno(1,2,3-cd)pyrene | ND | | 0.0431 | 1 | 09/18/2016 16:43 | WG908317 |
| 2-Methylnaphthalene | ND | | 0.0431 | 1 | 09/18/2016 16:43 | WG908317 |
| Naphthalene | ND | | 0.0431 | 1 | 09/18/2016 16:43 | WG908317 |
| Phenanthrene | ND | | 0.0431 | 1 | 09/18/2016 16:43 | WG908317 |
| Pyridine | ND | | 0.435 | 1 | 09/18/2016 16:43 | WG908317 |
| Bis(2-ethylhexyl)phthalate | ND | | 0.435 | 1 | 09/18/2016 16:43 | WG908317 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result (dry) mg/kg | Qualifier | RDL (dry) mg/kg | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Di-n-butyl phthalate | ND | | 0.435 | 1 | 09/18/2016 16:43 | WG908317 |
| Diethyl phthalate | ND | | 0.435 | 1 | 09/18/2016 16:43 | WG908317 |
| Pyrene | ND | | 0.0431 | 1 | 09/18/2016 16:43 | WG908317 |
| 2,4-Dimethylphenol | ND | | 0.435 | 1 | 09/18/2016 16:43 | WG908317 |
| 2,4-Dinitrophenol | ND | | 0.435 | 1 | 09/18/2016 16:43 | WG908317 |
| 2-Methylphenol | ND | | 0.435 | 1 | 09/18/2016 16:43 | WG908317 |
| 3&4-Methyl Phenol | ND | | 0.435 | 1 | 09/18/2016 16:43 | WG908317 |
| 4-Nitrophenol | ND | | 0.435 | 1 | 09/18/2016 16:43 | WG908317 |
| Phenol | ND | | 0.435 | 1 | 09/18/2016 16:43 | WG908317 |
| Quinoline | ND | | 0.435 | 1 | 09/19/2016 13:18 | WG908317 |
| *(S) 2-Fluorophenol* | *61.1* | | *21.1-116* | | *09/18/2016 16:43* | WG908317 |
| *(S) Phenol-d5* | *61.0* | | *26.3-121* | | *09/18/2016 16:43* | WG908317 |
| *(S) Nitrobenzene-d5* | *60.4* | | *21.9-129* | | *09/18/2016 16:43* | WG908317 |
| *(S) 2-Fluorobiphenyl* | *67.3* | | *34.9-129* | | *09/18/2016 16:43* | WG908317 |
| *(S) 2,4,6-Tribromophenol* | *88.4* | | *21.6-142* | | *09/18/2016 16:43* | WG908317 |
| *(S) p-Terphenyl-d14* | *70.0* | | *21.5-128* | | *09/18/2016 16:43* | WG908317 |

## Total Solids by Method 2540 G-2011

| Analyte | Result | Qualifier | Dilution | Analysis | Batch |
|---|---|---|---|---|---|
| | % | | | date / time | |
| Total Solids | 79.8 | | 1 | 09/16/2016 16:43 | WG908120 |

## Metals (ICP) by Method 6010B

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Cobalt | 7.56 | | 1.25 | 1 | 09/20/2016 13:58 | WG909293 |
| Lead | 11.8 | | 0.626 | 1 | 09/20/2016 13:58 | WG909293 |
| Nickel | 15.8 | | 2.50 | 1 | 09/20/2016 13:58 | WG909293 |
| Vanadium | 31.6 | | 2.50 | 1 | 09/20/2016 13:58 | WG909293 |
| Zinc | 42.5 | | 6.26 | 1 | 09/20/2016 13:58 | WG909293 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Benzene | ND | | 0.00125 | 1 | 09/24/2016 03:28 | WG909325 |
| sec-Butylbenzene | ND | | 0.00125 | 1 | 09/24/2016 03:28 | WG909325 |
| tert-Butylbenzene | ND | | 0.00125 | 1 | 09/24/2016 03:28 | WG909325 |
| Cyclohexane | ND | | 0.00125 | 1 | 09/24/2016 03:28 | WG909325 |
| 1,2-Dibromoethane | ND | | 0.00125 | 1 | 09/24/2016 03:28 | WG909325 |
| n-Hexane | ND | | 0.0125 | 1 | 09/24/2016 03:28 | WG909325 |
| 1,2-Dichloroethane | ND | | 0.00125 | 1 | 09/24/2016 03:28 | WG909325 |
| Ethylbenzene | ND | | 0.00125 | 1 | 09/24/2016 03:28 | WG909325 |
| Isopropylbenzene | ND | | 0.0125 | 1 | 09/24/2016 03:28 | WG909325 |
| Methyl tert-butyl ether | ND | | 0.00125 | 1 | 09/24/2016 03:28 | WG909325 |
| Toluene | ND | | 0.00626 | 1 | 09/24/2016 03:28 | WG909325 |
| 1,2,4-Trimethylbenzene | ND | | 0.00125 | 1 | 09/24/2016 03:28 | WG909325 |
| 1,3,5-Trimethylbenzene | ND | | 0.00125 | 1 | 09/24/2016 03:28 | WG909325 |
| Xylenes, Total | ND | | 0.00376 | 1 | 09/24/2016 03:28 | WG909325 |
| *(S) Toluene-d8* | *104* | | *88.7-115* | | *09/24/2016 03:28* | WG909325 |
| *(S) Dibromofluoromethane* | *96.4* | | *76.3-123* | | *09/24/2016 03:28* | WG909325 |
| *(S) α,α,α-Trifluorotoluene* | *101* | | *87.2-117* | | *09/24/2016 03:28* | WG909325 |
| *(S) 4-Bromofluorobenzene* | *92.7* | | *69.7-129* | | *09/24/2016 03:28* | WG909325 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Acenaphthene | ND | | 0.0413 | 1 | 09/18/2016 17:08 | WG908317 |
| Anthracene | ND | | 0.0413 | 1 | 09/18/2016 17:08 | WG908317 |
| Benzo(a)anthracene | ND | | 0.0413 | 1 | 09/18/2016 17:08 | WG908317 |
| Benzo(b)fluoranthene | ND | | 0.0413 | 1 | 09/18/2016 17:08 | WG908317 |
| Benzo(k)fluoranthene | ND | | 0.0413 | 1 | 09/18/2016 17:08 | WG908317 |
| Benzo(g,h,i)perylene | ND | | 0.0413 | 1 | 09/18/2016 17:08 | WG908317 |
| Benzo(a)pyrene | ND | | 0.0413 | 1 | 09/18/2016 17:08 | WG908317 |
| Biphenyl | ND | | 0.417 | 1 | 09/18/2016 17:08 | WG908317 |
| Chrysene | ND | | 0.0413 | 1 | 09/18/2016 17:08 | WG908317 |
| Dibenz(a,h)anthracene | ND | | 0.0413 | 1 | 09/18/2016 17:08 | WG908317 |
| Fluoranthene | ND | | 0.0413 | 1 | 09/18/2016 17:08 | WG908317 |
| Fluorene | ND | | 0.0413 | 1 | 09/18/2016 17:08 | WG908317 |
| Indeno(1,2,3-cd)pyrene | ND | | 0.0413 | 1 | 09/18/2016 17:08 | WG908317 |
| 2-Methylnaphthalene | ND | | 0.0413 | 1 | 09/18/2016 17:08 | WG908317 |
| Naphthalene | ND | | 0.0413 | 1 | 09/18/2016 17:08 | WG908317 |
| Phenanthrene | ND | | 0.0413 | 1 | 09/18/2016 17:08 | WG908317 |
| Pyridine | ND | | 0.417 | 1 | 09/18/2016 17:08 | WG908317 |
| Bis(2-ethylhexyl)phthalate | ND | | 0.417 | 1 | 09/18/2016 17:08 | WG908317 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result (dry) mg/kg | Qualifier | RDL (dry) mg/kg | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Di-n-butyl phthalate | ND | | 0.417 | 1 | 09/18/2016 17:08 | WG908317 |
| Diethyl phthalate | ND | | 0.417 | 1 | 09/18/2016 17:08 | WG908317 |
| Pyrene | ND | | 0.0413 | 1 | 09/18/2016 17:08 | WG908317 |
| 2,4-Dimethylphenol | ND | | 0.417 | 1 | 09/18/2016 17:08 | WG908317 |
| 2,4-Dinitrophenol | ND | | 0.417 | 1 | 09/18/2016 17:08 | WG908317 |
| 2-Methylphenol | ND | | 0.417 | 1 | 09/18/2016 17:08 | WG908317 |
| 3&4-Methyl Phenol | ND | | 0.417 | 1 | 09/18/2016 17:08 | WG908317 |
| 4-Nitrophenol | ND | | 0.417 | 1 | 09/18/2016 17:08 | WG908317 |
| Phenol | ND | | 0.417 | 1 | 09/18/2016 17:08 | WG908317 |
| Quinoline | ND | | 0.417 | 1 | 09/19/2016 13:35 | WG908317 |
| *(S) 2-Fluorophenol* | *52.9* | | *21.1-116* | | *09/18/2016 17:08* | WG908317 |
| *(S) Phenol-d5* | *55.1* | | *26.3-121* | | *09/18/2016 17:08* | WG908317 |
| *(S) Nitrobenzene-d5* | *52.8* | | *21.9-129* | | *09/18/2016 17:08* | WG908317 |
| *(S) 2-Fluorobiphenyl* | *56.5* | | *34.9-129* | | *09/18/2016 17:08* | WG908317 |
| *(S) 2,4,6-Tribromophenol* | *79.0* | | *21.6-142* | | *09/18/2016 17:08* | WG908317 |
| *(S) p-Terphenyl-d14* | *64.0* | | *21.5-128* | | *09/18/2016 17:08* | WG908317 |

## Total Solids by Method 2540 G-2011

| Analyte | Result | Qualifier | Dilution | Analysis | Batch |
|---|---|---|---|---|---|
| | % | | | date / time | |
| Total Solids | 78.5 | | 1 | 09/16/2016 16:43 | WG908120 |

## Metals (ICP) by Method 6010B

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Cobalt | 4.20 | | 1.27 | 1 | 09/20/2016 14:00 | WG909293 |
| Lead | 26.7 | | 0.637 | 1 | 09/20/2016 14:00 | WG909293 |
| Nickel | 15.5 | | 2.55 | 1 | 09/20/2016 14:00 | WG909293 |
| Vanadium | 47.4 | | 2.55 | 1 | 09/20/2016 14:00 | WG909293 |
| Zinc | 53.5 | | 6.37 | 1 | 09/20/2016 14:00 | WG909293 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Benzene | ND | | 0.00127 | 1 | 09/24/2016 03:50 | WG909325 |
| sec-Butylbenzene | ND | | 0.00127 | 1 | 09/24/2016 03:50 | WG909325 |
| tert-Butylbenzene | ND | | 0.00127 | 1 | 09/24/2016 03:50 | WG909325 |
| Cyclohexane | ND | | 0.00127 | 1 | 09/24/2016 03:50 | WG909325 |
| 1,2-Dibromoethane | ND | | 0.00127 | 1 | 09/24/2016 03:50 | WG909325 |
| n-Hexane | ND | | 0.0127 | 1 | 09/24/2016 03:50 | WG909325 |
| 1,2-Dichloroethane | ND | | 0.00127 | 1 | 09/24/2016 03:50 | WG909325 |
| Ethylbenzene | ND | | 0.00127 | 1 | 09/24/2016 03:50 | WG909325 |
| Isopropylbenzene | ND | | 0.0127 | 1 | 09/24/2016 03:50 | WG909325 |
| Methyl tert-butyl ether | ND | | 0.00127 | 1 | 09/24/2016 03:50 | WG909325 |
| Toluene | ND | | 0.00637 | 1 | 09/24/2016 03:50 | WG909325 |
| 1,2,4-Trimethylbenzene | ND | | 0.00127 | 1 | 09/24/2016 03:50 | WG909325 |
| 1,3,5-Trimethylbenzene | ND | | 0.00127 | 1 | 09/24/2016 03:50 | WG909325 |
| Xylenes, Total | ND | | 0.00382 | 1 | 09/24/2016 03:50 | WG909325 |
| *(S) Toluene-d8* | *108* | | *88.7-115* | | *09/24/2016 03:50* | WG909325 |
| *(S) Dibromofluoromethane* | *100* | | *76.3-123* | | *09/24/2016 03:50* | WG909325 |
| *(S) α,α,α-Trifluorotoluene* | *102* | | *87.2-117* | | *09/24/2016 03:50* | WG909325 |
| *(S) 4-Bromofluorobenzene* | *95.2* | | *69.7-129* | | *09/24/2016 03:50* | WG909325 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Acenaphthene | ND | | 0.0421 | 1 | 09/18/2016 18:48 | WG908317 |
| Anthracene | ND | | 0.0421 | 1 | 09/18/2016 18:48 | WG908317 |
| Benzo(a)anthracene | ND | | 0.0421 | 1 | 09/18/2016 18:48 | WG908317 |
| Benzo(b)fluoranthene | ND | | 0.0421 | 1 | 09/18/2016 18:48 | WG908317 |
| Benzo(k)fluoranthene | ND | | 0.0421 | 1 | 09/18/2016 18:48 | WG908317 |
| Benzo(g,h,i)perylene | ND | | 0.0421 | 1 | 09/18/2016 18:48 | WG908317 |
| Benzo(a)pyrene | ND | | 0.0421 | 1 | 09/18/2016 18:48 | WG908317 |
| Biphenyl | ND | | 0.424 | 1 | 09/18/2016 18:48 | WG908317 |
| Chrysene | ND | | 0.0421 | 1 | 09/18/2016 18:48 | WG908317 |
| Dibenz(a,h)anthracene | ND | | 0.0421 | 1 | 09/18/2016 18:48 | WG908317 |
| Fluoranthene | ND | | 0.0421 | 1 | 09/18/2016 18:48 | WG908317 |
| Fluorene | ND | | 0.0421 | 1 | 09/18/2016 18:48 | WG908317 |
| Indeno(1,2,3-cd)pyrene | ND | | 0.0421 | 1 | 09/18/2016 18:48 | WG908317 |
| 2-Methylnaphthalene | ND | | 0.0421 | 1 | 09/18/2016 18:48 | WG908317 |
| Naphthalene | ND | | 0.0421 | 1 | 09/18/2016 18:48 | WG908317 |
| Phenanthrene | ND | | 0.0421 | 1 | 09/18/2016 18:48 | WG908317 |
| Pyridine | ND | | 0.424 | 1 | 09/18/2016 18:48 | WG908317 |
| Bis(2-ethylhexyl)phthalate | ND | | 0.424 | 1 | 09/18/2016 18:48 | WG908317 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result (dry) mg/kg | Qualifier | RDL (dry) mg/kg | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Di-n-butyl phthalate | ND | | 0.424 | 1 | 09/18/2016 18:48 | WG908317 |
| Diethyl phthalate | ND | | 0.424 | 1 | 09/18/2016 18:48 | WG908317 |
| Pyrene | ND | | 0.0421 | 1 | 09/18/2016 18:48 | WG908317 |
| 2,4-Dimethylphenol | ND | | 0.424 | 1 | 09/18/2016 18:48 | WG908317 |
| 2,4-Dinitrophenol | ND | | 0.424 | 1 | 09/18/2016 18:48 | WG908317 |
| 2-Methylphenol | ND | | 0.424 | 1 | 09/18/2016 18:48 | WG908317 |
| 3&4-Methyl Phenol | ND | | 0.424 | 1 | 09/18/2016 18:48 | WG908317 |
| 4-Nitrophenol | ND | | 0.424 | 1 | 09/18/2016 18:48 | WG908317 |
| Phenol | ND | | 0.424 | 1 | 09/18/2016 18:48 | WG908317 |
| Quinoline | ND | | 0.424 | 1 | 09/19/2016 14:09 | WG908317 |
| *(S) 2-Fluorophenol* | *50.1* | | *21.1-116* | | *09/18/2016 18:48* | WG908317 |
| *(S) Phenol-d5* | *50.8* | | *26.3-121* | | *09/18/2016 18:48* | WG908317 |
| *(S) Nitrobenzene-d5* | *51.8* | | *21.9-129* | | *09/18/2016 18:48* | WG908317 |
| *(S) 2-Fluorobiphenyl* | *60.7* | | *34.9-129* | | *09/18/2016 18:48* | WG908317 |
| *(S) 2,4,6-Tribromophenol* | *87.9* | | *21.6-142* | | *09/18/2016 18:48* | WG908317 |
| *(S) p-Terphenyl-d14* | *67.2* | | *21.5-128* | | *09/18/2016 18:48* | WG908317 |

## Total Solids by Method 2540 G-2011

| Analyte | Result | Qualifier | Dilution | Analysis | Batch |
|---|---|---|---|---|---|
| | % | | | date / time | |
| Total Solids | 80.3 | | 1 | 09/16/2016 16:43 | WG908120 |

## Metals (ICP) by Method 6010B

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Cobalt | 7.10 | | 1.24 | 1 | 09/20/2016 14:03 | WG909293 |
| Lead | 49.8 | | 0.622 | 1 | 09/20/2016 14:03 | WG909293 |
| Nickel | 18.5 | | 2.49 | 1 | 09/20/2016 14:03 | WG909293 |
| Vanadium | 37.7 | | 2.49 | 1 | 09/20/2016 14:03 | WG909293 |
| Zinc | 63.4 | | 6.22 | 1 | 09/20/2016 14:03 | WG909293 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Benzene | ND | | 0.00124 | 1 | 09/24/2016 15:09 | WG909327 |
| sec-Butylbenzene | ND | | 0.00124 | 1 | 09/24/2016 15:09 | WG909327 |
| tert-Butylbenzene | ND | | 0.00124 | 1 | 09/24/2016 15:09 | WG909327 |
| Cyclohexane | ND | | 0.00124 | 1 | 09/24/2016 15:09 | WG909327 |
| 1,2-Dibromoethane | ND | | 0.00124 | 1 | 09/24/2016 15:09 | WG909327 |
| n-Hexane | ND | | 0.0124 | 1 | 09/24/2016 15:09 | WG909327 |
| 1,2-Dichloroethane | ND | | 0.00124 | 1 | 09/24/2016 15:09 | WG909327 |
| Ethylbenzene | ND | | 0.00124 | 1 | 09/24/2016 15:09 | WG909327 |
| Isopropylbenzene | ND | | 0.0124 | 1 | 09/24/2016 15:09 | WG909327 |
| Methyl tert-butyl ether | ND | | 0.00124 | 1 | 09/24/2016 15:09 | WG909327 |
| Toluene | ND | | 0.00622 | 1 | 09/24/2016 15:09 | WG909327 |
| 1,2,4-Trimethylbenzene | 0.00539 | | 0.00124 | 1 | 09/24/2016 15:09 | WG909327 |
| 1,3,5-Trimethylbenzene | 0.00186 | | 0.00124 | 1 | 09/24/2016 15:09 | WG909327 |
| Xylenes, Total | ND | | 0.00373 | 1 | 09/24/2016 15:09 | WG909327 |
| *(S) Toluene-d8* | *106* | | *88.7-115* | | *09/24/2016 15:09* | WG909327 |
| *(S) Dibromofluoromethane* | *112* | | *76.3-123* | | *09/24/2016 15:09* | WG909327 |
| *(S) α,α,α-Trifluorotoluene* | *98.2* | | *87.2-117* | | *09/24/2016 15:09* | WG909327 |
| *(S) 4-Bromofluorobenzene* | *89.8* | | *69.7-129* | | *09/24/2016 15:09* | WG909327 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Acenaphthene | ND | | 0.0411 | 1 | 09/18/2016 20:02 | WG908317 |
| Anthracene | ND | | 0.0411 | 1 | 09/18/2016 20:02 | WG908317 |
| Benzo(a)anthracene | 0.115 | | 0.0411 | 1 | 09/18/2016 20:02 | WG908317 |
| Benzo(b)fluoranthene | 0.148 | | 0.0411 | 1 | 09/18/2016 20:02 | WG908317 |
| Benzo(k)fluoranthene | 0.0448 | | 0.0411 | 1 | 09/18/2016 20:02 | WG908317 |
| Benzo(g,h,i)perylene | 0.0471 | | 0.0411 | 1 | 09/18/2016 20:02 | WG908317 |
| Benzo(a)pyrene | 0.112 | | 0.0411 | 1 | 09/18/2016 20:02 | WG908317 |
| Biphenyl | ND | | 0.415 | 1 | 09/18/2016 20:02 | WG908317 |
| Chrysene | 0.101 | | 0.0411 | 1 | 09/18/2016 20:02 | WG908317 |
| Dibenz(a,h)anthracene | ND | | 0.0411 | 1 | 09/18/2016 20:02 | WG908317 |
| Fluoranthene | 0.165 | | 0.0411 | 1 | 09/18/2016 20:02 | WG908317 |
| Fluorene | ND | | 0.0411 | 1 | 09/18/2016 20:02 | WG908317 |
| Indeno(1,2,3-cd)pyrene | 0.0452 | | 0.0411 | 1 | 09/18/2016 20:02 | WG908317 |
| 2-Methylnaphthalene | ND | | 0.0411 | 1 | 09/18/2016 20:02 | WG908317 |
| Naphthalene | ND | | 0.0411 | 1 | 09/18/2016 20:02 | WG908317 |
| Phenanthrene | ND | | 0.0411 | 1 | 09/18/2016 20:02 | WG908317 |
| Pyridine | ND | | 0.415 | 1 | 09/18/2016 20:02 | WG908317 |
| Bis(2-ethylhexyl)phthalate | ND | | 0.415 | 1 | 09/18/2016 20:02 | WG908317 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result (dry) mg/kg | Qualifier | RDL (dry) mg/kg | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Di-n-butyl phthalate | ND | | 0.415 | 1 | 09/18/2016 20:02 | WG908317 |
| Diethyl phthalate | ND | | 0.415 | 1 | 09/18/2016 20:02 | WG908317 |
| Pyrene | 0.131 | | 0.0411 | 1 | 09/18/2016 20:02 | WG908317 |
| 2,4-Dimethylphenol | ND | | 0.415 | 1 | 09/18/2016 20:02 | WG908317 |
| 2,4-Dinitrophenol | ND | | 0.415 | 1 | 09/18/2016 20:02 | WG908317 |
| 2-Methylphenol | ND | | 0.415 | 1 | 09/18/2016 20:02 | WG908317 |
| 3&4-Methyl Phenol | ND | | 0.415 | 1 | 09/18/2016 20:02 | WG908317 |
| 4-Nitrophenol | ND | | 0.415 | 1 | 09/18/2016 20:02 | WG908317 |
| Phenol | ND | | 0.415 | 1 | 09/18/2016 20:02 | WG908317 |
| Quinoline | ND | | 0.415 | 1 | 09/19/2016 14:44 | WG908317 |
| *(S) 2-Fluorophenol* | *59.5* | | *21.1-116* | | *09/18/2016 20:02* | WG908317 |
| *(S) Phenol-d5* | *61.9* | | *26.3-121* | | *09/18/2016 20:02* | WG908317 |
| *(S) Nitrobenzene-d5* | *60.5* | | *21.9-129* | | *09/18/2016 20:02* | WG908317 |
| *(S) 2-Fluorobiphenyl* | *68.5* | | *34.9-129* | | *09/18/2016 20:02* | WG908317 |
| *(S) 2,4,6-Tribromophenol* | *96.0* | | *21.6-142* | | *09/18/2016 20:02* | WG908317 |
| *(S) p-Terphenyl-d14* | *64.0* | | *21.5-128* | | *09/18/2016 20:02* | WG908317 |

## Total Solids by Method 2540 G-2011

| Analyte | Result | Qualifier | Dilution | Analysis | Batch |
|---|---|---|---|---|---|
| | % | | | date / time | |
| Total Solids | 76.7 | | 1 | 09/16/2016 16:43 | WG908120 |

## Metals (ICP) by Method 6010B

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Cobalt | 13.3 | | 1.30 | 1 | 09/20/2016 14:06 | WG909293 |
| Lead | 124 | | 0.652 | 1 | 09/20/2016 14:06 | WG909293 |
| Nickel | 28.7 | | 2.61 | 1 | 09/20/2016 14:06 | WG909293 |
| Vanadium | 64.1 | | 2.61 | 1 | 09/20/2016 14:06 | WG909293 |
| Zinc | 149 | | 6.52 | 1 | 09/20/2016 14:06 | WG909293 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Benzene | 0.116 | | 0.0320 | 24.5 | 09/24/2016 03:18 | WG909327 |
| sec-Butylbenzene | 0.0821 | | 0.0320 | 24.5 | 09/24/2016 03:18 | WG909327 |
| tert-Butylbenzene | 0.150 | | 0.0320 | 24.5 | 09/24/2016 03:18 | WG909327 |
| Cyclohexane | 0.683 | | 0.0320 | 24.5 | 09/24/2016 03:18 | WG909327 |
| 1,2-Dibromoethane | ND | | 0.0320 | 24.5 | 09/24/2016 03:18 | WG909327 |
| n-Hexane | ND | J3 J6 | 0.320 | 24.5 | 09/24/2016 03:18 | WG909327 |
| 1,2-Dichloroethane | ND | | 0.0320 | 24.5 | 09/24/2016 03:18 | WG909327 |
| Ethylbenzene | 0.0375 | | 0.0320 | 24.5 | 09/24/2016 03:18 | WG909327 |
| Isopropylbenzene | ND | | 0.320 | 24.5 | 09/24/2016 03:18 | WG909327 |
| Methyl tert-butyl ether | ND | | 0.0320 | 24.5 | 09/24/2016 03:18 | WG909327 |
| Toluene | ND | | 0.160 | 24.5 | 09/24/2016 03:18 | WG909327 |
| 1,2,4-Trimethylbenzene | 0.0713 | | 0.0320 | 24.5 | 09/24/2016 03:18 | WG909327 |
| 1,3,5-Trimethylbenzene | ND | | 0.0320 | 24.5 | 09/24/2016 03:18 | WG909327 |
| Xylenes, Total | 0.125 | | 0.0959 | 24.5 | 09/24/2016 03:18 | WG909327 |
| *(S) Toluene-d8* | *107* | | *88.7-115* | | *09/24/2016 03:18* | WG909327 |
| *(S) Dibromofluoromethane* | *99.8* | | *76.3-123* | | *09/24/2016 03:18* | WG909327 |
| *(S) a,a,a-Trifluorotoluene* | *98.2* | | *87.2-117* | | *09/24/2016 03:18* | WG909327 |
| *(S) 4-Bromofluorobenzene* | *96.2* | | *69.7-129* | | *09/24/2016 03:18* | WG909327 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Acenaphthene | ND | | 0.430 | 10 | 09/19/2016 15:06 | WG908317 |
| Anthracene | ND | | 0.430 | 10 | 09/19/2016 15:06 | WG908317 |
| Benzo(a)anthracene | ND | | 4.30 | 100 | 09/20/2016 12:46 | WG908317 |
| Benzo(b)fluoranthene | ND | | 4.30 | 100 | 09/20/2016 12:46 | WG908317 |
| Benzo(k)fluoranthene | ND | | 4.30 | 100 | 09/20/2016 12:46 | WG908317 |
| Benzo(g,h,i)perylene | ND | | 4.30 | 100 | 09/20/2016 12:46 | WG908317 |
| Benzo(a)pyrene | ND | | 4.30 | 100 | 09/20/2016 12:46 | WG908317 |
| Biphenyl | ND | | 4.34 | 10 | 09/19/2016 15:06 | WG908317 |
| Chrysene | ND | | 4.30 | 100 | 09/20/2016 12:46 | WG908317 |
| Dibenz(a,h)anthracene | ND | | 4.30 | 100 | 09/20/2016 12:46 | WG908317 |
| Fluoranthene | ND | | 0.430 | 10 | 09/19/2016 15:06 | WG908317 |
| Fluorene | 0.517 | | 0.430 | 10 | 09/19/2016 15:06 | WG908317 |
| Indeno(1,2,3-cd)pyrene | ND | | 4.30 | 100 | 09/20/2016 12:46 | WG908317 |
| 2-Methylnaphthalene | 1.56 | | 0.430 | 10 | 09/19/2016 15:06 | WG908317 |
| Naphthalene | ND | | 0.430 | 10 | 09/19/2016 15:06 | WG908317 |
| Phenanthrene | 1.26 | | 0.430 | 10 | 09/19/2016 15:06 | WG908317 |
| Pyridine | ND | | 4.34 | 10 | 09/19/2016 15:06 | WG908317 |
| Bis(2-ethylhexyl)phthalate | ND | | 43.4 | 100 | 09/20/2016 12:46 | WG908317 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result (dry) mg/kg | Qualifier | RDL (dry) mg/kg | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Di-n-butyl phthalate | ND | | 4.34 | 10 | 09/19/2016 15:06 | WG908317 |
| Diethyl phthalate | ND | | 4.34 | 10 | 09/19/2016 15:06 | WG908317 |
| Pyrene | ND | | 4.30 | 100 | 09/20/2016 12:46 | WG908317 |
| 2,4-Dimethylphenol | ND | | 4.34 | 10 | 09/19/2016 15:06 | WG908317 |
| 2,4-Dinitrophenol | ND | | 4.34 | 10 | 09/19/2016 15:06 | WG908317 |
| 2-Methylphenol | ND | | 4.34 | 10 | 09/19/2016 15:06 | WG908317 |
| 3&4-Methyl Phenol | ND | | 4.34 | 10 | 09/19/2016 15:06 | WG908317 |
| 4-Nitrophenol | ND | | 4.34 | 10 | 09/19/2016 15:06 | WG908317 |
| Phenol | ND | | 4.34 | 10 | 09/19/2016 15:06 | WG908317 |
| Quinoline | ND | | 4.34 | 10 | 09/19/2016 16:10 | WG908317 |
| *(S) 2-Fluorophenol* | *58.7* | | *21.1-116* | | *09/19/2016 15:06* | WG908317 |
| *(S) 2-Fluorophenol* | *53.5* | J7 | *21.1-116* | | *09/20/2016 12:46* | WG908317 |
| *(S) Phenol-d5* | *73.6* | J7 | *26.3-121* | | *09/20/2016 12:46* | WG908317 |
| *(S) Phenol-d5* | *59.0* | | *26.3-121* | | *09/19/2016 15:06* | WG908317 |
| *(S) Nitrobenzene-d5* | *73.4* | | *21.9-129* | | *09/19/2016 15:06* | WG908317 |
| *(S) Nitrobenzene-d5* | *81.3* | J7 | *21.9-129* | | *09/20/2016 12:46* | WG908317 |
| *(S) 2-Fluorobiphenyl* | *87.1* | J7 | *34.9-129* | | *09/20/2016 12:46* | WG908317 |
| *(S) 2-Fluorobiphenyl* | *67.9* | | *34.9-129* | | *09/19/2016 15:06* | WG908317 |
| *(S) 2,4,6-Tribromophenol* | *79.9* | | *21.6-142* | | *09/19/2016 15:06* | WG908317 |
| *(S) 2,4,6-Tribromophenol* | *80.1* | J7 | *21.6-142* | | *09/20/2016 12:46* | WG908317 |
| *(S) p-Terphenyl-d14* | *88.6* | J7 | *21.5-128* | | *09/20/2016 12:46* | WG908317 |
| *(S) p-Terphenyl-d14* | *61.1* | | *21.5-128* | | *09/19/2016 15:06* | WG908317 |

Sample Narrative:

8270C L859570-11 WG908317: Dilution due to matrix

8270C L859570-11 WG908317: IS/SURR failed on lower dilution.

## Total Solids by Method 2540 G-2011

| Analyte | Result | Qualifier | Dilution | Analysis | Batch |
|---|---|---|---|---|---|
| | % | | | date / time | |
| Total Solids | 66.0 | | 1 | 09/16/2016 16:43 | WG908120 |

## Metals (ICP) by Method 6010B

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Cobalt | 21.6 | | 1.51 | 1 | 09/20/2016 14:08 | WG909293 |
| Lead | 1660 | | 0.757 | 1 | 09/20/2016 14:08 | WG909293 |
| Nickel | 49.4 | | 3.03 | 1 | 09/20/2016 14:08 | WG909293 |
| Vanadium | 52.3 | | 3.03 | 1 | 09/20/2016 14:08 | WG909293 |
| Zinc | 549 | | 7.57 | 1 | 09/20/2016 14:08 | WG909293 |

## Volatile Organic Compounds (GC/MS) by Method 8260B

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Benzene | ND | | 1.34 | 885 | 09/24/2016 15:30 | WG909327 |
| sec-Butylbenzene | 1.73 | | 1.34 | 885 | 09/24/2016 15:30 | WG909327 |
| tert-Butylbenzene | ND | | 1.34 | 885 | 09/24/2016 15:30 | WG909327 |
| Cyclohexane | 6.53 | | 1.34 | 885 | 09/24/2016 15:30 | WG909327 |
| 1,2-Dibromoethane | ND | | 1.34 | 885 | 09/24/2016 15:30 | WG909327 |
| n-Hexane | ND | | 13.4 | 885 | 09/24/2016 15:30 | WG909327 |
| 1,2-Dichloroethane | ND | | 1.34 | 885 | 09/24/2016 15:30 | WG909327 |
| Ethylbenzene | ND | | 1.34 | 885 | 09/24/2016 15:30 | WG909327 |
| Isopropylbenzene | 15.6 | | 13.4 | 885 | 09/24/2016 15:30 | WG909327 |
| Methyl tert-butyl ether | ND | | 1.34 | 885 | 09/24/2016 15:30 | WG909327 |
| Toluene | ND | | 6.70 | 885 | 09/24/2016 15:30 | WG909327 |
| 1,2,4-Trimethylbenzene | 11.4 | | 1.34 | 885 | 09/24/2016 15:30 | WG909327 |
| 1,3,5-Trimethylbenzene | 2.70 | | 1.34 | 885 | 09/24/2016 15:30 | WG909327 |
| Xylenes, Total | 8.86 | | 4.02 | 885 | 09/24/2016 15:30 | WG909327 |
| *(S) Toluene-d8* | *108* | | *88.7-115* | | *09/24/2016 15:30* | WG909327 |
| *(S) Dibromofluoromethane* | *104* | | *76.3-123* | | *09/24/2016 15:30* | WG909327 |
| *(S) α,α,α-Trifluorotoluene* | *101* | | *87.2-117* | | *09/24/2016 15:30* | WG909327 |
| *(S) 4-Bromofluorobenzene* | *92.4* | | *69.7-129* | | *09/24/2016 15:30* | WG909327 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result (dry) | Qualifier | RDL (dry) | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/kg | | mg/kg | | date / time | |
| Acenaphthene | 8.39 | | 2.50 | 50 | 09/19/2016 15:56 | WG908317 |
| Anthracene | 4.10 | | 2.50 | 50 | 09/19/2016 15:56 | WG908317 |
| Benzo(a)anthracene | ND | | 5.00 | 100 | 09/19/2016 16:46 | WG908317 |
| Benzo(b)fluoranthene | 3.32 | | 2.50 | 50 | 09/19/2016 15:56 | WG908317 |
| Benzo(k)fluoranthene | ND | | 2.50 | 50 | 09/19/2016 15:56 | WG908317 |
| Benzo(g,h,i)perylene | ND | | 2.50 | 50 | 09/19/2016 15:56 | WG908317 |
| Benzo(a)pyrene | 3.58 | | 2.50 | 50 | 09/19/2016 15:56 | WG908317 |
| Biphenyl | ND | | 25.2 | 50 | 09/19/2016 15:56 | WG908317 |
| Chrysene | 5.60 | | 5.00 | 100 | 09/19/2016 16:46 | WG908317 |
| Dibenz(a,h)anthracene | ND | | 2.50 | 50 | 09/19/2016 15:56 | WG908317 |
| Fluoranthene | 5.17 | | 2.50 | 50 | 09/19/2016 15:56 | WG908317 |
| Fluorene | 10.6 | | 2.50 | 50 | 09/19/2016 15:56 | WG908317 |
| Indeno(1,2,3-cd)pyrene | ND | | 2.50 | 50 | 09/19/2016 15:56 | WG908317 |
| 2-Methylnaphthalene | 145 | | 5.00 | 100 | 09/19/2016 16:46 | WG908317 |
| Naphthalene | 10.4 | | 2.50 | 50 | 09/19/2016 15:56 | WG908317 |
| Phenanthrene | 24.5 | | 2.50 | 50 | 09/19/2016 15:56 | WG908317 |
| Pyridine | ND | | 25.2 | 50 | 09/19/2016 15:56 | WG908317 |
| Bis(2-ethylhexyl)phthalate | ND | | 50.4 | 100 | 09/19/2016 16:46 | WG908317 |

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C

| Analyte | Result (dry) mg/kg | Qualifier | RDL (dry) mg/kg | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Di-n-butyl phthalate | ND | | 25.2 | 50 | 09/19/2016 15:56 | WG908317 |
| Diethyl phthalate | ND | | 25.2 | 50 | 09/19/2016 15:56 | WG908317 |
| Pyrene | 7.49 | | 5.00 | 100 | 09/19/2016 16:46 | WG908317 |
| 2,4-Dimethylphenol | ND | | 25.2 | 50 | 09/19/2016 15:56 | WG908317 |
| 2,4-Dinitrophenol | ND | | 25.2 | 50 | 09/19/2016 15:56 | WG908317 |
| 2-Methylphenol | ND | | 25.2 | 50 | 09/19/2016 15:56 | WG908317 |
| 3&4-Methyl Phenol | ND | | 25.2 | 50 | 09/19/2016 15:56 | WG908317 |
| 4-Nitrophenol | ND | | 25.2 | 50 | 09/19/2016 15:56 | WG908317 |
| Phenol | ND | | 25.2 | 50 | 09/19/2016 15:56 | WG908317 |
| Quinoline | ND | | 25.2 | 50 | 09/19/2016 16:27 | WG908317 |
| *(S) 2-Fluorophenol* | *83.0* | J7 | *21.1-116* | | *09/19/2016 15:56* | WG908317 |
| *(S) 2-Fluorophenol* | *85.0* | J7 | *21.1-116* | | *09/19/2016 16:46* | WG908317 |
| *(S) Phenol-d5* | *82.5* | J7 | *26.3-121* | | *09/19/2016 16:46* | WG908317 |
| *(S) Phenol-d5* | *84.1* | J7 | *26.3-121* | | *09/19/2016 15:56* | WG908317 |
| *(S) Nitrobenzene-d5* | *170* | J7 | *21.9-129* | | *09/19/2016 15:56* | WG908317 |
| *(S) Nitrobenzene-d5* | *196* | J7 | *21.9-129* | | *09/19/2016 16:46* | WG908317 |
| *(S) 2-Fluorobiphenyl* | *147* | J7 | *34.9-129* | | *09/19/2016 16:46* | WG908317 |
| *(S) 2-Fluorobiphenyl* | *240* | J7 | *34.9-129* | | *09/19/2016 15:56* | WG908317 |
| *(S) 2,4,6-Tribromophenol* | *83.6* | J7 | *21.6-142* | | *09/19/2016 15:56* | WG908317 |
| *(S) 2,4,6-Tribromophenol* | *89.7* | J7 | *21.6-142* | | *09/19/2016 16:46* | WG908317 |
| *(S) p-Terphenyl-d14* | *76.1* | J7 | *21.5-128* | | *09/19/2016 16:46* | WG908317 |
| *(S) p-Terphenyl-d14* | *75.2* | J7 | *21.5-128* | | *09/19/2016 15:56* | WG908317 |

Sample Narrative:

8270C L859570-12 WG908317: IS/SURR failed on lower dilution.

8270C L859570-12 WG908317: Dilution due to matrix

## Method Blank (MB)

(MB) R3164288-1 09/16/16 17:54

| Analyte | MB Result | MB Qualifier | MB MDL | MB RDL |
|---|---|---|---|---|
| | % | | % | % |
| Total Solids | 0.000900 | | | |

## L859552-09 Original Sample (OS) • Duplicate (DUP)

(OS) L859552-09 09/16/16 17:54 • (DUP) R3164288-3 09/16/16 17:54

| Analyte | Original Result | DUP Result | Dilution | DUP RPD | DUP Qualifier | DUP RPD Limits |
|---|---|---|---|---|---|---|
| | % | % | | % | | % |
| Total Solids | 84.3 | 85.2 | 1 | 1.07 | | 5 |

## Laboratory Control Sample (LCS)

(LCS) R3164288-2 09/16/16 17:54

| Analyte | Spike Amount | LCS Result | LCS Rec. | Rec. Limits | LCS Qualifier |
|---|---|---|---|---|---|
| | % | % | % | % | |
| Total Solids | 50.0 | 50.0 | 100 | 85.0-115 | |

## Method Blank (MB)

(MB) R3164283-1 09/16/16 16:43

| Analyte | MB Result % | MB Qualifier | MB MDL % | MB RDL % |
|---|---|---|---|---|
| Total Solids | 0.00110 | | | |

## L859570-12 Original Sample (OS) • Duplicate (DUP)

(OS) L859570-12 09/16/16 16:43 • (DUP) R3164283-3 09/16/16 16:43

| Analyte | Original Result % | DUP Result % | Dilution | DUP RPD % | DUP Qualifier | DUP RPD Limits % |
|---|---|---|---|---|---|---|
| Total Solids | 66.0 | 66.9 | 1 | 1.30 | | 5 |

## Laboratory Control Sample (LCS)

(LCS) R3164283-2 09/16/16 16:43

| Analyte | Spike Amount % | LCS Result % | LCS Rec. % | Rec. Limits % | LCS Qualifier |
|---|---|---|---|---|---|
| Total Solids | 50.0 | 50.0 | 100 | 85.0-115 | |

## Method Blank (MB)

(MB) R3164837-1 09/20/16 13:07

| Analyte | MB Result mg/kg | MB Qualifier | MB MDL mg/kg | MB RDL mg/kg |
|---|---|---|---|---|
| Cobalt | U | | 0.23 | 1.00 |
| Lead | U | | 0.19 | 0.500 |
| Nickel | U | | 0.49 | 2.00 |
| Vanadium | U | | 0.24 | 2.00 |
| Zinc | 2.5 | J | 0.59 | 5.00 |

## Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3164837-2 09/20/16 13:13 • (LCSD) R3164837-3 09/20/16 13:16

| Analyte | Spike Amount mg/kg | LCS Result mg/kg | LCSD Result mg/kg | LCS Rec. % | LCSD Rec. % | Rec. Limits % | LCS Qualifier | LCSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|
| Cobalt | 100 | 103 | 103 | 103 | 103 | 80-120 | | | 0 | 20 |
| Lead | 100 | 99.5 | 99.8 | 99 | 100 | 80-120 | | | 0 | 20 |
| Nickel | 100 | 102 | 102 | 102 | 102 | 80-120 | | | 0 | 20 |
| Vanadium | 100 | 100 | 101 | 100 | 101 | 80-120 | | | 0 | 20 |
| Zinc | 100 | 101 | 101 | 101 | 101 | 80-120 | | | 1 | 20 |

## L859723-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L859723-04 09/20/16 13:19 • (MS) R3164837-6 09/20/16 13:28 • (MSD) R3164837-7 09/20/16 13:31

| Analyte | Spike Amount mg/kg | Original Result mg/kg | MS Result mg/kg | MSD Result mg/kg | MS Rec. % | MSD Rec. % | Dilution | Rec. Limits % | MS Qualifier | MSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cobalt | 100 | 7.34 | 117 | 118 | 110 | 110 | 1 | 75-125 | | | 1 | 20 |
| Lead | 100 | 14.9 | 118 | 119 | 104 | 105 | 1 | 75-125 | | | 1 | 20 |
| Nickel | 100 | 30.1 | 134 | 135 | 104 | 105 | 1 | 75-125 | | | 1 | 20 |
| Vanadium | 100 | 38.5 | 120 | 121 | 81 | 83 | 1 | 75-125 | | | 1 | 20 |
| Zinc | 100 | 71.5 | 142 | 143 | 71 | 71 | 1 | 75-125 | J6 | J6 | 0 | 20 |

## Method Blank (MB)

(MB) R3165717-3 09/23/16 09:52

| Analyte | MB Result mg/kg | MB Qualifier | MB MDL mg/kg | MB RDL mg/kg |
|---|---|---|---|---|
| Benzene | U | | 0.000270 | 0.00100 |
| sec-Butylbenzene | U | | 0.000201 | 0.00100 |
| tert-Butylbenzene | U | | 0.000206 | 0.00100 |
| Cyclohexane | U | | 0.000350 | 0.00100 |
| 1,2-Dibromoethane | U | | 0.000343 | 0.00100 |
| 1,2-Dichloroethane | U | | 0.000265 | 0.00100 |
| Ethylbenzene | U | | 0.000297 | 0.00100 |
| n-Hexane | U | | 0.000290 | 0.0100 |
| Isopropylbenzene | U | | 0.000243 | 0.0100 |
| Methyl tert-butyl ether | U | | 0.000212 | 0.00100 |
| Toluene | U | | 0.000434 | 0.00500 |
| 1,2,4-Trimethylbenzene | U | | 0.000211 | 0.00100 |
| 1,3,5-Trimethylbenzene | U | | 0.000266 | 0.00100 |
| Xylenes, Total | U | | 0.000698 | 0.00300 |
| *(S) Toluene-d8* | *104* | | | *88.7-115* |
| *(S) Dibromofluoromethane* | *93.1* | | | *76.3-123* |
| *(S) α,α,α-Trifluorotoluene* | *103* | | | *87.2-117* |
| *(S) 4-Bromofluorobenzene* | *94.6* | | | *69.7-129* |

## Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3165717-1 09/23/16 08:18 • (LCSD) R3165717-4 09/23/16 10:16

| Analyte | Spike Amount mg/kg | LCS Result mg/kg | LCSD Result mg/kg | LCS Rec. % | LCSD Rec. % | Rec. Limits % | LCS Qualifier | LCSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|
| Benzene | 0.0250 | 0.0248 | 0.0248 | 99.2 | 99.2 | 72.6-120 | | | 0.0200 | 20 |
| sec-Butylbenzene | 0.0250 | 0.0277 | 0.0267 | 111 | 107 | 77.8-129 | | | 3.32 | 20 |
| tert-Butylbenzene | 0.0250 | 0.0283 | 0.0274 | 113 | 110 | 77.2-129 | | | 3.17 | 20 |
| 1,2-Dibromoethane | 0.0250 | 0.0306 | 0.0295 | 122 | 118 | 78.7-123 | | | 3.63 | 20 |
| 1,2-Dichloroethane | 0.0250 | 0.0238 | 0.0231 | 95.2 | 92.4 | 67.2-121 | | | 2.90 | 20 |
| Ethylbenzene | 0.0250 | 0.0283 | 0.0279 | 113 | 112 | 78.6-124 | | | 1.34 | 20 |
| n-Hexane | 0.0250 | 0.0216 | 0.0204 | 86.5 | 81.6 | 59.9-125 | | | 5.87 | 20 |
| Isopropylbenzene | 0.0250 | 0.0279 | 0.0270 | 111 | 108 | 79.4-126 | | | 3.18 | 20 |
| Methyl tert-butyl ether | 0.0250 | 0.0222 | 0.0208 | 88.7 | 83.2 | 70.2-122 | | | 6.44 | 20 |
| Toluene | 0.0250 | 0.0278 | 0.0274 | 111 | 109 | 76.7-116 | | | 1.46 | 20 |
| 1,2,4-Trimethylbenzene | 0.0250 | 0.0282 | 0.0272 | 113 | 109 | 77.1-124 | | | 3.40 | 20 |
| 1,3,5-Trimethylbenzene | 0.0250 | 0.0281 | 0.0273 | 112 | 109 | 79.0-125 | | | 2.77 | 20 |
| Xylenes, Total | 0.0750 | 0.0851 | 0.0835 | 114 | 111 | 78.1-123 | | | 1.97 | 20 |
| *(S) Toluene-d8* | | | | *106* | *108* | *88.7-115* | | | | |
| *(S) Dibromofluoromethane* | | | | *91.7* | *95.0* | *76.3-123* | | | | |

## Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3165717-1 09/23/16 08:18 • (LCSD) R3165717-4 09/23/16 10:16

| Analyte | Spike Amount mg/kg | LCS Result mg/kg | LCSD Result mg/kg | LCS Rec. % | LCSD Rec. % | Rec. Limits % | LCS Qualifier | LCSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|
| *(S) α,α,α-Trifluorotoluene* | | | | *105* | *106* | *87.2-117* | | | | |
| *(S) 4-Bromofluorobenzene* | | | | *100* | *100* | *69.7-129* | | | | |

## L859693-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L859693-01 09/24/16 00:30 • (MS) R3165717-5 09/23/16 23:00 • (MSD) R3165717-6 09/23/16 23:45

| Analyte | Spike Amount mg/kg | Original Result mg/kg | MS Result mg/kg | MSD Result mg/kg | MS Rec. % | MSD Rec. % | Dilution | Rec. Limits % | MS Qualifier | MSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Benzene | 0.0250 | ND | 0.588 | 0.544 | 102 | 94.5 | 23 | 47.8-131 | | | 7.82 | 22.8 |
| sec-Butylbenzene | 0.0250 | ND | 0.621 | 0.582 | 108 | 101 | 23 | 31.0-142 | | | 6.58 | 34.7 |
| tert-Butylbenzene | 0.0250 | ND | 0.649 | 0.587 | 113 | 102 | 23 | 36.9-142 | | | 10.0 | 31.7 |
| 1,2-Dibromoethane | 0.0250 | ND | 0.563 | 0.535 | 97.9 | 93.1 | 23 | 50.2-133 | | | 5.02 | 23.6 |
| 1,2-Dichloroethane | 0.0250 | ND | 0.544 | 0.524 | 94.7 | 91.1 | 23 | 47.1-129 | | | 3.81 | 22.7 |
| Ethylbenzene | 0.0250 | ND | 0.607 | 0.572 | 106 | 99.4 | 23 | 44.8-135 | | | 6.06 | 26.9 |
| n-Hexane | 0.0250 | ND | 0.500 | 0.461 | 87.0 | 80.2 | 23 | 26.0-123 | | | 8.14 | 40 |
| Isopropylbenzene | 0.0250 | ND | 0.628 | 0.607 | 109 | 106 | 23 | 41.9-139 | | | 3.35 | 29.3 |
| Methyl tert-butyl ether | 0.0250 | ND | 0.557 | 0.560 | 96.9 | 97.4 | 23 | 50.4-131 | | | 0.550 | 24.8 |
| Toluene | 0.0250 | ND | 0.585 | 0.552 | 102 | 95.9 | 23 | 47.8-127 | | | 5.81 | 24.3 |
| 1,2,4-Trimethylbenzene | 0.0250 | ND | 0.626 | 0.585 | 109 | 102 | 23 | 32.9-139 | | | 6.78 | 30.6 |
| 1,3,5-Trimethylbenzene | 0.0250 | ND | 0.632 | 0.593 | 110 | 103 | 23 | 37.1-138 | | | 6.27 | 30.6 |
| Xylenes, Total | 0.0750 | ND | 1.86 | 1.76 | 108 | 102 | 23 | 42.7-135 | | | 5.24 | 26.6 |
| *(S) Toluene-d8* | | | | | *102* | *103* | | *88.7-115* | | | | |
| *(S) Dibromofluoromethane* | | | | | *98.7* | *98.1* | | *76.3-123* | | | | |
| *(S) α,α,α-Trifluorotoluene* | | | | | *105* | *110* | | *87.2-117* | | | | |
| *(S) 4-Bromofluorobenzene* | | | | | *93.9* | *93.0* | | *69.7-129* | | | | |

## Method Blank (MB)

(MB) R3165885-3 09/23/16 19:06

| Analyte | MB Result mg/kg | MB Qualifier | MB MDL mg/kg | MB RDL mg/kg |
|---|---|---|---|---|
| Benzene | U | | 0.000270 | 0.00100 |
| sec-Butylbenzene | U | | 0.000201 | 0.00100 |
| tert-Butylbenzene | U | | 0.000206 | 0.00100 |
| Cyclohexane | U | | 0.000350 | 0.00100 |
| 1,2-Dibromoethane | U | | 0.000343 | 0.00100 |
| 1,2-Dichloroethane | U | | 0.000265 | 0.00100 |
| Ethylbenzene | U | | 0.000297 | 0.00100 |
| n-Hexane | U | | 0.000290 | 0.0100 |
| Isopropylbenzene | U | | 0.000243 | 0.0100 |
| Methyl tert-butyl ether | U | | 0.000212 | 0.00100 |
| Toluene | U | | 0.000434 | 0.00500 |
| 1,2,4-Trimethylbenzene | U | | 0.000211 | 0.00100 |
| 1,3,5-Trimethylbenzene | U | | 0.000266 | 0.00100 |
| Xylenes, Total | U | | 0.000698 | 0.00300 |
| *(S) Toluene-d8* | *107* | | | *88.7-115* |
| *(S) Dibromofluoromethane* | *105* | | | *76.3-123* |
| *(S) α,α,α-Trifluorotoluene* | *98.8* | | | *87.2-117* |
| *(S) 4-Bromofluorobenzene* | *90.8* | | | *69.7-129* |

## Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3165885-1 09/23/16 17:20 • (LCSD) R3165885-2 09/23/16 17:41

| Analyte | Spike Amount mg/kg | LCS Result mg/kg | LCSD Result mg/kg | LCS Rec. % | LCSD Rec. % | Rec. Limits % | LCS Qualifier | LCSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|
| Benzene | 0.0250 | 0.0267 | 0.0275 | 107 | 110 | 72.6-120 | | | 3.08 | 20 |
| sec-Butylbenzene | 0.0250 | 0.0233 | 0.0245 | 93.2 | 98.0 | 77.8-129 | | | 5.04 | 20 |
| tert-Butylbenzene | 0.0250 | 0.0226 | 0.0236 | 90.2 | 94.6 | 77.2-129 | | | 4.70 | 20 |
| 1,2-Dibromoethane | 0.0250 | 0.0238 | 0.0243 | 95.1 | 97.1 | 78.7-123 | | | 2.04 | 20 |
| 1,2-Dichloroethane | 0.0250 | 0.0262 | 0.0274 | 105 | 110 | 67.2-121 | | | 4.70 | 20 |
| Ethylbenzene | 0.0250 | 0.0237 | 0.0242 | 94.9 | 96.8 | 78.6-124 | | | 1.98 | 20 |
| n-Hexane | 0.0250 | 0.0249 | 0.0258 | 99.5 | 103 | 59.9-125 | | | 3.72 | 20 |
| Isopropylbenzene | 0.0250 | 0.0228 | 0.0233 | 91.0 | 93.4 | 79.4-126 | | | 2.55 | 20 |
| Methyl tert-butyl ether | 0.0250 | 0.0238 | 0.0251 | 95.0 | 100 | 70.2-122 | | | 5.52 | 20 |
| Toluene | 0.0250 | 0.0255 | 0.0254 | 102 | 102 | 76.7-116 | | | 0.430 | 20 |
| 1,2,4-Trimethylbenzene | 0.0250 | 0.0231 | 0.0240 | 92.4 | 95.9 | 77.1-124 | | | 3.70 | 20 |
| 1,3,5-Trimethylbenzene | 0.0250 | 0.0233 | 0.0243 | 93.1 | 97.1 | 79.0-125 | | | 4.26 | 20 |
| Xylenes, Total | 0.0750 | 0.0712 | 0.0718 | 95.0 | 95.8 | 78.1-123 | | | 0.880 | 20 |
| *(S) Toluene-d8* | | | | *108* | *104* | *88.7-115* | | | | |
| *(S) Dibromofluoromethane* | | | | *102* | *106* | *76.3-123* | | | | |

## Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3165885-1 09/23/16 17:20 • (LCSD) R3165885-2 09/23/16 17:41

| Analyte | Spike Amount mg/kg | LCS Result mg/kg | LCSD Result mg/kg | LCS Rec. % | LCSD Rec. % | Rec. Limits % | LCS Qualifier | LCSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|
| *(S) α,α,α-Trifluorotoluene* | | | | *98.7* | *96.5* | *87.2-117* | | | | |
| *(S) 4-Bromofluorobenzene* | | | | *89.4* | *90.1* | *69.7-129* | | | | |

## L859570-11 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L859570-11 09/24/16 03:18 • (MS) R3165885-4 09/24/16 00:13 • (MSD) R3165885-5 09/24/16 02:13

| Analyte | Spike Amount (dry) mg/kg | Original Result (dry) mg/kg | MS Result (dry) mg/kg | MSD Result (dry) mg/kg | MS Rec. % | MSD Rec. % | Dilution | Rec. Limits % | MS Qualifier | MSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Benzene | 0.0326 | 0.116 | 0.938 | 0.995 | 103 | 110 | 24.5 | 47.8-131 | | | 5.85 | 22.8 |
| sec-Butylbenzene | 0.0326 | 0.0821 | 0.680 | 0.705 | 74.9 | 78.0 | 24.5 | 31.0-142 | | | 3.58 | 34.7 |
| tert-Butylbenzene | 0.0326 | 0.150 | 0.720 | 0.758 | 71.4 | 76.1 | 24.5 | 36.9-142 | | | 5.09 | 31.7 |
| 1,2-Dibromoethane | 0.0326 | ND | 0.577 | 0.612 | 72.2 | 76.7 | 24.5 | 50.2-133 | | | 5.92 | 23.6 |
| 1,2-Dichloroethane | 0.0326 | ND | 0.800 | 0.877 | 100 | 110 | 24.5 | 47.1-129 | | | 9.15 | 22.7 |
| Ethylbenzene | 0.0326 | 0.0375 | 0.656 | 0.665 | 77.4 | 78.5 | 24.5 | 44.8-135 | | | 1.36 | 26.9 |
| n-Hexane | 0.0326 | ND | 0.945 | ND | 81.1 | 0.000 | 24.5 | 26.0-123 | | J3 J6 | 200 | 40 |
| Isopropylbenzene | 0.0326 | ND | 0.684 | 0.691 | 75.7 | 76.6 | 24.5 | 41.9-139 | | | 1.05 | 29.3 |
| Methyl tert-butyl ether | 0.0326 | ND | 0.720 | 0.793 | 90.1 | 99.3 | 24.5 | 50.4-131 | | | 9.70 | 24.8 |
| Toluene | 0.0326 | ND | 0.877 | 0.886 | 97.8 | 98.9 | 24.5 | 47.8-127 | | | 0.970 | 24.3 |
| 1,2,4-Trimethylbenzene | 0.0326 | 0.0713 | 0.665 | 0.694 | 74.3 | 77.9 | 24.5 | 32.9-139 | | | 4.24 | 30.6 |
| 1,3,5-Trimethylbenzene | 0.0326 | ND | 0.639 | 0.638 | 77.0 | 77.0 | 24.5 | 37.1-138 | | | 0.100 | 30.6 |
| Xylenes, Total | 0.0978 | 0.125 | 1.96 | 1.97 | 76.4 | 76.8 | 24.5 | 42.7-135 | | | 0.490 | 26.6 |
| *(S) Toluene-d8* | | | | | *108* | *107* | | *88.7-115* | | | | |
| *(S) Dibromofluoromethane* | | | | | *102* | *106* | | *76.3-123* | | | | |
| *(S) α,α,α-Trifluorotoluene* | | | | | *99.1* | *95.5* | | *87.2-117* | | | | |
| *(S) 4-Bromofluorobenzene* | | | | | *83.4* | *89.3* | | *69.7-129* | | | | |

## Method Blank (MB)

(MB) R3164399-3 09/18/16 14:38

| Analyte | MB Result mg/kg | MB Qualifier | MB MDL mg/kg | MB RDL mg/kg |
|---|---|---|---|---|
| Acenaphthene | U | | 0.00642 | 0.0330 |
| Anthracene | U | | 0.00632 | 0.0330 |
| Benzo(a)anthracene | U | | 0.00428 | 0.0330 |
| Benzo(b)fluoranthene | U | | 0.00695 | 0.0330 |
| Benzo(k)fluoranthene | U | | 0.00582 | 0.0330 |
| Benzo(g,h,i)perylene | U | | 0.00721 | 0.0330 |
| Benzo(a)pyrene | U | | 0.00548 | 0.0330 |
| Biphenyl | U | | 0.00588 | 0.333 |
| Chrysene | U | | 0.00555 | 0.0330 |
| Dibenz(a,h)anthracene | U | | 0.00821 | 0.0330 |
| Fluoranthene | U | | 0.00496 | 0.0330 |
| Fluorene | U | | 0.00682 | 0.0330 |
| Indeno(1,2,3-cd)pyrene | U | | 0.00772 | 0.0330 |
| 2-Methylnaphthalene | U | | 0.00861 | 0.0330 |
| Naphthalene | U | | 0.00889 | 0.0330 |
| Phenanthrene | U | | 0.00528 | 0.0330 |
| Bis(2-ethylhexyl)phthalate | U | | 0.0120 | 0.333 |
| Di-n-butyl phthalate | U | | 0.0109 | 0.333 |
| Diethyl phthalate | U | | 0.00691 | 0.333 |
| Pyrene | U | | 0.0123 | 0.0330 |
| Pyridine | U | | 0.0628 | 0.333 |
| 2-Methylphenol | U | | 0.00986 | 0.333 |
| 3&4-Methyl Phenol | U | | 0.00783 | 0.333 |
| 2,4-Dimethylphenol | U | | 0.0471 | 0.333 |
| 2,4-Dinitrophenol | U | | 0.0980 | 0.333 |
| 4-Nitrophenol | U | | 0.0525 | 0.333 |
| Phenol | U | | 0.00695 | 0.333 |
| *(S) Nitrobenzene-d5* | *60.5* | | | *21.9-129* |
| *(S) 2-Fluorobiphenyl* | *69.2* | | | *34.9-129* |
| *(S) p-Terphenyl-d14* | *90.5* | | | *21.5-128* |
| *(S) Phenol-d5* | *65.6* | | | *26.3-121* |
| *(S) 2-Fluorophenol* | *61.5* | | | *21.1-116* |
| *(S) 2,4,6-Tribromophenol* | *94.3* | | | *21.6-142* |

## Method Blank (MB)

(MB) R3164587-2 09/19/16 12:09

| Analyte | MB Result mg/kg | MB Qualifier | MB MDL mg/kg | MB RDL mg/kg |
|---|---|---|---|---|
| Quinoline | U | | 0.0574 | 0.333 |

## Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3164399-1 09/18/16 13:48 • (LCSD) R3164399-2 09/18/16 14:13

| Analyte | Spike Amount mg/kg | LCS Result mg/kg | LCSD Result mg/kg | LCS Rec. % | LCSD Rec. % | Rec. Limits % | LCS Qualifier | LCSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | 0.667 | 0.503 | 0.508 | 75.4 | 76.2 | 48.9-107 | | | 1.09 | 20 |
| Anthracene | 0.667 | 0.503 | 0.504 | 75.3 | 75.6 | 52.0-112 | | | 0.270 | 20 |
| Benzo(a)anthracene | 0.667 | 0.473 | 0.483 | 70.9 | 72.5 | 52.3-106 | | | 2.13 | 20 |
| Benzo(b)fluoranthene | 0.667 | 0.498 | 0.520 | 74.7 | 77.9 | 51.3-106 | | | 4.25 | 20 |
| Benzo(k)fluoranthene | 0.667 | 0.529 | 0.525 | 79.4 | 78.7 | 52.9-107 | | | 0.780 | 20 |
| Benzo(g,h,i)perylene | 0.667 | 0.535 | 0.557 | 80.2 | 83.5 | 45.8-108 | | | 4.04 | 20 |
| Benzo(a)pyrene | 0.667 | 0.519 | 0.539 | 77.9 | 80.8 | 51.9-106 | | | 3.66 | 20 |
| Biphenyl | 0.667 | 0.459 | 0.468 | 68.9 | 70.2 | 45.6-103 | | | 1.86 | 20 |
| Chrysene | 0.667 | 0.482 | 0.492 | 72.3 | 73.7 | 54.4-110 | | | 1.96 | 20 |
| Dibenz(a,h)anthracene | 0.667 | 0.566 | 0.597 | 84.9 | 89.5 | 45.7-111 | | | 5.33 | 20 |
| Fluoranthene | 0.667 | 0.482 | 0.478 | 72.3 | 71.6 | 53.7-110 | | | 0.930 | 20 |
| Fluorene | 0.667 | 0.480 | 0.482 | 72.0 | 72.3 | 51.1-109 | | | 0.510 | 20 |
| Indeno(1,2,3-cd)pyrene | 0.667 | 0.572 | 0.601 | 85.8 | 90.1 | 47.5-109 | | | 4.87 | 20 |
| 2-Methylnaphthalene | 0.667 | 0.465 | 0.463 | 69.7 | 69.4 | 48.0-101 | | | 0.470 | 20 |
| Naphthalene | 0.667 | 0.422 | 0.403 | 63.2 | 60.4 | 43.4-103 | | | 4.50 | 20 |
| Phenanthrene | 0.667 | 0.484 | 0.501 | 72.6 | 75.1 | 51.6-107 | | | 3.38 | 20 |
| Bis(2-ethylhexyl)phthalate | 0.667 | 0.539 | 0.553 | 80.8 | 82.9 | 48.1-116 | | | 2.55 | 20.5 |
| Di-n-butyl phthalate | 0.667 | 0.531 | 0.531 | 79.6 | 79.6 | 49.7-113 | | | 0.0300 | 20 |
| Diethyl phthalate | 0.667 | 0.474 | 0.476 | 71.0 | 71.3 | 52.0-112 | | | 0.460 | 20 |
| Pyrene | 0.667 | 0.460 | 0.477 | 69.0 | 71.5 | 47.1-108 | | | 3.62 | 20 |
| Pyridine | 0.667 | 0.108 | 0.119 | 16.2 | 17.8 | 10.0-90.0 | | | 9.27 | 38.3 |
| 2-Methylphenol | 0.667 | 0.416 | 0.418 | 62.3 | 62.7 | 42.4-100 | | | 0.610 | 20 |
| 3&4-Methyl Phenol | 0.667 | 0.466 | 0.456 | 69.9 | 68.3 | 50.5-115 | | | 2.26 | 20 |
| 2,4-Dimethylphenol | 0.667 | 0.380 | 0.376 | 57.0 | 56.4 | 42.2-110 | | | 1.14 | 20 |
| 2,4-Dinitrophenol | 0.667 | 0.344 | 0.343 | 51.5 | 51.4 | 10.0-105 | | | 0.180 | 36.5 |
| 4-Nitrophenol | 0.667 | 0.438 | 0.436 | 65.6 | 65.4 | 34.8-109 | | | 0.410 | 20 |
| Phenol | 0.667 | 0.393 | 0.388 | 58.9 | 58.2 | 41.5-106 | | | 1.25 | 20 |
| *(S) Nitrobenzene-d5* | | | | *66.6* | *63.2* | *21.9-129* | | | | |
| *(S) 2-Fluorobiphenyl* | | | | *72.8* | *70.9* | *34.9-129* | | | | |
| *(S) p-Terphenyl-d14* | | | | *76.8* | *77.7* | *21.5-128* | | | | |
| *(S) Phenol-d5* | | | | *66.4* | *64.8* | *26.3-121* | | | | |
| *(S) 2-Fluorophenol* | | | | *61.3* | *58.6* | *21.1-116* | | | | |

## Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3164399-1 09/18/16 13:48 • (LCSD) R3164399-2 09/18/16 14:13

| Analyte | Spike Amount mg/kg | LCS Result mg/kg | LCSD Result mg/kg | LCS Rec. % | LCSD Rec. % | Rec. Limits % | LCS Qualifier | LCSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|
| *(S) 2,4,6-Tribromophenol* | | | | *99.6* | *99.5* | *21.6-142* | | | | |

## Laboratory Control Sample (LCS)

(LCS) R3164587-1 09/19/16 11:51

| Analyte | Spike Amount mg/kg | LCS Result mg/kg | LCS Rec. % | Rec. Limits % | LCS Qualifier |
|---|---|---|---|---|---|
| Quinoline | 0.667 | 0.470 | 70.4 | 60.0-140 | |

## L859776-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L859776-01 09/18/16 17:33 • (MS) R3164399-4 09/18/16 17:58 • (MSD) R3164399-5 09/18/16 18:23

| Analyte | Spike Amount (dry) mg/kg | Original Result (dry) mg/kg | MS Result (dry) mg/kg | MSD Result (dry) mg/kg | MS Rec. % | MSD Rec. % | Dilution | Rec. Limits % | MS Qualifier | MSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | 0.828 | U | 0.536 | 0.598 | 64.7 | 72.2 | 1 | 32.2-134 | | | 11.0 | 27.3 |
| Anthracene | 0.828 | U | 0.544 | 0.586 | 65.6 | 70.7 | 1 | 32.3-137 | | | 7.41 | 28.4 |
| Benzo(a)anthracene | 0.828 | U | 0.484 | 0.507 | 58.4 | 61.2 | 1 | 33.3-124 | | | 4.68 | 29 |
| Benzo(b)fluoranthene | 0.828 | U | 0.519 | 0.565 | 62.7 | 68.2 | 1 | 23.3-133 | | | 8.42 | 30.3 |
| Benzo(k)fluoranthene | 0.828 | U | 0.521 | 0.532 | 62.9 | 64.2 | 1 | 31.0-129 | | | 2.03 | 26.7 |
| Benzo(g,h,i)perylene | 0.828 | U | 0.374 | 0.388 | 45.2 | 46.9 | 1 | 10.0-127 | | | 3.70 | 31.9 |
| Benzo(a)pyrene | 0.828 | U | 0.516 | 0.550 | 62.3 | 66.4 | 1 | 28.2-128 | | | 6.39 | 28.4 |
| Chrysene | 0.828 | U | 0.487 | 0.518 | 58.8 | 62.6 | 1 | 36.3-129 | | | 6.16 | 28 |
| Dibenz(a,h)anthracene | 0.828 | U | 0.428 | 0.457 | 51.6 | 55.2 | 1 | 10.5-128 | | | 6.67 | 29.5 |
| Fluoranthene | 0.828 | U | 0.516 | 0.546 | 62.2 | 65.9 | 1 | 27.9-138 | | | 5.74 | 26.9 |
| Fluorene | 0.828 | U | 0.520 | 0.561 | 62.8 | 67.7 | 1 | 34.0-133 | | | 7.54 | 27.1 |
| Indeno(1,2,3-cd)pyrene | 0.828 | U | 0.431 | 0.455 | 52.1 | 54.9 | 1 | 10.0-128 | | | 5.28 | 31.5 |
| 2-Methylnaphthalene | 0.828 | U | 0.506 | 0.563 | 61.1 | 67.9 | 1 | 28.7-128 | | | 10.6 | 30.7 |
| Naphthalene | 0.828 | U | 0.436 | 0.506 | 52.6 | 61.1 | 1 | 36.4-121 | | | 15.0 | 27.2 |
| Phenanthrene | 0.828 | U | 0.530 | 0.568 | 63.9 | 68.5 | 1 | 30.8-137 | | | 6.96 | 26.5 |
| Bis(2-ethylhexyl)phthalate | 0.828 | U | 0.476 | 0.504 | 57.4 | 60.8 | 1 | 21.8-141 | | | 5.73 | 35.2 |
| Di-n-butyl phthalate | 0.828 | U | 0.546 | 0.568 | 65.9 | 68.6 | 1 | 32.2-133 | | | 3.99 | 25.9 |
| Diethyl phthalate | 0.828 | U | 0.536 | 0.590 | 64.7 | 71.3 | 1 | 39.4-136 | | | 9.61 | 25.5 |
| Pyrene | 0.828 | U | 0.440 | 0.470 | 53.1 | 56.7 | 1 | 24.1-130 | | | 6.58 | 29.9 |
| Pyridine | 0.828 | U | 0.225 | 0.338 | 27.2 | 40.8 | 1 | 10.0-111 | | J3 | 40.2 | 30.5 |
| 2-Methylphenol | 0.828 | U | 0.437 | 0.514 | 52.7 | 62.1 | 1 | 30.3-118 | | | 16.4 | 25.1 |
| 3&4-Methyl Phenol | 0.828 | U | 0.489 | 0.559 | 59.1 | 67.5 | 1 | 33.3-141 | | | 13.4 | 25.7 |
| 2,4-Dimethylphenol | 0.828 | U | 0.465 | 0.515 | 56.1 | 62.2 | 1 | 12.3-149 | | | 10.2 | 32.3 |
| 2,4-Dinitrophenol | 0.828 | U | 0.161 | 0.181 | 19.4 | 21.8 | 1 | 10.0-121 | | | 11.6 | 39.4 |

## L859776-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L859776-01 09/18/16 17:33 • (MS) R3164399-4 09/18/16 17:58 • (MSD) R3164399-5 09/18/16 18:23

| Analyte | Spike Amount (dry) | Original Result (dry) | MS Result (dry) | MSD Result (dry) | MS Rec. | MSD Rec. | Dilution | Rec. Limits | MS Qualifier | MSD Qualifier | RPD | RPD Limits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mg/kg | mg/kg | mg/kg | mg/kg | % | % | | % | | | % | % |
| 4-Nitrophenol | 0.828 | U | 0.463 | 0.526 | 55.9 | 63.4 | 1 | 20.0-133 | | | 12.7 | 30.2 |
| Phenol | 0.828 | U | 0.393 | 0.467 | 47.4 | 56.3 | 1 | 25.1-130 | | | 17.2 | 29.6 |
| Biphenyl | 0.828 | U | 0.497 | 0.552 | 60.0 | 66.6 | 1 | 38.5-118 | | | 10.5 | 28.9 |
| *(S) Nitrobenzene-d5* | | | | | *52.8* | *63.4* | | *21.9-129* | | | | |
| *(S) 2-Fluorobiphenyl* | | | | | *60.2* | *68.1* | | *34.9-129* | | | | |
| *(S) p-Terphenyl-d14* | | | | | *51.6* | *54.3* | | *21.5-128* | | | | |
| *(S) Phenol-d5* | | | | | *50.8* | *62.0* | | *26.3-121* | | | | |
| *(S) 2-Fluorophenol* | | | | | *42.6* | *57.7* | | *21.1-116* | | | | |
| *(S) 2,4,6-Tribromophenol* | | | | | *90.5* | *100* | | *21.6-142* | | | | |

## Abbreviations and Definitions

| | |
|---|---|
| SDG | Sample Delivery Group. |
| MDL | Method Detection Limit. |
| RDL | Reported Detection Limit. |
| ND | Not detected at the Reporting Limit (or MDL where applicable). |
| U | Not detected at the Reporting Limit (or MDL where applicable). |
| RPD | Relative Percent Difference. |
| (dry) | Results are reported based on the dry weight of the sample. [this will only be present on a dry report basis for soils]. |
| Original Sample | The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG. |
| (S) | Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media. |
| Rec. | Recovery. |

| Qualifier | Description |
|---|---|
| B | The same analyte is found in the associated blank. |
| J | The identification of the analyte is acceptable; the reported value is an estimate. |
| J1 | Surrogate recovery limits have been exceeded; values are outside upper control limits. |
| J3 | The associated batch QC was outside the established quality control range for precision. |
| J6 | The sample matrix interfered with the ability to make any accurate determination; spike value is low. |
| J7 | Surrogate recovery cannot be used for control limit evaluation due to dilution. |

ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our "one location" design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be **YOUR LAB OF CHOICE.**
***** Not all certifications held by the laboratory are applicable to the results reported in the attached report.

## State Accreditations

| | | | |
|---|---|---|---|
| Alabama | 40660 | Nevada | TN-03-2002-34 |
| Alaska | UST-080 | New Hampshire | 2975 |
| Arizona | AZ0612 | New Jersey–NELAP | TN002 |
| Arkansas | 88-0469 | New Mexico | TN00003 |
| California | 01157CA | New York | 11742 |
| Colorado | TN00003 | North Carolina | Env375 |
| Conneticut | PH-0197 | North Carolina [1] | DW21704 |
| Florida | E87487 | North Carolina [2] | 41 |
| Georgia | NELAP | North Dakota | R-140 |
| Georgia [1] | 923 | Ohio–VAP | CL0069 |
| Idaho | TN00003 | Oklahoma | 9915 |
| Illinois | 200008 | Oregon | TN200002 |
| Indiana | C-TN-01 | Pennsylvania | 68-02979 |
| Iowa | 364 | Rhode Island | 221 |
| Kansas | E-10277 | South Carolina | 84004 |
| Kentucky [1] | 90010 | South Dakota | n/a |
| Kentucky [2] | 16 | Tennessee [1 4] | 2006 |
| Louisiana | AI30792 | Texas | T 104704245-07-TX |
| Maine | TN0002 | Texas [5] | LAB0152 |
| Maryland | 324 | Utah | 6157585858 |
| Massachusetts | M-TN003 | Vermont | VT2006 |
| Michigan | 9958 | Virginia | 109 |
| Minnesota | 047-999-395 | Washington | C1915 |
| Mississippi | TN00003 | West Virginia | 233 |
| Missouri | 340 | Wisconsin | 9980939910 |
| Montana | CERT0086 | Wyoming | A2LA |
| Nebraska | NE-OS-15-05 | | |

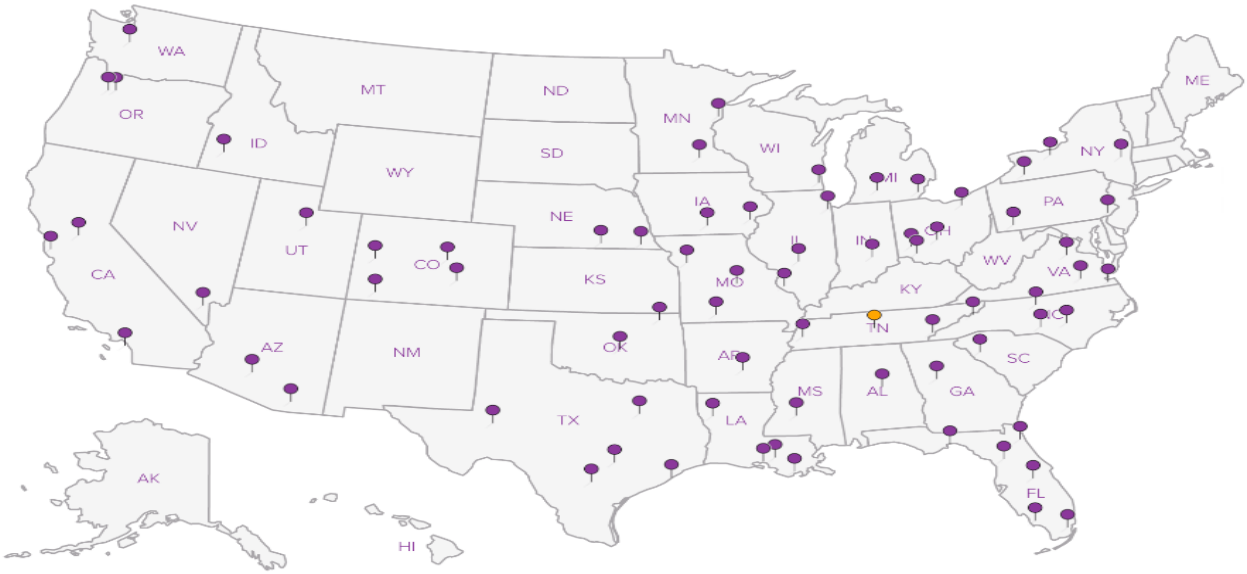
## Third Party & Federal Accreditations

| | | | |
|---|---|---|---|
| A2LA – ISO 17025 | 1461.01 | AIHA | 100789 |
| A2LA – ISO 17025 [5] | 1461.02 | DOD | 1461.01 |
| Canada | 1461.01 | USDA | S-67674 |
| EPA–Crypto | TN00003 | | |

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [n/a] Accreditation not applicable

## Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. **ESC Lab Sciences performs all testing at our central laboratory.**



13

| Company Name/Address: | Billing Information: |
|---|---|
| **Aquaterra Technologies - S/E**<br>122 South Church Street<br>West Chester, PA 19382 | Accounts Payable<br>122 South Church Street<br>West Chester, PA 19382 |
| Report to: Andrew Klingbeil<br>Michael Sarcinello / ~~Michael Newton~~ | Email To: Andrew.Klingbeil@stantec.com<br>ms@aquaterra-tech.com, ~~Michael.N~~ |

Chain of Custody Page 1 of 2

ESC LABORATORIES
YOUR LAB OF CHOICE
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Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# L859570
F025

| | | | |
|---|---|---|---|
| Project Description: AOI8 | | City/State Collected: Philadelphia, PA | |
| Phone: (610) 431-5733<br>Fax: | Client Project # | Lab Project #<br>SUNAQUA-AOI8 | |
| Collected by (print): Lisa Mokycki | Site/Facility ID # | P.O. # | |
| Collected by (signature): | Rush? (Lab MUST Be Notified)<br>___ Same Day .....200%<br>___ Next Day .....100%<br>___ Two Day .....50%<br>___ Three Day .....25% | Date Results Needed<br>Email? ___No ___Yes<br>FAX? ___No ___Yes | |
| Immediately Packed on Ice N ___ Y ___ | | | |

Acctnum: SUNAQUA
Template: T113711
Prelogin: P560320
TSR: Mark Beasley
Cooler:
Shipped Via:

| Sample ID | Comp/Grab | Matrix * | Depth | Date | Time | No. of Cntrs | EVERGREENCOMP - 3 - 40ml 5035 vials + 2 - 4oz jar | EVERGREENCOMP + MEK- 3 - 40ml 5035 + 2 - 4oz ja | SV8270PAHSIM, TS (Benzo(a)pyrene only) 1 - 4oz | Rem./Contaminant | Sample # (lab only) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| AOI8-BH-16-038-0-2-20160912 | 12 | SS | 0-2' | 9/12 | 0900 | 5 | X | | | | -01 |
| AOI8-BH-16-038-10-12-20160912 | 12 | SS | 10-12' | 9/12 | 1100 | 5 | X | | | | 02 |
| AOI8-BH-16-044-0-2-20160912 | | SS | 0-2' | 9/12 | 1200 | 5 | X | | | | 03 |
| AOI8-BH-16-044-10-12-20160912 | | SS | 10-12' | 9/12 | 1300 | 5 | X | | | | 04 |
| AOI8-BH-16-058-0-2-20160912 | | SS | 0-2' | 9/12 | 1400 | 5 | X | | | | 05 |
| AOI8-BH-16-058-12-14-20160912 | | SS | 12-14' | 9/12 | 1500 | 5 | X | | | | 06 |
| AOI8-BH-16-051-0-2-20160913 | | SS | 0-2' | 9/13 | 0900 | 5 | X | | | | 07 |
| AOI8-BH-16-051-12-14-20160913 | | SS | 12-14' | 9/13 | 1100 | 5 | X | | | | 08 |
| AOI8-BH-16-062-0-2-20160913 | | SS | 0-2 | 9/13 | 1200 | 5 | X | | | | 09 |
| AOI8-BH-16-062-12-14-20160913 | | SS | 12-14 | 9/13 | 1300 | 5 | X | | | | 10 |

* Matrix: **SS** - Soil **GW** - Groundwater **WW** - WasteWater **DW** - Drinking Water **OT** - Other_____

pH _____ Temp _____

Flow _____ Other _____

6903 4756 4359

Remarks: TS Tube = EV602385

Hold #

| Relinquished by : (Signature) | Date: | Time: | Received by: (Signature) |
|---|---|---|---|
| | 9/13/16 | 1520 | |
| Relinquished by : (Signature) | Date: | Time: | Received by: (Signature) |
| | | | |
| Relinquished by : (Signature) | Date: | Time: | Received for lab by: (Signature) |
| | | | |

Samples returned via: ☐ UPS ☐ FedEx ☐ Courier ☐ _____

Temp: 3.2 °C Bottles Received: 12

Condition: (lab use only) NR

COC Seal Intact: ✓ Y ___N ___NA

Date: 9-14-16 Time: 0900

pH Checked: NCF:

Page 2 of 3

Company Name/Address:
**Aquaterra Technologies - S/E**
122 South Church Street
West Chester, PA 19382

Billing Information:
Accounts Payable
122 South Church Street
West Chester, PA 19382

Report to: Andrew Kinzler
Michael Sarcinello / ~~Michael Newton~~

Email To: Andrewk/mjbei/@Stantec.com
ms@aquaterra-tech.com, ~~Michael.N~~

Project Description: AOI8

City/State Collected: Phila, PA

Phone: (610) 431-5733
Fax:

Client Project #

Lab Project #
SUNAQUA-AOI8

Collected by (print): Luke Mokycki

Site/Facility ID #

P.O. #

Collected by (signature):

Immediately Packed on Ice N ___ Y ___

*Rush? (Lab MUST Be Notified)
___ Same Day .....200%
___ Next Day .....100%
___ Two Day .....50%
___ Three Day .....25%

Date Results Needed

Email? ___No __Yes
FAX? ___No ___Yes

| Sample ID | Comp/Grab | Matrix * | Depth | Date | Time | No. of Cntrs | EVERGREENCOMP - 3 - 40ml 5035 vials + 2 - 4oz jar | EVERGREENCOMP + MEK- 3 - 40ml 5035 + 2 - 4oz ja | SV8270PAHSIM, TS (Benzo(a)pyrene only) 1 - 4oz | Rem./Contaminant | Sample # (lab only) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~~AOI8-BH16-092-0-2-20160913~~ | | SS | 0-2' | 9/13 | | 5 | X | | | | 11 |
| ~~AOI8-BH16-073-12-14-20160913~~ | | SS | 12-14' | 9/13 | 1400 | 5 | X | | | | 12 |
| | | SS | | | | | | | | | |
| | | SS | | | | | | | | | |
| | | SS | | | | | | | | | |
| | | SS | | | | | | | | | |
| | | SS | | | | | | | | | |
| | | SS | | | | | | | | | |
| | | SS | | | | | | | | | |
| | | SS | | | | | | | | | |

Analysis / Container / Preservative

Chain of Custody

ESC LABORATORY SCIENCES
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Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# L859570

Table #

Acctnum: SUNAQUA
Template: T113711
Prelogin: P560320
TSR: Mark Beasley
Cooler:
Shipped Via:

* Matrix: SS - Soil GW - Groundwater WW - WasteWater DW - Drinking Water OT - Other _____

pH _____ Temp _____
Flow _____ Other _____

Remarks:

Hold #

| Relinquished by: (Signature) | Date: | Time: | Received by: (Signature) |
|---|---|---|---|
| | 9/13/16 | 1500 | |
| Relinquished by: (Signature) | Date: | Time: | Received by: (Signature) |
| | | | |
| Relinquished by: (Signature) | Date: | Time: | Received for lab by: (Signature) |
| | | | |

Samples returned via: ☐ UPS ☐ FedEx ☐ Courier ☐ _____

Temp: 3.2 °C Bottles Received: 12

Date: 9/14/16 Time: 0900

Condition: (lab use only) mr

COC Seal Intact: ___Y ___N ___NA

pH Checked: NCF:

Company Name/Address:
**Aquaterra Technologies - S/E**
122 South Church Street
West Chester, PA 19382

Billing Information:
Accounts Payable
122 South Church Street
West Chester, PA 19382

Report to: Michael Sarcinello / Andrew Klingbeil

Email To: ms@aquaterra-tech.com, andrew.kl

Project Description: AOI8

City/State Collected: Phila, PA

Phone: (610) 431-5733
Fax:

Client Project #

Lab Project #
SUNAQUA-AOI8

Collected by (print): Robert Drewicz

Site/Facility ID #

P.O. #

Collected by (signature): Rob Drewicz
Immediately Packed on Ice N ___ Y ✓

*Rush?* (Lab MUST Be Notified)
___ Same Day .....200%
___ Next Day .....100%
___ Two Day .....50%
___ Three Day .....25%

Date Results Needed

Email? ___No ___Yes
FAX? ___No ___Yes

| Sample ID | Comp/Grab | Matrix * | Depth | Date | Time | No. of Cntrs | EVERGREENCOMP | | | | | | | | | Rem./Contaminant | Sample # (lab only) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N-155-20160913-WG | Grab | GW | | 09/13/16 | 08:40 | 10 | X | | | | | | | | | | 13 |
| TRIPBLANK | | GW | | | | 2 | | | | | | | | | | | 14 |
| | | GW | | | | | | | | | | | | | | | |
| | | GW | | | | | | | | | | | | | | | |
| | | GW | | | | | | | | | | | | | | | |
| | | GW | | | | | | | | | | | | | | | |
| | | GW | | | | | | | | | | | | | | | |
| | | GW | | | | | | | | | | | | | | | |
| | | GW | | | | | | | | | | | | | | | |
| | | GW | | | | | | | | | | | | | | | |

Analysis / Container / Preservative

Chain of Custody Page 1 of 1

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Fax: 615-758-5859

L # L859596
Table #
Acctnum: SUNAQUA
Template: T115068
Prelogin: P565108
TSR: Mark Beasley
Cooler:
Shipped Via:

* Matrix: SS - Soil GW - Groundwater WW - WasteWater DW - Drinking Water OT - Other_____

RH

pH _____ Temp _____

Remarks: EVERGREENCOMP = 2-40ml HCL, 3-40ml NaThi, 2-40ml NP, 2-100ml NP, 1-250ml HDPE NP

Flow _____ Other _____

Hold #

| Relinquished by : (Signature) | Date: | Time: | Received by: (Signature) |
|---|---|---|---|
| Rob Drewicz | 9/13/16 | 1000 | |
| | 9/13/16 | 1500 | |
| | | | |

Samples returned via: ☐ UPS ☐ FedEx ☐ Courier ☐ _____

Temp: 3.2 °C Bottles Received: 72

Condition: (lab use only) MI2

COC Seal Intact: ✓ Y ___N ___NA

Received for lab by: (Signature)

Date: 9-14-16 Time: 0900

pH Checked: NCF:

ESC
L·A·B S·C·I·E·N·C·E·S
YOUR LAB OF CHOICE

# Cooler Receipt Form

| | | | |
|---|---|---|---|
| Client: | SUNAQUA | SDG# | L859576 |
| Cooler Received/Opened On: 9-14-16 Receipt: | | Temperature Upon | 3.2 °c |
| Received By:Richard Hughes | | | |
| Signature: | | | |

| Receipt Check List | Yes | No | N/A |
|---|---|---|---|
| Were custody seals on outside of cooler and intact? | ✓ | | |
| Were custody papers properly filled out? | ✓ | | |
| Did all bottles arrive in good condition? | ✓ | | |
| Were correct bottles used for the analyses requested? | ✓ | | |
| Was sufficient amount of sample sent in each bottle? | | | ✓ |
| Were all applicable sample containers correctly preserved and checked for preservation? (Any not in accepted range noted on COC) | | | ✓ |
| If applicable, was an observable VOA headspace present? | | ✓ | ✓ |
| Non Conformance Generated. (If yes see attached NCF) | | | |

| Company Name/Address: | Billing Information: |
|---|---|
| **Aquaterra Technologies - S/E**<br>122 South Church Street<br>West Chester, PA 19382 | **Accounts Payable**<br>122 South Church Street<br>West Chester, PA 19382 |
| Report to: Andrew Klingbeil<br>**Michael Sarcinello / Michael Newton** | Email To: Andrew.Klingbeil@aquaterra-tech.com<br>**ms@aquaterra-tech.com, Michael.N** |
| Project Description: **AOI8** | City/State Collected: Philadelphia, PA |
| Phone: **(610) 431-5733**<br>Fax: | Client Project # |
| Lab Project #<br>**SUNAQUA-AOI8** | |
| Collected by (print): Lisa Matyuk | Site/Facility ID # |
| P.O. # | |
| Collected by (signature): | ***Rush?*** (Lab MUST Be Notified)<br>____ Same Day .....200%<br>____ Next Day .....100%<br>____ Two Day .....50%<br>____ Three Day .....25% |
| Date Results Needed | |
| Immediately Packed on Ice N____ Y____ | Email? ___No __Yes<br>FAX? ___No ___Yes |

| Sample ID | Comp/Grab | Matrix * | Depth | Date | Time | No. of Cntrs | EVERGREENCOMP - 3 - 40ml 5035 vials + 2 - 4oz jar | EVERGREENCOMP + MEK- 3 - 40ml 5035 + 2 - 4oz ja | SV8270PAHSIM, TS (Benzo(a)pyrene only) 1 - 4oz |
|---|---|---|---|---|---|---|---|---|---|
| AOI8-BH-16-039-0-2-20160912 | 12 | SS | 0-2 | 9/12 | 0900 | 5 | X | | |
| AOI8-BH-16-039-10-12-20160912 | 12 | SS | 10-12 | 9/12 | 1100 | 5 | X | | |
| AOI8-BH-16-044-0-2-20160912 | 12 | SS | 0-2' | 9/12 | 1200 | 5 | X | | |
| AOI8-BH-16-044-10-12-20160912 | 12 | SS | 10-12' | 9/12 | 1300 | 5 | X | | |
| AOI8-BH-16-058-0-2-20160912 | 12 | SS | 0-2' | 9/12 | 1400 | 5 | X | | |
| AOI8-BH-16-058-12-14-20160912 | 12 | SS | 12-14' | 9/12 | 1500 | 5 | X | | |
| AOI8-BH-16-051-0-2-20160913 | 13 | SS | 0-2' | 9/13 | 0900 | 5 | X | | |
| AOI8-BH-16-051-12-14-20160913 | 13 | SS | 12-14' | 9/13 | 1100 | 5 | X | | |
| AOI8-BH-16-062-0-2-20160913 | 13 | SS | 0-2 | 9/12 | 1200 | 5 | X | | |
| AOI8-BH-16-062-12-14-20160913 | 13 | SS | 12-14 | 9/13 | 1300 | 5 | X | | |

Analysis / Container / Preservative

Chain of Custody Page 1 of 1

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Phone: 800-767-5859
Fax: 615-758-5859

L# 859570

Table #

Acctnum: **SUNAQUA**
Template: **T113711**
Prelogin: **P560320**
TSR: **Mark Beasley**
Cooler:
Shipped Via:

| Rem./Contaminant | Sample # (lab only) |
|---|---|
| | |

* Matrix: **SS** - Soil **GW** - Groundwater **WW** - WasteWater **DW** - Drinking Water **OT** - Other_____

pH _____ Temp _____

Remarks:

Flow _____ Other _____

Hold #

| Relinquished by : (Signature) | Date: | Time: | Received by: (Signature) |
|---|---|---|---|
| | 9/13/16 | 1500 | |
| Relinquished by : (Signature) | Date: | Time: | Received by: (Signature) |
| | | | |
| Relinquished by : (Signature) | Date: | Time: | Received for lab by: (Signature) |
| | | | |

Samples returned via: ☐ UPS ☐ FedEx ☐ Courier ☐ _____

Temp: °C Bottles Received:

Condition: (lab use only)

COC Seal Intact: ____Y ____N ____NA

| Date: | Time: | pH Checked: | NCF: |
|---|---|---|---|
| | | | |

Company Name/Address:
**Aquaterra Technologies - S/E**
122 South Church Street
West Chester, PA 19382

Billing Information:
**Accounts Payable**
122 South Church Street
West Chester, PA 19382

Report to: Andrew Kinsley
**Michael Sarcinello / Michael Newton**

Email To: [illegible]
**ms@aquaterra-tech.com, Michael.N**

Project Description: **AOI8**

City/State Collected: Phila, PA

Phone: **(610) 431-5733**
Fax:

Client Project #

Lab Project #
**SUNAQUA-AOI8**

Collected by (print): Luke Mokycka

Site/Facility ID #

P.O. #

Collected by (signature):

Immediately Packed on Ice N ___ Y ___

***Rush?*** (Lab MUST be Notified)
___ Same Day .....200%
___ Next Day .....100%
___ Two Day .....50%
___ Three Day .....25%

Date Results Needed

Email? ___No ___Yes
FAX? ___No ___Yes

Analysis / Container / Preservative

| Sample ID | Comp/Grab | Matrix * | Depth | Date | Time | No. of Cntrs | EVERGREENCOMP - 3 - 40ml 5035 vials + 2 - 4oz jar | EVERGREENCOMP + MEK- 3 - 40ml 5035 + 2 - 4oz ja | SV8270PAHSIM, TS (Benzo(a)pyrene only) 1 - 4oz | | | | | | | Rem./Contaminant | Sample # (lab only) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AOI3-SH-16-073-0-7-20160913 | | SS | 0-7 | 9/13 | | 5 | X | | X | | | | | | | | |
| AOI3-SH-16-073-12-14-20160913 | | SS | 12-14 | 9/13 | 1400 | 5 | X | | X | | | | | | | | |
| | | SS | | | | | | | | | | | | | | | |
| | | SS | | | | | | | | | | | | | | | |
| | | SS | | | | | | | | | | | | | | | |
| | | SS | | | | | | | | | | | | | | | |
| | | SS | | | | | | | | | | | | | | | |
| | | SS | | | | | | | | | | | | | | | |
| | | SS | | | | | | | | | | | | | | | |
| | | SS | | | | | | | | | | | | | | | |
| | NS | SS | | | | | | | | | | | | | | | |

Corrected & Sent to lab 10/25/16

* Matrix: **SS** - Soil **GW** - Groundwater **WW** - WasteWater **DW** - Drinking Water **OT** - Other_____

pH _____ Temp _____

Flow _____ Other _____

Remarks:

| Relinquished by : (Signature) | Date: | Time: | Received by: (Signature) |
|---|---|---|---|
| | 9/13/16 | 1500 | |
| Relinquished by : (Signature) | Date: | Time: | Received by: (Signature) |
| Relinquished by : (Signature) | Date: | Time: | Received for lab by: (Signature) |

Samples returned via: ☐ UPS ☐ FedEx ☐ Courier ☐ _____

Temp: °C Bottles Received:

Date: Time:

Hold #

Condition: (lab use only)

COC Seal Intact: ___Y ___N ___NA

pH Checked: NCF:

Chain of Custody Page ___ of ___

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Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L #

Table #

Acctnum: **SUNAQUA**
Template: **T113711**
Prelogin: **P560320**
TSR: **Mark Beasley**
Cooler:
Shipped Via: