FORMER LOBELL REFINERY
EXPANDED INVESTIGATION
AND SVE PILOT STUDY REPORT

Former Lobell Refinery-Orphan
Site Remediation Program (OSRP)
File 57.004
CASPER, WYOMING

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Sign-off Sheet

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1.0 INTRODUCTION

The purpose of this Expanded Investigation and Soil Vapor Extraction (SVE) Pilot Study is to present the detailed descriptions of investigation activities for the Former Lobell Refinery (Site) Investigation and SVE Pilot Study Project to the Wyoming Department of Environmental Quality (WDEQ), Solid and Hazardous Waste Division, Orphan Site Remediation Program (OSRP). Given that the area of investigation has expanded beyond the original footprint of the former Lobell Refinery, the term "Site" in this document includes not only the original footprint of the former Lobell Refinery but also the areas surrounding the original footprint. This document was prepared by Stantec Consulting Services Inc. (Stantec) to detail the field execution of soil vapor extraction (SVE) pilot testing and the field activities associated with the Former Lobell Refinery Expanded Investigation (the Project) including a sewer scope and camera survey, a tetrachloroethylene (PCE) colorimetric tube vapor intrusion survey, and a ground penetrating radar (GPR) survey, as well as drilling and installation of sampling points, and the collection of groundwater and vapor samples. A Site location map is presented as Figure 1. A Site map, showing a detail of the Site including the location of sampling points, is presented as Figure 2.

1.1 PROJECT OBJECTIVES

The objectives of the Project are to:

- Define the extent and nature of PCE and degradation products in groundwater and soil vapor
- Evaluate potentially impacted structures through indoor air and soil vapor sampling
- Develop an accurate site conceptual model
- Evaluate the feasibility of SVE treatment as a remedy for PCE and degradation products present in soil, soil vapor, and indoor air

1.2 PROJECT TASKS

The scope of work for the investigation included the following tasks:

- Pre-field activities
- Installation and sampling of additional groundwater monitoring wells to further define the northern/down gradient extent of the groundwater plume
- Installation of SVE wells on the south side of the Salvation Army building
- SVE pilot study testing in the vicinity of the south side of the Salvation Army building
- Sewer scope and camera surveys at the Salvation Army, Casper Dry Cleaners, and 12-24 Club buildings and on East Collins Drive and East 5th Street
- GPR on the north and south side of the Casper Dry Cleaners building and surrounding the 12-24 Club building
- Preparation of an investigation and SVE pilot study report

A detailed description of work for the Project is included in Sections 3, 4, and 5.

2.0 BACKGROUND AND SITE HISTORY

The following section contains background information that was adapted from Tetra Tech, Inc. (Tetra Tech) historical reports (Tetra Tech, 2010), (Tetra Tech, 2011), (Tetra Tech, 2012), and (Tetra Tech, 2013) for the Project. Also contained in this section is background information from work completed by Stantec (Stantec 2014).

The former Lobell Refinery area has been occupied by a number of different businesses and companies since the late 1800s. Pennsylvania Oil and Gas Company built and operated a petroleum refinery on the site from 1895 to 1903. The refinery was then purchased by Lobell, who operated it from 1903 until 1911. Sanborn Maps from that period indicated several tanks were located within the footprint of the former Lobell Refinery which extended across Wolcott Street. Historical documents indicate there was an open oil storage pit located somewhere on the site, which was later filled in by the City of Casper because it was deemed a public health hazard.

Historical records also show that from 1911 to present time, the former Lobell Refinery was owned and/or occupied by several different owner/operators, including but not limited to Midwest Refining Company, Stanolind Oil and Gas Company, Standard Oil Company, Chicago Northwestern Railway Company, and the Goodstein Property Trust. An electricity generation plant was once present on the northwest corner of the former Lobell Refinery, which was fueled first by coal and later by fuel oil. Northern Utilities also operated a warehouse located along the southern edge of the property.

According to historical records, a railroad siding ran in an east/west direction between East Midwest Ave. and, what is now, East Collins Drive. The railroad siding was removed in the area of the Site between 1961 and 1967 and is now a pedestrian pathway as part of the "Rails to Trails" initiative to convert former railways into recreation areas.

Several site assessments and limited environmental site investigations have been performed since 1995 to characterize the contamination at the Site. The environmental studies conducted at the Site have included projects completed under the direction of WDEQ, United States Environmental Protection Agency (EPA), and private entities. These investigations are briefly summarized below.

- In 1995, two railroad tank car underground storage tanks beneath the northwest portion of the Site were emptied, cleaned and abandoned in place under the Wyoming Underground Storage Tank Program, Facility No. 4176.
- In 1997, URS Operating Services, Inc. (URS) on behalf of the EPA investigated reports of seeps of viscous liquids rising to the ground surface through cracks in the sidewalks at the Site. Eight polynuclear aromatic hydrocarbon (PAH) compounds were detected from the viscous liquids seeps at the Site. A report from URS (Denver, CO), entitled, "November 1997: Analytical Results Report for Focused Site Inspection, J.H. Lobell Refinery Site, Casper, Wyoming, CERCLIS ID# WY0001654391," was submitted to EPA Region VIII under Contract No. 68-W5-0031.
- In 2003, a limited environmental site assessment was conducted by Inberg Miller Engineers (IME). The report entitled, "Subsurface Exploration Service, 421 South Center Street Property,

Casper Wyoming," reported the presence of total petroleum hydrocarbon diesel range organics (TPH-DRO) in both shallow and deep soils in the eastern portions of the Site.

- In 2004, an additional site assessment was performed by Gene R. George & Associates, Inc. (GRGA). Activities included subsurface soil borings. Results confirmed the occurrence of weathered TPH-DRO in concentrations above the Wyoming Department of Environmental Quality Voluntary Remediation Program (WDEQ-VRP) soil cleanup levels (ranging from 2,410 milligrams per kilogram [mg/kg] to 8,200 mg/kg) in the soil. The source of the weathered hydrocarbons was attributed to the former refinery operations from over 100 years ago. Concentrations of PCE and trichloroethylene (TCE) were also found in groundwater at the site, with maximum levels of 340 micrograms per liter (µg/L) and 16 µg/L, respectively.
- From 2010 to 2011, limited site characterization studies were conducted at the Site by Tetra Tech and included subsurface soil sampling, direct push borings, test pit sampling, and assessment of the surface and subsurface acidic hydrocarbon seep material at Wolcott Street. Data collected was used to assess the vertical distribution of impact in proximity to potential release source areas.
- From July 30, 2012, through September 19, 2012, Tetra Tech performed acid sludge excavation and remediation, followed by restoration at the Site. Approximately 9,300 square feet of asphalt/concrete road surface and 668 square feet of sidewalk were removed from the remedial area to expose the acidic waste/soil for excavation and subsequent treatment by neutralization. An estimated total of 835 cubic yards of acidic waste/soil and native soil was excavated from the remedial area. Approximately 805 cubic yards of acidic waste/soil was successfully pH neutralized on-site and transported to the Casper Regional Landfill for final disposal as petroleum contaminated soil. In the areas excavated, the removal of the source of acidic hydrocarbon seep material effectively eliminated the surface exposure pathway and the subsequent potential public exposure to surface seeps.
- After acid sludge remediation, residual impacts of PCE remained in the groundwater monitoring wells. Additional investigation of tanks indicated that six small USTs are present in an area directly north and adjacent to the Casper Dry Cleaners building.
- In October 2013, UST excavation and abandonment activities were conducted at the Site by Stantec. A total of four USTs were abandoned in place and included one, 500-gallon, horizontal tank and three 400 to 500-gallon, vertical tanks. These tanks were located north of the Casper Dry Cleaners building. A limited site characterization study was also conducted by Stantec. Stantec installed six monitoring wells (MW-101 through MW-106), seven soil vapor points (VP-11R and VP-101 through VP-106), ten temporary passive soil gas modules (PSG-1 through PSG-10), and four sub-slab soil vapor points (SSG-1 through SSG-4). A site wide sampling event of these and historical monitoring locations was conducted. Details of the October 2013 activities are presented in the *Expanded Investigation and Underground Storage Tank (UST) Excavation/In-Situ Abandonment Repor*t (Stantec, 2014).

3.0 SITE INVESTIGATION AND FIELD ACTIVITIES

3.1 PRE-FIELD ACTIVITIES

Stantec previously prepared the applicable planning documents for the 2013 site investigation and field activities including the Investigative Work Plan (IWP) (Stantec, 2013a), Quality Assurance Project Plan (QAPP) and Sampling and Analysis Plan (SAP) (Stantec, 2013b) and a site Health and Safety Plan (HASP). The HASP was prepared in accordance with Occupation Safety and Health Administration (OSHA) requirements. These documents were updated, as needed, for the 2014 Expanded Investigation and Soil Vapor Extraction Pilot Study field activities. Stantec also conducted several Site reconnaissance visits to coordinate with subcontractors and meet with One Call of Wyoming to locate and identify all public utilities prior to drilling field activities.

3.2 SEWER SCOPE AND CAMERA SURVEY

Sewer scope and camera surveys were conducted on March 25 and 26, 2014. Sewer scope and camera surveys of the municipal main sewer lines in the area to the north and south of the Casper Dry Cleaners building were performed to evaluate the location, connection points, and condition of the sewer lines. These sewer lines are suspected of providing, at least in part, a transport mechanism for chlorinated compounds in the area. Additionally, the sewer lines may also provide the entrance point for chlorinated compound vapors to enter area buildings. Two different types of cameras were used to investigate both municipal main sewer lines and laterals connected to area buildings. A larger wheel mounted camera was used to investigate the municipal main sewer lines and a smaller push camera was used to investigate the lateral connections. Access to cleanouts inside buildings was required to investigate the lateral connections, including access into building basements. Primary target buildings include the Casper Dry Cleaners, the 12-24 Club, and the Salvation Army. No cleanout existed in the sanitary sewer line located in the basement of the Casper Dry Cleaners building and to facilitate access, on March 26, 2014, a cleanout was installed. The cleanout was installed in the sanitary sewer line just north of the location where the line exits the building through the south basement wall. There was also no access to the sanitary sewer line cleanout in the 12-24 Club building due to the position of the cleanout. The cleanout also appeared to be permanently sealed. Therefore, no sewer scope or camera survey was completed in the basement of the 12-24 Club building. Access to sewer manhole covers in street areas including traffic control was required to investigate the municipal main sewer lines. The City of Casper assisted in sewer manhole cover access and traffic control. Sewer scope and camera survey run locations are shown on Figure 3. A description of each sewer scope and camera survey run is also described below.

- Run Number 1: Started at sanitary sewer manhole CE-0930 and headed south (upstream) 151.1 feet toward manhole CE-0935
- Run Number 2: Started at sanitary sewer manhole CE-0930 and headed west (upstream) 168.4 feet toward manhole CE-1015
- Run Number 3: Started at sanitary sewer manhole CE-0930 and headed east (downstream) 173.2 feet toward manhole CE-0925

- Run Number 4: Started at storm sewer manhole 1258 and headed southwest 77.4 feet toward manhole 2848
- Run Number 5: Started at storm sewer manhole 356 and headed southwest 426.9 feet toward manhole 1250
- Run Number 6: Started at sanitary sewer cleanout in Salvation Army building and headed 44.1 feet south
- Run Number 7: Started at sanitary sewer cleanout in the Casper Dry Cleaners building and headed 46.1 feet south

A photographic log of field activities is provided in Appendix A. The sewer scope and camera survey video, with log sheets, are presented in Appendix B.

3.3 GPR SURVEY

GPR surveys were conducted on March 25, 2014 on the north and south side of Casper Dry Cleaners building and on each side of the 12-24 Club building. GPR surveys were conducted to investigate utility locations and other potential release sources, such as abandoned USTs, that may still be present in the area. These potential release sources were identified on historic Sanborn Fire Insurance Maps for the area, and documentation of their removal or final destination have not been located. The GPR surveys were conducted using a Geophysical Survey Systems Inc. (GSSI) Subsurface Interface Radar (SIR)-3000 unit with a 400 GSSI megahertz (MHz) antenna which allows collection of data at depths up to eight feet below ground surface (bgs). GPR survey run locations are presented on Figure 4. A photographic log of field activities is provided in Appendix A and the GPR survey report is presented in Appendix C.

3.4 PCE COLORIMETRIC TUBE SURVEY

PCE colorimetric tube surveys were conducted on March 25 and 26, 2014 in the 12-24 Club building, the Salvation Army building, and the Casper Dry Cleaners building. These surveys were conducted in each building to assist in identifying areas where PCE vapor intrusion may be occurring (e.g. cracks in the foundation, utility connections, open pipes). Colorimetric tubes were selected over a photoionization detector (PID) because they can target a specific compound rather than a variety of compounds reported as a single measurement. The PCE colorimetric tube surveys were conducted using a hand-held Draeger Accuro® pump with PCE reactive (0.1 to 4 parts per million [ppm]) colorimetric tubes (Draeger Tubes®). Six samples were collected inside the 12-24 Club building, six samples were collected inside the Salvation Army building, and seven samples were collected inside the Casper Dry Cleaners building. PCE colorimetric tube survey sample locations are presented on Figure 5 and descriptions are included in Table 1. A photographic log of field activities is provided in Appendix A.

3.5 GROUNDWATER MONITORING WELL INSTALLATION AND DEVELOPMENT

Two groundwater monitoring wells (MW-107 and MW-108) were installed on May 19 and 20, 2014, to further define the extent of groundwater impacts at the Site. Groundwater monitoring well locations are shown on Figure 2. A photographic log of field activities is provided in Appendix A.

Prior to drilling activities, each borehole location was cleared to approximately five bgs using hydrovac soft digging methods. Borehole locations were drilled using eight-inch, outside diameter (OD) hollow stem augers. During drilling activities, soil cores were collected every five feet for soil logging and field screening using a two-inch diameter, two foot long split spoon sampler.

Soils were visually evaluated and soil stratigraphy was classified using the Unified Soils Classification System (USCS) as a guide. Field screening was performed by placing a portion of each soil core into a plastic bag, sealing the bag and allowing the headspace to equilibrate (typically about five minutes). The headspace of the bag was then screened using a MiniRAE 3000 photoionization detector (PID) with a 10.6 electrovolt (eV) lamp. PID measurements did not indicate impacts during drilling and soil samples were not submitted for laboratory analysis.

The groundwater monitoring wells MW-107 and MW-108 and were installed to approximately 49 feet bgs and 30 feet bgs, respectively, and were constructed of 2-inch diameter Schedule 40 polyvinyl chloride (PVC). Monitoring well MW-107 included a 0.01-inch slotted well screen installed from approximately 49 feet bgs to 39 feet bgs and a riser from approximately 39 feet bgs to just below the ground surface. MW-107 was completed with 10/20 washed silica sand from the bottom of the bore hole to approximately 37 feet bgs and hydrated bentonite chips from approximately 37 feet bgs to two feet bgs. Monitoring well MW-108 included a 0.01-inch slotted well screen installed from approximately 30 feet bgs to 20 feet bgs and a riser from approximately 20 feet bgs to just below the ground surface. MW-108 was completed with 10/20 washed silica sand from the bottom of the bore hole to approximately 17.5 feet bgs and hydrated bentonite chips from approximately 17.5 feet bgs to 2 feet bgs. Both monitoring wells MW-107 and MW-108 were completed with a cement seal with a seven-inch diameter steel well vault which was installed level with surface grade. Soil boring logs and well completion details are presented in Appendix D and monitoring well details are summarized in Table 2.

Drill cuttings generated during the monitoring well installation process were containerized, stored, transported, and disposed of as detailed in Section 4.0.

At least 24 hours after installation, each of the newly installed groundwater monitoring wells were developed. Well development was performed on May 21, 2014, by purging and removing groundwater using a disposable hand bailer. Development continued until the turbidity of the purged groundwater was visibly low or until at least 10 casing volumes of groundwater had been removed. For these wells, 10 casing volumes of groundwater were removed because the turbidity of the purged groundwater remained visibly high through the development process.

3.6 SOIL VAPOR EXTRACTION WELL INSTALLATION

Nested SVE pilot test wells (SVE-1S and SVE-1D) were installed on May 20, 2014, south of the Salvation Army building. SVE-1S and SVE-1D were installed in the same borehole and screened at different intervals. These SVE wells were installed and utilized during the SVE pilot study performed to evaluate SVE as a potential remedy of chlorinated compound vapor impacts to area buildings. SVE pilot test well locations are presented on Figure 2.

Prior to drilling activities, the nested SVE pilot test well location was cleared to approximately five feet bgs using hydrovac soft digging methods. The borehole location was drilled using eight-inch, OD hollow stem augers. During drilling activities, soil cores were collected every five feet for soil logging and field screening using a two-inch diameter, two foot long split spoon sampler.

Soils were visually evaluated and soil stratigraphy was classified using the USCS as a guide. Field screening was performed by placing a portion of each soil core into a plastic bag, sealing the bag and allowing the headspace to equilibrate (typically about five minutes). The headspace of the bag was then screened using a MiniRAE 3000 PID with a 10.6 eV lamp. Because PID measurements were low, soil samples from the borehole were not submitted for laboratory analysis.

SVE-1S was installed to an approximate depth of five feet bgs and SVE-1D was installed to an approximate depth of 15 feet bgs using hallow stem auger drilling techniques. The SVE wells were constructed of 2-inch diameter Schedule 40 PVC. SVE-1S included a 0.01-inch slotted well screen installed from approximately 5 feet bgs to 2 feet bgs and a riser from approximately 2 feet bgs to just below the ground surface. SVE-1S was completed with 10/20 washed silica sand from 5 feet bgs to approximately 2 feet bgs and hydrated bentonite chips from approximately 2 feet bgs to 6-inches bgs. SVE-1D included a 0.01-inch slotted well screen installed from approximately 15 feet bgs to 12 feet bgs and a riser from approximately 12 feet bgs to just below the ground surface. SVE-1D was completed with 10/20 washed silica sand from 15 feet bgs to approximately 12 feet bgs and hydrated bentonite chips from approximately 12 feet bgs to 6-inches bgs. A cement seal with a 7-inch diameter traffic rated steel well vault was then installed level with surface grade. SVE well completion details are summarized in Table 3. A photographic log of field activities is provided in Appendix A. Soil borings bogs and well completion details are included in Appendix D.

Drill cuttings generated during the SVE well installation process were containerized, stored, transported, and disposed of as detailed in Section 4.0.

3.7 SVE PILOT STUDY OPERATIONS

The SVE Pilot Study was conducted on May 21 (Day 1) and 22 (Day 2), 2014, to evaluate the feasibility of SVE treatment as a remedy or vapor control for PCE and degradation products present in soil, soil vapor, and indoor air. The SVE Pilot Study was performed using a mobile SVE pilot testing system. The mobile SVE pilot testing system was enclosed in an insulated trailer and equipped with a 15 horsepower (Hp) Rietschle Rotary Claw Extraction blower, capable of moving 150 standard cubic feet per minute (scfm) at 40-50 inches of water column (inWC), a knock out tank, an oil water separator, and liquid phase bag filters. The mobile pilot testing system also included flow meters, vacuum gages and control valves. The mobile pilot testing system required a 480 volt, 3-phase, 100-amp generator for operation. Both the mobile pilot testing system and generator were staged south of the Salvation Army Building and to the east of SVE-1S/1D. A photographic log of field activities is provided in Appendix A and SVE pilot testing system specifications are presented in Appendix E.

In order to evaluate the SVE technology and obtain data relevant to a full-scale system design, the SVE Pilot Study was conducted in a stepped approach. A summary of the Step Tests are listed below.

- Step Test 1 – Performed on Day 1 at SVE-1D

- Step Test 2 – Performed on Day 1 at SVE-1D
- Step Test 3 – Performed on Day 2 at SVE-1S
- Step Test 4 – Performed on Day 2 at SVE-1S
- Step Test 5 – Performed on Day 2 at SVE-1S

Monitoring during the SVE Pilot Study occurred continuously during each Step Test. The monitored parameters included:

- Pressure in inWC
- System extracted air flow velocities in scfm
- System Pressure in inches of mercury (inHG)
- Dilution in scfm

A description and details of Step Test conducted are provided below.

3.7.1 SVE Pilot Study Step Test 1

SVE Pilot Study Step Test 1 was conducted from 09:00 through 10:00 on May 21, 2014 (Day 1). The SVE pilot testing system was set up and a vacuum was applied to SVE-1D. The vacuum level during Step Test 1 was 17 inHg with a flow of 80 scfm. Data was collected from the mobile pilot testing system and from locations at radial distances from SVE-1D to monitor corresponding subsurface influence. Data was collected from VP-01, VP-08, VP-10, VP-11R, VP-12, VP-13, VP-102, MW-02, MW-07, MW-10, MW-11, and MW-101. Data collected during Step Test 1 are summarized in Table 4A.

3.7.2 SVE Pilot Study Step Test 2

SVE Pilot Study Step Test 2 was conducted from 13:11 through 16:40 on May 21, 2014 (Day 1). The SVE pilot testing system was set up and a vacuum was applied to SVE-1D. The vacuum level during Step Test 2 was 17 inHg with a flow of 55 scfm. Data was collected from the mobile pilot testing system and from locations at radial distances from SVE-1D to monitor corresponding subsurface influence. Data was collected from VP-01, VP-08, VP-11R, VP-12, VP-13, MW-02, MW-07, and MW-10. During Step Test 2, one representative vapor sample was collected from the extracted vapors from SVE-1D. Details of Step Test sampling are included in Section 5.2. Data collected during Step Test 2 are summarized in Table 4B.

3.7.3 SVE Pilot Study Step Test 3

SVE Pilot Study Step Test 3 was conducted from 08:21 through 08:44 on May 22, 2014 (Day 2). The SVE pilot testing system was set up and a vacuum was applied to SVE-1S. The vacuum level during Step Test 3 was 16 inHg with a flow of 55 scfm. Data was collected from the mobile pilot testing system and from locations at radial distances from SVE-1S to monitor corresponding subsurface influence. Data was collected from VP-01, VP-08, VP-11R, VP-12, VP-13, VP-102, MW-02, and MW-101. Data collected during Step Test 3 are summarized in Table 4C.

3.7.4 SVE Pilot Study Step Test 4

SVE Pilot Study Step Test 4 was conducted at SVE-1S on May 22, 2014 (Day 2). SVE Pilot Study Step Test 4 was conducted from 09:21 through 12.02 on May 22, 2014. The SVE pilot testing system was set up and a vacuum was applied to SVE-1S. The vacuum level during Step Test 4 was 19 inHg with a flow of 55 scfm. Data was collected from the mobile pilot testing system and from locations at radial distances from SVE-1S to monitor corresponding subsurface influence. Data was collected from VP-01, VP-08, VP-11R, VP-12, MW-02, and MW-10. During Step Test 4, one representative vapor sample was collected from the extracted vapors from SVE-1S. Details of Step Test sampling are included in Section 5.2. Data collected during Step Test 4 are summarized in Table 4D.

3.7.5 SVE Pilot Study Step Test 5

SVE Pilot Study Step Test 5 was conducted at SVE-1S on May 22, 2014 (Day 2). SVE Pilot Study Step Test 3 was conducted from 12:22 through 12.40 on May 22, 2014. The SVE pilot testing system was set up and a vacuum was applied to SVE-1S. The vacuum level during Step Test 5 was 17 inHg with a flow of 55 scfm. Data was collected from the mobile pilot testing system and from locations at radial distances from SVE-1S to monitor corresponding subsurface influence. Data was collected from VP-01, VP-08, VP-11R, VP-12, MW-02, and MW-10. Data collected during Step Test 5 are summarized in Table 4E.

4.0 WASTE MANAGEMENT AND DISPOSAL

Both solid and liquid wastes were generated during the site investigation field activities. Wastes generated at the Site were previously characterized as either non-hazardous or hazardous and stored on-site in the designated waste storage area until transport to the appropriate disposal facility (TSDF). A summary of wastes generated are included below.

4.1 GROUNDWATER MONITORING WELL AND SOIL VAPOR EXTRACTION WELL INSTALLATION SOIL CUTTINGS

Approximately three cubic yards of soil generated from groundwater monitoring well and soil vapor point installation were containerized in nine 55-gallon Department of Transportation (DOT) approved steel drums. This waste was sampled and profiled as non-hazardous waste. This waste was stored in a temporary waste storage area until it was transported by Clean Harbors and disposed of at the Clean Harbors Deer Trail Landfill located in Deer Trail, Colorado. Waste manifests are presented in Appendix F.

4.2 DRILLING DECONTAMINATION WATER AND GROUNDWATER MONITORING WELL DEVELOPMENT AND SAMPLING PURGE GROUNDWATER

Approximately 60 gallons of drilling decontamination water and groundwater produced during groundwater monitoring well development and sample purging was generated and containerized in 250-gallon DOT approved plastic totes. This liquid waste was grouped in with the liquid/sludge waste, manifested and disposed of as hazardous waste with a F002 waste code. This waste was stored in a temporary waste storage area until it was transported by Clean Harbors and disposed of at the Clean Harbors Kimball, Nebraska Incinerator. Waste manifests are presented in Appendix F.

5.0 SAMPLING

5.1 PCE COLORIMETRIC TUBE SURVEY

PCE vapor intrusion surveys were conducted on March 25 and 26, 2014. Six samples were collected inside the 12-24 Club building, six samples were collected inside the Salvation Army building, and seven samples were collected in the Casper Dry Cleaners building. Areas in each building were identified where vapor instruction may be occurring (e.g. cracks in the foundation, utility connections, open pipes). Sample location descriptions are presented on Table 1 and sample locations are presented on Figure 4.

5.2 GROUNDWATER MONITORING WELLS

After the installation and development of the two new groundwater monitoring wells, a groundwater sampling event was conducted for new monitoring wells (MW-107 and MW-108) and select existing monitoring wells (MW-2, MW-4, MW-6, MW-7, MW-10, MW-11, and MW-101 through MW-106) at the Site. Sampling of the new wells was not initiated until a minimum of 24 hours after well development. Monitoring wells were gauged for depth to groundwater relative to the top of the well casing before sampling. A water quality meter was used to measure field parameters during purging and groundwater sampling. Measured field parameters included:

- Conductivity
- Dissolved oxygen
- Temperature
- Oxygen reduction potential

The water level indicator and water quality meter were decontaminated with environmental grade detergent and rinsed with distilled water between wells. The depth to water and water quality measurements were recorded on a field log.

Groundwater samples were collected in laboratory-provided containers, labeled, stored on ice, and transported under COC procedures to ChemSolutions for analysis. Groundwater samples were analyzed for volatile organic compounds (VOCs) using EPA Methods 8260B. The groundwater laboratory analytical report is presented in Appendix G.

Purged groundwater generated during the sampling process was containerized, stored, transported, and disposed of as detailed in Section 4.0.

5.3 SVE PILOT STUDY

As stated in Sections 3.7.2 and 3.7.4, two samples were collected during the SVE pilot study step testing. One extracted vapor sample was collected at 13:30 on May 21, 2014 (Day 1) during Step Test 2 from SVE-1D. One extracted vapor sample was collected at 11:30 on May 22, 2014 (Day 2) during Step Test 4 from SVE-1S. Vapor samples were collected in laboratory-provided six-liter stainless steel summa canisters with regulators allowing a flow rate of approximately 50 milliliters per minute (ml/min). The canisters

were labeled and transported under COC procedures to Eurofins Air Toxics in Folsom, California for analysis. SVE vapor samples were analyzed for VOCs (EPA Method TO-15). The SVE vapor sample laboratory analytical report is presented in Appendix G.

5.4 SOIL VAPOR POINTS

Soil vapor point sampling was conducted on May 20 and 21, 2014 utilizing select soil vapor points (VP-01 through VP-04, VP-06, VP-09, VP-10, VP-11R, VP-12 through VP-14, and VP-101 through VP-106) at the Site. An air pump was used to purge stagnant air from each vapor point prior to sample collection. Each soil vapor point was sampled using a shroud containing helium (He) for real-time leak testing. Samples were collected in laboratory-provided six-liter stainless steel, batch-certified canisters with regulators allowing a flow rate of approximately 50 ml/min. Soil vapor sample canisters were labeled and transported under COC procedures to Eurofins Air Toxics in Folsom, California for analysis. Soil vapor point samples were analyzed for VOCs (EPA Method TO-15 full scan), and oxygen (O_2), nitrogen (N_2), carbon dioxide (CO_2), and methane (CH_4), as well as He to indicate ambient air leakage using ASTM D-1946. The soil vapor point laboratory analytical report is presented in Appendix G.

5.5 INDOOR AIR

Two indoor air samples (IA-10 and IA-11) were collected at the locations presented on Figure 2. Each sample interval was 24 hours in duration. Generally, the duration of sample collection corresponds to typical periods of building occupancy, in this case approximately 8 hours. However, the Salvation Army is considering using a portion of their space for temporary family housing and the sampling duration was adjusted to evaluate potential future building occupancy and exposure. Indoor air samples were collected in laboratory-provided six-liter, individually certified, stainless steel canisters fitted with laboratory-calibrated flow controllers. Indoor air sample canisters were labeled and transported under COC procedures to Eurofins Air Toxics in Folsom California for analysis. Due to very low indoor air OSRP Residential Use Screening Levels (Screening Levels), analysis was performed using EPA Method TO-15 in the Selective Ion Mode (SIM). The indoor air laboratory analytical report is presented in Appendix G.

6.0 RESULTS

Although standard EPA analytes were analyzed and reported during this investigation, based on identified use, storage and potential release of chlorinated solvents, PCE and daughter products, specifically TCE, cis-1,2-Dichloroethene (cis-DCE), and vinyl chloride (VC) were considered the primary contaminants of concern. Groundwater results were compared to cleanup levels provided in Table 1 of the QAPP and SAP (Stantec, 2013b). Indoor air results were compared to Screening Levels and soil vapor point results were compared to Action Levels (OSRP Residential Use Screening Level ÷ 0.01 the generic attenuation factor-soil vapor to indoor air). Screening Levels and Action Levels for shallow soil vapor were established subsequent to preparation of the QAPP and SAP (Stantec, 2013b) and are included in the data summary tables of this report. Because the fall 2013 UST investigation indicated that there was only minimal presence of VOCs in the area below the tank pit, and the USTs were found to be in good condition, it does not appear that the USTs are the primary release source at this site. The information presented below is based on the premise that an alternate source or sources are likely present at the site.

6.1 SEWER SCOPE AND CAMERA SURVEY

Sewer scope and camera surveys were conducted on March 25 and 26, 2014. Sewer scope and camera surveys were performed for both municipal main sewer lines and lateral sewer lines connected to area buildings in the area surrounding the Casper Dry Cleaners building. These surveys were performed to evaluate the location, condition, and connections of the sewer lines, as these lines are suspected of providing, at least in part, transport mechanisms for chlorinated compounds and entrance points for chlorinated compound vapor to enter area buildings. A larger wheel mounted camera was used to investigate the municipal main sewer lines and a smaller push camera was used to investigate lateral connections. There was no access to the sanitary sewer line cleanout in the 12-24 Club building because of its position and that it has been permanently sealed. A summary of sewer scope survey observations are presented on Figure 3 and video and logs are presented in Appendix B. A summary of notable features observed during the sewer scope and camera surveys are listed below.

- Run Number 1: Starting at sanitary sewer manhole CE-0930 headed south (upstream) 151.1 feet toward manhole CE-0935
    - Sewer line constructed of vitrified clay pipe
    - Longitudinal fractures at 4.7 and 7.9 feet
    - Hole and soil visible at 64.5 feet
    - Multiple fractures at 62.2, 93.5, and 112.1 feet
    - Broken pipe at 103.9 and 109.1 feet

- Run Number 2: Starting at sanitary sewer manhole CE-0930 headed west (upstream) 168.4 feet toward manhole CE-1015
    - Sewer line constructed of vitrified clay pipe (0-161.7 feet) and PVC (161.7-168.4 feet)
    - Hole and soil visible at 5.1, 10.3, and 13.5 feet
    - Broken pipe at 10.1 feet

- Run Number 3: Starting at sanitary sewer manhole CE-0930 headed east (downstream) 173.2 feet toward manhole CE-0925
    - Sewer line constructed of vitrified clay pipe (0-164.8 feet) and PVC (164.8-173.2 feet)
    - Hole at 30.8 feet
    - Multiple fractures at 33.1, 63.6, 76.2, 83.7, 89.2, 91.5, 94.3, and 101.9 feet
    - Broken pipe at 56.1, 66.8, 76.2, 84.2, 86.5, 98.7, and 117.0 feet
    - Longitudinal crack at 62.5 feet
    - Multiple fractures at 63.6, 76.2, 89.2, 91.5, 94.3, and 101.9 feet
    - Hole and soil visible at 64.0 and 66.7 feet
    - Circumferential crack at 81.4 feet
    - Circumferential fracture at 99.5 feet

- Run Number 4: Starting at storm sewer manhole 1258 headed west 77.4 feet toward manhole 2848
    - Sewer line constructed of reinforced concrete pipe

- Run Number 5: Starting at storm sewer manhole 356 headed west 426.9 feet toward manhole 1250
    - Sewer line composed of corrugated metal pipe

- Run Number 6: Starting at sanitary sewer cleanout in Salvation Army building headed 44.1 feet south
    - Sewer line constructed of PVC (0-23.3 feet), cast iron (23.3-32.2 feet) and vitrified clay pipe (32.2-46.1 feet)
    - Pipe alignment change at 6.3 and 8.8 feet

- Run Number 7: Starting at sanitary sewer cleanout in the Casper Dry Cleaners building headed 46.1 feet south
    - Sewer line constructed of vitrified clay pipe
    - Pipe alignment change at 23.3 feet
    - Offset joint at 32.2 feet

The sewer lines in the vicinity of the 12-24 Club building are generally in poor condition as described for Runs 1 and 3 in this report. Those areas where the sanitary sewer is breached represent locations of possible sources. The locations of these breaches also coincides with the location of PCE impacts present in soil vapor and groundwater near the northeast corner of the 12-24 Club building and on the passive soil gas survey presented in the Draft Expanded Investigation and Underground Storage Tank (UST) Excavation/In-Situ Abandonment Report (Stantec, 2014). Thus, the area north of the 12-24 Club building appears to be a focus area for additional investigation in the form of monitoring and/or remediation wells. Since this investigation was focused on examining the location, condition, and distribution of the sewer lines, the condition of dry cleaning equipment and PCE storage practices were not emphasized. . It should be noted that breached sewer lines could potentially transmit soil vapors by releasing liquids or

vapors to the surrounding backfill around the pipe where vapors could migrate into the buildings. Also, if the backfill around the sewer line pipes was impacted by other means, liquids and vapors could enter into the sewer pipes and transmit vapors to nearby buildings.

6.2 GPR SURVEY

GPR surveys were conducted on March 25, 2014 on the north and south side of Casper Dry Cleaners building and on each side of the 12-24 Club building. GPR survey run locations are presented on Figure 4 and the GPR survey report is presented in Appendix C. A summary of the GPR survey findings are listed below:

- An anomaly was identified at a depth of approximately 2.6 feet bgs (running in line with the gas meter) north of the Casper Dry Cleaners building to the east of the known location of the USTs.
- An anomaly was identified at a depth of approximately 2.3 feet bgs north of the Casper Dry Cleaners building in the area of the known USTs.
- The GPR survey was unable to detect the sewer line south of the Casper Dry Cleaners building.
- The GPR survey was unable to detect the sewer line north of the 12-24 Club building.

No formerly unknown potential release sources, such as abandoned USTs, were identified during the May 2014 GPR surveys.

6.3 PCE COLORIMETRIC TUBE SURVEY

Colorimetric tube surveys were conducted on March 25 and 26, 2014 in the 12-24 Club building, the Salvation Army building, and in the Casper Dry Cleaners building. Of the 19 total colorimetric tube samples collected, concentrations of PCE were detected in five samples. Of the six colorimetric tube samples collected in the 12-24 Club building, no PCE concentrations were detected. Of the six colorimetric tube samples collected in Salvation Army building basement, concentrations of PCE were detected at 0.3 ppm in two samples (one primary sample and one duplicate sample). These samples were collected from the opening around the location where the municipal water line enters the Salvation Army building basement. Based on the measurable PCE concentrations at this location, it appears that the utility corridor is a likely pathway for PCE vapors impacting the Salvation Army building. A preferential pathway for soil gas transport from the source of the release to the Salvation Army building is likely associated with the backfill material surrounding the water line.

PCE was detected in three of seven colorimetric tube samples collected in Casper Dry Cleaners building. Concentrations of PCE in ambient indoor air were detected at 0.1 ppm in the basement and at >4.0 ppm around the PCE washer unit. Concentrations of PCE were also detected at 0.5 ppm[1] from sludge removed from the sanitary sewer line. Samples of the sewer line sludge were collected during the installation of the sewer line cleanout needed for the sewer scoping and camera survey (as described in Section 3.2). Colorimetric tube survey PCE concentrations are presented in Table 1 and on Figure 5. Previous laboratory analysis did not detect typical degradation products of PCE (TCE, cis-DCE, and VC) which

[1] Measurement collected by doubling recommended exposure to detect any presence of PCE

would provide evidence either that PCE has apparently not undergone degradation in the subsurface or that conditions present in a preferential pathway such as utility line backfill do not support degradation. The lack of daughter compounds combined with the findings of the original tank excavation, which revealed that the USTs located on the north side of the building were in good condition, suggests that the USTs may not have been the source and there may be a recent or ongoing source. The observed PCE concentrations in sludge as described above suggest that PCE was introduced into the sanitary sewer line at some point in time in the past. Given that multiple fractures were identified in the sanitary sewer network's piping, it is likely that PCE impacted water and/or sediment were distributed through the sanitary sewer and released from the sewer through fractures into the backfill material surrounding the sanitary sewer. This is one likely area for the focus of remediation efforts on the south side of the Casper Dry Cleaners building.

6.4 GROUNDWATER

The groundwater monitoring and sampling event was conducted on May 22 and 23, 2014. Before sample collection, groundwater levels were collected and recorded to the nearest +0.01 foot using a water level indicator. Groundwater was encountered at depths ranging from 19.35 to 26.10 feet below top of casing (TOC). During the May 2014 monitoring and sampling event, the groundwater flow direction was generally to the north-northwest. The hydraulic gradient around the Site varies significantly. The measured hydraulic gradient between monitoring wells MW-106 and MW-02 (south end of the Site) is 0.012 feet per foot (ft/ft) and the measured hydraulic gradient between monitoring wells MW-02 and MW-105 (north end of the Site) is 0.0023 ft/ft. Groundwater elevations are presented in Table 5 and on Figure 6.

Groundwater samples were collected from 14 wells, MW-2, MW-4, MW-6, MW-7, MW-10, MW-11, and MW-101 through MW-108 during the May 2014 monitoring and sampling event. For the following list of contaminants of concern, cleanup levels established in Table 1 of the QAPP and SAP (Stantec, 2013b) were exceeded in groundwater samples collected in May 2014 from monitoring wells:

- PCE: MW-02, MW-04, MW-06, MW-07, MW-10, MW-104, and MW-105
- TCE: MW-04 and MW-06
- cis-DCE: None
- VC: None

Of the monitoring wells that exceeded the cleanup levels, PCE concentrations ranged from 6.4 to 710 µg/L. TCE was detected in groundwater from the listed wells at concentrations ranging from 29 to 38 µg/L. Cis-DCE was not detected above the cleanup levels. Monitoring wells MW-07 and MW-10 showed TCE and VC concentrations in groundwater below the laboratory detection limits but above the cleanup levels. This variation in the data is due to the lab dilution of these samples to account for the concentrations of PCE in the groundwater samples. Concentrations of PCE, TCE, cis-DCE, and VC were not detected above the cleanup levels in monitoring wells MW-11, MW-101, MW-102, MW-103, MW-106, MW-107 and MW-108. The Groundwater Sample Analytical Summary is presented in Table 6 and the

PCE, TCE, cis-DCE, and VC Concentrations in Groundwater Maps are presented as Figures 7, 8, 9 and 10, respectively.

With few exceptions, the magnitude of groundwater concentrations are generally too low to generate the vapor concentrations observed in the Salvation Army building or the 12-24 Club building. Based on the available information, it appears that there is likely a recent or ongoing release of PCE from the general vicinity of the Casper Dry Cleaner building. The magnitude of VOC concentrations present in indoor air suggests that VOCs are likely not generated from partitioning from impacted groundwater to vapor. Although some partitioning is to be expected, this does not appear to be the primary source for elevated indoor air VOC concentrations in the Salvation Army building or 12-24 Club building. VOC impacts to the underground utility corridors more likely accounts for the elevated VOC concentrations observed in indoor air.

6.5 SVE PILOT STUDY

The SVE Pilot Study was conducted using a mobile SVE pilot testing system on May 21 and 22, 2014. The SVE Pilot Study was conducted to evaluate the feasibility of SVE treatment as a remedy for PCE and daughter compounds present in soil, soil vapor, and indoor air. The Pilot Study was conducted in a stepped approach at two separate depths. Specifically, the Step Tests were conducted at SVE-1S at depths ranging from 2-5 feet bgs and SVE-1D at depths ranging from 12-15 feet bgs. Data collected during the SVE Pilot Study was evaluated in part using the United States Army Corps of Engineers (US Army Corps Engineers), *Engineering Manual* (*EM) 1110-1-4001, Engineering and Design-Soil Vapor Extraction and Bioventing,* (US Army Corps Engineers, June 2002), pore-volume exchange (PVE) method. The PVE method uses soil porosity, area, and extraction rates to project a radius of influence (ROI). Data collected during the SVE Pilot Study are summarized in Tables 4A through 4E. Analysis of the SVE Pilot Study data is presented in Table 7 and Graph 1.

The EM 1110-1-4001 (US Army Corps Engineers, June 2002), indicates that 1,000 to 1,500 PVEs are typically needed for remediation, unless initial concentrations are relatively high or cleanup goals are relatively low. Given that magnitude of VOC concentrations at certain areas throughout the Site, a target value of approximately 2,190 PVEs (3.0 PVE per day) is recommended as the targeted exchange rate. Based on utilizing the PVE method and the calculations presented on Table 7, the initial SVE Pilot Study indicates that the effective ROI is approximately 91 to 110 feet.

Monitoring of subsurface vacuum levels was conducted at multiple monitoring locations during pilot study operations to assist in the determination of vapor influence for each of the test wells. An induced vacuum of 0.1 inWC in the observation wells is a generally accepted value which is commonly used to estimate an effective vapor extraction ROI. For comparison purposes using this technique, as seen on Graph 1, an effective ROI as indicated by measured induced vacuum is approximately 40 feet.

Evaluation of the pilot test data suggests the following conclusions regarding suitability of SVE for remediation of vadose zone soils:

- SVE is technically feasible for treatment of PCE and daughter compounds present in soil, soil vapor, and indoor air at the Site;

- Air extraction rates ranging from approximately 55 to 80 scfm per well were measured during testing;
- The most prevalent compound identified in the SVE exhaust was PCE, analyzed at 20,000 ug/m^3 in SVE-1S and 73,000 ug/m^3 in SVE-1D (Table 8);
- Mass extraction rates of PCE ranged from approximately 0.10 pounds per day (lbs/day) at SVE-1S to approximately 0.36 lbs/day at SVE-1D; Mass extraction rates of TCE ranged from approximately 0.0002 lbs/day at SVE-1S to approximately 0.0017 lbs/day at SVE-1D; Mass extraction rates of cis-DCE ranged from approximately 0.0002 lbs/day at SVE-1S to approximately 0.0013 lbs/day at SVE-1D; Mass extraction rates of VC ranged from approximately 0.0001 lbs/day at SVE-1S to approximately 0.0008 lbs/day at SVE-1D;
- There was little evidence to suggest that the pilot test vacuum had influence on the north side of the Salvation Army at VP-11R where vacuum influence would have confirmed that impacts below the building could be mitigated to some extent.
- It is recommended that the more conservative ROI estimated value of 40 feet, evaluated by induced vacuum measurements at the various observation wells, is utilized during full-scale design of an SVE system.

The data indicates that the geologic conditions are favorable for implementation of a full scale treatment system at this site. However, given the site configuration some technical considerations are required for any full scale design. An SVE system could be used to mitigate soil impacts and soil vapors in certain areas and is likely to be a useful tool for the reduction of VOC vapors in the Salvation Army building and the 12-24 Club building. Optimally, an initial SVE system install could involve wells installed on the northern and southern edge of the Casper Dry Cleaners building, extending across the street to the area north of the 12-24 Club building, and extending across the street to the area south of the Salvation Army building.

Assuming that indoor air concentrations in the Salvation Army building and 12-24 Club building are transmitted through the backfill surrounding utility corridors (as described in Section 6.3), the presence of an SVE system would likely intercept VOC vapors before reaching either the Salvation Army or 12-24 Club building, provided that the wells can be located in relatively close proximity to either the original source or the affected utility corridor. At least some of the source mass is believed to be located in the vicinity of, or below the Casper Dry Cleaners building. With an estimated radius of influence of approximately 40 feet, some degree of mass removal from the soil below the buildings could be expected from an SVE treatment application. The extent of the functionality of the SVE to remove soil vapor from beneath that the Casper Dry Cleaners building, or any building, will be dependent on the depth of well screens and the configuration of the building's foundation. As the ability to remove vapors from directly below buildings could be limited by Site conditions, the initial application of the SVE would primarily be used to remove source mass accessible from outside the building footprints and to intercept vapors before transport to the Salvation Army and 12-24 Club. Given the ROI determined during the SVE Pilot Study, there is a potential that additional mass (if present) could be pulled from below the Casper Dry Cleaners building.

6.6 SOIL VAPOR

Soil vapor sampling was conducted on May 20 and 21, 2014. Soil vapor samples were collected from 17 vapor points, VP-01 through VP-04, VP-06, VP-09, VP-10, VP-11R, VP-12 through VP-14, and VP-101 through VP-106. PCE was detected in soil vapor from all 17 vapor points. Detected PCE concentrations in soil vapor ranged from 16 to 22,000 micrograms per cubic meter (µg/m^3). TCE was detected in soil vapor from vapor points VP-01, VP-02, VP-06, VP-11R, and VP-14 at concentrations ranging from 26 to 100 µg/m^3. Cis-DCE was detected in one soil vapor point (VP-06) at concentrations of 33 µg/m^3. Concentrations of VC in soil vapor from all vapor points sampled were less than the laboratory reporting limits, and ranged from <3.3 to <180 µg/m^3. For the following list of contaminants of concern, soil vapor exceeded Action Levels[2] in May 2014 from vapor points:

- PCE: VP-01, VP-02, VP-06, VP-10, VP-11R, VP-12, VP-14, and VP-102
- TCE: VP-06 and VP-11R
- cis-DCE: None
- VC: None

WDEQ will typically collect indoor air samples from buildings that are adjacent to soil vapor points that exceed the Action Levels. The soil vapor data continues to suggest that the PCE concentrations in soil vapor are considerably elevated on the south side of the Salvation Army building and the north side of the 12-24 Club building. The majority of buildings in the project area have previously been evaluated for indoor air concentrations and the buildings with concentrations above the Screening Levels have already been identified. The Soil Vapor Point Sample Analytical Summary is presented as Table 8 and the PCE, TCE, cis-DCE, and VC Concentrations in Soil Vapor are presented as Figures 11, 12, 13, and 14, respectively.

6.7 INDOOR AIR

The indoor air sampling event was conducted on May 21 and 23, 2014. Indoor air samples were collected from two locations. Air samples were collected from IA-10 and IA-11 located within the Salvation Army building. Laboratory analysis identified concentrations above Screening Levels[3] for indoor air of the following compounds and samples as follows:

- PCE: IA-10 and IA-11
- TCE: None detected. Reporting limits below Screening Level.
- cis-DCE: None detected. Reporting limits below Screening Level.
- VC: None detected. Reporting limits below Screening Level.

PCE concentrations in indoor air samples from the listed locations ranged from 61 to 130 µg/m^3. The Indoor Air Analytical Summary is presented as Table 9 and the PCE, TCE, cis-DCE, and VC

[2] Action Level = OSRP Residential Use Screening Level ÷ 0.01 the generic attenuation factor-soil vapor to indoor air.
[3] OSRP Residential Screening Levels

Concentrations in Soil Vapor, Sub-Slab Vapor and Indoor Air Maps are presented as Figures 11, 12, 13, and 14, respectively.

7.0 DATA VALIDATION AND QUALITY CONTROL

7.1 SUMMARY OF DATA VALIDATION AND QUALITY CONTROL

This section summarizes actions taken to verify data quality control by the laboratory. Data packages for air, groundwater, soils, drums and hazardous wastes were validated by QA/QC Solutions, LLC. Samples were submitted to and analyzed for American Society for Testing and Materials (ASTM) D-1946 modified for He, EPA TO-15 (gas chromatography–mass spectrometry [GC/MS] operated in full scan mode) for VOCs, EPA TO-15 GC/MS) operated in the SIM by Eurofins/Air Toxics; and EPA SW 846 8260C by ChemSolutions.

ChemSolutions data package STN115 was reported for analysis of VOCs using method SW-846 8260C by GC-MS on water samples collected May 22 and 23, 2014. Eurofins/Air Toxics data package 1405490C was reported for analysis of He using method ASTM D-1946 for samples collected on May 20 and 21, 2014. Eurofins/Air Toxics data package 1405490B was reported for analysis of VOCs using method TO-15 by GC-MS SIM on indoor air samples and data package 1405490A for the analysis of VOCs using method TO-15 by GC-MS in full scan mode for soil vapor samples collected May 20 and 21, 2014.

7.2 DATA VALIDATION

Data validation was performed in accordance with the IWP (Stantec, 2013a) and QAPP and SAP (Stantec, 2013b) for the Site. Data validation was performed to ensure the quality of project data. Four analytical reports containing the results for aqueous and air field samples, a trip blank, and an air field blank were validated and reviewed for the following items (if reported):

- Completeness of data deliverables,
- Sample holding time,
- Applicable blank data (i.e., applicable method, trip, and field blanks),
- Applicable instrument calibrations,
- Applicable surrogate recoveries,
- Applicable matrix spike/matrix spike duplicate (MS/MSD) recoveries,
- Applicable laboratory control sample (LCS)/ LCS duplicate recoveries,
- Applicable laboratory duplicate sample precision,
- Applicable field sample duplicate precision.

The Data Validation Checklists for data collected during the reporting period are presented in this Appendix H.

7.3 DATA VALIDATION PRESENTATION AND EVALUATION

Data validation forms from the previous project report were used (and modified as needed by QA/QC Solutions, LLC) to address the items required for data validation listed above. The forms include method specific, client and/or laboratory limits.

7.4 LABORATORY QUALITY CONTROLS

The types of laboratory quality control (QC) samples associated with this report include applicable instrument calibrations, surrogates, method blank, LCS, and MS/MSD samples and laboratory duplicates. These QC samples were used to measure analytical method precision and accuracy. The method blank was used to assess laboratory contamination.

Representativeness of data was evaluated through review of analysis holding times and laboratory blank data in accordance with EPA analytical method guidelines. The holding time criteria for samples were met during the reporting period.

7.4.1 Laboratory Method Blank Samples

All method blanks were free of contamination.

7.4.2 Laboratory Control Samples

LCSs and/or LCS duplicates were analyzed with each data package for each analytical method. The LCS data were used in conjunction with the matrix spike recovery data and the system monitoring compound recoveries to evaluate the accuracy of the analytical data. All LCS and/or LCS duplicate recoveries were acceptable, except as noted below.

For the analysis of soil vapor samples, in one LCS/LCS duplicate pair in work order 1405490A analyzed on June 11, 2014 at 0848 and 0910, the recoveries for dichloromethane (i.e., methylene chloride) were reported at 136 percent and 135 percent, respectively. These recoveries are above the laboratory-established upper control limit of 130 percent. No qualification was necessary because dichloromethane was not reported as detected in the associated samples.

7.4.3 Matrix Spike Samples

Laboratory MS/MSD samples were analyzed at a frequency of 5 percent if required for each analytical method. MS/MSD sample recoveries were evaluated in conjunction with the other batch QC sample recoveries to evaluate the need for qualification of analytical data. Site specific MS/MSD samples were submitted and analyzed. The results for applicable MS/MSD analyses were acceptable.

7.4.4 Measurement Monitoring Compounds

Analytical measurement monitoring compounds, also known as surrogate spike compounds, were used for EPA Method, 8260C and TO-15 methods to monitor the performance of an individual measurement during sample extraction and analysis. All surrogate recoveries are within applicable control limits.

7.4.5 Field Quality Controls

Field QC samples for this report included one trip blank associated with the water samples which was analyzed for VOCs to assess the potential for contamination resulting from sample shipping and storage. Analytes were not detected in the trip blank. One equipment blank (Sample L-001) was submitted for analysis of VOCs by collecting nitrogen gas in a summa canister during field sampling. Ethanol and PCE were reported as detected at 23 µg/m^3 and 17 µg/m^3, respectively. No sample results were qualified for this reason; however, it may be possible results reported for these two VOCs at concentrations <5x (i.e., 115 µg/m^3 for ethanol and 85 µg/m^3 for PCE) may exhibit a high bias or possibly be a false positive. A total of 11 ethanol and 3 PCE results may be affected. No samples were flagged for blank contamination.

7.5 DATA ASSESSMENT AND USABILITY

The Data Validation Checklists summarize issues that were considered for qualification and are presented in Appendix H.

Analytes were not detected in blanks during the reporting period, with the exception of the nitrogen gas equipment blank, as noted above. Laboratory control sample and continuing calibration percent recoveries were acceptable, except as noted above. Applicable surrogate, MS/MSD, and LCS/LCS duplicate recoveries were within applicable control limits, except as noted above. Data were considered "useable". The Data Validation Checklists summarize compounds and issues which were considered are presented in Appendix H.

8.0 CONCLUSIONS

8.1 CONCLUSIONS

The following conclusions are based on a review of historical data, data gathered during the 2013 Expanded Investigation and UST Excavation/In-Situ Abandonment field activities, and data gathered during the 2014 Expanded Investigation and SVE Pilot Study field activities.

8.1.1 Sewer Scope and Camera Survey

The municipal main sewer lines in the vicinity of the 12-24 Club building are generally in poor condition (as described in Section 6.1) for sewer scope and camera survey Run Number 1 and Run Number 3. Those areas where the sanitary sewer is breached represent locations of possible PCE releases and sources of impact. The locations of these breaches also coincides with the location of PCE impacts near the northeast corner of the 12-24 Club on the passive soil gas survey presented in the previous project report. Thus, the area north of the 12-24 Club appears to a focus area for additional investigation in the form of monitoring and/or remediation wells. Since this investigation was focused on examining the location, condition, and distribution of the sewer lines, the condition of dry cleaning equipment and PCE storage practices were not emphasized. It should be noted that breached sewer lines could potentially transmit soil vapors by releasing liquids or vapors to the surrounding backfill around the pipe and vapors could migrate into the buildings. Also, if the backfill around the sewer line pipes was impacted by other means, liquids and vapors could enter into the sewer pipes and transmit vapors to nearby buildings.

8.1.2 GPR Survey

The GPR surveys conducted in March 2014 at the Site did not identify any formerly unknown potential release sources, such as abandoned USTs.

8.1.3 PCE Colorimetric Tube Survey

Of the six colorimetric tube samples collected in Salvation Army building basement, concentrations of PCE were detected at 0.3 ppm in two samples (one sample and one duplicate sample of that sample). These samples were collected from the opening around the location where the municipal water line enters the Salvation Army building basement. Based on the measurable PID concentration at this location, it appears that a utility corridor PCE pathway is likely impacting the Salvation Army.

PCE was detected in three of seven colorimetric tube samples collected in Casper Dry Cleaners building. Concentrations of PCE were detected at 0.1 ppm in the basement ambient air and at >4.0 ppm in ambient air around the PCE washer unit. Concentrations of PCE were also detected at 0.5 ppm[4] from sludge removed from the sanitary sewer line. Samples of the sewer line sludge were collected during the installation of the sewer line cleanout needed for the sewer scoping and camera survey (as described in Section 3.2). Colorimetric tube survey PCE concentrations are presented in Table 1 and on Figure 5.

[4] Measurement collected by doubling recommended exposure to detect any presence of PCE

Stantec previously identified an anomalous condition at this site, in that the parent compound PCE does not appear to be degraded. In a historical release of any substantial age, the parent compound will typically degrade to daughter compounds such as TCE, cis-DCE, and VC over the course of time. The lack of daughter compounds combined with the findings of the original tank excavation, which revealed that the USTs located on the north side of the building were in good condition, suggests that the USTs may not have been the source and there may be a recent or ongoing source. The observed PCE concentrations in sludge as described above suggest that PCE was introduced into the sanitary sewer line as some time in the past. Given that multiple fractures were identified in the sanitary sewer network's piping, it is likely that PCE impacted water and/or sediment were distributed through the sanitary sewer and released from the sewer through fractures into the backfill material surrounding the sanitary sewer. This is one likely area for the focus of remediation efforts on the south side of the Casper Dry Cleaners building.

8.1.4 Groundwater

Groundwater impacts are primarily comprised of PCE with the highest concentrations in groundwater located between the Casper Dry Cleaners and the Salvation Army buildings. No groundwater sample detections of PCE, TCE, cis-DCE, or VC were present in down gradient wells MW-107 and MW-108.

The primary constituent of concern observed in groundwater is PCE, which could indicate one or both of the following:

- The groundwater plume is fast moving and does not allow for sufficient degradation time of PCE to TCE, cis-DCE, and VC
- The observed PCE is from a recent or ongoing release and sufficient degradation time has not occurred for PCE to degrade to TCE, cis-DCE, and VC

With few exceptions, the magnitude of groundwater concentrations are generally too low to generate the vapor concentrations observed in the Salvation Army or 12-24 Club buildings. Based on the available information, it appears that there is likely a recent or ongoing release of PCE from the general vicinity of the dry cleaner property. The magnitude of the concentrations suggests that indoor air VOCs are likely not generated from partitioning of VOCs from groundwater to vapor phase. Although some partitioning is to be expected, this does not appear to be the primary reason for elevated indoor air VOC concentrations in the Salvation Army or 12-24 Club buildings and impacts to the underground utility corridors seem more likely to account for the elevated indoor air measurements.

8.1.5 SVE Pilot Study

The data indicates that the geologic conditions are favorable for implementation of a full scale treatment system at this site. However, given the site configuration, some technical considerations are required for any full scale design. An SVE system could be used to mitigate soil impacts and soil vapors in certain areas and is likely to be a useful tool for the reduction of VOC vapors in the Salvation Army and the 12-24 Club buildings. Optimally, an initial SVE system install could involve wells installed on the northern and southern edge of the Casper Dry Cleaners building, extending across the street to the area north of the 12-24 Club building, and extending across the street to the area south of the Salvation Army building.

Assuming that indoor air concentrations in the Salvation Army building and 12-24 Club building are transmitted through the backfill surrounding utility corridors (as described in this report), the presence of an SVE system would be likely to intercept vapors before reaching either the Salvation Army building or 12-24 Club building, provided that the wells can be located in relatively close proximity to the either the original source or the affected utility corridor. At least some of the source mass is believed to be located in the vicinity of, or below the Casper Dry Cleaners building. With an estimated radius of influence of approximately 40 feet, some degree of mass removal from the soil below the buildings could be expected from an SVE treatment application. The extent of the functionality of the SVE to remove soil vapor from beneath that, or any building, will be dependent on the depth of well screens and the configuration of the building's foundation. As the ability to remove vapors from directly below buildings could be limited, the initial application of the SVE would primarily be used to remove source mass accessible from the outside the building footprints. Initial application of the SVE would also be used to intercept vapors before transport to the Salvation Army and 12-24 Club buildings with the hope that additional mass (if present) would be pulled from below the Casper Dry Cleaners building.

8.1.6 Soil Vapor

For the following list of contaminants of concern, soil vapor exceeded Action Levels[5] in May 2014 from vapor points:

- PCE: VP-01, VP-02, VP-06, VP-10, VP-11R, VP-12, VP-14, and VP-102
- TCE: VP-06 and VP-11R
- cis-DCE: None detected. Reporting limits below Action Level.
- VC: None detected. Reporting limits below Action Level.

WDEQ will typically collect indoor air samples from buildings that are adjacent to soil vapor points that exceed the OSRP Residential Use Action Levels. The soil vapor data continues to suggest that the PCE concentrations in soil vapor are considerably elevated on the south side of the Salvation Army building and the North side of the 12-24 Club building. The majority of buildings in the project area have previously been evaluated for indoor air concentrations and the buildings with concentrations above the OSRP Residential Use Screening Level have already been identified.

8.1.7 Indoor Air

The indoor air sampling event was conducted on May 21 and 23, 2014. Indoor air samples were collected from two locations. Air samples were collected from IA-10 and IA-11 located within the Salvation Army building. Laboratory analysis identified concentrations above Screening Levels[6] for indoor air of the following compounds and samples as follows:

- PCE: IA-10 and IA-11
- TCE: None detected. Reporting limits below Screening Level.

[5] Action Level = OSRP Residential Use Screening Level ÷ 0.01 the generic attenuation factor-soil vapor to indoor air.
[6] OSRP Residential Screening Levels

- cis-DCE: None detected. Reporting limits below Screening Level.
- VC: None detected. Reporting limits below Screening Level.

PCE concentrations in indoor air samples from the listed locations ranged from 61 to 130 µg/m3. The Indoor Air Analytical Summary is presented as Table 9 and the PCE, TCE, cis-DCE, and VC Concentrations in Soil Vapor, Sub-Slab Vapor and Indoor Air Maps are presented as Figures 11, 12, 13, and 14, respectively.

Consideration of the absence of PCE degradation products in sewer sludge samples versus the detection of several degradation products of PCE in current and prior indoor air samples suggest that more than one source of chemicals identified in indoor air may be present: direct transport of vapor phase PCE via sewer lines and transport of soil gas from the subsurface (where degradation may be occurring) to indoor air.

9.0 REFERENCES

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Wyoming Statutes (Wyoming Statutes 2012) *Tittle 33 – Professions and Occupations Chapter 29-Surveyors and Engineers 33-29-124. Certificate required for the practice of engineering or land surveying*. 2012.

TABLES

TABLE 1
PCE COLORIMETRIC TUBE SURVEY ANALYTICAL SUMMARY
Former Lobell Refinery-Orphan Site Remediation Program (OSRP) File 57.004
Casper, Wyoming
Stantec Project NO. 212205045

Sample Identification	Date Measured	Time Measured	Sample Location and Description	Tetrachloroethene (PCE) (ppm)[1]
DT-AA1-032514	3/25/2014	1211	12-24 Club-Basement-Ambient Air	0.0
DT-01-032514	3/25/2014	1214	12-24 Club-Basement-Sewer Line Opening	0.0
DT-02-032514	3/25/2014	1222	12-24 Club-Basement-Crack/Hole in Basement Wall	0.0
DT-03-032514	3/25/2014	1233	12-24 Club-Basement-Hole in Top of Basement Wall	0.0
DT-04-032514	3/25/2014	1240	12-24 Club-Basement-Floor Sump	0.0
DT-05-032514	3/25/2014	1259	12-24 Club-Basement-Open Insulated Pipe in Basement Wall	0.0
DT-AA2-032514	3/25/2014	1320	Salvation Army-Basement-Ambient Air	0.0
DT-06-032514	3/25/2014	1330	Salvation Army-Basement-Sump	0.0
DT-07-032514	3/25/2014	1345	Salvation Army-Basement-Water Line Opening	0.3
DT-08-032514	3/25/2014	1358	Salvation Army-Basement-Crack in Wall	0.0
DT-09-032514	3/25/2014	1410	Salvation Army-Basement-Crawl Space/Piping Area	0.0
DT-10-032514	3/25/2014	1420	Salvation Army-Basement-Water Line Opening (Duplicate)	0.3
DT-AA3-032514	3/25/2014	1531	Casper Dry Cleaners-Basement-Ambient Air	0.1
DT-11-032514	3/25/2014	1545	Casper Dry Cleaners-Basement-Sewer Line Area	0.0
DT-12-032514	3/25/2014	1550	Casper Dry Cleaners-Basement-Sewer Line Connection	0.0
DT-13-032514	3/25/2014	1557	Casper Dry Cleaners-Basement-Leaking Sewer Line	0.0
DT-14-032514	3/25/2014	1610	Casper Dry Cleaners-Basement-Sewer Line	0.0
DT-AA4-032514	3/25/2014	1620	Casper Dry Cleaners Front Counter Ambient Air	>4.0
DT-15-032614	3/26/2014	1000	Casper Dry Cleaners-Basement-Sewer Pipe Sludge	0.05[2]

Notes:

[1]Measuremets collected using Draeger Accuro Hand Pump and 0.1-4 ppm PCE Colorimetric Tube

[2]Measuremet collected by doubling recommended exposure in order to detect any present PCE

DT: Draeger Tube

AA: Ambient Air

ppm: parts per million

TABLE 2
GROUNDWATER MONITORING WELL CONSTRUCTION SUMMARY
Former Lobell Refinery-Orphan Site Remediation Program (OSRP) File 57.004
Casper, Wyoming
Stantec Project NO. 212205045

Well Identification	Date Constructed	Boring Depth (feet bgs)	Well Depth (feet below TOC)	Screened Interval (feet bgs)	TOC Elevation (feet amsl)
MW-01	2/23/2010	30.00	30.00	20.0-30.0	5125.88
MW-02	2/25/2010	30.00	29.50	19.5-29.5	5124.66
MW-03	2/25/2010	30.00	29.50	19.5-29.5	5123.28
MW-04	2/25/2010	33.00	31.00	21.0-31.0	5126.14
MW-05	2/25/2010	26.50	31.00	21.0-31.0	NA[1]
MW-06	2/25/2010	32.00	31.50	21.5-31.5	5127.01
MW-07	10/20/2010	28.00	28.00	18.0-28.0	5123.36
MW-08	10/20/2010	29.00	29.00	19.0-29.0	5123.91
MW-09	10/20/2010	23.00	23.00	13.0-23.0	5125.02
MW-10	10/20/2010	28.00	28.00	18.0-28.0	5123.86
MW-11	10/20/2010	26.50	26.50	16.5-26.5	5124.21
MW-101	10/7/2013	30.00	30.00	20.0-30.0	5124.74
MW-102	10/7/2013	32.00	30.00	20.0-30.0	5125.26
MW-103	10/8/2013	32.00	30.00	20.0-30.0	5126.45
MW-104	10/6/2013	32.00	30.00	20.0-30.0	5127.14
MW-105	10/6/2013	33.00	33.00	23.0-33.0	5125.79
MW-106	10/7/2013	32.00	30.00	15.0-30.0	5125.62
MW-107	5/19/2014	50.00	49.00	39.0-49.0	NA
MW-108	5/20/2014	30.00	29.50	19.5-29.5	NA

Notes:

[1]MW-5 was destroyed prior to October 2013
bgs: below ground surface
TOC: Top of Casing
amsl: above mean sea level
MW: monitoring well
NA: Not Available

TABLE 3
SOIL VAPOR POINT AND SOIL VAPOR EXTRACTION WELL CONSTRUCTION SUMMARY
Former Lobell Refinery-Orphan Site Remediation Program (OSRP) File 57.004
Casper, Wyoming
Stantec Project NO. 212205045

Vapor Point Identification	Date Constructed	Ground Elevation (feet amsl)	Screened Depth (feet bgs)
VP-01	2/2010	NA	5
VP-02	2/2010	5127.55	5
VP-03	2/2010	5126.73	5
VP-04	2/2010	5126.25	5
VP-05	2/2010	5125.00	5
VP-06	5/2010	5124.89	5
VP-07[1]	NA	NA	NA
VP-08	5/2010	5123.13	5
VP-09	5/2010	NA	5
VP-10	5/2010	5124.69	5
VP-11[1]	NA	NA	NA
VP-11R	10/7/2013	5127.23	15.5
VP-12	5/2010	5124.54	8
VP-13	5/2010	5124.75	8
VP-14	5/2010	5125.65	8
VP-15	5/2010	5124.32	8
VP-101	10/7/2013	5125.81	13
VP-102	10/8/2013	5125.11	15
VP-103	10/7/2013	5125.51	5
VP-104	10/8/2013	5126.96	5
VP-105	10/7/2013	5125.65	13
VP-106	10/7/2013	5125.52	15
SVE-1S	5/20/2014	NA	2-5
SVE-1D	5/20/2014	NA	12-17

Notes:

[1]VP-7 and VP-11 were destroyed prior to October 2013
amsl: above mean sea level
bgs: below ground surface
VP: vapor point
NA: Not Available
S: Shallow
D: Deep

TABLE 4A
SVE-1D PILOT TEST - DAY 1, STEP TEST 1
Former Lobell Refinery-Orphan Site Remediation Program (OSRP) File 57.004
Casper, Wyoming
Stantec Project NO. 212205045

Description:	SVE Test	Start Time: 09:05		**Day 1, Step Test 1 with SVE-1D as Extraction Well**
Date:	May 21, 2014	End Time: 16:44		
Atmospheric Pressure based on Elevation:			**12.17**	
Actual Relative Humidity			**0.67**	
Sat. Vapor Pressure of water at actual temp.			**0.2386**	

Parameter	**Units**	**Time**	**Value**	**Time**	**Value**
System Vacuum	InHg	9:05	17.0	14:00	17.0
System Vacuum	InWC	9:05	231.1	14:00	231.1
Wellhead Flow Rate	scfm	9:05	80.0	14:00	80.0

Well	**Distance from SVE-1 (feet)**	**Time**	**Vac (InWC)**	**Time**	**Vac (InWC)**
VP-01	20.00	9:05	0.55	14:00	0.58
MW-02	34.00	9:10	0.62	14:16	0.59
VP-12	36.00	9:15	0.13	14:19	0.13
MW-10	38.00	9:17	0.22	14:20	0.23
VP-10	74.00	9:20	0.05		
MW-101	140.00	9:27	0.00		
VP-102	138.00	9:30	0.00		
VP-11R	60.00	9:32	0.02	14:33	0.03
MW-07	70.00	9:40	0.10		
VP-08	122.00	9:48	0.01		
MW-11	160.00	9:54	0.01		
VP-13	163.00	10:00	0.20		

Explanation of Abbreviations:

°F	= degrees Fahrenheit	ppm	= part per million
scfm	= standard cubic feet per minute	InWC	= inches of water column
acfm	= actual cubic feet per minute	NM	= not measured
Vac	= vacuum	VOCs	= volatile organic compounds
InHg	= inches of mercury column		

TABLE 4B
SVE-1D PILOT TEST - DAY 1, STEP TEST 2
Former Lobell Refinery-Orphan Site Remediation Program (OSRP) File 57.004
Casper, Wyoming
Stantec Project NO. 212205045

Description:	SVE Test	Start Time: 09:05		**Day 1, Step Test 2 with SVE-1D as Extraction Well**
Date:	May 21, 2014	End Time: 16:44		
Atmospheric Pressure based on Elevation:			**12.17**	
Actual Relative Humidity			**0.67**	
Sat. Vapor Pressure of water at actual temp.			**0.2386**	

Parameter	Units	Time	Value	Time	Value	Time	Value
System Vacuum	InHg	10:33	17.0	13:11	17.0	15:21	17.0
System Vacuum	InWC	10:33	231.1	13:11	231.1	15:21	231.1
Wellhead Flow Rate	scfm	10:33	55.0	13:11	55.0	15:21	55.0

Well	Distance from SVE-1 (feet)	Time	Vac (InWC)	Time	Vac (InWC)	Time	Vac (InWC)	Time	Vac (InWC)
VP-01	20.00	10:33	0.40	13:11	0.30	15:21	0.22	16:06	0.31
MW-02	34.00	10:27	0.50	13:15	0.40	15:22	0.34	16:08	0.38
VP-12	36.00	10:58	0.06	13:33	0.02	15:25	0.09	16:09	0.08
MW-10	38.00	11:01	0.12	13:45	0.02	15:25	0.14	16:10	0.12
MW-101	140.00	16:43	0.00						
VP-102	138.00	16:44	0.00						
VP-11R	60.00	13:58	0.01						
MW-07	70.00	16:37	0.07						
VP-08	122.00	16:29	0.02						
VP-13	163.00	16:40	0.14						

Notes:

Vapor sample SVE-1D collected at 13:30

Explanation of Abbreviations:

°F = degrees Fahrenheit
scfm = standard cubic feet per minute
acfm = actual cubic feet per minute
Vac = vacuum
InHg = inches of mercury column
ppm = part per million
InWC = inches of water column
NM = not measured
VOCs = volatile organic compounds

TABLE 4C
SVE-1S PILOT TEST - DAY 2, STEP TEST 3
Former Lobell Refinery-Orphan Site Remediation Program (OSRP) File 57.004
Casper, Wyoming
Stantec Project NO. 212205045

Description:	SVE Test	Start Time: 08:21		**Day 2, Step Test 3 with SVE-1S as Extraction Well**
Date:	May 22, 2014	End Time: 20:00		
Atmospheric Pressure based on Elevation:			**12.17**	
Actual Relative Humidity			**0.61**	
Sat. Vapor Pressure of water at actual temp.			**0.2473**	

Parameter	**Units**	**Time**	**Value**
System Vacuum	InHg	8:21	16.0
System Vacuum	InWC	8:21	217.5
Wellhead Flow Rate	scfm	8:21	55.0

Well	**Distance from SVE-1 (feet)**	**Time**	**Vac (InWC)**	**Time**	**Vac (InWC)**
VP-01	20.00	8:21	0.71		
MW-02	34.00	8:23	0.15		
VP-08	122.00	8:24	0.02		
VP-12	36.00	8:27	0.08		
MW-101	140.00	8:28	0.08		
VP-13	163.00	8:35	0.00		
VP-102	138.00	8:39	0.01		
VP-11R	60.00	8:41	0.01	8:44	0.02

Explanation of Abbreviations:

°F	= degrees Fahrenheit	ppm	= part per million
scfm	= standard cubic feet per minute	InWC	= inches of water column
acfm	= actual cubic feet per minute	NM	= not measured
Vac	= vacuum	VOCs	= volatile organic compounds
InHg	= inches of mercury column		

TABLE 4D
SVE-1S PILOT TEST - DAY 2, STEP TEST 4
Former Lobell Refinery-Orphan Site Remediation Program (OSRP) File 57.004
Casper, Wyoming
Stantec Project NO. 212205045

Description:	SVE Test	Start Time: 08:21		**Day 2, Step Test 4 with SVE-1S as Extraction Well**
Date:	May 22, 2014	End Time: 20:00		
Atmospheric Pressure based on Elevation:			**12.17**	
Actual Relative Humidity			**0.61**	
Sat. Vapor Pressure of water at actual temp.			**0.2473**	

Parameter	Units	Time	Value
System Vacuum	InHg	9:21	19.0
System Vacuum	InWC	9:21	258.3
Wellhead Flow Rate	scfm	9:21	55.0

Well	Distance from SVE-1 (feet)	Time	Vac (InWC)	Time	Vac (InWC)	Time	Vac (InWC)
VP-01	20.00	9:21	0.74	10:12	0.73	11:39	0.72
MW-02	34.00	9:23	0.16	10:14	0.14	11:41	0.16
VP-12	36.00	9:26	0.07	10:15	0.08	12:00	0.08
MW-10	38.00	9:26	0.07	10:17	0.07	12:02	0.07
VP-08	122.00	10:10	0.01				
VP-11R	60.00	10:20	0.00	11:34	0.00		

Notes:

Vapor sample SVE-1S collected at 13:30

Explanation of Abbreviations:

°F	= degrees Fahrenheit	ppm	= part per million
scfm	= standard cubic feet per minute	InWC	= inches of water column
acfm	= actual cubic feet per minute	NM	= not measured
Vac	= vacuum	VOCs	= volatile organic compounds
InHg	= inches of mercury column		

TABLE 4E
SVE-1S PILOT TEST - DAY 2, STEP TEST 5
Former Lobell Refinery-Orphan Site Remediation Program (OSRP) File 57.004
Casper, Wyoming
Stantec Project NO. 212205045

Description:	SVE Test	Start Time: 08:21		**Day 2, Step Test 5 with SVE-1S as Extraction Well**
Date:	May 22, 2014	End Time: 20:00		
Atmospheric Pressure based on Elevation:			**12.17**	
Actual Relative Humidity			**0.61**	
Sat. Vapor Pressure of water at actual temp.			**0.2473**	

Parameter	Units	Time	Value
System Vacuum	InHg	9:21	17.0
System Vacuum	InWC	9:21	231.1
Wellhead Flow Rate	scfm	9:21	55.0

Well	Distance from SVE-1 (feet)	Time	Vac (InWC)	Time	Vac (InWC)	Time	Vac (InWC)
VP-01	20.00	12:22	0.71	16:00	0.72		
MW-02	34.00	12:25	0.16	17:00	0.15		
VP-12	36.00	12:30	0.08	13:00	0.06	18:00	0.05
MW-10	38.00	14:00	0.08	19:00	0.06		
VP-08	122.00	20:00	0.01				
VP-11R	60.00	12:40	0.00				

Explanation of Abbreviations:

°F	= degrees Fahrenheit	ppm	= part per million
scfm	= standard cubic feet per minute	InWC	= inches of water column
acfm	= actual cubic feet per minute	NM	= not measured
Vac	= vacuum	VOCs	= volatile organic compounds
InHg	= inches of mercury column		

TABLE 5
GROUNDWATER ELEVATION SUMMARY
Former Lobell Refinery-Orphan Site Remediation Program (OSRP) File 57.004
Casper, Wyoming
Stantec Project NO. 212205045

Well Identification	Date Measured	TOC Elevation (feet amsl)	Depth to Groundwater (feet below TOC)	Depth to Well Bottom (feet below TOC)	Groundwater Elevation (feet amsl)
MW-01	10/18/2013	5125.88	24.18	28.90	5101.70
MW-01	5/22/2014	5125.88	NM	NM	NM
MW-02	10/18/2013	5124.66	21.96	27.98	5102.70
MW-02	5/22/2014	5124.66	22.58	27.98	5102.08
MW-03	10/18/2013	5123.28	21.40	29.22	5101.88
MW-03	5/22/2014	5123.28	NM	NM	NM
MW-04	10/18/2013	5126.14	24.43	29.66	5101.71
MW-04	5/22/2014	5126.14	25.00	29.66	5101.14
MW-06	10/18/2013	5127.01	25.22	30.20	5101.79
MW-06	5/22/2014	5127.01	25.82	30.20	5101.19
MW-07	10/18/2013	5123.36	21.33	27.65	5102.03
MW-07	5/22/2014	5123.36	21.98	27.65	5101.38
MW-08	10/18/2013	5123.91	19.56	27.60	5104.35
MW-08	5/22/2014	5123.91	NM	NM	NM
MW-09	10/18/2013	5125.02	19.91	22.40	5105.11
MW-09	5/22/2014	5125.02	NM	NM	NM
MW-10	10/18/2013	5123.86	22.03	27.30	5101.83
MW-10	5/22/2014	5123.86	22.64	27.30	5101.22
MW-11	10/18/2013	5124.21	22.11	26.01	5102.10
MW-11	5/22/2014	5124.21	22.75	26.01	5101.46
MW-101	10/18/2013	5124.74	22.92	29.64	5101.82
MW-101	5/22/2014	5124.74	23.54	29.64	5101.20
MW-102	10/18/2013	5125.26	23.57	29.46	5101.69
MW-102	5/22/2014	5125.26	24.13	29.46	5101.13
MW-103	10/18/2013	5126.45	24.85	29.29	5101.60
MW-103	5/22/2014	5126.45	25.43	29.29	5101.02
MW-104	10/18/2013	5127.14	25.53	29.90	5101.61
MW-104	5/22/2014	5127.14	26.10	29.90	5101.04
MW-105	10/18/2013	5125.79	24.25	32.44	5101.54
MW-105	5/22/2014	5125.79	24.83	32.44	5100.96
MW-106	10/18/2013	5125.62	19.21	28.72	5106.41
MW-106	5/22/2014	5125.62	19.35	28.72	5106.27
MW-107[1]	5/23/2014	NA	22.72	45.84	NA
MW-108[1]	5/23/2014	NA	22.29	29.33	NA

Notes:

[1]MW-107 and MW-108 which were measured on May 23, 2014
MW-5 was destroyed prior to October 2013
TOC: Top of Casing
amsl: above mean sea level
MW: monitoring well
NM: Not Measured
NA: Not Available

TABLE 6
GROUNDWATER ANALYTICAL SUMMARY
Former Lobell Refinery-Orphan Site Remediation Program (OSRP) File 57.004
Casper, Wyoming
Stantec Project NO. 212205045

		CVOCs					VOCs/SVOCs									TPH-DRO
Sample Locations	**Date Sampled**	**Tetrachloroethene (PCE) (µg/L)**	**Trichloroethene (TCE) (µg/L)**	**cis 1,2-Dichloroethene (cis-DCE) (µg/L)**	**trans 1,2-Dichloroethene (trans-DCE) (µg/L)**	**Vinyl Chloride (VC) (µg/L)**	**Benzo[a]anthracene (µg/L)**	**Benzo[a]pyrene (µg/L)**	**Benzo[b]fluoranthene (µg/L)**	**Benzo[g,h,i]perylene (µg/L)**	**bis(2-Chloroethyl)ether (µg/L)**	**bis(2-Ethylhexyl)phthalate (µg/L)**	**Butylbenzylphthalate (µg/L)**	**Dibenz[a,h]anthracene (µg/L)**	**Indeno[1,2,3-cd]pyrene (µg/L)**	**TPH-DRO (µg/L)**
Cleanup Level (µg/L)		**5**	**5**	**70**	**NE**	**2**	**0.117**	**0.2**	**0.117**	**NE**	**0.0773**	**6**	**7290**	**0.0117**	**0.117**	**NE**
MW-01	3/25/2010	4.65	<1.00	<1.00	<1.00	<1.00	**<2.11**	**<2.11**	**<2.11**	<2.11	**<10.5**	**<10.5**	<10.5	**<2.11**	**<2.11**	611
	6/29/2010	**13**	<1.00	<1.00	<1.00	<1.00	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	11/17/2010	4.26	<1.00	<1.00	<1.00	<1.00	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	2/24/2011	**8.60**	<1.00	<1.00	<1.00	<1.00	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	10/10/2013	**18**	<2	<2	<2	<2	**0.52**	0.17	**0.17**	0.12	<0.01	<2.5	<2.5	**0.14**	0.11	0.00092
MW-02	3/18/2010	**74.70**	<1.00	<1.00	<1.00	<1.00	**<2.22**	**<2.22**	**<2.22**	<2.22	<11.1	**<11.1**	<11.1	**<2.22**	**<2.22**	<94.3
	6/29/2010	**44**	<1.00	<1.00	<1.00	<1.00	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	11/17/2010	**26.0**	<1.00	<1.00	<1.00	<1.00	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	2/24/2011	**46.0**	<1.00	<1.00	<1.00	<1.00	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	10/10/2013	**51**	<2	<2	<2	<2	<0.1	<0.1	<0.1	<0.1	0.046	4.8	2.8	<0.01	<0.1	<0.0005
	5/22/2014	**22**	<2	<2	<2	<2	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
MW-03	3/25/2010	<1.00	<1.00	<1.00	<1.00	<1.00	**<2.11**	<2.11	**<2.11**	<2.11	**<10.5**	**<10.5**	<10.5	**<2.11**	**<2.11**	<105
	6/29/2010	<1.00	<1.00	<1.00	<1.00	<1.00	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	11/17/2010	<1.00	<1.00	<1.00	<1.00	<1.00	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	2/24/2011	<1.00	<1.00	<1.00	<1.00	<1.00	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	10/9/2013	<2	<2	<2	<2	<2	<0.1	<0.1	<0.1	<0.1	0.028	<2.5	<2.5	**0.026**	<0.1	<0.0005
MW-04	3/25/2010	**1,840**	**56.2**	<1.00	<1.00	<1.00	**<1.89**	**<1.89**	**<1.89**	<1.89	**<9.43**	**<9.43**	<9.43	**<1.89**	**<1.89**	211
	6/29/2010	**1,470**	**33.7**	<1.00	<1.00	<1.00	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	11/17/2010	**833**	**9.09**	<1.00	<1.00	<1.00	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	2/28/2011	**952**	**16.9**	1.50	<1.00	<1.00	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	10/9/2013	**290**	**56**	54	<2	<2	<0.1	<0.1	<0.1	<0.1	0.043	<2.5	2.8	<0.01	<0.1	<0.0005
	5/22/2014	**460**	**38**	<20	<20	<20	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
MW-05	3/25/2010	<1.00	<1.00	<1.00	<1.00	<1.00	**<1.89**	**<1.89**	**<1.89**	<1.89	**<9.43**	**<9.43**	<9.43	**<1.89**	**<1.89**	512
MW-06	3/25/2010	**1,800**	**296**	40.9	<1.00	<1.00	**<2.22**	**<2.22**	**<2.22**	<2.22	<11.1	**<11.1**	<11.1	**<2.22**	**<2.22**	176
	6/29/2010	**1,700**	**44.8**	<1.00	<1.00	<1.00	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	11/18/2010	**524**	**76.9**	29.4	1.24	<1.00	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	2/24/2011	**582**	**52.7**	10.3	2.49	<1.00	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	10/9/2013	**260**	**79**	**130**	<2	<2	<0.1	<0.1	<0.1	<0.1	<0.01	<2.5	<2.5	**0.012**	<0.1	<0.0005
	5/22/2014	**200**	**29**	30	<20	<20	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
MW-07	11/16/2010	**1,170**	<1.00	<1.00	<1.00	<1.00	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	2/28/2011	**342**	<1.00	<1.00	<1.00	<1.00	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	10/9/2013	**800**	**<20**	<20	<20	**<20**	<0.1	<0.1	<0.1	<0.1	<0.01	<2.5	<2.5	**0.012**	<0.1	<0.0005
	5/22/2014	**710**	**<20**	<20	<20	**<20**	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
MW-08	11/16/2010	<1.00	<1.00	<1.00	<1.00	<1.00	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	2/28/2011	<1.00	<1.00	<1.00	<1.00	<1.00	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	10/10/2013	2.8	<2	<2	<2	<2	<0.1	<0.1	<0.1	<0.1	<0.01	<2.5	<2.5	<0.01	<0.1	<0.0005
MW-09	11/16/2010	<1.00	<1.00	<1.00	<1.00	<1.00	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	2/28/2011	1.48	<1.00	<1.00	<1.00	<1.00	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	10/10/2013	4.3	<2	<2	<2	<2	<0.1	<0.1	<0.1	<0.1	<0.01	<2.5	<2.5	<0.01	<0.1	<0.0005
MW-10	11/17/2010	**712**	<1.00	<1.00	<1.00	<1.00	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	2/24/2011	**1,010**	<1.00	<1.00	<1.00	<1.00	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	10/9/2013	**480**	**<20**	<20	<20	**<20**	<0.1	<0.1	<0.1	<0.1	<0.01	<2.5	<2.5	**0.012**	<0.1	<0.0005
	5/22/2014	**600**	**<20**	<20	<20	**<20**	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
MW-11	11/17/2010	<1.00	<1.00	<1.00	<1.00	<1.00	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	2/28/2011	<1.00	<1.00	<1.00	<1.00	<1.00	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	10/10/2013	<2	<2	<2	<2	<2	<0.1	<0.1	<0.1	<0.1	0.020	<2.5	<2.5	<0.01	<0.1	<0.0005
	5/22/2014	<2	<2	<2	<2	<2	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
MW-101	10/11/2013	<2	<2	<2	<2	<2	<0.1	<0.1	<0.1	<0.1	<0.01	<2.5	<2.5	<0.01	<0.1	<0.0005
	5/22/2014	<2	<2	<2	<2	<2	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
MW-102	10/11/2013	<2	<2	<2	<2	<2	<0.1	<0.1	<0.1	<0.1	<0.01	3.7	<2.5	<0.01	<0.1	<0.0005
	5/22/2014	<2	<2	<2	<2	<2	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
MW-103	10/11/2013	<2	<2	<2	<2	<2	<0.1	**<0.5**	<0.1	<0.5	<0.01	<2.5	<2.5	**0.018**	**<0.5**	<0.0005
	5/22/2014	<2	<2	<2	<2	<2	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
MW-104	10/11/2013	**130**	2.2	<2	<2	<2	<0.1	<0.1	<0.1	<0.1	<0.01	<2.5	<2.5	<0.01	<0.1	<0.0005
	5/22/2014	**150**	3.0	<2	<2	<2	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
MW-105	10/11/2013	**160**	2.4	<2	<2	<2	<0.1	<0.1	<0.1	<0.1	0.018	<2.5	<2.5	**0.19**	**0.14**	<0.0005
	5/22/2014	**6.4**	<2	<2	<2	<2	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
MW-106	10/11/2013	<2	<2	<2	<2	<2	<0.1	<0.1	<0.1	<0.1	<0.01	<2.5	<2.5	<0.01	<0.1	<0.0005
	5/22/2014	<2	<2	<2	<2	<2	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
MW-107	5/23/2014	<2	<2	<2	<2	<2	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
MW-108	5/23/2014	<2	<2	<2	<2	<2	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA

Notes:

Laboratory Analysis by EPA Method 8260C for VOC and 8270D/8270SIM for SVOC
Bold indicates sample results which exceed Groundwater Clean Up Levels
CVOCs: Chlorinated Volatile Organic Compounds
SVOCs: Semi-Volatile Organic Compounds
VOCs: Volatile Organic Compounds
TPH-DRO: Total Petroleum Hydrocarbon-Diesel Range Organics
µg/L: micrograms per liter
NE: Not Established
MW: monitoring well
NDA: No data available

TABLE 7
SVE PILOT TEST - RADIUS OF INFLUENCE (ROI) - PORE VOLUME EXCANGE (PVE) METHOD
Former Lobell Refinery-Orphan Site Remediation Program (OSRP) File 57.004
Casper, Wyoming
Stantec Project NO. 212205045

Design PVE	3.000 day	
Flow	55 cfm	
Air-filled Porosity	0.304	
Total Soil Pore Volume	747.558 m^3	
Total Soil Volume Treated	2459.07 m^3	
Thickness of Treatment Zone	1.000	
Surface Area of Treatment Zone	2459.07 m^2	
Radius of Treatment Zone	27.9847 m	91.817819 ft

Date		Flow Rate (scfm)	Total Soil Pore Volume (m^3)	Total Soil Volume Treated (m^3)	Surface Area of Treatment Zone (m^2)	Radius of Treatment Zone (m)	Radius of Treatment Zone (ft)
05/21/14		80	1,087.357	3,576.831	3,576.831	**33.751**	**110.736**
05/21/14		55	747.558	2,459.071	2,459.071	**27.985**	**91.818**
05/22/14		55	747.558	2,459.071	2,459.071	**27.985**	**91.818**

$$Q_v = \frac{\pi r^2 b n_a}{t_{ex}}$$

Where:

Q_v	=	Volumetric flow rate at atmospheric pressure
r	=	Radius of the treatment zone
b	=	Vadone zone thickness
n_a	=	Air-filled porosity of the soil
t_{ex}	=	Time requires for one pore volume exchange

Given:

Pore Volume Exchange	=	3.000 per day
b	=	1.000 meter
n_a	=	0.304 average from lab report
t_{ex}	=	1,095 days
1 m^3	=	35.315 m3
1 m	=	3.281 f
1 day	=	1440 minutes

Total Soil Pore Volume	=	Flow (m^3/day) / PVE (per day)
Total Soil Volume Treated	=	Total soil pore volume (m^3) / air-filled porosity (unitless)
Surface Area of Treatment Zone	=	Total soil volume treated (m^3) / thickness of treatment zone (m)

TABLE 8
SOIL VAPOR POINT AND SOIL VAPOR EXTRACTION WELL ANALYTICAL SUMMARY
Former Lobell Refinery-Orphan Site Remediation Program (OSRP) File 57.004
Casper, Wyoming
Stantec Project NO. 212205045

		CVOCs				VOCs																								
Sample Locations	**Date Sampled**	**Tetrachloroethene (PCE) ($\mu g/m^3$)**	**Trichloroethene (TCE) ($\mu g/m^3$)**	**cis-1,2-Dichloroethene (cis-DCE) ($\mu g/m^3$)**	**Vinyl Chloride (VC) ($\mu g/m^3$)**	**1,1,1-Trichloroethane ($\mu g/m^3$)**	**1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113) ($\mu g/m^3$)**	**1,2,4-Trimethylbenzene ($\mu g/m^3$)**	**1,3-Dichlorobenzene ($\mu g/m^3$)**	**1,3,5-Trimethylbenzene ($\mu g/m^3$)**	**4-Ethyltoluene ($\mu g/m^3$)**	**Acetone ($\mu g/m^3$)**	**Benzene ($\mu g/m^3$)**	**Bromomethane ($\mu g/m^3$)**	**Chloroform ($\mu g/m^3$)**	**Chloroethane ($\mu g/m^3$)**	**Chloromethane ($\mu g/m^3$)**	**Cyclohexane ($\mu g/m^3$)**	**Dichlorodifluoromethane (Freon 12) ($\mu g/m^3$)**	**Ethanol ($\mu g/m^3$)**	**Ethyl Benzene ($\mu g/m^3$)**	**Hexane ($\mu g/m^3$)**	**m,p-Xylene ($\mu g/m^3$)**	**Methylene Chloride ($\mu g/m^3$)**	**Naphthalene ($\mu g/m^3$)**	**o-Xylene ($\mu g/m^3$)**	**Tetrahydrofuran ($\mu g/m^3$)**	**Toluene ($\mu g/m^3$)**	**Trichlorofluoromethane (Freon 11) ($\mu g/m^3$)**
OSRP Residential Use Action Level[1]		**810**	**90**	**3,500**	**28**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
VP-01	3/18/2010	**27,133**	**107**	<175	**<112.47**	<240.1	<337.23	<216.29	<264.56	<216.31	NDA	NDA	<140.57	<170.87	**<214.85**	<116.11	<227.15	NDA	<217.61	NDA	<191.04	NDA	<191.06	59.06 J	NDA	<191.06	NDA	45.22 J	<247.23
	10/17/2013	**4,400**	30	<9.9	<6.4	<14	<19	<12	<15	<12	<12	<59	<8	<97	<12	<12	<52	<8.6	<12	38	<11	<8.8	<11	<87	NDA	<11	<7.4	210	<14
	5/20/2014	**20,000**	66	<33	<21	<45	<63	<40	<50	<40	<40	<200	<26	<320	<40	<87	<170	<28	<41	200	<36	<29	<36	<290	NDA	<36	<24	<31	<46
VP-02	3/18/2010	1,424	<1.07	<0.79	<1.02	1.04 J	0.61 J	1.28 J	<2.41	<1.97	NDA	NDA	<1.28	<1.55	<1.95	<1.06	<2.07	NDA	1.68 J	NDA	1.00 J	NDA	2.87	1.49 J	NDA	0.96 J	NDA	34.29	1.8 J
	10/18/2013	**2,500**	38	<5.5	<3.6	<7.6	<11	<6.8	<8.4	<6.8	<6.8	<33	<4.4	<54	<6.8	<15	<29	<4.8	<6.9	12	<6.0	<4.9	<6.0	<48	NDA	<6.0	<4.1	<5.2	<7.8
	5/21/2014	**1,400**	26	<6.6	<4.3	<9.1	<13	<8.2	<10	<8.2	<8.2	<40	<5.3	<65	<8.2	<18	<34	<5.7	<8.2	46	<7.2	<5.9	<7.2	<58	NDA	<7.2	<4.9	<6.3	<9.4
VP-03	3/18/2010	115	<1.07	<0.79	<0.51	<1.09	0.57 J	1.23	0.72 J	<0.98	NDA	NDA	<0.64	<0.78	0.23 J	<0.53	0.52 J	NDA	0.54 J	NDA	0.52 J	NDA	1.48	1.08 J	NDA	0.52 J	NDA	19.97	1.35
	10/18/2013	310	<7.3	<5.4	<3.5	<7.4	<10	<6.7	<8.2	<6.7	<6.7	<32	<4.3	<53	<6.6	<14	<28	<4.7	<6.7	14	<5.9	<4.8	<5.9	<47	NDA	<5.9	<4.0	73	<7.6
	5/20/2014	250	<9.0	<6.6	<4.3	<9.1	<13	<8.2	<10	<8.2	<8.2	85	<5.3	<65	<8.2	<18	<34	<5.7	<8.2	59	<7.2	<5.9	<7.2	<58	NDA	<7.2	<4.9	<6.3	<9.4
VP-04	3/18/2010	271	4.19	<0.79	<0.51	<1.09	0.51 J	2.51	1.3	0.54 J	NDA	NDA	0.21 J	<0.78	<0.98	<0.53	<1.03	NDA	0.64 J	NDA	1.0	NDA	3.1	1.04 J	NDA	1.09 J	NDA	6.03	1.07 J
	10/18/2013	190	<7.7	<5.7	<3.7	<7.8	<11	<7.1	<8.6	<7.1	<7.1	<34	<4.6	<56	<7.0	<15	<30	<5.0	<7.1	17	<6.2	<5.1	6.20	<50	NDA	<6.2	<4.2	110	<8.1
	5/20/2014	740	<5.5	<4.1	<2.6	<5.6	<7.8	<5.0	<6.2	<5.0	<5.0	<24	<3.3	<40	<5.0	<11	<21	<3.5	<5.1	38	<4.4	<3.6	<4.4	<36	NDA	<4.4	<3.0	<3.9	<5.8
VP-05	3/18/2010	4	<1.07	<0.79	<0.51	<1.09	0.46 J	2.36	0.84 J	0.54 J	NDA	NDA	0.20 J	<0.78	0.22 J	<0.53	<1.03	NDA	0.69 J	NDA	0.82 J	NDA	2.87	0.90 J	NDA	1.00 J	NDA	3.2	0.73 J
	10/18/2013	45	<7.5	<5.5	<3.6	<7.6	<11	<6.8	<8.4	<6.8	<6.8	110	<4.4	<54	<6.8	<15	<29	<4.8	<6.9	41	<6.0	<4.9	9.3	<48	NDA	<6.0	<4.1	280	370
VP-06	5/24/2010	**814**	8.1	<3.9	<2.56	<5.46	<7.66	<4.92	<6.01	<9.42	NDA	NDA	<3.19	<3.88	<4.88	<2.64	<5.16	NDA	2.57 J	NDA	<4.34	NDA	<4.34	2.4 J	NDA	<4.34	NDA	<3.77	1.63 J
	10/18/2013	**2,100**	26	<5.1	<3.3	<7.0	<9.8	<6.3	<7.7	<6.3	<6.3	<30	<4.1	<50	<6.3	<14	<26	<4.4	<6.4	32	<5.6	<4.5	7.7	<45	NDA	<5.6	<3.8	170	<7.2
	5/21/2014	**4,000**	**100**	33	<4.3	<9.2	<13	<8.3	<10	<8.3	<8.3	<40	<5.4	<65	<8.2	<18	<35	<5.8	<8.3	74	<7.3	<5.9	<7.3	<58	NDA	<7.3	<5.0	<6.3	<9.5
VP-07	5/24/2010	**189,930**	**591**	274	**<383.44**	<818.53	<1149.63	<737.36	<901.9	<1113.19	NDA	NDA	<479.20	<582.52	**<732.45**	<395.83	<743.41	NDA	<741.84	NDA	<651.29	NDA	<651.35	267.5 J	NDA	<651.35	NDA	<565.21	<842.82
VP-08	5/24/2010	265	<1.45	<1.07	<0.69	<1.47	0.56 J	0.54 J	<1.62	<2	NDA	NDA	<0.86	0.30 J	<1.32	0.23 J	3.5	NDA	2.67	NDA	0.87 J	NDA	1.26	2.47	NDA	0.48 J	NDA	0.53 J	2.92
	10/18/2013	47	<6.9	<5.1	<4.1	<7.0	<9.8	<6.3	<7.7	<6.3	<6.3	<30	<4.1	<50	18	<14	<26	<4.4	<6.3	26	<5.6	<4.5	7.4	<44	NDA	<5.6	<3.8	200	<7.2
VP-09	5/24/2010	18	<1.07	<0.079	<0.51	<1.09	0.51 J	5.41	<1.2	<1.82	NDA	NDA	<0.64	<0.78	0.73 J	<0.53	0.85 J	NDA	2.47	NDA	1.35	NDA	5.65	0.83 J	NDA	1.82	NDA	0.49 J	1.57
	10/18/2013	**1,500**	8.1	<5.6	<3.6	<7.6	<11	<6.9	<8.4	<6.9	<6.9	<33	<4.5	<54	<6.8	<15	<29	<4.8	<6.9	<10	<6.1	<4.9	6.2	<49	NDA	<6.1	<4.1	160	<7.9
	5/21/2014	29	<8.6	<6.3	<4.1	<8.7	<12	<7.8	<9.6	<7.8	<7.8	46	<5.1	<62	<7.8	<17	<33	<5.5	<7.9	33	<6.9	<5.6	<6.9	<55	NDA	<6.9	<4.7	<6.0	<9.0
VP-10	5/24/2010	**27,133**	24.2	<91	**<58.79**	<125.51	<176.28	<113.06	<138.29	<113.07	NDA	NDA	<73.48	<89.32	35.65 J	<60.69	<117.71	NDA	<113.75	NDA	<99.86	NDA	<99.87	29.88 J	NDA	<99.87	NDA	<86.67	<129.23
	10/18/2013	540	<7.6	<5.6	<3.6	<7.7	<11	<6.9	<8.5	<6.9	<6.9	37	<4.5	<55	<6.9	<15	<29	<4.8	<7.0	38	6.7	<5.0	11	<49	NDA	<6.1	<4.2	250	<7.9
	5/20/2014	**14,000**	<37	<28	<18	<38	<53	<34	<42	<34	<34	<160	<22	<270	<34	<73	<140	<24	<34	260	<30	<24	<30	<240	NDA	<30	<20	<26	<39
VP-11	5/24/2010	**12,888**	54	<37.7	<24.28	<51.84	<72.81	<46.7	<57.12	<63.05	NDA	NDA	<30.35	<36.89	<46.39	<25.07	<49.56	NDA	<46.98	NDA	<41.25	NDA	<41.25	41.69 J	NDA	<41.25	NDA	<35.8	12.36 J
VP-11R	10/17/2013	**21,000**	**160**	<53	<34	<72	<100	<65	<80	<65	<65	<320	<42	<520	<65	<140	<270	<46	<66	<100	<58	<47	<58	<460	NDA	<58	<39	190	<75
	5/20/2014	**22,000**	**93**	<33	<21	<46	<64	<41	<50	<41	<41	<200	<27	<330	<41	<89	<170	<29	<42	80	<36	<30	<36	<290	NDA	<36	<25	<32	<47
VP-12	10/17/2013	**93,000**	**<380**	<280	**<180**	<380	<540	<340	<420	<340	<340	<1,700	<220	<2700	<340	<740	<1400	<240	<350	<1,300	<300	<250	<300	<2,400	NDA	<300	<210	360	<390
	5/20/2014	**7,900**	<46	<34	<22	<46	<65	<42	<51	<42	<42	<200	<27	<330	<42	<90	<180	<29	<42	150	<37	<30	<37	<300	NDA	<37	<25	<32	<48
VP-13	10/17/2013	200	<7.2	<5.4	<3.4	<7.4	<10	<6.6	<8.1	<6.6	<6.6	<32	<4.3	<52	<6.6	<14	<28	<4.6	<6.7	<10	<5.9	<4.8	<5.9	<47	NDA	<5.9	<4.0	<5.1	<7.6
	5/21/2014	580	<9.0	<6.7	<4.3	<9.2	<13	<8.3	<10	<8.3	<8.3	<40	<5.4	<65	<8.2	<18	<35	<5.8	<8.3	53	<7.3	<5.9	<7.3	<58	NDA	<7.3	<5.0	<6.3	<9.5
VP-14	4/10/2012	**17,500**	NDA	72	NDA	NDA	NDA	NDA	<2.5	NDA	<2.0	4.9	<0.65	<1.6	31.2	<1.1	<0.84	<1.4	<2.0	1.4	<1.8	<1.4	NDA	<1.4	3.3	NDA	NDA	NDA	NDA
	10/17/2013	**13,000**	130	<22	<14	<30	<42	<27	<33	<27	<27	<130	<18	<210	<27	<58	<110	<19	<27	<41	<24	<19	<24	<190	NDA	<24	<16	<21	<31
	5/21/2014	**7,900**	60	<13	<8.2	<17	<24	<16	<19	<16	<16	<76	<10	<120	<16	<34	<66	<11	<16	40	<14	<11	<14	<110	NDA	<14	<9.4	<12	<18
VP-15[2]	10/17/2013	13	<7.5	<5.5	<3.6	<7.6	<42	<6.8	<8.4	<6.8	<6.8	<33	<4.4	<54	<6.8	<15	<29	<4.8	<6.9	13	<6.0	<4.9	<6.0	<48	NDA	<6.0	<4.1	<5.2	<7.8
VP-101	10/17/2013	570	<7.6	<5.6	<3.6	<7.7	<11	<6.9	<8.4	<6.9	<6.9	<33	<4.5	<54	<6.9	<15	<29	<4.8	<6.9	21	<6.1	6.2	9.2	<49	NDA	<6.1	4.4	140	<7.9
	5/21/2014	790	<9.0	<6.6	<4.3	<9.1	<13	<8.2	<10	<8.2	<8.2	46	<5.3	<65	<8.2	<18	<34	<5.7	<8.2	150	<7.2	<5.9	<7.2	<58	NDA	<7.2	<4.9	<6.3	<9.4
VP-102	10/17/2013	**2,000**	<7.6	<5.6	<3.6	<7.7	<11	<6.9	<8.5	<6.9	<6.9	<33	<4.5	<55	<6.9	<15	<29	<4.8	<7.0	19	<6.1	<5.0	9.5	<49	NDA	<6.1	<4.2	240	<7.9
	5/20/2014	**820**	<8.9	<6.6	<4.2	<9.1	<13	<8.2	<10	<8.2	<8.2	50	<5.3	<65	<8.1	<18	<34	<5.7	<8.2	160	<7.2	<5.9	<7.2	<58	NDA	<7.2	<4.9	<6.3	<9.4
VP-103	10/18/2013	<9.4	<7.5	<5.5	<3.6	<7.6	<11	12	<8.4	<6.8	12	<33	<4.4	<54	<6.8	<15	<29	<4.8	<6.9	43	8.5	<4.9	38	<48	NDA	11	<4.1	50	<7.8
	5/21/2014	16	<8.5	<6.3	<4.1	<8.7	<12	<7.8	<9.6	<7.8	<7.8	<38	<5.1	<62	<7.8	<17	<33	<5.5	<7.9	29	<6.9	<5.6	<6.9	<55	NDA	<6.9	<4.7	<6.0	<8.9
VP-104	10/18/2013	140	<7.1	<5.3	<3.4	<7.2	<10	<6.5	<8.0	<6.5	<6.5	<32	<4.2	<52	<6.5	<14	<27	<4.6	<6.6	17	<5.8	<4.7	6.1	<46	NDA	<5.8	<3.9	130	<7.5
	5/21/2014	200	<9.1	<6.7	<4.3	<9.3	<13	<8.4	<10	<8.4	<8.4	<40	<5.4	<66	<8.3	<18	<35	<5.8	<8.4	34	<7.4	<6.0	<7.4	<59	NDA	<7.4	<5.0	<6.4	<9.6
VP-105	10/18/2013	290	<7.4	<5.5	<3.5	<7.5	<10	15	<8.3	<6.8	18	<33	<4.4	<54	<6.7	<14	<28	<4.8	<6.8	<10	18	<4.9	72	<48	NDA	17	<4.1	78	<7.8
	5/20/2014	420	<8.6	<6.3	<4.1	<8.7	<12	13	<9.6	<7.9	14	<38	<5.1	<62	<7.8	<17	<33	<5.5	<7.9	64	<6.9	<5.6	22	<56	NDA	<6.9	<4.7	<6.0	<9.0
VP-106	10/18/2013	700	<7.7	<5.7	<3.6	<7.8	<11	<7.0	<8.6	<7.0	<7.0	<34	<4.6	<56	<7.0	<15	<30	5.1	<7.1	16	<6.2	6.6	8.1	<50	NDA	<6.2	<4.2	160	<8.0
	5/21/2014	24	<8.6	<6.3	<4.1	<8.7	<12	<7.9	<9.6	<7.9	<7.9	<38	<5.1	<62	<7.8	<17	<33	<5.5	<7.9	30	<6.9	<5.6	<6.9	<56	NDA	<6.9	<4.7	<6.0	<9.0
SVE-1S[3]	5/22/2014	**20,000**	<47	<35	<22	<48	<67	65	<53	<43	<43	<210	<28	<340	<43	<93	<180	<30	<44	<66	<38	<31	<38	<300	NDA	<38	100	<33	<49
SVE-1D[3]	5/21/2014	**73,000**	**<350**	<260	**<170**	<350	<500	<320	<390	<320	<320	4300	<210	<2500	<320	<690	<1300	<220	<320	<490	<280	<230	<280	<2200	NDA	<280	<190	<240	<360
MW-02	5/24/2010	**128,881**	**279**	<278	**<178.94**	<381.98	<536.49	<344.1	<420.89	<344.13	NDA	NDA	<223.63	<271.84	**<341.81**	<184.72	<371.71	NDA	<346.19	NDA	<303.93	NDA	<303.96	208.44 J	NDA	<303.96	NDA	<263.77	<393.32

Notes:

[1] Orphan Site Remediation Program (OSRP) Residential Use Action Level ÷ 0.01 (generic attenuation factor-soil vapor to indoor air)

[2] When VP-15 was sampled on 10/17/2013 the sample was labeled as VP-11, but it has been corrected on this table.

[3] Samples collected during Soil Vapor Extraction Pilot Study (SVE) Pilot Study

Laboratory Analysis by TO-15

Bold indicates sample results which exceed Standard

Shaded Cells: Results converted from parts per billion volume per volume (ppb (v/v))

Concentrations are less than 10 x's PCE concentration of field blank

CVOCs: Chlorinated Volatile Organic Compounds

VOCs: Volatile Organic Compounds

$\mu g/m^3$: Micrograms per cubic meter

NE: Not Established

VP: Vapor Point

NDA: No data available

J: Estimated Result (Result is less than Reporting Limit)

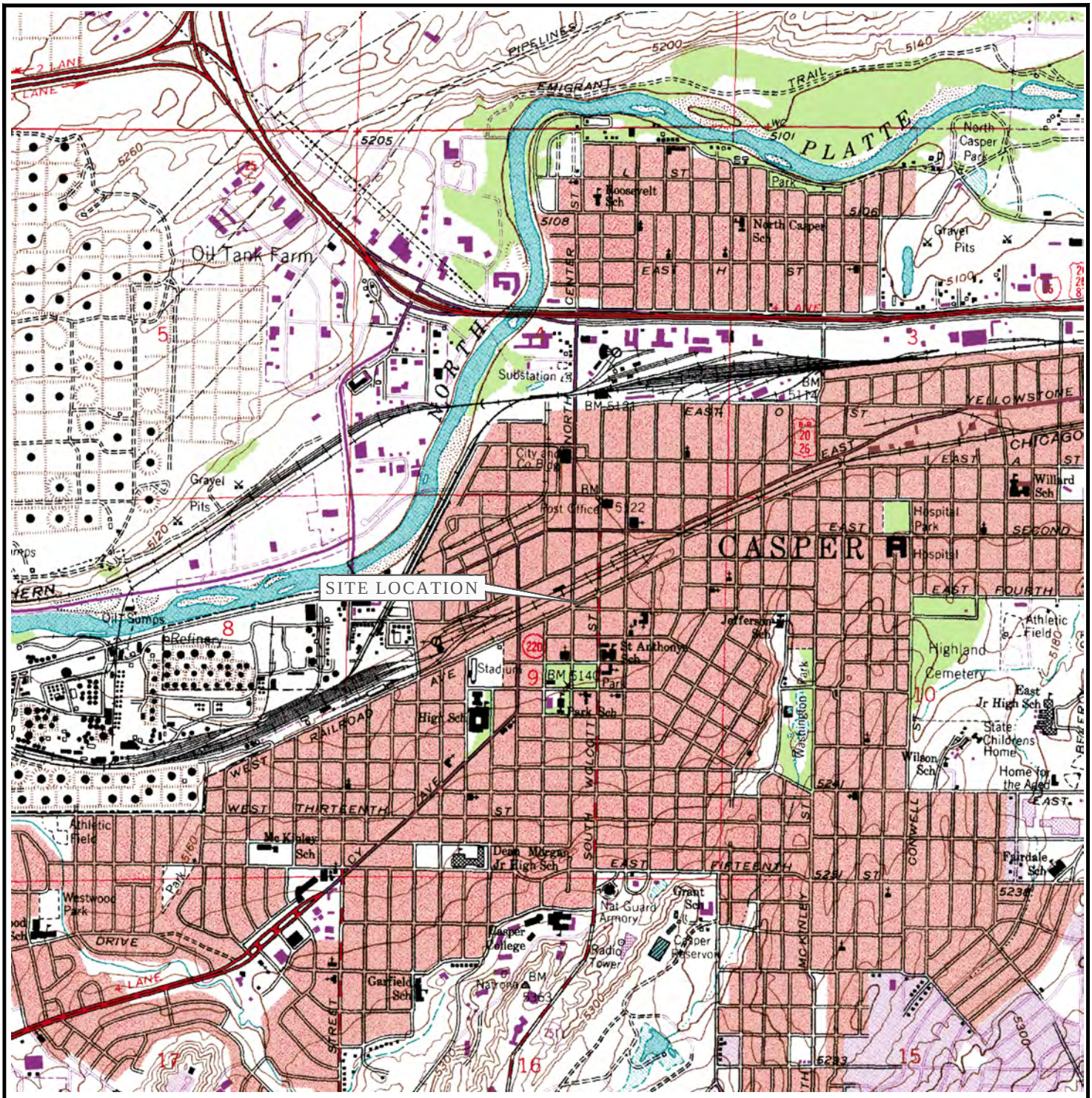
TABLE 9
INDOOR AIR ANALYTICAL SUMMARY
Former Lobell Refinery-Orphan Site Remediation Program (OSRP) File 57.004
Casper, Wyoming
Stantec Project NO. 212205045

		CVOCs				VOCs						
Sample Locations	**Date Sampled**	**Tetrachloroethene (PCE) (µg/m^3)**	**Trichloroethene (TCE) (µg/m^3)**	**cis-1,2-Dichloroethene (cis-DCE) (µg/m^3)**	**Vinyl Chloride (VC) (µg/m^3)**	**1,1,1-Trichloroethane (µg/m^3)**	**1,2-Dichloroethane (µg/m^3)**	**Benzene (µg/m^3)**	**Ethyl Benzene (µg/m^3)**	**m,p-Xylene (µg/m^3)**	**o-Xylene (µg/m^3)**	**Toluene (µg/m^3)**
OSRP Residential Use Screening Level[1]		**8.1**	**0.9**	**35**	**0.28**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
AA-1	10/16/2013	3.4	<0.23	<0.17	<0.054	<0.23	<0.17	0.38	<0.18	0.44	<0.18	0.94
IA-1	10/16/2013	**130**	**3.3**	2.5	<0.049	<0.21	0.35	0.52	0.88	3.3	1.4	6.8
IA-2	10/16/2013	**120**	**3.3**	2.4	0.063	<0.20	0.35	0.51	0.91	3.2	1.3	7.1
IA-6	10/15/2013	**49**	<0.21	<0.15	<0.050	<0.21	0.16	0.68	0.38	1.1	0.41	2.1
IA-7	10/15/2013	**140**	**0.32**	<0.14	<0.044	0.36	<0.14	0.78	0.44	1.4	0.50	6.2
IA-8	10/15/2013	**74**	<0.21	<0.16	<0.050	0.25	<0.16	0.62	0.28	0.88	0.34	1.8
IA-9	10/15/2013	0.70	<0.17	<0.13	<0.041	<0.17	<0.13	0.58	0.22	0.74	0.28	1.4
IA-10	5/21/2014	**130**	0.21	<0.14	<0.044	0.52	<0.14	0.78	0.48	1.4	0.47	2.7
IA-11	5/23/2014	**61**	<0.19	<0.14	<0.044	0.56	<0.14	0.94	0.62	2.0	0.64	3.5

Notes:

[1]Orphan Site Remediation Program (OSRP) Residential Use Screening Level
Laboratory Analysis by Modified EPA Method TO-15 SIM
Bold indicates sample results which exceed OSRP Residential Use Screening Level
CVOCs: Chlorinated Volatile Organic compounds
VOCs: Volatile Organic compounds
µg/m^3: micrograms per cubic meter
NE: Not Established
AA: ambient air
IA: Indoor Air

FIGURES



REFERENCE: USGS 7.5 MINUTE QUADRANGLE; CASPER, WYOMING

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FOR:
FORMER LOBELL REFINERY-
ORPHAN SITE REMEDIATION PROGRAM
(OSRP) FILE 57.004
CASPER, WYOMING

SITE LOCATION MAP

FIGURE: 1

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
212205045	ARA	CB	RJC	11/4/13

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ORPHAN SITE REMEDIATION PROGRAM
(OSRP) FILE 57.004
CASPER, WYOMING

SITE MAP

FIGURE: 2

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
212205045	ARA	BC	RJC	8/4/14

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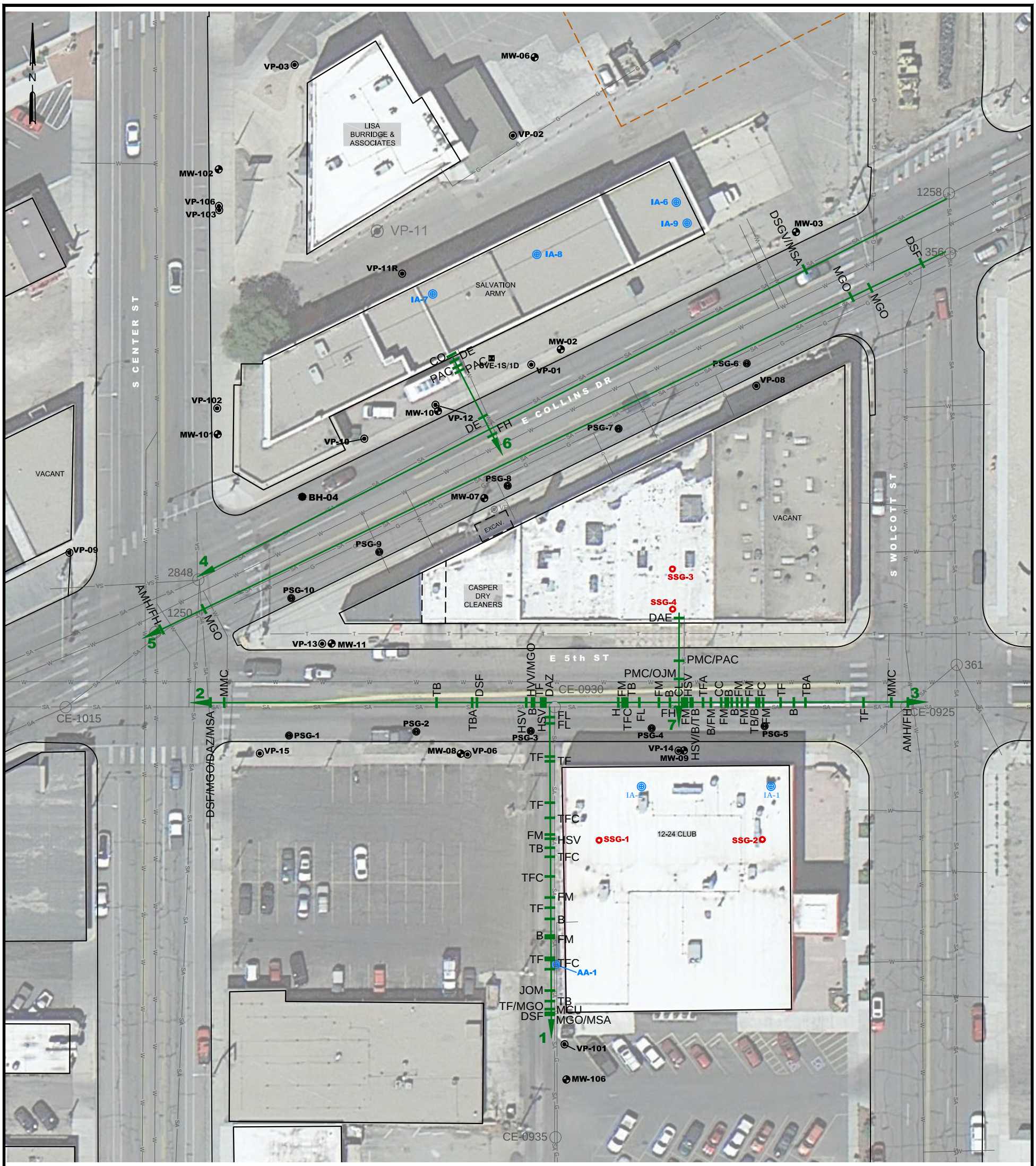

SOIL GAS WELLS	AMH	MANHOLE	HVV	HOLE VOID VISIBLE
MONITORING WELL	B	BROKEN	JOM	JOINT OFFSET MEDIUM
INDOOR AIR SAMPLES	CC	CRACK CIRCUMFERENTIAL	MCU	CAMERA UNDERWATER
PASSIVE SOIL GAS MODULES	CL	CRACK LONGITUDINAL	MGO	GENERAL OBSERVATION
SUB-SLAB SOIL GAS PROBES	CO	CLEANOUT	MMC	MATERIAL CHANGE
FORMER WELL LOCATION	DAZ	DEPOSITS ATTACHED OTHER	MSA	ABANDONED SURVEY
SVE PILOT TEST WELL	DAE	DEPOSITS ATTACHED ENCRUSTATION	OJM	OFFSET JOINT MEDIUM
GAS LINE	DE	DEBRIS	PAC	PIPE ALIGNMENT CHANGE
SANITARY SEWER	DSGV	DEPOSITS SETTLED GRAVEL	PMC	PIPE MATERIAL CHANGE
WATER LINE	DSF	DEPOSITS SETTLED FINE	TB	TAP BREAK-IN
COMMUNICATIONS LINE	FC	FRACTURE CIRCUMFERENTIAL	TBA	TAP BREAK-IN ACTIVE
EXCAVATION LIMITS	FH	END OF SURVEY	TF	TAP FACTORY
1 SEWER RUN AND NUMBER	FL	FRACTURE LONGITUDINAL	TFA	TAP FACTORY ACTIVE
CE-1015 MANHOLE AND NUMBER	FM	FRACTURE MULTIPLE	TFC	TAP FACTORY CAPPED
	H	HOLE		
	HSV	HOLE SOIL VISIBLE		

0 50 100

APPROXIMATE SCALE IN FEET

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FOR:
FORMER LOBELL REFINERY-
ORPHAN SITE REMEDIATION PROGRAM
(OSRP) FILE 57.004
CASPER, WYOMING

SEWER SCOPE AND CAMERA SURVEY LOCATION AND FEATURE MAP

FIGURE: 3A

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
212205045	ARA	BC	RJC	8/4/14

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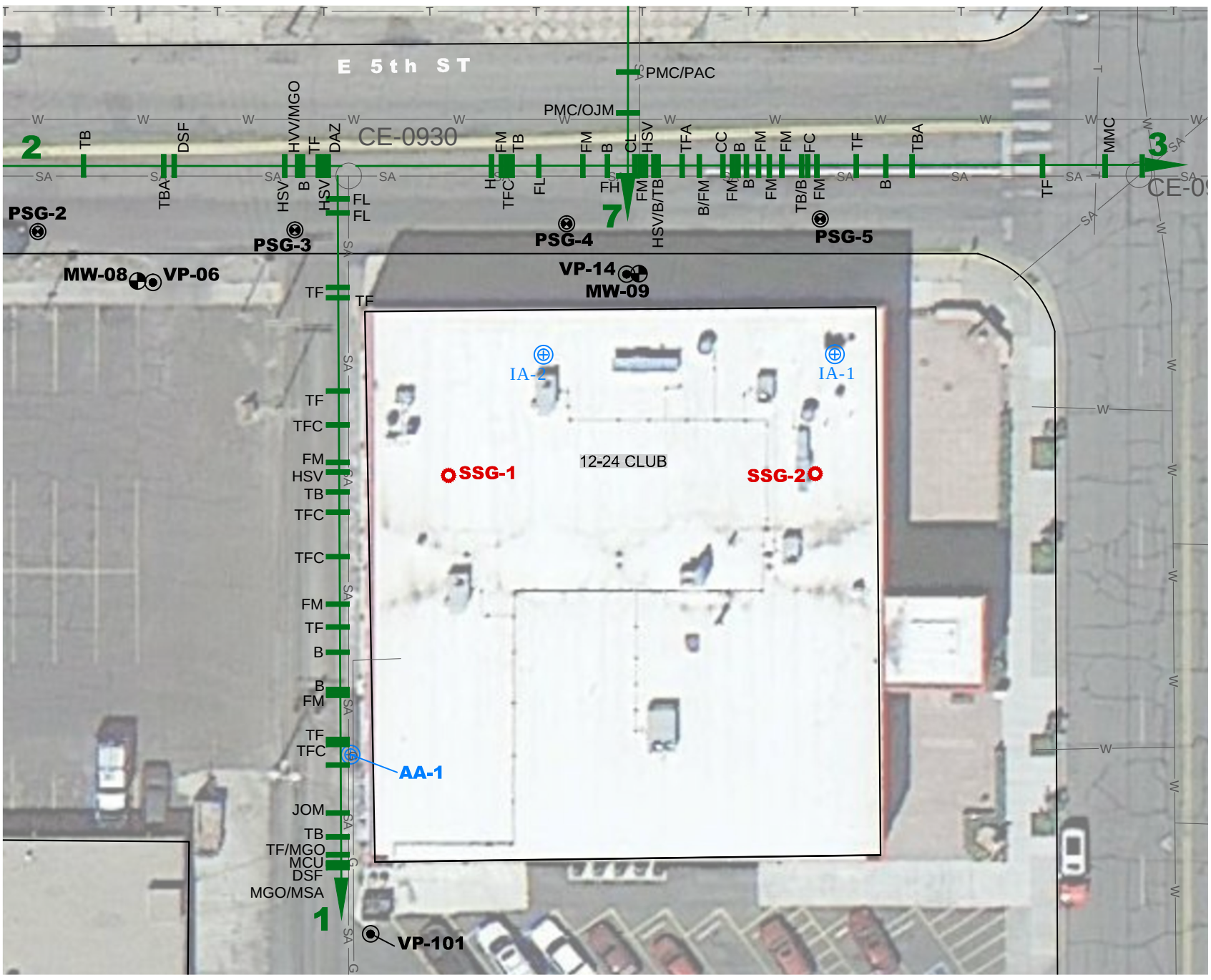

SOIL GAS WELLS	AMH MANHOLE	HVV HOLE VOID VISIBLE
MONITORING WELL	B BROKEN	JOM JOINT OFFSET MEDIUM
INDOOR AIR SAMPLES	CC CRACK CIRCUMFERENTIAL	MCU CAMERA UNDERWATER
PASSIVE SOIL GAS MODULES	CL CRACK LONGITUDINAL	MGO GENERAL OBSERVATION
SUB-SLAB SOIL GAS PROBES	CO CLEANOUT	MMC MATERIAL CHANGE
FORMER WELL LOCATION	DAZ DEPOSITS ATTACHED OTHER	MSA ABANDONED SURVEY
SVE PILOT TEST WELL	DAE DEPOSITS ATTACHED ENCRUSTATION	OJM OFFSET JOINT MEDIUM
GAS LINE	DE DEBRIS	PAC PIPE ALIGNMENT CHANGE
SANITARY SEWER	DSGV DEPOSITS SETTLED GRAVEL	PMC PIPE MATERIAL CHANGE
WATER LINE	DSF DEPOSITS SETTLED FINE	TB TAP BREAK-IN
COMMUNICATIONS LINE	FC FRACTURE CIRCUMFERENTIAL	TBA TAP BREAK-IN ACTIVE
EXCAVATION LIMITS	FH END OF SURVEY	TF TAP FACTORY
1 SEWER RUN AND NUMBER	FL FRACTURE LONGITUDINAL	TFA TAP FACTORY ACTIVE
CE-1015 MANHOLE AND NUMBER	FM FRACTURE MULTIPLE	TFC TAP FACTORY CAPPED
	H HOLE	
	HSV HOLE SOIL VISIBLE	

0 30 60

APPROXIMATE SCALE IN FEET

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FOR:
FORMER LOBELL REFINERY-
ORPHAN SITE REMEDIATION PROGRAM
(OSRP) FILE 57.004
CASPER, WYOMING

SEWER SCOPE AND CAMERA SURVEY
LOCATION AND FEATURE MAP
12-24 CLUB DETAIL

FIGURE: 3B

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
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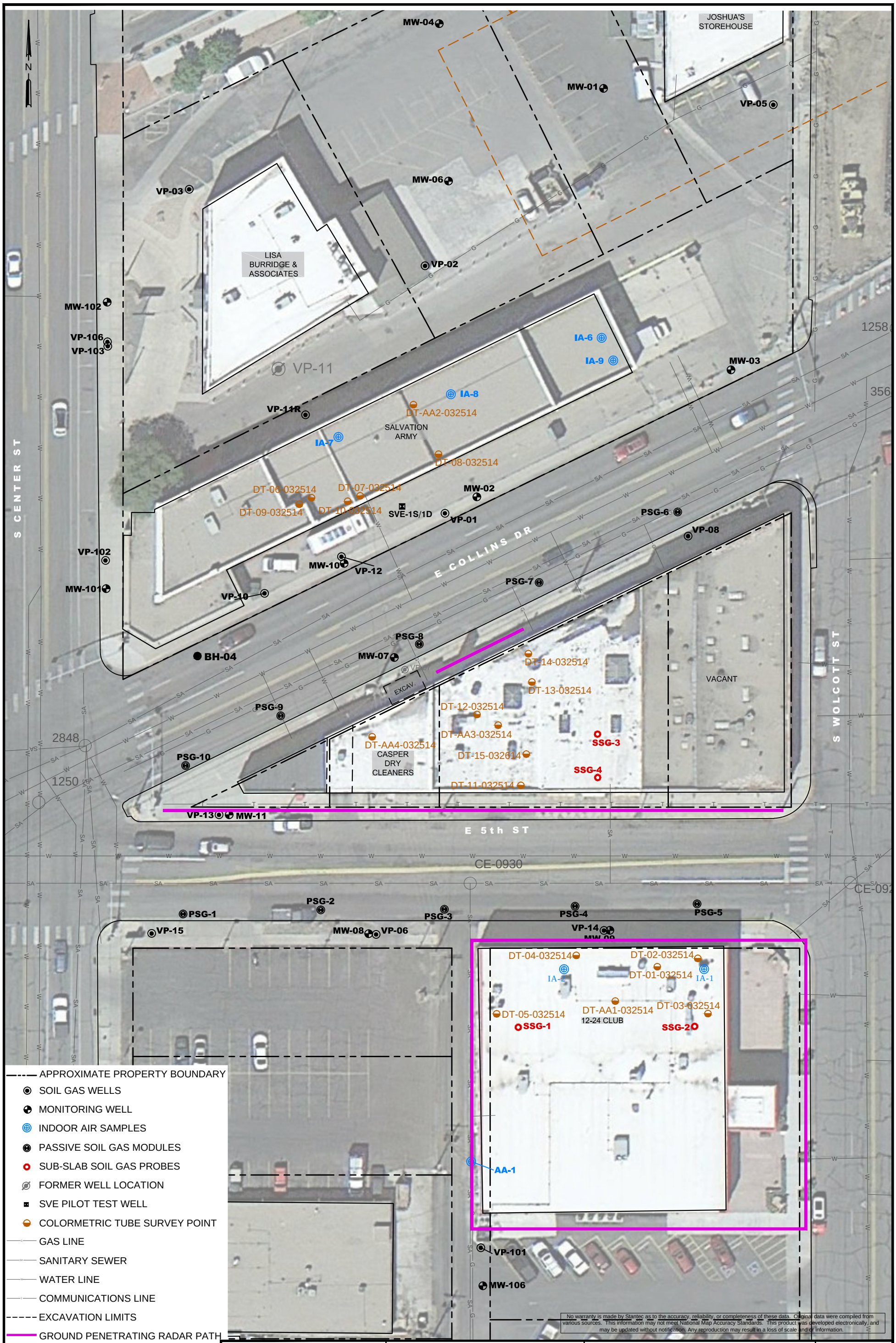

- APPROXIMATE PROPERTY BOUNDARY
- SOIL GAS WELLS
- MONITORING WELL
- INDOOR AIR SAMPLES
- PASSIVE SOIL GAS MODULES
- SUB-SLAB SOIL GAS PROBES
- FORMER WELL LOCATION
- SVE PILOT TEST WELL
- COLORMETRIC TUBE SURVEY POINT
- GAS LINE
- SANITARY SEWER
- WATER LINE
- COMMUNICATIONS LINE
- EXCAVATION LIMITS
- GROUND PENETRATING RADAR PATH

0 40 80

APPROXIMATE SCALE IN FEET

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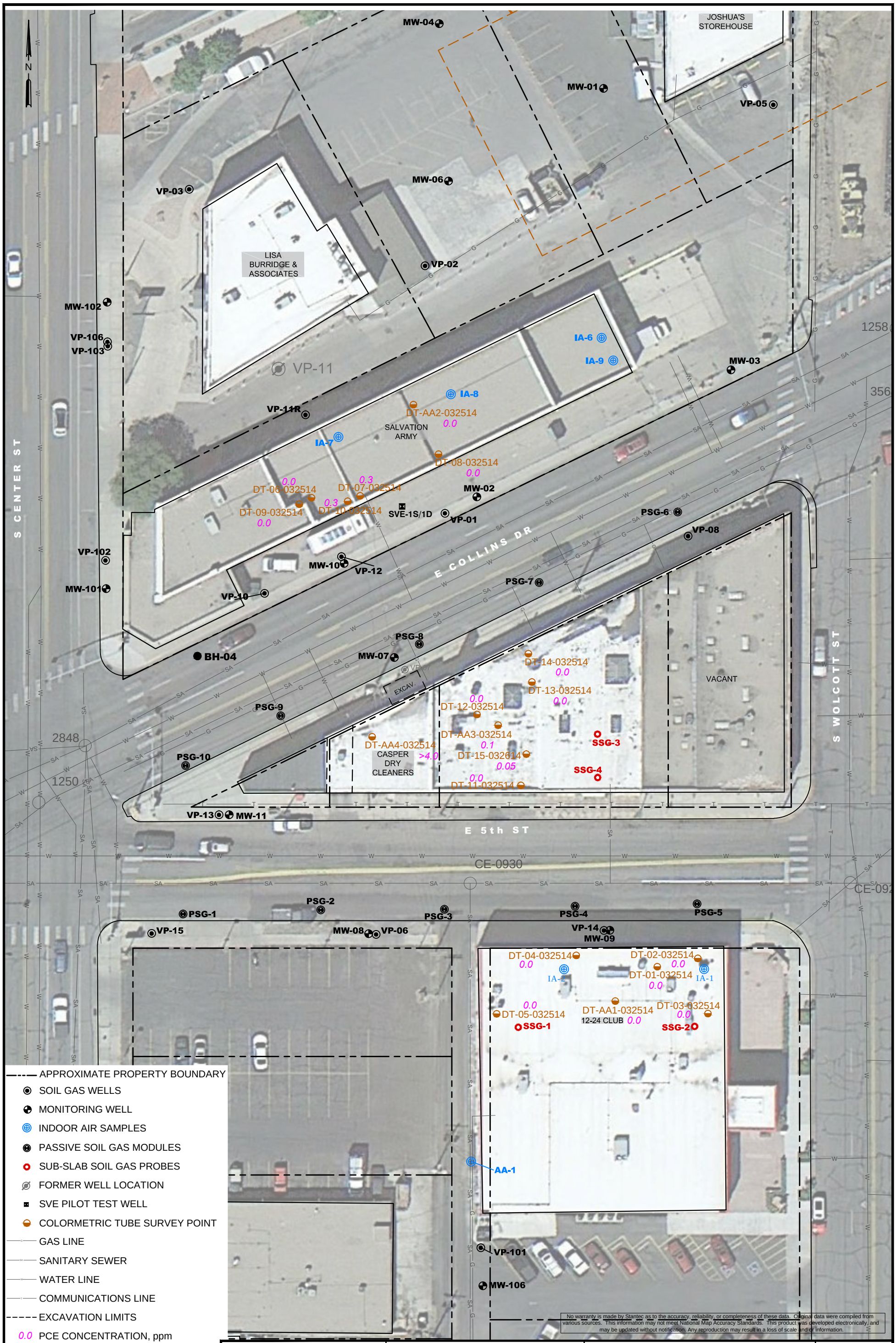
ORPHAN SITE REMEDIATION PROGRAM
(OSRP) FILE 57.004
CASPER, WYOMING

GPR SURVEY
LOCATION MAP

FIGURE: 4

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
212205045	ARA	BC	RJC	8/14/14

FILEPATH:V:\1878\CADD_files\Other_offices_work\GOLDEN\wdeq_present_Lobell\Casper\Casper-pce_colormetric-314.dwg|aandrews|Aug 26, 2014 at 9:31|Layout: gpr location



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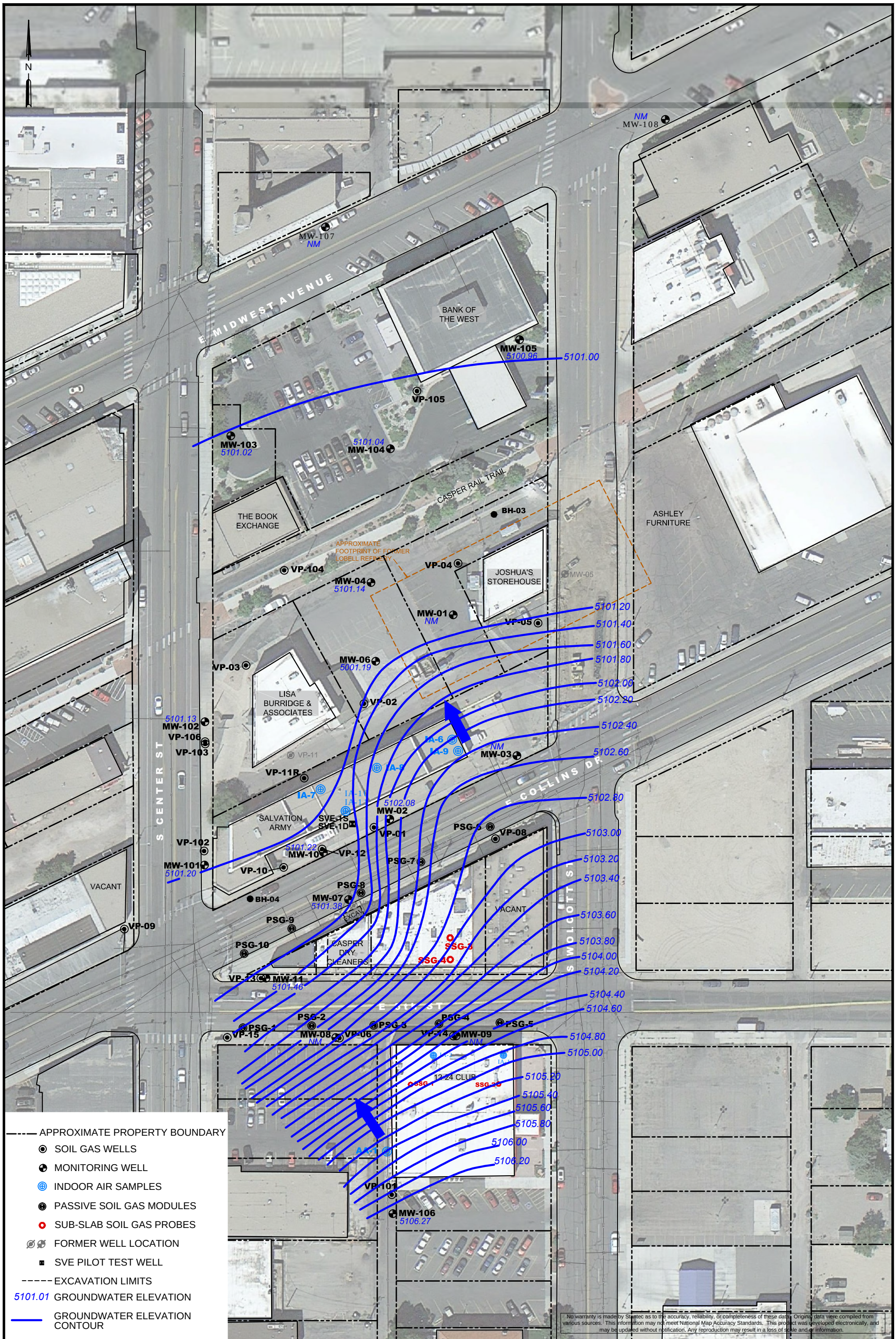
PCE COLORIMETRIC TUBE SURVEY SAMPLE LOCATION AND CONCENTRATION MAP

FIGURE: 5

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
212205045	ARA	BC	RJC	7/3/14

FILEPATH:V:\1878\CADD_files\Other_offices_work\GOLDEN\wdeq_present_Lobell\Casper\Casper-pce_colormetric-314.dwg|aandrews|Aug 15, 2014 at 11:19|Layout: colormetric



APPROXIMATE PROPERTY BOUNDARY
SOIL GAS WELLS
MONITORING WELL
INDOOR AIR SAMPLES
PASSIVE SOIL GAS MODULES
SUB-SLAB SOIL GAS PROBES
FORMER WELL LOCATION
SVE PILOT TEST WELL
EXCAVATION LIMITS
5101.01 GROUNDWATER ELEVATION
GROUNDWATER ELEVATION CONTOUR
GROUNDWATER FLOW DIRECTION ARROW
NM NOT MEASURED

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CASPER, WYOMING

GROUNDWATER ELEVATION CONTOUR MAP
MAY 22, 2014

FIGURE: 6

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
212205045	ARA	CB	RJC	6/25/14

FILEPATH:V:\1878\CADD_files\Other_offices_work\GOLDEN\wdeq_present_Lobell\Casper\Casper-gw-514.dwg|aandrews|Aug 15, 2014 at 11:20|Layout: WLE

N

E MIDWEST AVENUE

S CENTER ST

E COLLINS DR

S WOLCOTT ST

E 5th ST

CASPER RAIL TRAIL

BANK OF THE WEST

THE BOOK EXCHANGE

ASHLEY FURNITURE

JOSHUA'S STOREHOUSE

LISA BURRIDGE & ASSOCIATES

SALVATION ARMY

VACANT

VACANT

CASPER DRY CLEANERS

12-24 CLUB

APPROXIMATE FOOTPRINT OF FORMER LOBELL REFINERY

EXCAVATION

MW-107 <2

MW-108 <2

MW-105 64

VP-105

MW-103 <2

MW-104 750

BH-03

VP-104

MW-04 460

VP-04

MW-05

MW-01 NS

VP-05

MW-06 200

VP-03

VP-02

MW-102 <2

VP-106

VP-103

VP-11

VP-11R

IA-6

IA-9

MW-03 NS

IA-8

IA-7

IA-10

IA-11

MW-02 22

SVE-1S

SVE-1D

VP-01

PSG-6

VP-08

VP-102

MW-10 600

VP-12

PSG-7

MW-101 NS

VP-10

PSG-11

BH-04

MW-07 70

PSG-9

VP-09

PSG-10

SSG-3

SSG-4

VP-13

MW-11 <2

PSG-1

PSG-2

PSG-3

PSG-4

PSG-5

VP-15

MW-08 NS

VP-06

VP-14

MW-09 NS

IA-2

IA-1

SSG-1

SSG-2

AA-1

VP-101

MW-106 <2

0 80 160

APPROXIMATE SCALE IN FEET

- APPROXIMATE PROPERTY BOUNDARY
- SOIL GAS WELLS
- MONITORING WELL
- INDOOR AIR SAMPLES
- PASSIVE SOIL GAS MODULES
- SUB-SLAB SOIL GAS PROBES
- FORMER WELL LOCATION
- SVE PILOT TEST WELL
- EXCAVATION LIMITS
- <2 PCE CONCENTRATION (µg/L)
- PCE CONCENTRATION CONTOUR (5 µg/L GROUNDWATER STANDARD)
- µg/L MICROGRAMS PER LITER
- PCE TETRACHLOROETHENE
- NS NOT SAMPLED

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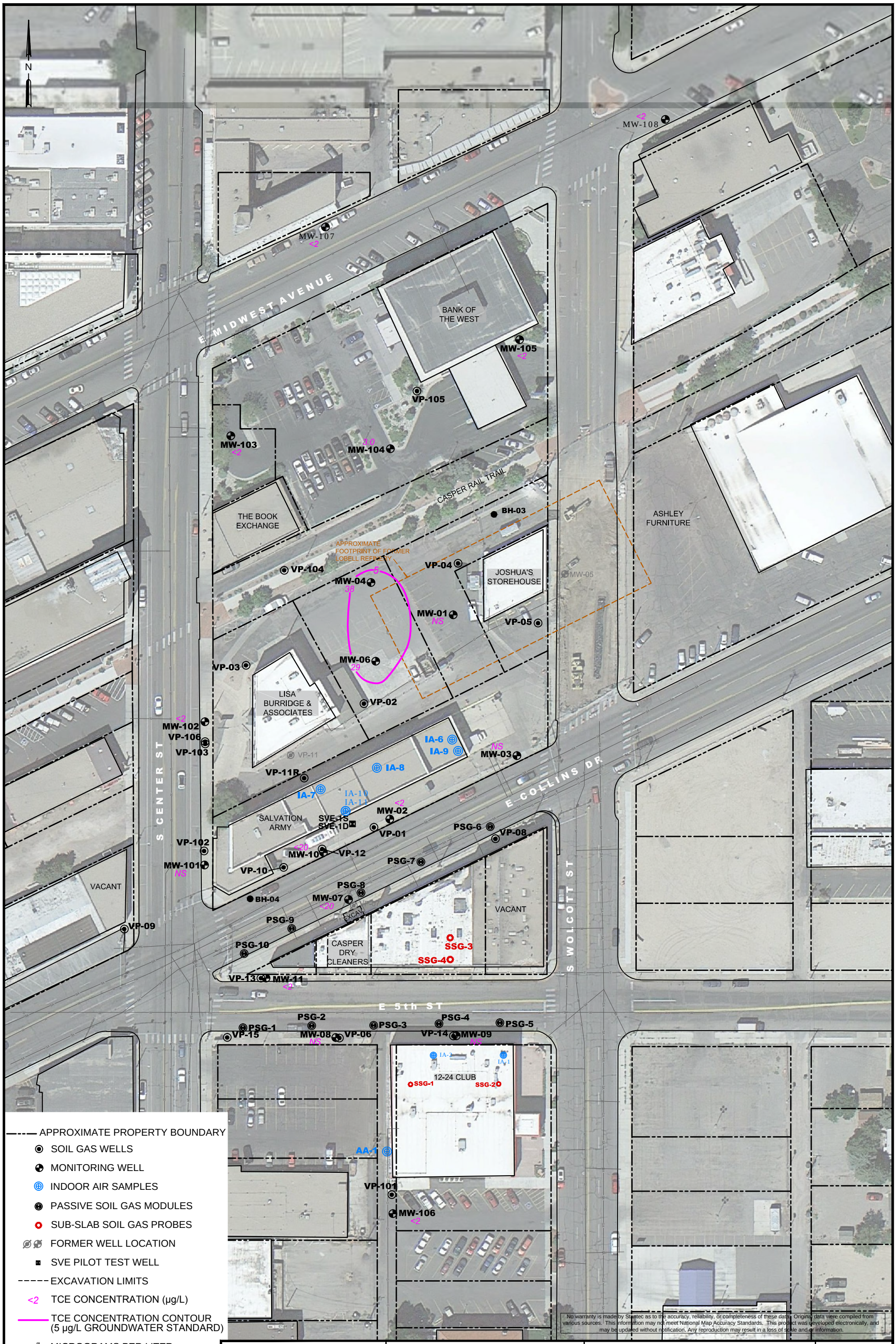
ORPHAN SITE REMEDIATION PROGRAM
(OSRP) FILE 57.004
CASPER, WYOMING

GROUNDWATER PCE CONCENTRATION MAP MAY 22-23, 2014

FIGURE: 7

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
212205045	ARA	CB	RJC	6/25/14

FILEPATH:V:\1878\CADD_files\Other_offices_work\GOLDEN\wdeq_present_Lobell\Casper\Casper-gw-514.dwg|aandrews|Aug 15, 2014 at 11:20|Layout: GW-PCE



APPROXIMATE PROPERTY BOUNDARY
SOIL GAS WELLS
MONITORING WELL
INDOOR AIR SAMPLES
PASSIVE SOIL GAS MODULES
SUB-SLAB SOIL GAS PROBES
FORMER WELL LOCATION
SVE PILOT TEST WELL
EXCAVATION LIMITS
<2 TCE CONCENTRATION (µg/L)
TCE CONCENTRATION CONTOUR (5 µg/L GROUNDWATER STANDARD)
µg/L MICROGRAMS PER LITER
PCE TRICHLOROETHENE
NS NOT SAMPLED

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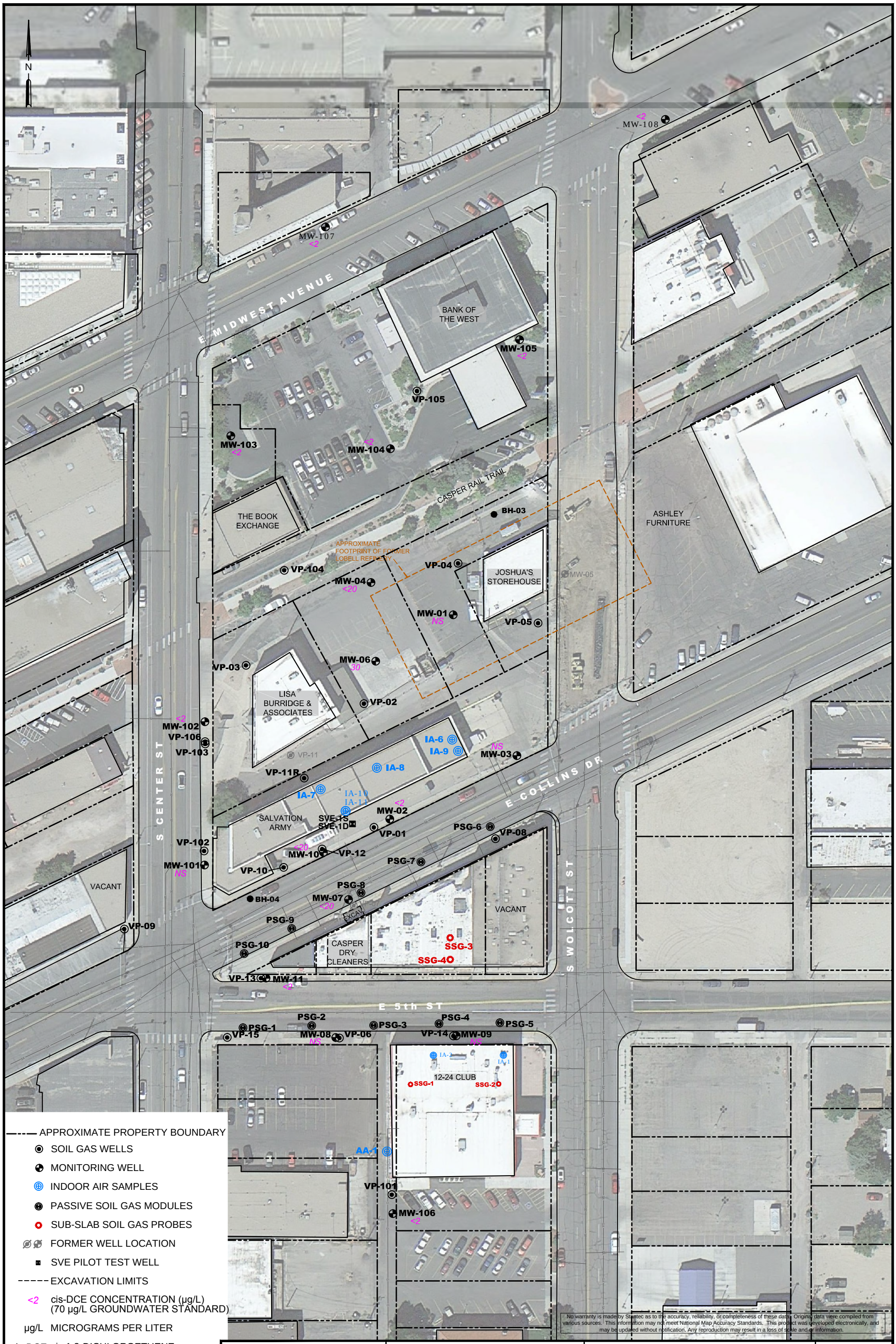
GROUNDWATER TCE CONCENTRATION MAP
MAY 22-23, 2014

FIGURE: 8

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
212205045	ARA	CB	RJC	6/25/14

FILEPATH:V:\1878\CADD_files\Other_offices_work\GOLDEN\wdeq_present_Lobell\Casper\Casper-gw-514.dwg|aandrews|Aug 15, 2014 at 11:20|Layout: GW-TCE



APPROXIMATE PROPERTY BOUNDARY
SOIL GAS WELLS
MONITORING WELL
INDOOR AIR SAMPLES
PASSIVE SOIL GAS MODULES
SUB-SLAB SOIL GAS PROBES
FORMER WELL LOCATION
SVE PILOT TEST WELL
EXCAVATION LIMITS
<2 cis-DCE CONCENTRATION (µg/L) (70 µg/L GROUNDWATER STANDARD)
µg/L MICROGRAMS PER LITER
cis-DCE cis 1,2-DICHLOROETHENE
NS NOT SAMPLED

0 80 160
APPROXIMATE SCALE IN FEET

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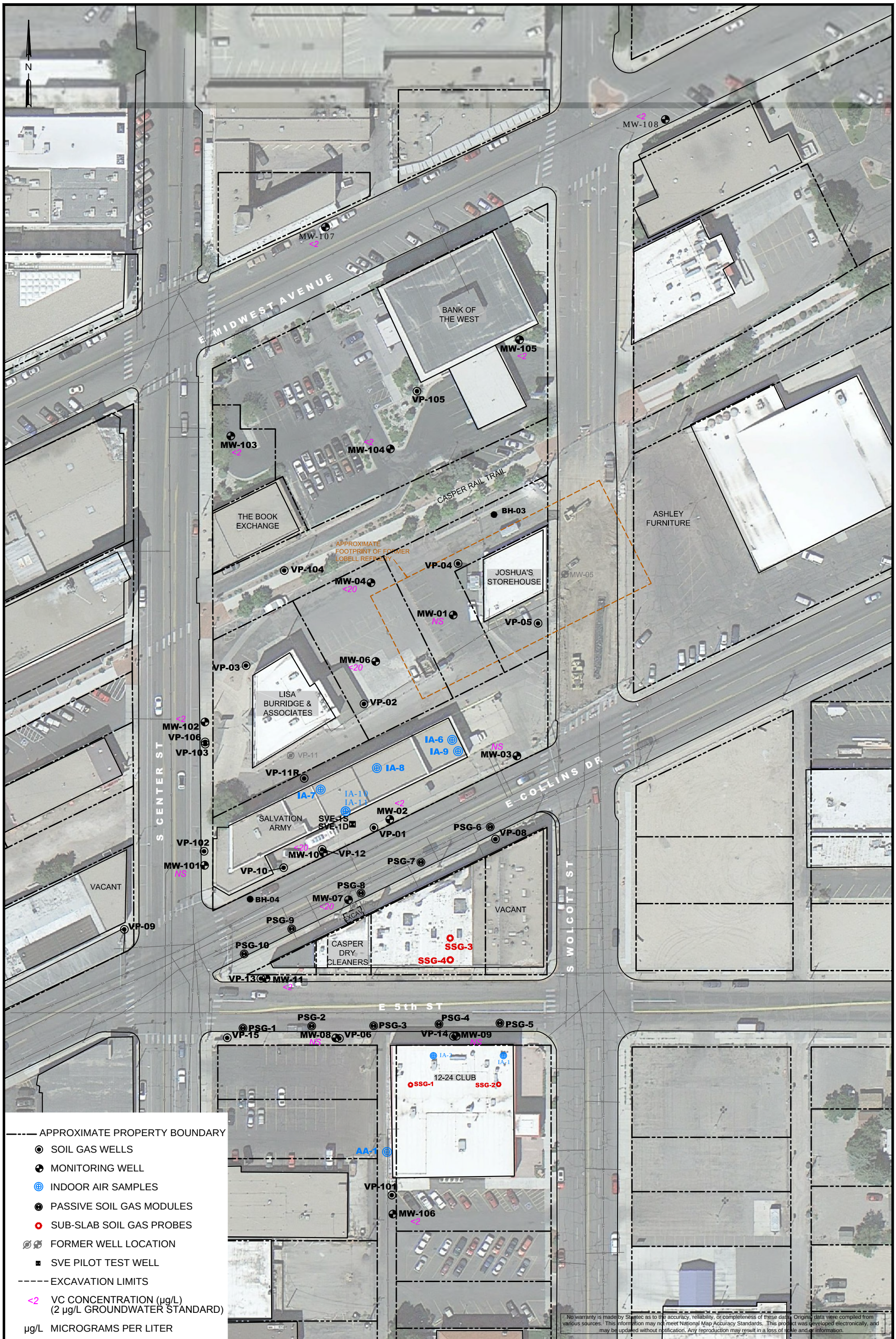
(OSRP) FILE 57.004
CASPER, WYOMING

GROUNDWATER cis-DCE CONCENTRATION MAP MAY 22-23, 2014

FIGURE: 9

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
212205045	ARA	CB	RJC	6/25/14

FILEPATH:V:\1878\CADD_files\Other_offices_work\GOLDEN\wdeq_present_Lobell\Casper\Casper-gw-514.dwg|aandrews|Aug 15, 2014 at 11:21|Layout: GW-DCE



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CASPER, WYOMING

GROUNDWATER VC CONCENTRATION MAP
MAY 22-23, 2014

FIGURE: 10

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
212205045	ARA	CB	RJC	6/25/14

FILEPATH:V:\1878\CADD_files\Other_offices_work\GOLDEN\wdeq_present_Lobell\Casper\Casper-gw-514.dwg|aandrews|Nov 24, 2014 at 13:31|Layout: GW-VC

N

E MIDWEST AVENUE

S CENTER ST

S WOLCOTT ST

E COLLINS DR

E 5th ST

CASPER RAIL TRAIL

BANK OF THE WEST

THE BOOK EXCHANGE

ASHLEY FURNITURE

JOSHUA'S STOREHOUSE

LISA BURRIDGE & ASSOCIATES

SALVATION ARMY

VACANT

VACANT

CASPER DRY CLEANERS

12-24 CLUB

APPROXIMATE FOOTPRINT OF FORMER LOBELL REFINERY

MW-107
MW-108
MW-105
VP-105 420
MW-103
MW-104
BH-03
VP-104 200
MW-04
VP-04 740
MW-05
MW-01
VP-05 NS
VP-03 250
MW-06
VP-02 1,400
MW-102
VP-106 24
VP-103 16
VP-11
NS
VP-11R
IA-6
IA-9
MW-03
IA-8
IA-7
130
IA-10
61
IA-11
MW-02
SVE-1S
SVE-1D
VP-01 28,000
PSG-6
VP-08 NS
820
VP-102
MW-10
VP-12 7,900
PSG-7
MW-101
14,000
VP-10
PSG-8
BH-04
MW-07
PSG-9
VP-09 29
PSG-10
SSG-3
SSG-4
VP-13
MW-11 580
PSG-2
PSG-1
VP-15 NS
MW-08
VP-06 4,000
PSG-3
PSG-4
VP-14 7,600
MW-09
PSG-5
IA-2
IA-1
SSG-1
SSG-2
AA-1
VP-101 790
MW-106

- APPROXIMATE PROPERTY BOUNDARY
- SOIL GAS WELLS
- MONITORING WELL
- INDOOR AIR SAMPLES
- PASSIVE SOIL GAS MODULES
- SUB-SLAB SOIL GAS PROBES
- FORMER WELL LOCATION
- SVE PILOT TEST WELL
- GAS LINE
- SANITARY SEWER
- WATER LINE
- COMMUNICATIONS LINE
- EXCAVATION LIMITS
- <2 PCE CONCENTRATION (µg/m3)
- µg/m3 MICROGRAMS PER CUBIC METER
- PCE TETRACHLOROETHENE

0 80 160

APPROXIMATE SCALE IN FEET

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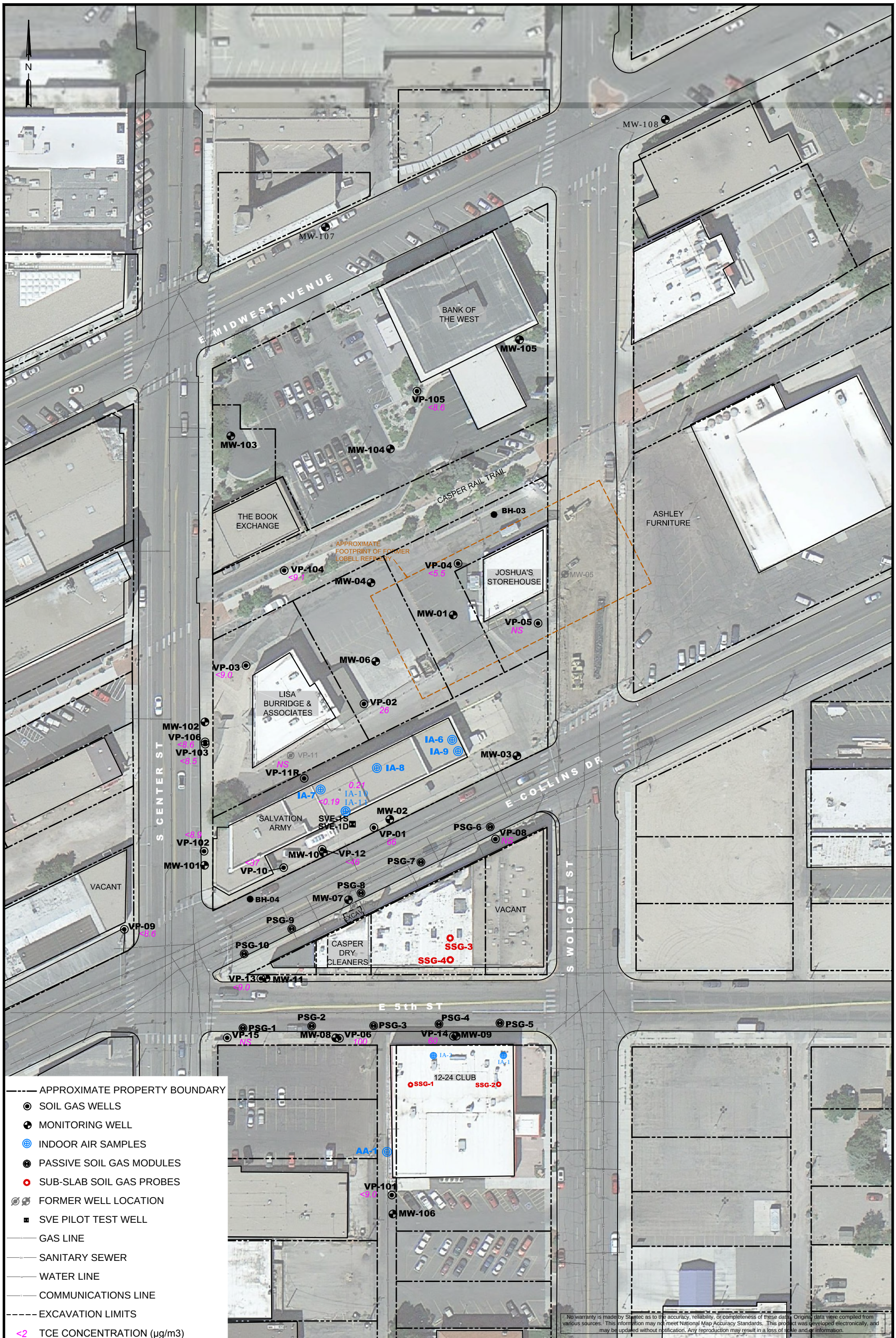
SOIL VAPOR AND INDOOR AIR PCE CONCENTRATION MAP MAY 20-23, 2014

FIGURE: 11

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
212205045	ARA	BC	RJC	7/25/14

FILEPATH:V:\1878\CADD_files\Other_offices_work\GOLDEN\wdeq_present_Lobell\Casper\Casper-gw-514.dwg|aandrews|Aug 26, 2014 at 13:48|Layout: V-PCE



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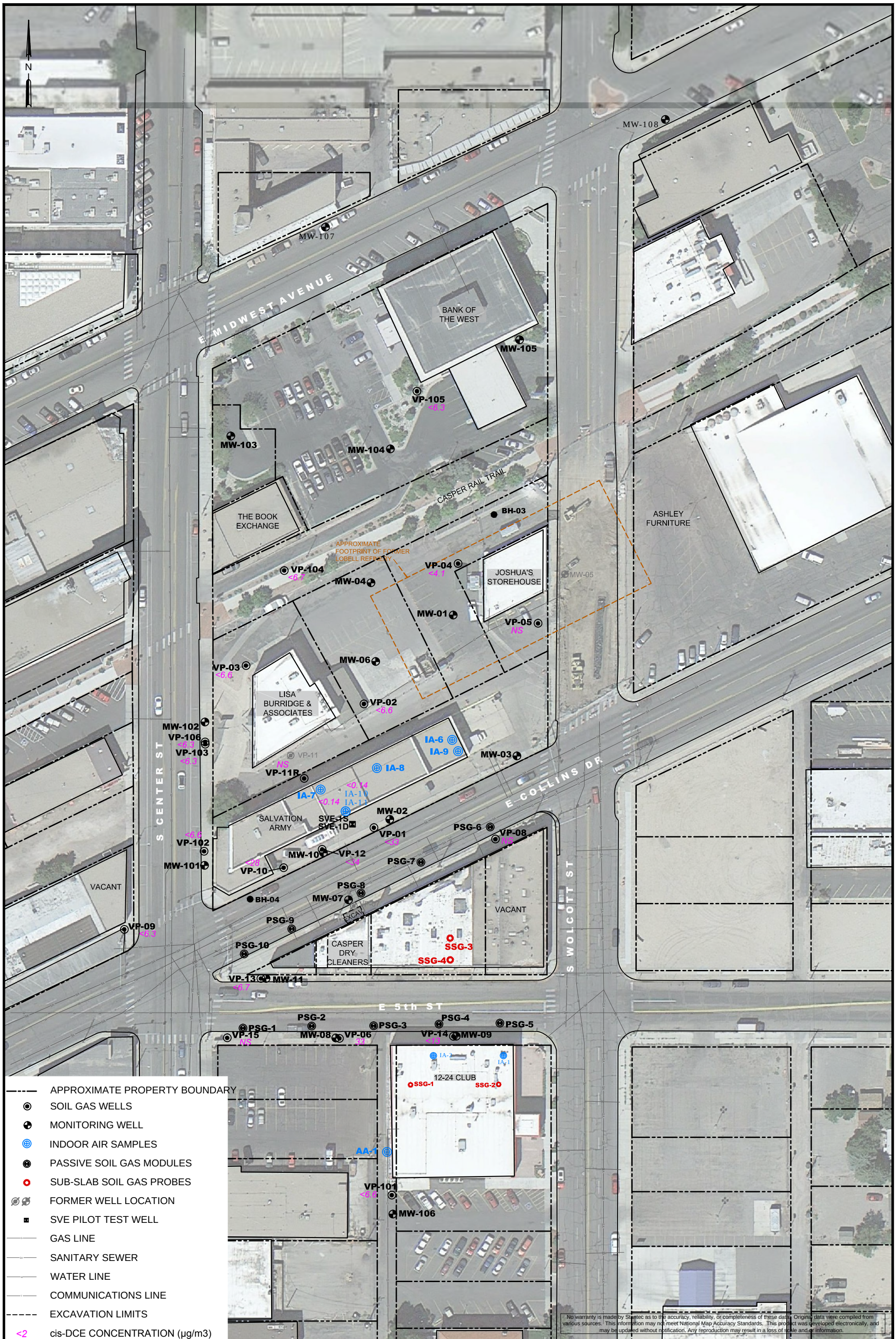
SOIL VAPOR AND INDOOR AIR
TCE CONCENTRATION MAP
MAY 20-23, 2014

FIGURE: 12

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
212205045	ARA	BC	RJC	7/25/14

FILEPATH:V:\1878\CADD_files\Other_offices_work\GOLDEN\wdeq_present_Lobell\Casper\Casper-gw-514.dwg|aandrews|Aug 26, 2014 at 13:48|Layout: V-TCE



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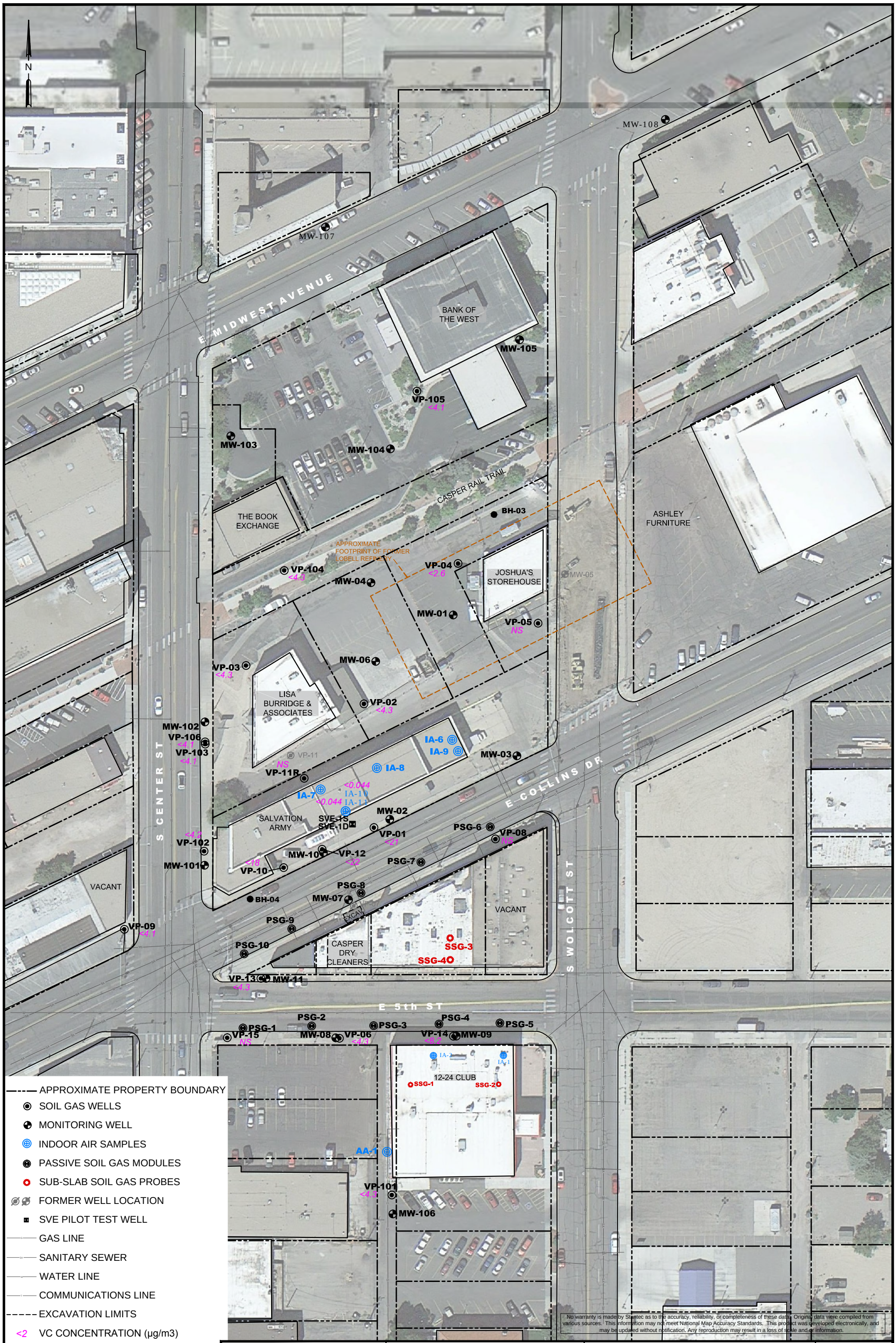
(OSRP) FILE 57.004
CASPER, WYOMING

SOIL VAPOR AND INDOOR AIR
cis-DCE CONCENTRATION MAP
MAY 20-23, 2014

FIGURE: 13

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
212205045	ARA	BC	RJC	7/25/14

FILEPATH:V:\1878\CADD_files\Other_offices_work\GOLDEN\wdeq_present_Lobell\Casper\Casper-gw-514.dwg|aandrews|Aug 26, 2014 at 13:49|Layout: V-CIS



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ORPHAN SITE REMEDIATION PROGRAM
(OSRP) FILE 57.004
CASPER, WYOMING

SOIL VAPOR AND INDOOR AIR VC CONCENTRATION MAP MAY 20-23, 2014

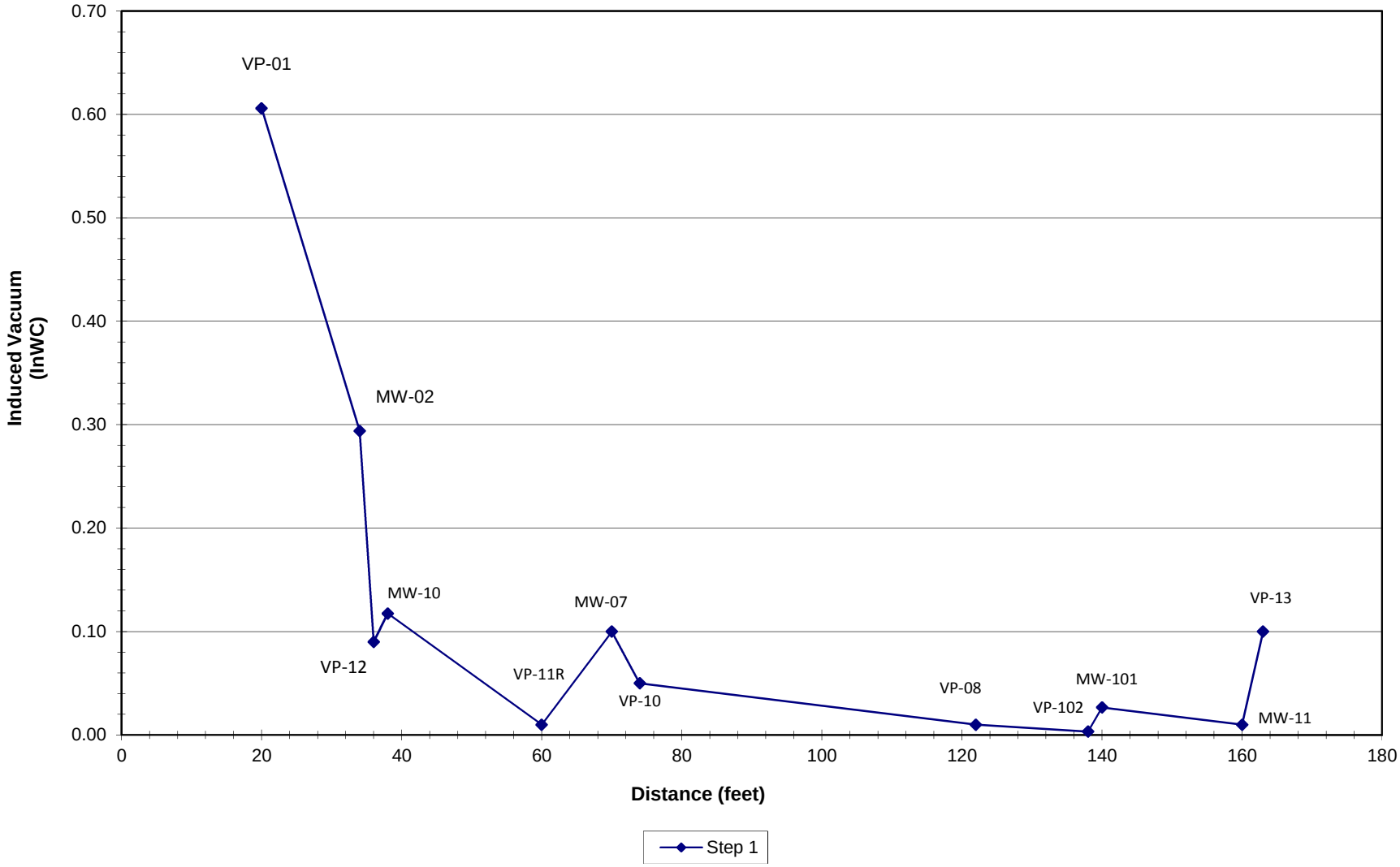
FIGURE: 14

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
212205045	ARA	BC	RJC	7/25/14

FILEPATH:V:\1878\CADD_files\Other_offices_work\GOLDEN\wdeq_present_Lobell\Casper\Casper-gw-514.dwg|aandrews|Aug 26, 2014 at 13:49|Layout: V-VC

GRAPHS

GRAPH 1
SVE Pilot Study -Average Induced Vacuum vs. Distance from SVE-1S /1D
Former Lobell Refinery-Orphan Site Remediation Program (OSRP) File 57.004
Casper, Wyoming
Stantec Project NO. 212205045



APPENDICES

APPENDIX A

STANTEC CONSULTING SERVICES INC. PHOTOGRAPHIC RECORD	
Client: WDEQ	**Job Number:** 212205045
Site Name: Former Lobell Refinery	**Location:** Casper, Wyoming
Photographer: CAB	**Date:** March 2014

Photograph No. 1

View of wheel mounted sewer scope/camera and support vehicle.

Photograph No. 2

View of sewer scoping of sanitary sewer lines on East 5th Street.

STANTEC CONSULTING SERVICES INC. PHOTOGRAPHIC RECORD	
Client: WDEQ	**Job Number:** 212205045
Site Name: Former Lobell Refinery	**Location:** Casper, Wyoming
Photographer: CAB	**Date:** March 2014

Photograph No. 3

View of sewer scoping control and recording center inside support vehicle.

Photograph No. 4

View of sanitary sewer lines in the basement of the 12-24 Club building.

STANTEC CONSULTING SERVICES INC. PHOTOGRAPHIC RECORD	
Client: WDEQ	**Job Number:** 212205045
Site Name: Former Lobell Refinery	**Location:** Casper, Wyoming
Photographer: CAB	**Date:** March 2014

Photograph No. 5

View of sanitary sewer lines and cleanout in the basement of the 12-24 Club building.

Photograph No. 6

View of sanitary sewer lines and cleanout in the basement of the Salvation Army building.

STANTEC CONSULTING SERVICES INC. PHOTOGRAPHIC RECORD	
Client: WDEQ	**Job Number:** 212205045
Site Name: Former Lobell Refinery	**Location:** Casper, Wyoming
Photographer: CAB	**Date:** March 2014

Photograph No. 7

View of sanitary sewer line and cleanout in the basement of the Casper Dry Cleaners building.

Photograph No. 8

View of the mobile GPR unit.

STANTEC CONSULTING SERVICES INC. PHOTOGRAPHIC RECORD	
Client: WDEQ	**Job Number:** 212205045
Site Name: Former Lobell Refinery	**Location:** Casper, Wyoming
Photographer: CAB	**Date:** March 2014

Photograph No. 9

View of sanitary sewer line running through the north basement wall of the 12-24 Club building.

Photograph No. 10

View of sewer line running through the west basement wall of the 12-24 Club building.

STANTEC CONSULTING SERVICES INC. PHOTOGRAPHIC RECORD	
Client: WDEQ	**Job Number:** 212205045
Site Name: Former Lobell Refinery	**Location:** Casper, Wyoming
Photographer: CAB	**Date:** March 2014

Photograph No. 11

View of sump on east basement wall of the 12-24 Club building.

Photograph No. 12

View of water line running through the south basement wall of the Salvation Army building.

STANTEC CONSULTING SERVICES INC. PHOTOGRAPHIC RECORD	
Client: WDEQ	**Job Number:** 212205045
Site Name: Former Lobell Refinery	**Location:** Casper, Wyoming
Photographer: CAB	**Date:** March 2014

Photograph No. 13

View of gap and packing around the water line running through the south basement wall of the Salvation Army building.

Photograph No. 14

View of sump in basement of the Salvation Army building.

STANTEC CONSULTING SERVICES INC. PHOTOGRAPHIC RECORD	
Client: WDEQ	**Job Number:** 212205045
Site Name: Former Lobell Refinery	**Location:** Casper, Wyoming
Photographer: CAB	**Date:** March 2014

Photograph No. 15

View of sanitary sewer line in the basement of the Casper Dry Cleaners building.

Photograph No. 16

View of sanitary sewer line and northeast corner of the basement of the Casper Dry Cleaners building.

STANTEC CONSULTING SERVICES INC.
PHOTOGRAPHIC RECORD

Client: WDEQ	**Job Number:** 212205045
Site Name: Former Lobell Refinery	**Location:** Casper, Wyoming
Photographer: CAB	**Date:** March 2014

Photograph No. 17

View of sanitary sewer line and piping the basement of the Casper Dry Cleaners building.

STANTEC CONSULTING SERVICES INC. PHOTOGRAPHIC RECORD	
Client: WDEQ	**Job Number:** 212205045
Site Name: Former Lobell Refinery	**Location:** Casper, Wyoming
Photographer: BJC	**Date:** May 2014

Photograph No. 1

View of installation of groundwater monitoring well MW-107.

Photograph No. 2

View of SVE Pilot Study trailer and generator.

STANTEC CONSULTING SERVICES INC.
PHOTOGRAPHIC RECORD

Client: WDEQ	**Job Number:** 212205045
Site Name: Former Lobell Refinery	**Location:** Casper, Wyoming
Photographer: BJC	**Date:** May 2014

Photograph No. 3

View of SVE Pilot Study trailer connected to SVE-1S/1D.

APPENDIX B

Run Number 1

Tabular Report of PSR CE-0935 X **for STANTEC**

Setup 1 **Surveyor** TOM **Certificate #** U-114-0619366 **System Owner** CITY OF CASPER

Drainage **Survey Customer** STANTEC

P/O # **Date** 2014/03/25 **Time** 9:00 **Street** 5TH ST.

City CASPER **Further location details**

Start CE-0930 **Rim to invert** **Grade to invert** **Rim to grade** **Ft**

Finish CE-0935 **Rim to invert** **Grade to invert** **Rim to grade** **Ft**

Use **Direction** Up **Flow control** **Media No**

Shape Circular **Height** 8 **Width** **ins** **Preclean** N **Year Cleaned**

Material Vitrified Clay Pipe **Joint length** **Ft** **Total length** **Ft** **Length Surveyed** 151.1

Lining **Year laid** **Year rehabilitated** **Weather**

Purpose **Cat** **Pressure**

Additional info

Structural O&M Constructional
Miscellaneous Hydraulic

Location

Project LOBELL REFINERY **Work Order**

Northing **Easting** **Elevation**

Coordinate System **GPS Accuracy**

Count	Video	CD	Code		In1	In2	%	Jnt	Fr	To	ImRef	Remarks
0.0			ST	Start of Survey								
0.0			AMH	Manhole								CE-0930
0.0			MWL	Water Level			5					
4.7		S01	FL	Fracture Longitudinal					12			
7.9		F01	FL	Fracture Longitudinal					12			
24.3			TF	Tap Factory	4.000				03			WEST
26.5			TF	Tap Factory	4.000				10			EAST
46.9			TF	Tap Factory	4.000				02			WEST
54.3			TFC	Tap Factory Capped	4.000				10			EAST
62.6			FM	Fracture Multiple					02	05		
64.5			HSV	Hole Soil Visible					04			
69.1			TB	Tap Break-in	4.000				12			EAST
73.5			TFC	Tap Factory Capped	4.000				02			WEST
83.2			TFC	Tap Factory Capped	4.000				10			EAST
93.5			FM	Fracture Multiple					07	12		
98.1			TF	Tap Factory	4.000				02			WEST
103.9			B	Broken				J	12			
109.1			B	Broken				J	12			
112.1			FM	Fracture Multiple				J	09	12		
113.2			TF	Tap Factory	4.000				10			EAST
123.0			TFC	Tap Factory Capped	4.000				02			WEST
139.2			JOM	Joint Offset Medium								SMALL
144.4			TB	Tap Break-in	4.000				02			WEST
148.3			TF	Tap Factory	4.000				02			WEST
148.3			MGO	General Observation								UNABLE TO SEE IF CAPPED
148.3			MGO	General Observation								DUE TO WATER LEVEL
150.1			MCU	Camera Underwater								
150.3			DSF	Deposits Settled Fine			5		06			
151.1			MGO	General Observation								DEBRIS TO THICK IN LINE
151.1			MGO	General Observation								CAMERA UNABLE TO CONTINUE
151.1			MSA	Abandoned Survey								CAMERA UNABLE TO CONTINUE

Run Number 1

Tabular Report of PSR CE-0935 X **for STANTEC**

Setup 1 **Surveyor** TOM **Certificate #** U-114-0619366 **System Owner** CITY OF CASPER

Drainage	**Survey Customer** STANTEC			
P/O #	**Date** 2014/03/25	**Time** 9:00	**Street** 5TH ST.	
City CASPER	**Further location details**			
Start CE-0930	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Finish CE-0935	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Use	**Direction** Up	**Flow control**	**Media No**	
Shape Circular	**Height** 8 **Width**	**ins** **Preclean** N	**Year Cleaned**	
Material Vitrified Clay Pipe	**Joint length**	**Ft** **Total length**	**Ft** **Length Surveyed** 151.1	
Lining	**Year laid**	**Year rehabilitated**	**Weather**	
Purpose	**Cat**		**Pressure**	
Additional info		Structural O&M Constructional		
Location		Miscellaneous Hydraulic		
Project LOBELL REFINERY		**Work Order**		
Northing	**Easting**	**Elevation**		
Coordinate System		**GPS Accuracy**		

151.1 **Ft** **Total Length Surveyed**

Scores

Structural:	**Total** 30	**Mean Defect** 3.3	**Peak** 5	**Mean Pipe** 0.2
Service:	**Total** 6	**Mean Defect** 1.5	**Peak** 4	**Mean Pipe** 0

Run Number 2

Tabular Report of PSR CE-1015 X **for STANTEC**

Setup 2 **Surveyor** TOM **Certificate #** U-114-0619366 **System Owner** CITY OF CASPER

Drainage **Survey Customer** STANTEC
P/O # **Date** 2014/03/25 **Time** 9:42 **Street** 5TH ST.
City CASPER **Further location details**

Start CE-0930 **Rim to invert** **Grade to invert** **Rim to grade** **Ft**
Finish CE-1015 **Rim to invert** **Grade to invert** **Rim to grade** **Ft**

Use **Direction** Up **Flow control** **Media No**
Shape Circular **Height** 8 **Width** **ins** **Preclean** N **Year Cleaned**
Material Vitrified Clay Pipe **Joint length** **Ft** **Total length** **Ft** **Length Surveyed** 168.4
Lining **Year laid** **Year rehabilitated** **Weather**
Purpose **Cat** **Pressure**

Additional info
Location
Project LOBELL REFINERY
Northing **Easting** **Elevation**
Coordinate System **GPS Accuracy**

Structural O&M Constructional
Miscellaneous Hydraulic

Work Order

Count	Video	CD	Code		In1	In2	%	Jnt	Fr	To	ImRef	Remarks
0.0			ST	Start of Survey								
0.0			AMH	Manhole								CE-0930
0.0			MWL	Water Level			5					
4.5		S01	DAZ	Deposits Attached Other			5		12			
5.1			HSV	Hole Soil Visible				J	12			
5.9			TF	Tap Factory	4.000				02			NORTH
10.1			B	Broken					12			
10.3			HVV	Hole Void Visible					01			
10.3			MGO	General Observation								SMALL PIPE THRU HOLE
13.5			HSV	Hole Soil Visible					09			
37.7			DSF	Deposits Settled Fine			5		06			
40.0			TBA	Tap Break-in Active	4.000				02			NORTH
57.5			TB	Tap Break-in	4.000				02			NORTH
161.7			MMC	Material change								CHANGE TO PVC
168.4			DSF	Deposits Settled Fine			5		06			
168.4			MGO	General Observation								CAMERA UNABLE TO CONTINUE
168.4			MGO	General Observation								DUE TO DEBRIS
168.4		F01	DAZ	Deposits Attached Other			5		12			
168.4			MSA	Abandoned Survey								CAMERA UN ABLE TO CONTINUE

168.4 **Ft** **Total Length Surveyed**

Scores

Structural:	**Total** 18	**Mean Defect** 4.5	**Peak** 5	**Mean Pipe** 0.1
Service:	**Total** 72	**Mean Defect** 2	**Peak** 4	**Mean Pipe** 0.4

Run Number 3

Tabular Report of PSR CE-0930 X **for STANTEC**

Setup 3 **Surveyor** TOM **Certificate #** U-114-0619366 **System Owner** CITY OF CASPER

Drainage **Survey Customer** STANTEC
P/O # **Date** 2014/03/25 **Time** 10:13 **Street** 5TH ST.
City CASPER **Further location details**

Start CE-0930 **Rim to invert** **Grade to invert** **Rim to grade** **Ft**
Finish CE-0925 **Rim to invert** **Grade to invert** **Rim to grade** **Ft**

Use **Direction** Down **Flow control** **Media No**
Shape Circular **Height** 8 **Width** **ins** **Preclean** N **Year Cleaned**
Material Vitrified Clay Pipe **Joint length** **Ft** **Total length** 173.2 **Ft** **Length Surveyed** 173.2
Lining **Year laid** **Year rehabilitated** **Weather**
Purpose **Cat** **Pressure**

Additional info
Location
Project LOBELL REFINERY
Northing **Easting** **Elevation**
Coordinate System **GPS Accuracy**

Structural O&M Constructional
Miscellaneous Hydraulic
Work Order

Count	Video	CD	Code		In1	In2	%	Jnt	Fr	To	ImRef	Remarks
0.0			ST	Start of Survey								
0.0			AMH	Manhole								CE-0930
0.0			MWL	Water Level			5					
30.8			H	Hole				J	12			
33.1			FM	Fracture Multiple				J	10	01		
34.2			TFC	Tap Factory Capped	4.000				09			NORTH
35.3			TB	Tap Break-in	4.000				09			NORTH
41.1			FL	Fracture Longitudinal					12			
50.7			FM	Fracture Multiple					07	05		
56.1			B	Broken					12			
62.5			CL	Crack Longitudinal					09			
63.6			FM	Fracture Multiple				J	08	05		
64.0			HSV	Hole Soil Visible					12			
66.7			HSV	Hole Soil Visible					04			
66.8			B	Broken					04			
67.0			TB	Tap Break-in	4.000				02			SOUTH
72.5			TFA	Tap Factory Active	4.000				10			NORTH
76.2			B	Broken				J	12			
76.2			FM	Fracture Multiple				J	11	03		
81.4			CC	Crack Circumferential				J	09	11		
83.7			FM	Fracture Multiple				J	01	04		
84.2			B	Broken					02			
86.5			B	Broken					03			
89.2			FM	Fracture Multiple					08	10		
91.5			FM	Fracture Multiple					08	02		
94.3			FM	Fracture Multiple				J	01	05		
98.7			TB	Tap Break-in	4.000				10			NORTH
98.7			B	Broken					12			TOP OF TAP
99.5			FC	Fracture Circumferential				J	07	11		
101.9			FM	Fracture Multiple				J	12	05		
110.5			TF	Tap Factory	4.000				10			NORTH

Run Number 3

Tabular Report of PSR CE-0930 X **for STANTEC**

Setup 3 **Surveyor** TOM **Certificate #** U-114-0619366 **System Owner** CITY OF CASPER

Drainage **Survey Customer** STANTEC
P/O # **Date** 2014/03/25 **Time** 10:13 **Street** 5TH ST.
City CASPER **Further location details**

Start CE-0930 **Rim to invert** **Grade to invert** **Rim to grade** **Ft**
Finish CE-0925 **Rim to invert** **Grade to invert** **Rim to grade** **Ft**

Use **Direction** Down **Flow control** **Media No**
Shape Circular **Height** 8 **Width** **ins** **Preclean** N **Year Cleaned**
Material Vitrified Clay Pipe **Joint length** **Ft** **Total length** 173.2 **Ft** **Length Surveyed** 173.2
Lining **Year laid** **Year rehabilitated** **Weather**
Purpose **Cat** **Pressure**

Additional info
Location
Project LOBELL REFINERY
Northing **Easting** **Elevation**
Coordinate System **GPS Accuracy**

Structural O&M Constructional
Miscellaneous Hydraulic

Work Order

Count	Video	CD	Code		In1	In2	%	Jnt	Fr	To	ImRef	Remarks
117.0			B	Broken					03			
122.8			TBA	Tap Break-in Active	4.000				02			SOUTH
151.1			TF	Tap Factory	4.000				10			NORTH
164.8			MMC	Material change								CHANGE TO PVC
173.2			AMH	Manhole								CE-0925
173.2			FH	End of Survey								

173.2 **Ft** **Total Length Surveyed**

Scores

Structural:	**Total** 78	**Mean Defect** 3.4	**Peak** 7	**Mean Pipe** 0.5
Service:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0

Run Number 4

Tabular Report of PSR 2848 X **for STANTEC**

Setup 4 **Surveyor** TOM **Certificate #** U-114-0619366 **System Owner** CITY OF CASPER

Drainage	**Survey Customer** STANTEC		
P/O #	**Date** 2014/03/25 **Time** 11:32	**Street** E. COLLINS DR.	
City CASPER	**Further location details**		
Start 1258	**Rim to invert**	**Grade to invert**	**Rim to grade** **Ft**
Finish 2848	**Rim to invert**	**Grade to invert**	**Rim to grade** **Ft**
Use	**Direction** Up	**Flow control**	**Media No**
Shape Circular	**Height** 36 **Width**	**ins** **Preclean** N	**Year Cleaned**
Material Reinforced Concrete Pipe	**Joint length** **Ft**	**Total length** **Ft**	**Length Surveyed** 77.4
Lining	**Year laid**	**Year rehabilitated**	**Weather**
Purpose	**Cat**		**Pressure**
Additional info		Structural O&M Constructional	
Location		Miscellaneous Hydraulic	
Project LOBELL REFINERY			**Work Order**
Northing	**Easting**	**Elevation**	
Coordinate System		**GPS Accuracy**	

Count	Video		CD	Code		In1	In2	%		Jnt	Fr	To		ImRef	Remarks
0.0				ST	Start of Survey										
0.0				AMH	Manhole										1258
0.0				MWL	Water Level			5							
77.4				DSGV	Deposits Settled Gravel			10			06				
77.4				MSA	Abandoned Survey										CAMERA UNABLE TO CONTINUE

77.4 **Ft** **Total Length Surveyed**

Scores

Structural:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0
Service:	**Total** 2	**Mean Defect** 2	**Peak** 2	**Mean Pipe** 0

Run Number 5

Tabular Report of PSR 1250 X **for STANTEC**

Setup 5 **Surveyor** TOM **Certificate #** U-114-0619366 **System Owner** CITY OF CASPER

Drainage **Survey Customer** STANTEC
P/O # **Date** 2014/03/25 **Time** 12:56 **Street** E. COLLINS DR.
City CASPER **Further location details**

Start 356 **Rim to invert** **Grade to invert** **Rim to grade** **Ft**
Finish 1250 **Rim to invert** **Grade to invert** **Rim to grade** **Ft**

Use **Direction** Up **Flow control** **Media No**
Shape Circular **Height** 54 **Width** **ins** **Preclean** N **Year Cleaned**
Material Corrugated Metal Pipe **Joint length** **Ft** **Total length** 426.9 **Ft** **Length Surveyed** 426.9
Lining **Year laid** **Year rehabilitated** **Weather**
Purpose **Cat** **Pressure**

Additional info
Location
Project LOBELL REFINERY
Northing **Easting** **Elevation**
Coordinate System **GPS Accuracy**

Structural O&M Constructional
Miscellaneous Hydraulic
Work Order

Count	Video	CD	Code		In1	In2	%	Jnt	Fr	To	ImRef	Remarks
0.0			ST	Start of Survey								
0.0			AMH	Manhole								356
0.0			MWL	Water Level			5					
12.8			DSF	Deposits Settled Fine			5		06			
40.9			MGO	General Observation								TWO INLETS FROM THE 10
51.1			MGO	General Observation								CAPPED INLET
403.8			MGO	General Observation								INLET FROM THE 10
426.9			AMH	Manhole								1250
426.9			FH	End of Survey								

426.9 **Ft** **Total Length Surveyed**

Scores

Structural:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0
Service:	**Total** 2	**Mean Defect** 2	**Peak** 2	**Mean Pipe** 0

Run Number 6

DRC Construction Services, Inc.

4100 Rio Grande Ave
PO Box 640
Sedalia, CO 80135
(303) 688-2166 (p)
(303) 688-4740 (f)

Video Inspection Log

Surveyor: Tom Date: March 25, 2014

Project Owner/Client: Stantec – Salvation Army - Casper, WY

Address/Location: Salvation Army Basement – Casper, WY

Pipe Plan Length: N/A Field Length: N/A Data View Length: 44.1

Pipe Size: 4" Pipe Material: PVC

Depth to Invert: N/A Direction(US/DS): DS

Comments:

FOOTAGE	OBSERVATION	DESCRIPTION/COMMENTS
0.0	CO	Cleanout in Basement of Salvation Army
3.1	Debris	Settled in bottom of pipe, holding water
6.3	PAC	Pipe Alignment Change – To the Left
8.8	PAC	Pile Alignment Change – To the Right
34.1	Debris	Debris settled in line
44.1	TFA	Connection to Mainline

Run Number 7

DRC Construction Services, Inc.

4100 Rio Grande Ave
PO Box 640
Sedalia, CO 80135
(303) 688-2166 (p)
(303) 688-4740 (f)

Video Inspection Log

Surveyor: TOM Date: 3/26/2014

Project Owner/Client: STANTEC

Address/Location: BASEMENT OF DRY CLEANERS – CASPER, WY

Pipe Plan Length: n/a Field Length: Data View Length: 46.1

Pipe Size: 4” Pipe Material: VCP

Depth to Invert: N/A Direction(US/DS): DS

Comments:

FOOTAGE	OBSERVATION	DESCRIPTION/COMMENTS
0.0	C.O.	CLEANOUT IN BASEMENT
2.0	DAE	DEPOSITS/ATTACHED ENCRUSTATION
23.3	PMC	PIPE MATERIAL CHANGE – TO CAST IRON
23.3	PAC	PIPE ALIGNMENT CHANGE – DEFLECTS DOWN
32.2	PMC	PIPE MATERIAL CHANGE – TO VCP
32.2	OJM	OFFSET JOINT - MEDIUM
46.1	MAIN	CONNECTION TO MAIN LINE – END SURVEY

APPENDIX C

Monday, April 07, 2014

Nick Pitrone
Project Manager

Stantec Consulting
2000 South Colorado Boulevard Suite 2-300, Denver, CO 80222
P: 303.758.4058
M: 970.214.1126

Subject: Geophysical Survey for USTs and Utilities.

Table of Contents

1. Overview of GPR

Ground Penetrating Radar (GPR), also known as surface penetrating radar, is a technology that sends radar pulses into the surface and reflects back off of anomalies below. As the radar pulses pass through differing materials, the radar reflects back to the surface off of anomalies. The anomalies can be interpreted as steel pipes, PVC conduits, underground storage tanks, voids, ect. One of the many advantages of the technology is the ability to locate non-metallic objects as well as determining depth to the object. GPR data acquisition is very fast with immediate results. It is common for an experienced technician to survey a very large area in a day. Although sometimes confused with X-Ray, GPR uses no radiation emissions and is perfectly safe to work with human presence in close proximity.

Figure 1 - GSSI 400 MHz antenna

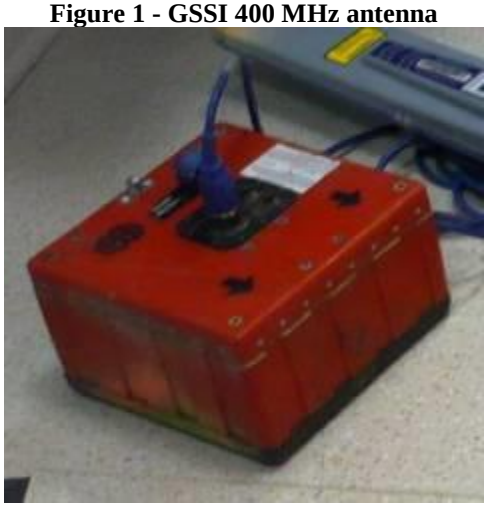


Figure 2 - GSSI SIR-3000 GPR

2. Equipment and Capabilities

Ground Penetrating Radar (GPR)

- **GSSI SIR – 3000 (fig. 2)**
  - We use a Geophysical Survey Systems Inc (GSSI) SIR-3000 Radar unit. This is the most advanced GPR available. It allows for onsite interpretation, as well as stores data for later processing. This equipment is self-calibrating (see figure 3), allowing more precise depth and location measurements.
  - GSSI is a leading GPR designer and manufacturer. Information can be found at www.geophysical.com
- **400 MHz GSSI antenna (fig. 1)**
  - For this project, we used a 400 MHz antenna with the GPR. This antenna allows data collection to depths of 8'in the Athens, Georgia area. The signal reflects on all objects which are a different conductivity from the substrate (dirt). This reflection is what allows us to "see" objects.

15 May 2006

To Whom It May Concern:

GSSI Radar Controller units and Antennas do not require factory calibration. There are no calibration certificates available. These units have been designed to self-calibrate automatically each time the unit is turned on.

GSSI recommends that Radar Controller units and Antennas be tested every three years to ensure that they meet published performance specifications. To ensure safe and accurate testing, a certified GSSI test system must be used.

Scott Ratté
Field Service & Rental Manager

Geophysical Survey Systems, Inc.

12 Industrial Way
Salem, NH 03079

Tel 603.893.1109 • Fax 603-889-3984
www.geophysical.com • sales@geophysical.com

Figure 3

3. Photos and Maps

Aerial photo of scan area and findings.

4. GPR Data Shots

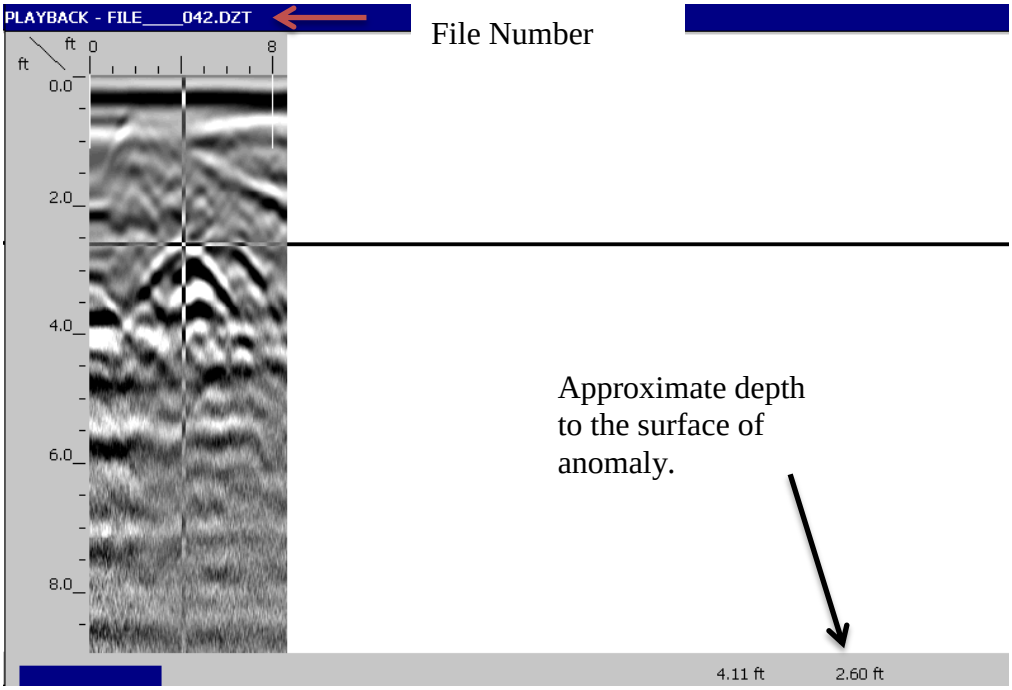
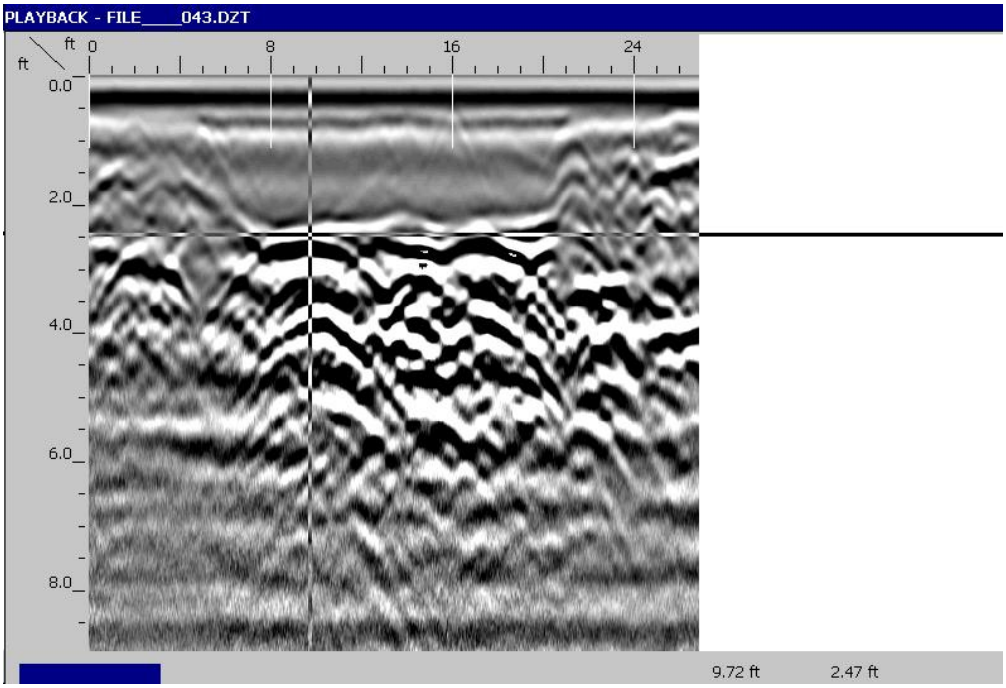
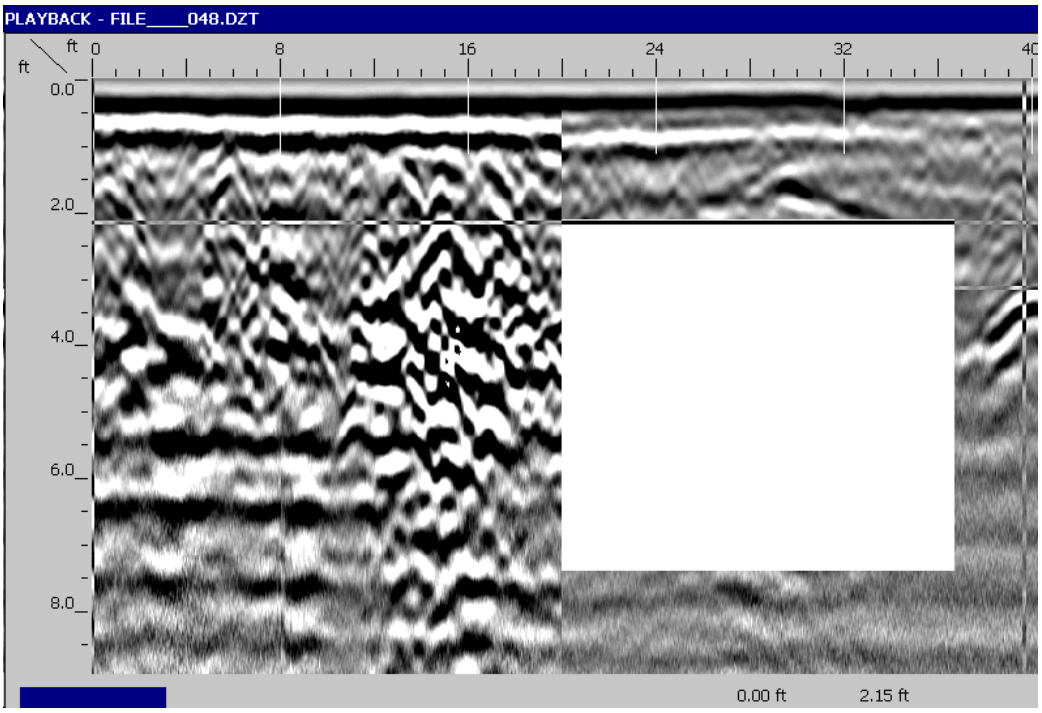


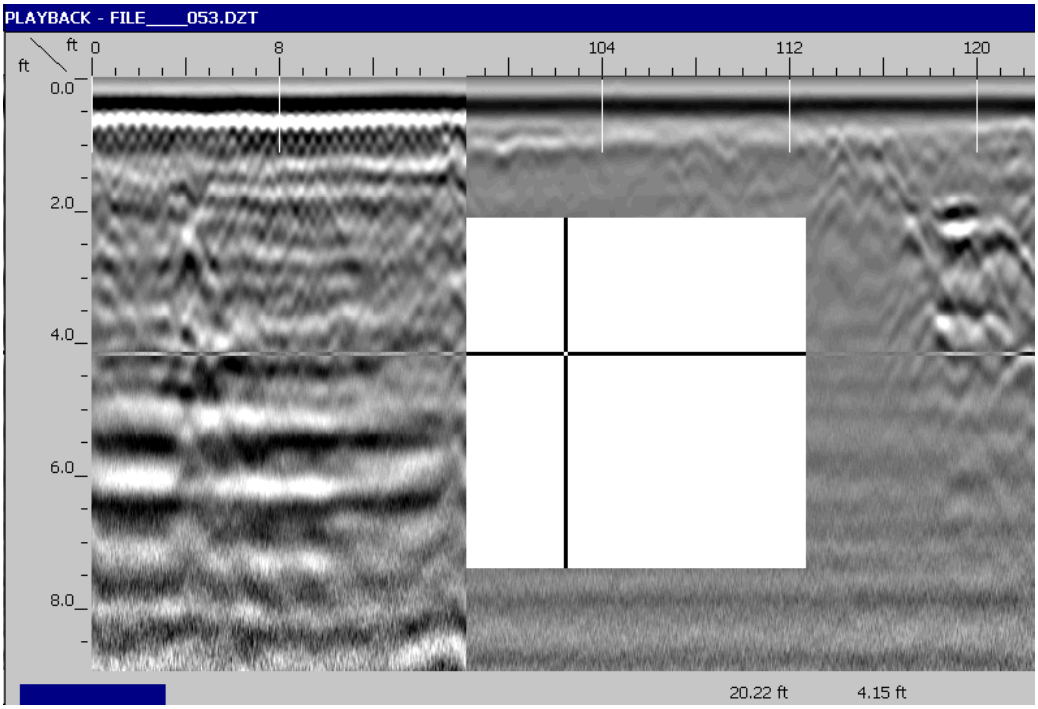
Photo of area running West to East just ahead of known UST's on North side of building on E Collins Dr. Anomaly is at approximately 2.6ft depth and is running in line with gas meter. File 042.



Data from area of known UST's running East to West on North side of building with approximate depth to surface of anomaly. File 043



Data from first proposed area of sewer line running from cleaners on the south side of building running along 5th Street. GPR was unable to detect sewer line and Radio Detection was unable to set a tone on pipe. Pipe was field verified in basement of cleaners. Further investigation may be necessary. File 048



GPR Data from second proposed sewer line area on the north side of building running along 5th street. GPR was unable to locate sewer line running from building. File 053

5. Results/Analysis

The purpose of this geophysical survey was to determine the presence of Underground Storage Tanks (USTs), known or unknown as well as utilities, specifically sewer lines running from buildings to street.

The property was scanned using GPR equipment and a Radio Detection unit. This scanning process revealed several known UST's on the North side of the building running on E Collins Dr. These were marked in pink paint as known in the field notes. Upon further investigation no other similar anomalies were located in area. While investigating the perimeter of buildings running along 5th street GPR was unable to locate sewer lines running from buildings to street. Also while using the Radio Detection several utilities were detected and marked out.

6. Site Description

Site: 5th street and Center street, Casper, WY 82601

Date: 3/25/2014

Time: All Day

Weather: Dry warm weather and clear skies. Slightly windy.

Scanning conditions: Wet and snow packed on North side of buildings but dry and warm in all other areas.

7. Qualifications

Ground Penetrating Radar Systems, Inc. (GPRS) was started in October 2001, by Matt Aston. The original intention in starting this business was to give contractors a reliable way to "see" into concrete slabs in order to avoid cutting embedded electrical conduits and critical reinforcing steel. While GPRS performs this work on a regular basis, there are many other applications in which we use Ground Penetrating Radar to benefit our customer base.

In the past four years, GPRS has completed over 5,000 jobs as a company. In 2011, 89% of the work GPRS performed was either repeat business or business that we were referred by one of our customers. We are proud of this number and believe it speaks to the level of satisfaction our customers have with the type of service we perform.

All of our technicians are GPR certified by GSSI and have gone through extensive training with a GPRS senior technician. Our technicians also are PTI Level 1 certified.

8. Closing

Thank you for the opportunity to serve you on this project. I hope this report has answered all the questions you had regarding this survey. However if there is anything you have questions about or feel was omitted, please do not hesitate to call.

Thank you,

Nick Pitrone
GPRS
Project Manager
Colorado|Wyoming
Direct 303.656.6536
Fax 419.843.5829
Nick.pitrone@gp-radar.com

www.gp-radar.com

APPENDIX D

PROJECT: **WDEQ-Former Lobell Refinery**
LOCATION: **East Collins Dr., Casper, WY**
PROJECT NUMBER: **212205045**

WELL / PROBEHOLE / BOREHOLE NO: **MW-107**
PAGE 1 OF 2

Stantec

DRILLING: STARTED **5/19/14** COMPLETED: **5/19/14**
INSTALLATION: STARTED COMPLETED:
DRILLING COMPANY: **DrillPro Services**
DRILLING EQUIPMENT: **Diedrich D120**
DRILLING METHOD: **hollow stem auger**
SAMPLING EQUIPMENT: **split spoon**

NORTHING (ft): EASTING (ft):
LATITUDE: LONGITUDE:
GROUND ELEV (ft): TOC ELEV (ft):
INITIAL DTW (ft): **28** BOREHOLE DEPTH (ft): **49**
STATIC DTW (ft): **22.88** WELL DEPTH (ft): **49**
WELL CASING DIAMETER (in): **2** BOREHOLE DIAMETER (in): **8**
LOGGED BY: **B.Collins** CHECKED BY: **C.Beall**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction
			Asphalt, 6" thick Waterknifed to 5' bgs							Concrete
14:54 5		SW	**SAND** ; SW; tan; medium-grained; loose; moist; no odor; no staining; weak cementation; well graded			1.16/2	1 3 3 4	10.1	5	2" SCH40 PVC Blank casing
15:02 10		SW	**SAND** ; SW; tan; medium-grained; loose; moist; no odor; weak cementation; well graded; black staining			1.33/2	4 5 9 10	0.0	10	
15:07		SW	**SAND** ; SW; tan; medium-grained; loose; moist; no odor; no staining; weak cementation; well graded			1.2/2	10 11 15 15		15	
15:14		SW	**SAND** ; SW; tan; medium-grained; loose; moist; no odor; no staining; weak cementation; well graded			1.33/2	11 23 50/6"	0.0	20	Hydrated bentonite chips
15:20		SW	**SAND** ; SW; tan to brown; medium-grained; no odor; no staining; weak cementation; well graded			1.33/2	3 9 24 50/3"	2.8	25	

GEO FORM 304 LOBELL-MW107-108_SVE1-STAN2_LIB.GPJ STANTEC ENVIRO TEMPLATE 010509.GDT 7/8/14

PROJECT: **WDEQ-Former Lobell Refinery**
LOCATION: **East Collins Dr., Casper, WY**
PROJECT NUMBER: **212205045**

WELL / PROBEHOLE / BOREHOLE NO: **MW-107**
PAGE 2 OF 2

Stantec

DRILLING: STARTED **5/19/14** COMPLETED: **5/19/14**
INSTALLATION: STARTED COMPLETED:
DRILLING COMPANY: **DrillPro Services**
DRILLING EQUIPMENT: **Diedrich D120**
DRILLING METHOD: **hollow stem auger**
SAMPLING EQUIPMENT: **split spoon**

NORTHING (ft):
EASTING (ft):
LATITUDE:
LONGITUDE:
GROUND ELEV (ft):
TOC ELEV (ft):
INITIAL DTW (ft): **28**
BOREHOLE DEPTH (ft): **49**
STATIC DTW (ft): **22.88**
WELL DEPTH (ft): **49**
WELL CASING DIAMETER (in): **2**
BOREHOLE DIAMETER (in): **8**
LOGGED BY: **B.Collins**
CHECKED BY: **C.Beall**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction
		SW								
15:36		SW	**SAND** ; SW; tan to light brown; medium-grained; wet; no odor; weak cementation; well graded; red and dark brown staining @29': flowing sand			1.33/2	9 8 12 14	0.0		2" SCH40 PVC 0.010" Slotted screen
30									30	
35									35	
40									40	10/20 silica sand
45									45	
			Borehole terminated at 49 feet.							
50									50	

GEO FORM 304 LOBELL-MW107-108_SVE1-STAN2_LIB.GPJ STANTEC ENVIRO TEMPLATE 010509.GDT 7/8/14

PROJECT: **WDEQ-Former Lobell Refinery**
LOCATION: **East Collins Dr., Casper, WY**
PROJECT NUMBER: **212205045**

WELL / PROBEHOLE / BOREHOLE NO: **MW-108**
PAGE 1 OF 2

Stantec

DRILLING: STARTED **5/20/14** COMPLETED: **5/20/14**
INSTALLATION: STARTED COMPLETED:
DRILLING COMPANY: **DrillPro Services**
DRILLING EQUIPMENT: **Diedrich D120**
DRILLING METHOD: **hollow stem auger**
SAMPLING EQUIPMENT: **split spoon**

NORTHING (ft): EASTING (ft):
LATITUDE: LONGITUDE:
GROUND ELEV (ft): TOC ELEV (ft):
INITIAL DTW (ft): **25** BOREHOLE DEPTH (ft): **30**
STATIC DTW (ft): **22.28** WELL DEPTH (ft): **29.5**
WELL CASING DIAMETER (in): **2** BOREHOLE DIAMETER (in): **8**
LOGGED BY: **B.Collins** CHECKED BY: **C.Beall**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction
			Asphalt, 6" thick Waterknifed to 5' bgs							Concrete
9:21 5		SC	**CLAYEY SAND** ; SC; tan to dark brown; fine to medium-grained; medium dense; moist; no odor; moderate cementation; well graded; red staining			1.16/2	2 4 4 5	15.1	5	2" SCH40 PVC Blank casing
9:31 10		SC	**CLAYEY SAND** ; SC; tan to brown; fine to medium-grained; medium dense; moist; no odor; moderate cementation; well graded; red staining			1.5/2	1 4 5 7	12.6	10	Hydrated bentonite chips
9:42 15		SW	**SAND WITH GRAVEL** ; SW; white to brown; loose; moist; no odor; no staining; weak cementation; well graded			1.16/2	5 11 16 20	8.6	15	
9:51 20		SW	**SAND** ; SW; tan to brown; medium-grained; loose; moist; no odor; no staining; weak cementation; well graded			0.94/2	12 22 50/3"	3.3	20	10/20 silica sand
25		SM	**SILTY SAND WITH GRAVEL** ; SM; tan to brown; loose; wet; no odor; no staining; weak						25	

GEO FORM 304 LOBELL-MW107-108_SVE1-STAN2_LIB.GPJ STANTEC ENVIRO TEMPLATE 010509.GDT 7/8/14

PROJECT: **WDEQ-Former Lobell Refinery**
LOCATION: **East Collins Dr., Casper, WY**
PROJECT NUMBER: **212205045**

WELL / PROBEHOLE / BOREHOLE NO: **MW-108**
PAGE 2 OF 2

Stantec

DRILLING: STARTED **5/20/14** COMPLETED: **5/20/14**
INSTALLATION: STARTED COMPLETED:
DRILLING COMPANY: **DrillPro Services**
DRILLING EQUIPMENT: **Diedrich D120**
DRILLING METHOD: **hollow stem auger**
SAMPLING EQUIPMENT: **split spoon**

NORTHING (ft):
EASTING (ft):
LATITUDE:
LONGITUDE:
GROUND ELEV (ft):
TOC ELEV (ft):
INITIAL DTW (ft): **25**
BOREHOLE DEPTH (ft): **30**
STATIC DTW (ft): **22.28**
WELL DEPTH (ft): **29.5**
WELL CASING DIAMETER (in): **2**
BOREHOLE DIAMETER (in): **8**
LOGGED BY: **B.Collins**
CHECKED BY: **C.Beall**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction
		SM	cementation; well graded							
30			Borehole terminated at 30 feet.						30	2" SCH40 PVC 0.010" Slotted screen
35									35	
40									40	
45									45	
50									50	

GEO FORM 304 LOBELL-MW107-108_SVE1-STAN2_LIB.GPJ STANTEC ENVIRO TEMPLATE 010509.GDT 7/8/14

PROJECT: **WDEQ-Former Lobell Refinery**
LOCATION: **East Collins Dr., Casper, WY**
PROJECT NUMBER: **212205045**

WELL / PROBEHOLE / BOREHOLE NO: **SVE-1**
PAGE 1 OF 1

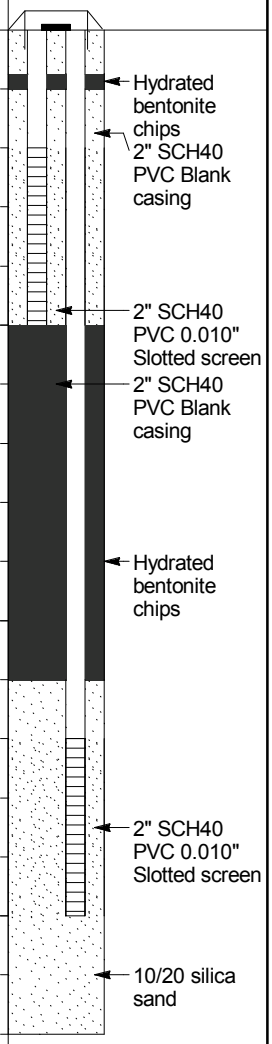
Stantec

DRILLING: STARTED **5/20/14** COMPLETED: **5/20/14**
INSTALLATION: STARTED COMPLETED:
DRILLING COMPANY: **DrillPro Services**
DRILLING EQUIPMENT: **Diedrich D120**
DRILLING METHOD: **hollow stem auger**
SAMPLING EQUIPMENT: **split spoon**

NORTHING (ft): EASTING (ft):
LATITUDE: LONGITUDE:
GROUND ELEV (ft): TOC ELEV (ft):
INITIAL DTW (ft): **Not Encountered** BOREHOLE DEPTH (ft): **17**
STATIC DTW (ft): **Not Encountered** WELL DEPTH (ft): **5/15**
WELL CASING DIAMETER (in): **2** BOREHOLE DIAMETER (in): **8**
LOGGED BY: **B.Collins** CHECKED BY: **C.Beall**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)
			Asphalt, 6" thick						
			Waterknifed to 5' bgs						
5		SW	**SAND** ; SW; tan to dark brown; medium-grained; loose; moist; no odor; no staining; weak cementation; well graded			1.9/2	15 20 20 23	34.3	5
10		SW	**SAND** ; SW; tan to light brown; medium-grained; loose; moist; no odor; weak cementation; well graded; black staining			1.4/2	9 13 16 20	33.0	10
15		SW	**SAND** ; SW; tan to brown; medium-grained; loose; moist; no odor; no staining; weak cementation; well graded			1.5/2	17 25 50/6"	25.1	15
			Borehole terminated at 17 feet.						
20									20
25									25

Well Construction



GEO FORM 304 LOBELL-MW107-108_SVE1-STAN2_LIB.GPJ STANTEC ENVIRO TEMPLATE 010509.GDT 7/8/14

APPENDIX E

Dual Phase Extraction System

Rotary Claw Blower w/Oil/Water Seperator/Air Stripper
Bag filter/Carbon adsorbers/Air Sparge Blower
& Diesel generator

Unit#75

Environmental Treatment Specialists

General Specifications:	5 GPM water treatment 300 ACFM @ 20" Hg Vacuum 125 ACFM @ 25 PSI Sparge Pressure
Trailer:	8ft wide x 32 ft long x 8 ft height 21,000 pound triple axle trailer
Main Equipment:	15 Hp Rietschle Rotary Claw Extraction blower 120 gallon knock out tank w/clean out port 5 GPM XP ¾ Hp Moyno pump 10 GPM Oil/Water Separator 55 gallon product collection drum 10 GPM XP ½ Hp water transfer pump 10 GPM Air stripper with blower 10 GPM XP 1Hp transfer pump 2 - LCO8 Rosedale Bag Filters 2-800 pound granular activated carbon adsorbers 15 Hp Rietschle Rotary Claw Sparge blower Totalizing air flow meter for both Extracted and Sparge air Totalizing water Flow meter Vacuum & Pressure gauges, sample ports
Trailer Specifications:	XP Lights, heater and fan in equipment room Components in equipment room wired for XP Non XP lights and control panel in control room Outside light
Control Panel:	ProControl computer controlled PLC (Program Logic controller) Cell phone communication package w/PLC for alarms and data acquisition HAO switch – all components Emergency stop button Fault lights and reset GFI
Inlet Hose Connection:	5- well vacuum manifold including site glass, flow meter, vacuum gauge, flow control valve 2" camlock
Outlet Hose Connection:	4" air stack for LRP (18 Ft. high) Vapors can be plumbed for off-gas treatment 1" male camlock water discharge 5-well sparge manifold including flow meter, pressure gauge, flow control valve 1" camlock
Power Requirements:	230 Volt, 3 phase, 100 Amp services (Main fused disconnect located outside trailer) 55 KW Diesel power generator

ProAct Services Corporation

Corp Office: 231-843-2711
Gulf Coast: 210-862-6467
or 713-202-6351
Midwest Office: 231-342-1115
East Coast Office: 203-262-1200

www.proact-usa.com

Texas ● Colorado ● Michigan ● New Jersey ● Connecticut

APPENDIX F

1400392571 SC PPW 12/11/2013

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
WYD035994052	1	(800) 483-3718	007502706 FLE

GENERATOR

5. Generator's Name and Mailing Address
Wyoming Department of Environmental Quality
120 East 5th Street
Casper, WY 82601
Generator's Phone: (307) 777-2949

Generator's Site Address (if different than mailing address)
SAME

6. Transporter 1 Company Name
Clean Harbors Environmental Services Inc

U.S. EPA ID Number
MAD039322250

7. Transporter 2 Company Name

U.S. EPA ID Number

8. Designated Facility Name and Site Address
Clean Harbors Env Services Inc
2247 South Highway 71
Kimball, NE 69145
Facility's Phone: (308) 235-4012

U.S. EPA ID Number
NED981723513

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
X	1. NA3082, HAZARDOUS WASTE, LIQUID, N.O.S., (TETRACHLOROETHENE), 9, PG III	1	TP	20	G	F002		
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
1. CH6922778 ERG#171 / VTSC 2

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name | Signature | Month | Day | Year

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: TRUE AJAESON | Signature | Month: 12 | Day: 23 | Year: 14

Transporter 2 Printed/Typed Name | Signature | Month | Day | Year

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator) | U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator) | Month | Day | Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
H040			

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name | Signature | Month | Day | Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

TRANSPORTER'S COPY

Clean Harbors has the appropriate permits for and will accept the waste the generator is shipping.

Clean Harbors
ENVIRONMENTAL SERVICES

Land Disposal Restriction Notification Form

Printed Date :May 19, 2014

MANIFEST INFORMATION

Generator : Wyoming Department of Environmental Quality

Address: 120 East 5th Street
Casper,WY 82601

EPA ID #: WYD035994052

Manifest Tracking Info.

007502706FLE

Sales Order No: 1400392571

LINE ITEM INFORMATION

Line Item:	Page No:	Profile No:	Treatability Group:	LDR Disposal Category
1.	1	CH692277B	NON-WASTEWATER	2 (This is subject to LDR.)

EPA Waste Code	EPA Waste SubCategory
F002	NONE

LDR Chemical Data

Chemical	Underlying Hazardous Constituents	Constituents of Concern	Contaminants Subject to Treatment
TETRACHLOROETHYLENE	N	Y	N

Certification

	Applies to Manifest Line Items
Pursuant to 40 CFR 268.7(a), I hereby notify that this shipment contains waste restricted under 40 CFR Part 268.	1.

Waste analysis data, where available, is attached.

Signature : Cindi Martinez

Print Name Cindi Martinez

Title : Program Principal

Date : May 20, 2014

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) 1400392571 SC PPW 12/11/2013 Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: WYD035994052
2. Page 1 of: 1
3. Emergency Response Phone: (800) 483-3718
4. Manifest Tracking Number: 007502705 FLE

GENERATOR

5. Generator's Name and Mailing Address
Wyoming Department of Environmental Quality
120 East 5th Street
Casper, WY 82601
Generator's Phone: (307) 777-2948

Generator's Site Address (if different than mailing address): SAME

6. Transporter 1 Company Name: Clean Harbors Environmental Services Inc
U.S. EPA ID Number: MAD039322250

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Clean Harbors Deer Trail LLC
108556 East Highway 36
Deer Trail, CO 80105
Facility's Phone: (970) 386-2293
U.S. EPA ID Number: COD991300484

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
	1. NON-REGULATED SOLID. (SOIL)	9	DM	4500	P	
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
1.CH701150

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name | Signature | Month: 5 | Day: 12 | Year: 14

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: RICK ANDERSON | Signature | Month: 5 | Day: 23 | Year: 14

Transporter 2 Printed/Typed Name | Signature | Month | Day | Year

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator) | U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator) | Month | Day | Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
H132			

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name | Signature | Month | Day | Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

TRANSPORTER'S COPY

Clean Harbors has the appropriate permits for and will accept the waste the generator is shipping.

APPENDIX G

ChemSolutions

7388 S. Revere Parkway #806
Centennial, CO 80112
303.771.5570

June 5, 2014

Russ Cirillo
Stantec Consulting
2000 South Colorado Blvd.
Suite 2-300
Denver, CO 80222

RE: STN115

Dear Russ,

Enclosed please find the analytical results for the Project #212205045 water samples collected on 5/22-5/23/14.

Tables 1-15 contain the analytical results for the samples. The quality control samples are summarized in Tables 16-18.

Thank you for the opportunity to work on this project. Please call if you have any questions. The invoice will follow shortly.

Sincerely,

John Graves
Laboratory Director
ChemSolutions LLC

ChemSolutions LLC

TABLE 1

VOLATILE ORGANIC COMPOUND RESULTS

Project ID: STN115

Client Sample ID: MW-02-052214 | Date Sampled: 5/22/14

Client Project ID: 212205045 WDEQ-Lobell | Date Received: 5/27/14

EPA Method 8260C | Date Analyzed: 6/2/14

Units: ug/L | Sample Matrix: Water

Analyte	Concentration	Reporting Limit	Analyte	Concentration	Reporting Limit
Dichlorodifluoromethane	ND	5	trans-1,3-Dichloropropene	ND	5
Chloromethane	ND	5	1,1,2-Trichloroethane	ND	2
Vinyl Chloride	ND	2	Tetrachloroethene	22	2
Bromomethane	ND	5	Dibromochloromethane	ND	5
Chloroethane	ND	5	1,2-Dibromoethane	ND	5
Trichlorofluoromethane	ND	5	Chlorobenzene	ND	2
Acetone	ND	20	1,1,1,2-Tetrachloroethane	ND	5
1,1-Dichloroethene	ND	5	Ethylbenzene	ND	5
Carbon Disulfide	ND	5	Total Xylene	ND	5
Methyl-tert-butyl ether	ND	2	Styrene	ND	5
Methylene Chloride	ND	5	Isopropylbenzene	ND	5
trans-1,2-Dichloroethene	ND	2	Bromoform	ND	5
1,1-Dichloroethane	ND	2	n-Propylbenzene	ND	5
Vinyl acetate	ND	10	1,2,3-Trichloropropane	ND	5
2-Butanone	ND	10	2-Chlorotoluene	ND	5
cis-1,2-Dichloroethene	ND	2	1,3,5-Trimethylbenzene	ND	5
Chloroform	ND	5	4-Chlorotoluene	ND	5
Tetrahydrofuran	ND	10	t-Butylbenzene	ND	5
1,1,1-Trichloroethane	ND	2	1,2,4-Trimethylbenzene	ND	5
Carbon Tetrachloride	ND	2	sec-Butylbenzene	ND	5
Benzene	ND	2	p-Isopropyltoluene	ND	5
1,2-Dichloroethane	ND	2	1,1,2,2-Tetrachloroethane	ND	5
Trichloroethene	ND	2	1,3-Dichlorobenzene	ND	5
1,2-Dichloropropane	ND	5	1,4-Dichlorobenzene	ND	5
Dibromomethane	ND	5	n-Butylbenzene	ND	5
Bromodichloromethane	ND	5	1,2 Dichlorobenzene	ND	5
cis-1,3-Dichloropropene	ND	5	1,2-Dibromo-3-chloropropane	ND	5
4-Methyl-2-pentanone	ND	10	1,2,4-Trichlorobenzene	ND	5
Toluene	ND	5	Hexachlorobutadiene	ND	5
2-Hexanone	ND	10	1,2,3-Trichlorobenzene	ND	5
			Naphthalene	ND	5

Surrogate	% Recovery
Dibromofluoromethane	117
1,2-Dichloroethane-D4	115
Toluene-D8	102
Bromofluorobenzene	100

ND= Not detected

6/5/14

ChemSolutions LLC

TABLE 2

VOLATILE ORGANIC COMPOUND RESULTS

Project ID: STN115

Client Sample ID: MW-04-052214 | Date Sampled: 5/22/14

Client Project ID: 212205045 WDEQ-Lobell | Date Received: 5/27/14

EPA Method 8260C | Date Analyzed: 6/3/14

Units: ug/L | Sample Matrix: Water

Analyte	Concentration	Reporting Limit	Analyte	Concentration	Reporting Limit
Dichlorodifluoromethane	ND	50	trans-1,3-Dichloropropene	ND	50
Chloromethane	ND	50	1,1,2-Trichloroethane	ND	20
Vinyl Chloride	ND	20	Tetrachloroethene	460	20
Bromomethane	ND	50	Dibromochloromethane	ND	50
Chloroethane	ND	50	1,2-Dibromoethane	ND	50
Trichlorofluoromethane	ND	50	Chlorobenzene	ND	20
Acetone	ND	200	1,1,1,2-Tetrachloroethane	ND	50
1,1-Dichloroethene	ND	50	Ethylbenzene	ND	50
Carbon Disulfide	ND	50	Total Xylene	ND	50
Methyl-tert-butyl ether	ND	20	Styrene	ND	50
Methylene Chloride	ND	50	Isopropylbenzene	ND	50
trans-1,2-Dichloroethene	ND	20	Bromoform	ND	50
1,1-Dichloroethane	ND	20	n-Propylbenzene	ND	50
Vinyl acetate	ND	100	1,2,3-Trichloropropane	ND	50
2-Butanone	ND	100	2-Chlorotoluene	ND	50
cis-1,2-Dichloroethene	ND	20	1,3,5-Trimethylbenzene	ND	50
Chloroform	ND	50	4-Chlorotoluene	ND	50
Tetrahydrofuran	ND	100	t-Butylbenzene	ND	50
1,1,1-Trichloroethane	ND	20	1,2,4-Trimethylbenzene	ND	50
Carbon Tetrachloride	ND	20	sec-Butylbenzene	ND	50
Benzene	ND	20	p-Isopropyltoluene	ND	50
1,2-Dichloroethane	ND	20	1,1,2,2-Tetrachloroethane	ND	50
Trichloroethene	38	20	1,3-Dichlorobenzene	ND	50
1,2-Dichloropropane	ND	50	1,4-Dichlorobenzene	ND	50
Dibromomethane	ND	50	n-Butylbenzene	ND	50
Bromodichloromethane	ND	50	1,2 Dichlorobenzene	ND	50
cis-1,3-Dichloropropene	ND	50	1,2-Dibromo-3-chloropropane	ND	50
4-Methyl-2-pentanone	ND	100	1,2,4-Trichlorobenzene	ND	50
Toluene	ND	50	Hexachlorobutadiene	ND	50
2-Hexanone	ND	100	1,2,3-Trichlorobenzene	ND	50
			Naphthalene	ND	50

Surrogate	% Recovery
Dibromofluoromethane	116
1,2-Dichloroethane-D4	116
Toluene-D8	104
Bromofluorobenzene	99.8

ND= Not detected

ChemSolutions LLC

TABLE 3

VOLATILE ORGANIC COMPOUND RESULTS

Project ID: STN115

Client Sample ID: MW-06-052214
Client Project ID: 212205045 WDEQ-Lobell
EPA Method 8260C
Units: ug/L

Date Sampled: 5/22/14
Date Received: 5/27/14
Date Analyzed: 6/3/14
Sample Matrix: Water

Analyte	Concentration	Reporting Limit	Analyte	Concentration	Reporting Limit
Dichlorodifluoromethane	ND	50	trans-1,3-Dichloropropene	ND	50
Chloromethane	ND	50	1,1,2-Trichloroethane	ND	20
Vinyl Chloride	ND	20	Tetrachloroethene	200	20
Bromomethane	ND	50	Dibromochloromethane	ND	50
Chloroethane	ND	50	1,2-Dibromoethane	ND	50
Trichlorofluoromethane	ND	50	Chlorobenzene	ND	20
Acetone	ND	200	1,1,1,2-Tetrachloroethane	ND	50
1,1-Dichloroethene	ND	50	Ethylbenzene	ND	50
Carbon Disulfide	ND	50	Total Xylene	ND	50
Methyl-tert-butyl ether	ND	20	Styrene	ND	50
Methylene Chloride	ND	50	Isopropylbenzene	ND	50
trans-1,2-Dichloroethene	ND	20	Bromoform	ND	50
1,1-Dichloroethane	ND	20	n-Propylbenzene	ND	50
Vinyl acetate	ND	100	1,2,3-Trichloropropane	ND	50
2-Butanone	ND	100	2-Chlorotoluene	ND	50
cis-1,2-Dichloroethene	30	20	1,3,5-Trimethylbenzene	ND	50
Chloroform	ND	50	4-Chlorotoluene	ND	50
Tetrahydrofuran	ND	100	t-Butylbenzene	ND	50
1,1,1-Trichloroethane	ND	20	1,2,4-Trimethylbenzene	ND	50
Carbon Tetrachloride	ND	20	sec-Butylbenzene	ND	50
Benzene	ND	20	p-Isopropyltoluene	ND	50
1,2-Dichloroethane	ND	20	1,1,2,2-Tetrachloroethane	ND	50
Trichloroethene	29	20	1,3-Dichlorobenzene	ND	50
1,2-Dichloropropane	ND	50	1,4-Dichlorobenzene	ND	50
Dibromomethane	ND	50	n-Butylbenzene	ND	50
Bromodichloromethane	ND	50	1,2 Dichlorobenzene	ND	50
cis-1,3-Dichloropropene	ND	50	1,2-Dibromo-3-chloropropane	ND	50
4-Methyl-2-pentanone	ND	100	1,2,4-Trichlorobenzene	ND	50
Toluene	ND	50	Hexachlorobutadiene	ND	50
2-Hexanone	ND	100	1,2,3-Trichlorobenzene	ND	50
			Naphthalene	ND	50

Surrogate	% Recovery
Dibromofluoromethane	114
1,2-Dichloroethane-D4	114
Toluene-D8	105
Bromofluorobenzene	99.3

ND= Not detected

ChemSolutions LLC

TABLE 4

VOLATILE ORGANIC COMPOUND RESULTS

Project ID: STN115

Client Sample ID: MW-07-052214
Client Project ID: 212205045 WDEQ-Lobell
EPA Method 8260C
Units: ug/L

Date Sampled: 5/22/14
Date Received: 5/27/14
Date Analyzed: 6/3/14
Sample Matrix: Water

Analyte	Concentration	Reporting Limit	Analyte	Concentration	Reporting Limit
Dichlorodifluoromethane	ND	50	trans-1,3-Dichloropropene	ND	50
Chloromethane	ND	50	1,1,2-Trichloroethane	ND	20
Vinyl Chloride	ND	20	Tetrachloroethene	710	20
Bromomethane	ND	50	Dibromochloromethane	ND	50
Chloroethane	ND	50	1,2-Dibromoethane	ND	50
Trichlorofluoromethane	ND	50	Chlorobenzene	ND	20
Acetone	ND	200	1,1,1,2-Tetrachloroethane	ND	50
1,1-Dichloroethene	ND	50	Ethylbenzene	ND	50
Carbon Disulfide	ND	50	Total Xylene	ND	50
Methyl-tert-butyl ether	ND	20	Styrene	ND	50
Methylene Chloride	ND	50	Isopropylbenzene	ND	50
trans-1,2-Dichloroethene	ND	20	Bromoform	ND	50
1,1-Dichloroethane	ND	20	n-Propylbenzene	ND	50
Vinyl acetate	ND	100	1,2,3-Trichloropropane	ND	50
2-Butanone	ND	100	2-Chlorotoluene	ND	50
cis-1,2-Dichloroethene	ND	20	1,3,5-Trimethylbenzene	ND	50
Chloroform	ND	50	4-Chlorotoluene	ND	50
Tetrahydrofuran	ND	100	t-Butylbenzene	ND	50
1,1,1-Trichloroethane	ND	20	1,2,4-Trimethylbenzene	ND	50
Carbon Tetrachloride	ND	20	sec-Butylbenzene	ND	50
Benzene	ND	20	p-Isopropyltoluene	ND	50
1,2-Dichloroethane	ND	20	1,1,2,2-Tetrachloroethane	ND	50
Trichloroethene	ND	20	1,3-Dichlorobenzene	ND	50
1,2-Dichloropropane	ND	50	1,4-Dichlorobenzene	ND	50
Dibromomethane	ND	50	n-Butylbenzene	ND	50
Bromodichloromethane	ND	50	1,2 Dichlorobenzene	ND	50
cis-1,3-Dichloropropene	ND	50	1,2-Dibromo-3-chloropropane	ND	50
4-Methyl-2-pentanone	ND	100	1,2,4-Trichlorobenzene	ND	50
Toluene	ND	50	Hexachlorobutadiene	ND	50
2-Hexanone	ND	100	1,2,3-Trichlorobenzene	ND	50
			Naphthalene	ND	50

Surrogate	% Recovery
Dibromofluoromethane	124
1,2-Dichloroethane-D4	121
Toluene-D8	103
Bromofluorobenzene	98.7

ND= Not detected

ChemSolutions LLC

TABLE 5

VOLATILE ORGANIC COMPOUND RESULTS

Project ID: STN115

Client Sample ID: MW-10-052214
Client Project ID: 212205045 WDEQ-Lobell
EPA Method 8260C
Units: ug/L

Date Sampled: 5/22/14
Date Received: 5/27/14
Date Analyzed: 6/3/14
Sample Matrix: Water

Analyte	Concentration	Reporting Limit	Analyte	Concentration	Reporting Limit
Dichlorodifluoromethane	ND	50	trans-1,3-Dichloropropene	ND	50
Chloromethane	ND	50	1,1,2-Trichloroethane	ND	20
Vinyl Chloride	ND	20	Tetrachloroethene	600	20
Bromomethane	ND	50	Dibromochloromethane	ND	50
Chloroethane	ND	50	1,2-Dibromoethane	ND	50
Trichlorofluoromethane	ND	50	Chlorobenzene	ND	20
Acetone	ND	200	1,1,1,2-Tetrachloroethane	ND	50
1,1-Dichloroethene	ND	50	Ethylbenzene	ND	50
Carbon Disulfide	ND	50	Total Xylene	ND	50
Methyl-tert-butyl ether	ND	20	Styrene	ND	50
Methylene Chloride	ND	50	Isopropylbenzene	ND	50
trans-1,2-Dichloroethene	ND	20	Bromoform	ND	50
1,1-Dichloroethane	ND	20	n-Propylbenzene	ND	50
Vinyl acetate	ND	100	1,2,3-Trichloropropane	ND	50
2-Butanone	ND	100	2-Chlorotoluene	ND	50
cis-1,2-Dichloroethene	ND	20	1,3,5-Trimethylbenzene	ND	50
Chloroform	ND	50	4-Chlorotoluene	ND	50
Tetrahydrofuran	ND	100	t-Butylbenzene	ND	50
1,1,1-Trichloroethane	ND	20	1,2,4-Trimethylbenzene	ND	50
Carbon Tetrachloride	ND	20	sec-Butylbenzene	ND	50
Benzene	ND	20	p-Isopropyltoluene	ND	50
1,2-Dichloroethane	ND	20	1,1,2,2-Tetrachloroethane	ND	50
Trichloroethene	ND	20	1,3-Dichlorobenzene	ND	50
1,2-Dichloropropane	ND	50	1,4-Dichlorobenzene	ND	50
Dibromomethane	ND	50	n-Butylbenzene	ND	50
Bromodichloromethane	ND	50	1,2 Dichlorobenzene	ND	50
cis-1,3-Dichloropropene	ND	50	1,2-Dibromo-3-chloropropane	ND	50
4-Methyl-2-pentanone	ND	100	1,2,4-Trichlorobenzene	ND	50
Toluene	ND	50	Hexachlorobutadiene	ND	50
2-Hexanone	ND	100	1,2,3-Trichlorobenzene	ND	50
			Naphthalene	ND	50

Surrogate	% Recovery
Dibromofluoromethane	118
1,2-Dichloroethane-D4	116
Toluene-D8	105
Bromofluorobenzene	98.4

ND= Not detected

ChemSolutions LLC

TABLE 6

VOLATILE ORGANIC COMPOUND RESULTS

Project ID: STN115

Client Sample ID: MW-11-052214
Client Project ID: 212205045 WDEQ-Lobell
EPA Method 8260C
Units: ug/L

Date Sampled: 5/22/14
Date Received: 5/27/14
Date Analyzed: 6/2/14
Sample Matrix: Water

Analyte	Concentration	Reporting Limit	Analyte	Concentration	Reporting Limit
Dichlorodifluoromethane	ND	5	trans-1,3-Dichloropropene	ND	5
Chloromethane	ND	5	1,1,2-Trichloroethane	ND	2
Vinyl Chloride	ND	2	Tetrachloroethene	ND	2
Bromomethane	ND	5	Dibromochloromethane	ND	5
Chloroethane	ND	5	1,2-Dibromoethane	ND	5
Trichlorofluoromethane	ND	5	Chlorobenzene	ND	2
Acetone	ND	20	1,1,1,2-Tetrachloroethane	ND	5
1,1-Dichloroethene	ND	5	Ethylbenzene	ND	5
Carbon Disulfide	ND	5	Total Xylene	ND	5
Methyl-tert-butyl ether	ND	2	Styrene	ND	5
Methylene Chloride	ND	5	Isopropylbenzene	ND	5
trans-1,2-Dichloroethene	ND	2	Bromoform	ND	5
1,1-Dichloroethane	ND	2	n-Propylbenzene	ND	5
Vinyl acetate	ND	10	1,2,3-Trichloropropane	ND	5
2-Butanone	ND	10	2-Chlorotoluene	ND	5
cis-1,2-Dichloroethene	ND	2	1,3,5-Trimethylbenzene	ND	5
Chloroform	ND	5	4-Chlorotoluene	ND	5
Tetrahydrofuran	ND	10	t-Butylbenzene	ND	5
1,1,1-Trichloroethane	ND	2	1,2,4-Trimethylbenzene	ND	5
Carbon Tetrachloride	ND	2	sec-Butylbenzene	ND	5
Benzene	ND	2	p-Isopropyltoluene	ND	5
1,2-Dichloroethane	ND	2	1,1,2,2-Tetrachloroethane	ND	5
Trichloroethene	ND	2	1,3-Dichlorobenzene	ND	5
1,2-Dichloropropane	ND	5	1,4-Dichlorobenzene	ND	5
Dibromomethane	ND	5	n-Butylbenzene	ND	5
Bromodichloromethane	ND	5	1,2 Dichlorobenzene	ND	5
cis-1,3-Dichloropropene	ND	5	1,2-Dibromo-3-chloropropane	ND	5
4-Methyl-2-pentanone	ND	10	1,2,4-Trichlorobenzene	ND	5
Toluene	ND	5	Hexachlorobutadiene	ND	5
2-Hexanone	ND	10	1,2,3-Trichlorobenzene	ND	5
			Naphthalene	ND	5

Surrogate	% Recovery
Dibromofluoromethane	102
1,2-Dichloroethane-D4	98.5
Toluene-D8	97.7
Bromofluorobenzene	98.1

ND= Not detected

ChemSolutions LLC

TABLE 7

VOLATILE ORGANIC COMPOUND RESULTS

Project ID: STN115

Client Sample ID: MW-101-052214
Client Project ID: 212205045 WDEQ-Lobell
EPA Method 8260C
Units: ug/L

Date Sampled: 5/22/14
Date Received: 5/27/14
Date Analyzed: 6/2/14
Sample Matrix: Water

Analyte	Concentration	Reporting Limit	Analyte	Concentration	Reporting Limit
Dichlorodifluoromethane	ND	5	trans-1,3-Dichloropropene	ND	5
Chloromethane	ND	5	1,1,2-Trichloroethane	ND	2
Vinyl Chloride	ND	2	Tetrachloroethene	ND	2
Bromomethane	ND	5	Dibromochloromethane	ND	5
Chloroethane	ND	5	1,2-Dibromoethane	ND	5
Trichlorofluoromethane	ND	5	Chlorobenzene	ND	2
Acetone	ND	20	1,1,1,2-Tetrachloroethane	ND	5
1,1-Dichloroethene	ND	5	Ethylbenzene	ND	5
Carbon Disulfide	ND	5	Total Xylene	ND	5
Methyl-tert-butyl ether	ND	2	Styrene	ND	5
Methylene Chloride	ND	5	Isopropylbenzene	ND	5
trans-1,2-Dichloroethene	ND	2	Bromoform	ND	5
1,1-Dichloroethane	ND	2	n-Propylbenzene	ND	5
Vinyl acetate	ND	10	1,2,3-Trichloropropane	ND	5
2-Butanone	ND	10	2-Chlorotoluene	ND	5
cis-1,2-Dichloroethene	ND	2	1,3,5-Trimethylbenzene	ND	5
Chloroform	ND	5	4-Chlorotoluene	ND	5
Tetrahydrofuran	ND	10	t-Butylbenzene	ND	5
1,1,1-Trichloroethane	ND	2	1,2,4-Trimethylbenzene	ND	5
Carbon Tetrachloride	ND	2	sec-Butylbenzene	ND	5
Benzene	ND	2	p-Isopropyltoluene	ND	5
1,2-Dichloroethane	ND	2	1,1,2,2-Tetrachloroethane	ND	5
Trichloroethene	ND	2	1,3-Dichlorobenzene	ND	5
1,2-Dichloropropane	ND	5	1,4-Dichlorobenzene	ND	5
Dibromomethane	ND	5	n-Butylbenzene	ND	5
Bromodichloromethane	ND	5	1,2 Dichlorobenzene	ND	5
cis-1,3-Dichloropropene	ND	5	1,2-Dibromo-3-chloropropane	ND	5
4-Methyl-2-pentanone	ND	10	1,2,4-Trichlorobenzene	ND	5
Toluene	ND	5	Hexachlorobutadiene	ND	5
2-Hexanone	ND	10	1,2,3-Trichlorobenzene	ND	5
			Naphthalene	ND	5

Surrogate	% Recovery
Dibromofluoromethane	107
1,2-Dichloroethane-D4	106
Toluene-D8	101
Bromofluorobenzene	99.8

ND= Not detected

ChemSolutions LLC

TABLE 8

VOLATILE ORGANIC COMPOUND RESULTS

Project ID: STN115

Client Sample ID: MW-102-052214
Client Project ID: 212205045 WDEQ-Lobell
EPA Method 8260C
Units: ug/L

Date Sampled: 5/22/14
Date Received: 5/27/14
Date Analyzed: 6/2/14
Sample Matrix: Water

Analyte	Concentration	Reporting Limit	Analyte	Concentration	Reporting Limit
Dichlorodifluoromethane	ND	5	trans-1,3-Dichloropropene	ND	5
Chloromethane	ND	5	1,1,2-Trichloroethane	ND	2
Vinyl Chloride	ND	2	Tetrachloroethene	ND	2
Bromomethane	ND	5	Dibromochloromethane	ND	5
Chloroethane	ND	5	1,2-Dibromoethane	ND	5
Trichlorofluoromethane	ND	5	Chlorobenzene	ND	2
Acetone	ND	20	1,1,1,2-Tetrachloroethane	ND	5
1,1-Dichloroethene	ND	5	Ethylbenzene	ND	5
Carbon Disulfide	ND	5	Total Xylene	ND	5
Methyl-tert-butyl ether	ND	2	Styrene	ND	5
Methylene Chloride	ND	5	Isopropylbenzene	ND	5
trans-1,2-Dichloroethene	ND	2	Bromoform	ND	5
1,1-Dichloroethane	ND	2	n-Propylbenzene	ND	5
Vinyl acetate	ND	10	1,2,3-Trichloropropane	ND	5
2-Butanone	ND	10	2-Chlorotoluene	ND	5
cis-1,2-Dichloroethene	ND	2	1,3,5-Trimethylbenzene	ND	5
Chloroform	ND	5	4-Chlorotoluene	ND	5
Tetrahydrofuran	ND	10	t-Butylbenzene	ND	5
1,1,1-Trichloroethane	ND	2	1,2,4-Trimethylbenzene	ND	5
Carbon Tetrachloride	ND	2	sec-Butylbenzene	ND	5
Benzene	ND	2	p-Isopropyltoluene	ND	5
1,2-Dichloroethane	ND	2	1,1,2,2-Tetrachloroethane	ND	5
Trichloroethene	ND	2	1,3-Dichlorobenzene	ND	5
1,2-Dichloropropane	ND	5	1,4-Dichlorobenzene	ND	5
Dibromomethane	ND	5	n-Butylbenzene	ND	5
Bromodichloromethane	ND	5	1,2 Dichlorobenzene	ND	5
cis-1,3-Dichloropropene	ND	5	1,2-Dibromo-3-chloropropane	ND	5
4-Methyl-2-pentanone	ND	10	1,2,4-Trichlorobenzene	ND	5
Toluene	ND	5	Hexachlorobutadiene	ND	5
2-Hexanone	ND	10	1,2,3-Trichlorobenzene	ND	5
			Naphthalene	ND	5

Surrogate	% Recovery
Dibromofluoromethane	108
1,2-Dichloroethane-D4	110
Toluene-D8	101
Bromofluorobenzene	100

ND= Not detected

ChemSolutions LLC

TABLE 9

VOLATILE ORGANIC COMPOUND RESULTS

Project ID: STN115

Client Sample ID: MW-103-052214
Client Project ID: 212205045 WDEQ-Lobell
EPA Method 8260C
Units: ug/L

Date Sampled: 5/22/14
Date Received: 5/27/14
Date Analyzed: 6/2/14
Sample Matrix: Water

Analyte	Concentration	Reporting Limit	Analyte	Concentration	Reporting Limit
Dichlorodifluoromethane	ND	5	trans-1,3-Dichloropropene	ND	5
Chloromethane	ND	5	1,1,2-Trichloroethane	ND	2
Vinyl Chloride	ND	2	Tetrachloroethene	ND	2
Bromomethane	ND	5	Dibromochloromethane	ND	5
Chloroethane	ND	5	1,2-Dibromoethane	ND	5
Trichlorofluoromethane	ND	5	Chlorobenzene	ND	2
Acetone	ND	20	1,1,1,2-Tetrachloroethane	ND	5
1,1-Dichloroethene	ND	5	Ethylbenzene	ND	5
Carbon Disulfide	ND	5	Total Xylene	ND	5
Methyl-tert-butyl ether	ND	2	Styrene	ND	5
Methylene Chloride	ND	5	Isopropylbenzene	ND	5
trans-1,2-Dichloroethene	ND	2	Bromoform	ND	5
1,1-Dichloroethane	ND	2	n-Propylbenzene	ND	5
Vinyl acetate	ND	10	1,2,3-Trichloropropane	ND	5
2-Butanone	ND	10	2-Chlorotoluene	ND	5
cis-1,2-Dichloroethene	ND	2	1,3,5-Trimethylbenzene	ND	5
Chloroform	ND	5	4-Chlorotoluene	ND	5
Tetrahydrofuran	ND	10	t-Butylbenzene	ND	5
1,1,1-Trichloroethane	ND	2	1,2,4-Trimethylbenzene	ND	5
Carbon Tetrachloride	ND	2	sec-Butylbenzene	ND	5
Benzene	ND	2	p-Isopropyltoluene	ND	5
1,2-Dichloroethane	ND	2	1,1,2,2-Tetrachloroethane	ND	5
Trichloroethene	ND	2	1,3-Dichlorobenzene	ND	5
1,2-Dichloropropane	ND	5	1,4-Dichlorobenzene	ND	5
Dibromomethane	ND	5	n-Butylbenzene	ND	5
Bromodichloromethane	ND	5	1,2 Dichlorobenzene	ND	5
cis-1,3-Dichloropropene	ND	5	1,2-Dibromo-3-chloropropane	ND	5
4-Methyl-2-pentanone	ND	10	1,2,4-Trichlorobenzene	ND	5
Toluene	ND	5	Hexachlorobutadiene	ND	5
2-Hexanone	ND	10	1,2,3-Trichlorobenzene	ND	5
			Naphthalene	ND	5

Surrogate	% Recovery
Dibromofluoromethane	123
1,2-Dichloroethane-D4	114
Toluene-D8	104
Bromofluorobenzene	99.9

ND= Not detected

ChemSolutions LLC

TABLE 10

VOLATILE ORGANIC COMPOUND RESULTS

Project ID: STN115

Client Sample ID: MW-104-052214
Client Project ID: 212205045 WDEQ-Lobell
EPA Method 8260C
Units: ug/L

Date Sampled: 5/22/14
Date Received: 5/27/14
Date Analyzed: 6/2/14
Sample Matrix: Water

Analyte	Concentration	Reporting Limit	Analyte	Concentration	Reporting Limit
Dichlorodifluoromethane	ND	5	trans-1,3-Dichloropropene	ND	5
Chloromethane	ND	5	1,1,2-Trichloroethane	ND	2
Vinyl Chloride	ND	2	Tetrachloroethene	150	2
Bromomethane	ND	5	Dibromochloromethane	ND	5
Chloroethane	ND	5	1,2-Dibromoethane	ND	5
Trichlorofluoromethane	ND	5	Chlorobenzene	ND	2
Acetone	ND	20	1,1,1,2-Tetrachloroethane	ND	5
1,1-Dichloroethene	ND	5	Ethylbenzene	ND	5
Carbon Disulfide	ND	5	Total Xylene	ND	5
Methyl-tert-butyl ether	ND	2	Styrene	ND	5
Methylene Chloride	ND	5	Isopropylbenzene	ND	5
trans-1,2-Dichloroethene	ND	2	Bromoform	ND	5
1,1-Dichloroethane	ND	2	n-Propylbenzene	ND	5
Vinyl acetate	ND	10	1,2,3-Trichloropropane	ND	5
2-Butanone	ND	10	2-Chlorotoluene	ND	5
cis-1,2-Dichloroethene	ND	2	1,3,5-Trimethylbenzene	ND	5
Chloroform	ND	5	4-Chlorotoluene	ND	5
Tetrahydrofuran	ND	10	t-Butylbenzene	ND	5
1,1,1-Trichloroethane	ND	2	1,2,4-Trimethylbenzene	ND	5
Carbon Tetrachloride	ND	2	sec-Butylbenzene	ND	5
Benzene	ND	2	p-Isopropyltoluene	ND	5
1,2-Dichloroethane	ND	2	1,1,2,2-Tetrachloroethane	ND	5
Trichloroethene	3.0	2	1,3-Dichlorobenzene	ND	5
1,2-Dichloropropane	ND	5	1,4-Dichlorobenzene	ND	5
Dibromomethane	ND	5	n-Butylbenzene	ND	5
Bromodichloromethane	ND	5	1,2 Dichlorobenzene	ND	5
cis-1,3-Dichloropropene	ND	5	1,2-Dibromo-3-chloropropane	ND	5
4-Methyl-2-pentanone	ND	10	1,2,4-Trichlorobenzene	ND	5
Toluene	ND	5	Hexachlorobutadiene	ND	5
2-Hexanone	ND	10	1,2,3-Trichlorobenzene	ND	5
			Naphthalene	ND	5

Surrogate	% Recovery
Dibromofluoromethane	116
1,2-Dichloroethane-D4	112
Toluene-D8	102
Bromofluorobenzene	97.1

ND= Not detected

ChemSolutions LLC

TABLE 11

VOLATILE ORGANIC COMPOUND RESULTS

Project ID: STN115

Client Sample ID: MW-105-052214 | Date Sampled: 5/22/14

Client Project ID: 212205045 WDEQ-Lobell | Date Received: 5/27/14

EPA Method 8260C | Date Analyzed: 6/3/14

Units: ug/L | Sample Matrix: Water

Analyte	Concentration	Reporting Limit	Analyte	Concentration	Reporting Limit
Dichlorodifluoromethane	ND	5	trans-1,3-Dichloropropene	ND	5
Chloromethane	ND	5	1,1,2-Trichloroethane	ND	2
Vinyl Chloride	ND	2	Tetrachloroethene	6.4	2
Bromomethane	ND	5	Dibromochloromethane	ND	5
Chloroethane	ND	5	1,2-Dibromoethane	ND	5
Trichlorofluoromethane	ND	5	Chlorobenzene	ND	2
Acetone	ND	20	1,1,1,2-Tetrachloroethane	ND	5
1,1-Dichloroethene	ND	5	Ethylbenzene	ND	5
Carbon Disulfide	ND	5	Total Xylene	ND	5
Methyl-tert-butyl ether	ND	2	Styrene	ND	5
Methylene Chloride	ND	5	Isopropylbenzene	ND	5
trans-1,2-Dichloroethene	ND	2	Bromoform	ND	5
1,1-Dichloroethane	ND	2	n-Propylbenzene	ND	5
Vinyl acetate	ND	10	1,2,3-Trichloropropane	ND	5
2-Butanone	ND	10	2-Chlorotoluene	ND	5
cis-1,2-Dichloroethene	ND	2	1,3,5-Trimethylbenzene	ND	5
Chloroform	ND	5	4-Chlorotoluene	ND	5
Tetrahydrofuran	ND	10	t-Butylbenzene	ND	5
1,1,1-Trichloroethane	ND	2	1,2,4-Trimethylbenzene	ND	5
Carbon Tetrachloride	ND	2	sec-Butylbenzene	ND	5
Benzene	ND	2	p-Isopropyltoluene	ND	5
1,2-Dichloroethane	ND	2	1,1,2,2-Tetrachloroethane	ND	5
Trichloroethene	ND	2	1,3-Dichlorobenzene	ND	5
1,2-Dichloropropane	ND	5	1,4-Dichlorobenzene	ND	5
Dibromomethane	ND	5	n-Butylbenzene	ND	5
Bromodichloromethane	ND	5	1,2 Dichlorobenzene	ND	5
cis-1,3-Dichloropropene	ND	5	1,2-Dibromo-3-chloropropane	ND	5
4-Methyl-2-pentanone	ND	10	1,2,4-Trichlorobenzene	ND	5
Toluene	ND	5	Hexachlorobutadiene	ND	5
2-Hexanone	ND	10	1,2,3-Trichlorobenzene	ND	5
			Naphthalene	ND	5

Surrogate	% Recovery
Dibromofluoromethane	115
1,2-Dichloroethane-D4	116
Toluene-D8	103
Bromofluorobenzene	101

ND= Not detected

ChemSolutions LLC

TABLE 12

VOLATILE ORGANIC COMPOUND RESULTS

Project ID: STN115

Client Sample ID: MW-106-052214
Client Project ID: 212205045 WDEQ-Lobell
EPA Method 8260C
Units: ug/L

Date Sampled: 5/22/14
Date Received: 5/27/14
Date Analyzed: 6/2/14
Sample Matrix: Water

Analyte	Concentration	Reporting Limit	Analyte	Concentration	Reporting Limit
Dichlorodifluoromethane	ND	5	trans-1,3-Dichloropropene	ND	5
Chloromethane	ND	5	1,1,2-Trichloroethane	ND	2
Vinyl Chloride	ND	2	Tetrachloroethene	ND	2
Bromomethane	ND	5	Dibromochloromethane	ND	5
Chloroethane	ND	5	1,2-Dibromoethane	ND	5
Trichlorofluoromethane	ND	5	Chlorobenzene	ND	2
Acetone	ND	20	1,1,1,2-Tetrachloroethane	ND	5
1,1-Dichloroethene	ND	5	Ethylbenzene	ND	5
Carbon Disulfide	ND	5	Total Xylene	ND	5
Methyl-tert-butyl ether	ND	2	Styrene	ND	5
Methylene Chloride	ND	5	Isopropylbenzene	ND	5
trans-1,2-Dichloroethene	ND	2	Bromoform	ND	5
1,1-Dichloroethane	ND	2	n-Propylbenzene	ND	5
Vinyl acetate	ND	10	1,2,3-Trichloropropane	ND	5
2-Butanone	ND	10	2-Chlorotoluene	ND	5
cis-1,2-Dichloroethene	ND	2	1,3,5-Trimethylbenzene	ND	5
Chloroform	ND	5	4-Chlorotoluene	ND	5
Tetrahydrofuran	ND	10	t-Butylbenzene	ND	5
1,1,1-Trichloroethane	ND	2	1,2,4-Trimethylbenzene	ND	5
Carbon Tetrachloride	ND	2	sec-Butylbenzene	ND	5
Benzene	ND	2	p-Isopropyltoluene	ND	5
1,2-Dichloroethane	ND	2	1,1,2,2-Tetrachloroethane	ND	5
Trichloroethene	ND	2	1,3-Dichlorobenzene	ND	5
1,2-Dichloropropane	ND	5	1,4-Dichlorobenzene	ND	5
Dibromomethane	ND	5	n-Butylbenzene	ND	5
Bromodichloromethane	ND	5	1,2 Dichlorobenzene	ND	5
cis-1,3-Dichloropropene	ND	5	1,2-Dibromo-3-chloropropane	ND	5
4-Methyl-2-pentanone	ND	10	1,2,4-Trichlorobenzene	ND	5
Toluene	ND	5	Hexachlorobutadiene	ND	5
2-Hexanone	ND	10	1,2,3-Trichlorobenzene	ND	5
			Naphthalene	ND	5

Surrogate	% Recovery
Dibromofluoromethane	114
1,2-Dichloroethane-D4	117
Toluene-D8	101
Bromofluorobenzene	98.6

ND= Not detected

ChemSolutions LLC

TABLE 13

VOLATILE ORGANIC COMPOUND RESULTS

Project ID: STN115

Client Sample ID: MW-107-052314
Client Project ID: 212205045 WDEQ-Lobell
EPA Method 8260C
Units: ug/L

Date Sampled: 5/23/14
Date Received: 5/27/14
Date Analyzed: 6/2/14
Sample Matrix: Water

Analyte	Concentration	Reporting Limit	Analyte	Concentration	Reporting Limit
Dichlorodifluoromethane	ND	5	trans-1,3-Dichloropropene	ND	5
Chloromethane	ND	5	1,1,2-Trichloroethane	ND	2
Vinyl Chloride	ND	2	Tetrachloroethene	ND	2
Bromomethane	ND	5	Dibromochloromethane	ND	5
Chloroethane	ND	5	1,2-Dibromoethane	ND	5
Trichlorofluoromethane	ND	5	Chlorobenzene	ND	2
Acetone	ND	20	1,1,1,2-Tetrachloroethane	ND	5
1,1-Dichloroethene	ND	5	Ethylbenzene	ND	5
Carbon Disulfide	ND	5	Total Xylene	ND	5
Methyl-tert-butyl ether	ND	2	Styrene	ND	5
Methylene Chloride	ND	5	Isopropylbenzene	ND	5
trans-1,2-Dichloroethene	ND	2	Bromoform	ND	5
1,1-Dichloroethane	ND	2	n-Propylbenzene	ND	5
Vinyl acetate	ND	10	1,2,3-Trichloropropane	ND	5
2-Butanone	ND	10	2-Chlorotoluene	ND	5
cis-1,2-Dichloroethene	ND	2	1,3,5-Trimethylbenzene	ND	5
Chloroform	ND	5	4-Chlorotoluene	ND	5
Tetrahydrofuran	ND	10	t-Butylbenzene	ND	5
1,1,1-Trichloroethane	ND	2	1,2,4-Trimethylbenzene	ND	5
Carbon Tetrachloride	ND	2	sec-Butylbenzene	ND	5
Benzene	ND	2	p-Isopropyltoluene	ND	5
1,2-Dichloroethane	ND	2	1,1,2,2-Tetrachloroethane	ND	5
Trichloroethene	ND	2	1,3-Dichlorobenzene	ND	5
1,2-Dichloropropane	ND	5	1,4-Dichlorobenzene	ND	5
Dibromomethane	ND	5	n-Butylbenzene	ND	5
Bromodichloromethane	ND	5	1,2 Dichlorobenzene	ND	5
cis-1,3-Dichloropropene	ND	5	1,2-Dibromo-3-chloropropane	ND	5
4-Methyl-2-pentanone	ND	10	1,2,4-Trichlorobenzene	ND	5
Toluene	ND	5	Hexachlorobutadiene	ND	5
2-Hexanone	ND	10	1,2,3-Trichlorobenzene	ND	5
			Naphthalene	ND	5

Surrogate	% Recovery
Dibromofluoromethane	113
1,2-Dichloroethane-D4	112
Toluene-D8	103
Bromofluorobenzene	99.8

ND= Not detected

ChemSolutions LLC

TABLE 14

VOLATILE ORGANIC COMPOUND RESULTS

Project ID: STN115

Client Sample ID: MW-108-052314 | Date Sampled: 5/23/14

Client Project ID: 212205045 WDEQ-Lobell | Date Received: 5/27/14

EPA Method 8260C | Date Analyzed: 6/2/14

Units: ug/L | Sample Matrix: Water

Analyte	Concentration	Reporting Limit	Analyte	Concentration	Reporting Limit
Dichlorodifluoromethane	ND	5	trans-1,3-Dichloropropene	ND	5
Chloromethane	ND	5	1,1,2-Trichloroethane	ND	2
Vinyl Chloride	ND	2	Tetrachloroethene	ND	2
Bromomethane	ND	5	Dibromochloromethane	ND	5
Chloroethane	ND	5	1,2-Dibromoethane	ND	5
Trichlorofluoromethane	ND	5	Chlorobenzene	ND	2
Acetone	ND	20	1,1,1,2-Tetrachloroethane	ND	5
1,1-Dichloroethene	ND	5	Ethylbenzene	ND	5
Carbon Disulfide	ND	5	Total Xylene	ND	5
Methyl-tert-butyl ether	ND	2	Styrene	ND	5
Methylene Chloride	ND	5	Isopropylbenzene	ND	5
trans-1,2-Dichloroethene	ND	2	Bromoform	ND	5
1,1-Dichloroethane	ND	2	n-Propylbenzene	ND	5
Vinyl acetate	ND	10	1,2,3-Trichloropropane	ND	5
2-Butanone	ND	10	2-Chlorotoluene	ND	5
cis-1,2-Dichloroethene	ND	2	1,3,5-Trimethylbenzene	ND	5
Chloroform	ND	5	4-Chlorotoluene	ND	5
Tetrahydrofuran	ND	10	t-Butylbenzene	ND	5
1,1,1-Trichloroethane	ND	2	1,2,4-Trimethylbenzene	ND	5
Carbon Tetrachloride	ND	2	sec-Butylbenzene	ND	5
Benzene	ND	2	p-Isopropyltoluene	ND	5
1,2-Dichloroethane	ND	2	1,1,2,2-Tetrachloroethane	ND	5
Trichloroethene	ND	2	1,3-Dichlorobenzene	ND	5
1,2-Dichloropropane	ND	5	1,4-Dichlorobenzene	ND	5
Dibromomethane	ND	5	n-Butylbenzene	ND	5
Bromodichloromethane	ND	5	1,2 Dichlorobenzene	ND	5
cis-1,3-Dichloropropene	ND	5	1,2-Dibromo-3-chloropropane	ND	5
4-Methyl-2-pentanone	ND	10	1,2,4-Trichlorobenzene	ND	5
Toluene	ND	5	Hexachlorobutadiene	ND	5
2-Hexanone	ND	10	1,2,3-Trichlorobenzene	ND	5
			Naphthalene	ND	5

Surrogate	% Recovery
Dibromofluoromethane	117
1,2-Dichloroethane-D4	115
Toluene-D8	105
Bromofluorobenzene	97.9

ND= Not detected

ChemSolutions LLC

TABLE 15

VOLATILE ORGANIC COMPOUND RESULTS

Project ID: STN115

Client Sample ID: TB-01 | Date Sampled: NA

Client Project ID: 212205045 WDEQ-Lobell | Date Received: 5/27/14

EPA Method 8260C | Date Analyzed: 6/2/14

Units: ug/L | Sample Matrix: Water

Analyte	Concentration	Reporting Limit	Analyte	Concentration	Reporting Limit
Dichlorodifluoromethane	ND	5	trans-1,3-Dichloropropene	ND	5
Chloromethane	ND	5	1,1,2-Trichloroethane	ND	2
Vinyl Chloride	ND	2	Tetrachloroethene	ND	2
Bromomethane	ND	5	Dibromochloromethane	ND	5
Chloroethane	ND	5	1,2-Dibromoethane	ND	5
Trichlorofluoromethane	ND	5	Chlorobenzene	ND	2
Acetone	ND	20	1,1,1,2-Tetrachloroethane	ND	5
1,1-Dichloroethene	ND	5	Ethylbenzene	ND	5
Carbon Disulfide	ND	5	Total Xylene	ND	5
Methyl-tert-butyl ether	ND	2	Styrene	ND	5
Methylene Chloride	ND	5	Isopropylbenzene	ND	5
trans-1,2-Dichloroethene	ND	2	Bromoform	ND	5
1,1-Dichloroethane	ND	2	n-Propylbenzene	ND	5
Vinyl acetate	ND	10	1,2,3-Trichloropropane	ND	5
2-Butanone	ND	10	2-Chlorotoluene	ND	5
cis-1,2-Dichloroethene	ND	2	1,3,5-Trimethylbenzene	ND	5
Chloroform	ND	5	4-Chlorotoluene	ND	5
Tetrahydrofuran	ND	10	t-Butylbenzene	ND	5
1,1,1-Trichloroethane	ND	2	1,2,4-Trimethylbenzene	ND	5
Carbon Tetrachloride	ND	2	sec-Butylbenzene	ND	5
Benzene	ND	2	p-Isopropyltoluene	ND	5
1,2-Dichloroethane	ND	2	1,1,2,2-Tetrachloroethane	ND	5
Trichloroethene	ND	2	1,3-Dichlorobenzene	ND	5
1,2-Dichloropropane	ND	5	1,4-Dichlorobenzene	ND	5
Dibromomethane	ND	5	n-Butylbenzene	ND	5
Bromodichloromethane	ND	5	1,2 Dichlorobenzene	ND	5
cis-1,3-Dichloropropene	ND	5	1,2-Dibromo-3-chloropropane	ND	5
4-Methyl-2-pentanone	ND	10	1,2,4-Trichlorobenzene	ND	5
Toluene	ND	5	Hexachlorobutadiene	ND	5
2-Hexanone	ND	10	1,2,3-Trichlorobenzene	ND	5
			Naphthalene	ND	5

Surrogate	% Recovery
Dibromofluoromethane	116
1,2-Dichloroethane-D4	108
Toluene-D8	100
Bromofluorobenzene	100

ND= Not detected

ChemSolutions LLC

TABLE 16

METHOD BLANK RESULTS

Project ID: STN115

Sample ID: Blank
Client Project ID: 212205045 WDEQ-Lobell
EPA Method 8260C
Units: ug/L

Date Sampled: NA
Date Received: NA
Date Analyzed: 6/2/14
Sample Matrix: Water

Analyte	Concentration	Reporting Limit	Analyte	Concentration	Reporting Limit
Dichlorodifluoromethane	ND	5	trans-1,3-Dichloropropene	ND	5
Chloromethane	ND	5	1,1,2-Trichloroethane	ND	2
Vinyl Chloride	ND	2	Tetrachloroethene	ND	2
Bromomethane	ND	5	Dibromochloromethane	ND	5
Chloroethane	ND	5	1,2-Dibromoethane	ND	5
Trichlorofluoromethane	ND	5	Chlorobenzene	ND	2
Acetone	ND	20	1,1,1,2-Tetrachloroethane	ND	5
1,1-Dichloroethene	ND	5	Ethylbenzene	ND	5
Carbon Disulfide	ND	5	Total Xylene	ND	5
Methyl-tert-butyl ether	ND	2	Styrene	ND	5
Methylene Chloride	ND	5	Isopropylbenzene	ND	5
trans-1,2-Dichloroethene	ND	2	Bromoform	ND	5
1,1-Dichloroethane	ND	2	n-Propylbenzene	ND	5
Vinyl acetate	ND	10	1,2,3-Trichloropropane	ND	5
2-Butanone	ND	10	2-Chlorotoluene	ND	5
cis-1,2-Dichloroethene	ND	2	1,3,5-Trimethylbenzene	ND	5
Chloroform	ND	5	4-Chlorotoluene	ND	5
Tetrahydrofuran	ND	10	t-Butylbenzene	ND	5
1,1,1-Trichloroethane	ND	2	1,2,4-Trimethylbenzene	ND	5
Carbon Tetrachloride	ND	2	sec-Butylbenzene	ND	5
Benzene	ND	2	p-Isopropyltoluene	ND	5
1,2-Dichloroethane	ND	2	1,1,2,2-Tetrachloroethane	ND	5
Trichloroethene	ND	2	1,3-Dichlorobenzene	ND	5
1,2-Dichloropropane	ND	5	1,4-Dichlorobenzene	ND	5
Dibromomethane	ND	5	n-Butylbenzene	ND	5
Bromodichloromethane	ND	5	1,2 Dichlorobenzene	ND	5
cis-1,3-Dichloropropene	ND	5	1,2-Dibromo-3-chloropropane	ND	5
4-Methyl-2-pentanone	ND	10	1,2,4-Trichlorobenzene	ND	5
Toluene	ND	5	Hexachlorobutadiene	ND	5
2-Hexanone	ND	10	1,2,3-Trichlorobenzene	ND	5
			Naphthalene	ND	5

Surrogate	% Recovery
Dibromofluoromethane	109
1,2-Dichloroethane-D4	104
Toluene-D8	101
Bromofluorobenzene	100

ND= Not detected

ChemSolutions LLC
TABLE 17
LABORATORY CONTROL SAMPLE RESULTS
Project ID: STN115

Sample ID: Water LCS
Client Project ID: 212205045 WDEQ-Lobell
EPA Method 8260C
Units: ug/L
Spike Amount: 50 ug/L

Date Sampled: NA
Date Received: NA
Date Analyzed: 6/2/14
Sample Matrix: Water

Analyte	Amount Recovered	% Recovery	Analyte	Amount Recovered	% Recovery
Dichlorodifluoromethane	ND	NA	trans-1,3-Dichloropropene	ND	NA
Chloromethane	ND	NA	1,1,2-Trichloroethane	ND	NA
Vinyl Chloride	ND	NA	Tetrachloroethene	ND	NA
Bromomethane	ND	NA	Dibromochloromethane	ND	NA
Chloroethane	ND	NA	1,2-Dibromoethane	ND	NA
Trichlorofluoromethane	ND	NA	Chlorobenzene	46.6	93.2
Acetone	ND	NA	1,1,1,2-Tetrachloroethane	ND	NA
1,1-Dichloroethene	57.2	114	Ethylbenzene	ND	NA
Carbon Disulfide	ND	NA	Total Xylene	ND	NA
Methyl-tert-butyl ether	ND	NA	Styrene	ND	NA
Methylene Chloride	ND	NA	Isopropylbenzene	ND	NA
trans-1,2-Dichloroethene	ND	NA	Bromoform	ND	NA
1,1-Dichloroethane	ND	NA	n-Propylbenzene	ND	NA
Vinyl acetate	ND	NA	1,2,3-Trichloropropane	ND	NA
2-Butanone	ND	NA	2-Chlorotoluene	ND	NA
cis-1,2-Dichloroethene	ND	NA	1,3,5-Trimethylbenzene	ND	NA
Chloroform	ND	NA	4-Chlorotoluene	ND	NA
Tetrahydrofuran	ND	NA	t-Butylbenzene	ND	NA
1,1,1-Trichloroethane	ND	NA	1,2,4-Trimethylbenzene	ND	NA
Carbon Tetrachloride	ND	NA	sec-Butylbenzene	ND	NA
Benzene	48.6	97.2	p-Isopropyltoluene	ND	NA
1,2-Dichloroethane	ND	NA	1,1,2,2-Tetrachloroethane	ND	NA
Trichloroethene	50.0	100	1,3-Dichlorobenzene	ND	NA
1,2-Dichloropropane	ND	NA	1,4-Dichlorobenzene	ND	NA
Dibromomethane	ND	NA	n-Butylbenzene	ND	NA
Bromodichloromethane	ND	NA	1,2 Dichlorobenzene	ND	NA
cis-1,3-Dichloropropene	ND	NA	1,2-Dibromo-3-chloropropane	ND	NA
4-Methyl-2-pentanone	ND	NA	1,2,4-Trichlorobenzene	ND	NA
Toluene	46.5	93.0	Hexachlorobutadiene	ND	NA
2-Hexanone	ND	NA	1,2,3-Trichlorobenzene	ND	NA
			Naphthalene	ND	NA

Surrogate	% Recovery
Dibromofluoromethane	104
1,2-Dichloroethane-D4	102
Toluene-D8	97.6
Bromofluorobenzene	101

ND= Not detected

ChemSolutions LLC
TABLE 18 (Page 1 of 2)
MATRIX SPIKE RESULTS
Project ID: STN115

Client Sample ID: MW-11-052214
Client Project ID: 212205045 WDEQ-Lobell
EPA Method 8260C
Units: ug/L
Spike Amount: 50 ug/L

Date Sampled: 5/22/14
Date Received: 5/27/14
Date Analyzed: 6/2/14
Sample Matrix: Water

Analyte	Amount Recovered	% Recovery	Analyte	Amount Recovered	% Recovery
Dichlorodifluoromethane	ND	NA	trans-1,3-Dichloropropene	ND	NA
Chloromethane	ND	NA	1,1,2-Trichloroethane	ND	NA
Vinyl Chloride	ND	NA	Tetrachloroethene	ND	NA
Bromomethane	ND	NA	Dibromochloromethane	ND	NA
Chloroethane	ND	NA	1,2-Dibromoethane	ND	NA
Trichlorofluoromethane	ND	NA	Chlorobenzene	50.4	101
Acetone	ND	NA	1,1,1,2-Tetrachloroethane	ND	NA
1,1-Dichloroethene	58.9	118	Ethylbenzene	ND	NA
Carbon Disulfide	ND	NA	Total Xylene	ND	NA
Methyl-tert-butyl ether	ND	NA	Styrene	ND	NA
Methylene Chloride	ND	NA	Isopropylbenzene	ND	NA
trans-1,2-Dichloroethene	ND	NA	Bromoform	ND	NA
1,1-Dichloroethane	ND	NA	n-Propylbenzene	ND	NA
Vinyl acetate	ND	NA	1,2,3-Trichloropropane	ND	NA
2-Butanone	ND	NA	2-Chlorotoluene	ND	NA
cis-1,2-Dichloroethene	ND	NA	1,3,5-Trimethylbenzene	ND	NA
Chloroform	ND	NA	4-Chlorotoluene	ND	NA
Tetrahydrofuran	ND	NA	t-Butylbenzene	ND	NA
1,1,1-Trichloroethane	ND	NA	1,2,4-Trimethylbenzene	ND	NA
Carbon Tetrachloride	ND	NA	sec-Butylbenzene	ND	NA
Benzene	56.1	112	p-Isopropyltoluene	ND	NA
1,2-Dichloroethane	ND	NA	1,1,2,2-Tetrachloroethane	ND	NA
Trichloroethene	53.8	108	1,3-Dichlorobenzene	ND	NA
1,2-Dichloropropane	ND	NA	1,4-Dichlorobenzene	ND	NA
Dibromomethane	ND	NA	n-Butylbenzene	ND	NA
Bromodichloromethane	ND	NA	1,2 Dichlorobenzene	ND	NA
cis-1,3-Dichloropropene	ND	NA	1,2-Dibromo-3-chloropropane	ND	NA
4-Methyl-2-pentanone	ND	NA	1,2,4-Trichlorobenzene	ND	NA
Toluene	52.6	105	Hexachlorobutadiene	ND	NA
2-Hexanone	ND	NA	1,2,3-Trichlorobenzene	ND	NA
			Naphthalene	ND	NA

Surrogate	% Recovery
Dibromofluoromethane	112
1,2-Dichloroethane-D4	109
Toluene-D8	101
Bromofluorobenzene	101

ND = Not Detected, NA = Not Analyzed

ChemSolutions LLC
TABLE 18 (Page 2 of 2)
MATRIX SPIKE DUPLICATE RESULTS
Project ID: STN115

Client Sample ID: MW-11-052214
Client Project ID: 212205045 WDEQ-Lobell
EPA Method 8260C
Units: ug/L
Spike Amount: 50 ug/L

Date Sampled: 5/22/14
Date Received: 5/27/14
Date Analyzed: 6/2/14
Sample Matrix: Water

Analyte	Amount Recovered	% Recovery	RPD	Analyte	Amount Recovered	% Recovery	RPD
Dichlorodifluoromethane	ND	NA	NA	trans-1,3-Dichloropropene	ND	NA	NA
Chloromethane	ND	NA	NA	1,1,2-Trichloroethane	ND	NA	NA
Vinyl Chloride	ND	NA	NA	Tetrachloroethene	ND	NA	NA
Bromomethane	ND	NA	NA	Dibromochloromethane	ND	NA	NA
Chloroethane	ND	NA	NA	1,2-Dibromoethane	ND	NA	NA
Trichlorofluoromethane	ND	NA	NA	Chlorobenzene	54.4	109	7.6
Acetone	ND	NA	NA	1,1,1,2-Tetrachloroethane	ND	NA	NA
1,1-Dichloroethene	61.1	122	3.7	Ethylbenzene	ND	NA	NA
Carbon Disulfide	ND	NA	NA	Total Xylene	ND	NA	NA
Methyl-tert-butyl ether	ND	NA	NA	Styrene	ND	NA	NA
Methylene Chloride	ND	NA	NA	Isopropylbenzene	ND	NA	NA
trans-1,2-Dichloroethene	ND	NA	NA	Bromoform	ND	NA	NA
1,1-Dichloroethane	ND	NA	NA	n-Propylbenzene	ND	NA	NA
Vinyl acetate	ND	NA	NA	1,2,3-Trichloropropane	ND	NA	NA
2-Butanone	ND	NA	NA	2-Chlorotoluene	ND	NA	NA
cis-1,2-Dichloroethene	ND	NA	NA	1,3,5-Trimethylbenzene	ND	NA	NA
Chloroform	ND	NA	NA	4-Chlorotoluene	ND	NA	NA
Tetrahydrofuran	ND	NA	NA	t-Butylbenzene	ND	NA	NA
1,1,1-Trichloroethane	ND	NA	NA	1,2,4-Trimethylbenzene	ND	NA	NA
Carbon Tetrachloride	ND	NA	NA	sec-Butylbenzene	ND	NA	NA
Benzene	61.6	123	9.3	p-Isopropyltoluene	ND	NA	NA
1,2-Dichloroethane	ND	NA	NA	1,1,2,2-Tetrachloroethane	ND	NA	NA
Trichloroethene	57.5	115	6.6	1,3-Dichlorobenzene	ND	NA	NA
1,2-Dichloropropane	ND	NA	NA	1,4-Dichlorobenzene	ND	NA	NA
Dibromomethane	ND	NA	NA	n-Butylbenzene	ND	NA	NA
Bromodichloromethane	ND	NA	NA	1,2 Dichlorobenzene	ND	NA	NA
cis-1,3-Dichloropropene	ND	NA	NA	1,2-Dibromo-3-chloropropane	ND	NA	NA
4-Methyl-2-pentanone	ND	NA	NA	1,2,4-Trichlorobenzene	ND	NA	NA
Toluene	56.5	113	7.1	Hexachlorobutadiene	ND	NA	NA
2-Hexanone	ND	NA	NA	1,2,3-Trichlorobenzene	ND	NA	NA
				Naphthalene	ND	NA	NA

Surrogate	% Recovery
Dibromofluoromethane	111
1,2-Dichloroethane-D4	108
Toluene-D8	100
Bromofluorobenzene	99.9

ND = Not Detected, NA = Not Analyzed

End of Report

Chain of Custody

ChemSolutions
7388 S. Revere Pkwy, #806
Centennial, CO 80112
Email: john@chemmobile.com
Phone: 303-771-5570
Fax: 303-771-5574

Client Name & Address: Russ Cirillo/Stantec, 2000 South Colorado Suite 2-300, Denver, CO 80222	Client Project Name & Location: WDEQ-Lobell, Casper, WY	ChemSolutions Project #: 57115
Contact: Russ Cirillo	Sampler: Byron Collins	Location Received: Base Lab
Phone #: 303 225 4660	Client Project Number: 212205045	Custody Seals: n/a
E-mail: Russ.Cirillo@Stantec.com	Invoice to: Russ Cirillo	Temperature Upon Receipt: 4°C

Sample ID	Date Sampled	Time Sampled	Grab or Comp	Matrix	# of Containers	Requested Analysis/Preservative: VOC 8260B (incl BTEX)	Remarks
MW-02-052214	5/22/14	1400	Grab	AQ	3	X	
MW-04-052214		1210				X	
MW-06-052214		1230				X	
MW-07-052214		1425				X	
MW-10-052214		1335				X	
MW-11-052214		1445				X	
MW-101-052214		1310				X	
MW-102-052214		1255				X	
MW-103-052214		1045				X	
MW-104-052214	↓	1105	↓	↓	↓	X	

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
[signature]	5/27/14	1515	[signature]	5/27/14	1515
Relinquished by:	Date:	Time:	Received by:	Date:	Time:

Chain of Custody

ChemSolutions

7388 S. Revere Pkwy, #806
Centennial, CO 80112
Email: john@chemmobile.com

Phone: 303-771-5570
Fax: 303-771-5574

Client Name & Address: Stantec 2000 South Colorado Blvd Suite 2-300 Denver, CO 80222	Client Project Name & Location: WDEQ-Lobell Casper, WY	ChemSolutions Project #: STN115
Contact: Russ Cirillo	Sampler: Byron Collins	Location Received: Base Lab
Phone #: 303 285 4000	Client Project Number: 21220504S	Custody Seals: n/a
E-mail: Russ.Cirillo@Stantec.com	Invoice to: Russ Cirillo	Temperature Upon Receipt: 4°C

Sample ID	Date Sampled	Time Sampled	Grab or Comp	Matrix	# of Containers	Requested Analysis/Preservative: VOC 8260B (incl. BTEX)								Remarks
MW-105-052214	5/22/14	1010	Grab	AQ	3	X								
MW-106-052214	5/22/14	1510	↓	↓	↓	X								
MW-107-052314	5/23/14	930	↓	↓	↓	X								
MW-108-052314	5/23/14	0900	↓	↓	↓	X								
TB-01	—	—		AQ		X								Trip Blank

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
[signature]	5/27/14	1515	[signature]	5/27/14	1515
Relinquished by:	Date:	Time:	Received by:	Date:	Time:
[signature]					

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6/11/2014
Mr. Russ Cirillo
Stantec Consulting Corporation
2000 South Colorado Boulevard
Suite 2-300
Denver CO 80222

Project Name: Lobell
Project #:
Workorder #: 1405490C

Dear Mr. Russ Cirillo

The following report includes the data for the above referenced project for sample(s) received on 5/28/2014 at Air Toxics Ltd.

The data and associated QC analyzed by Modified ASTM D-1946 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kelly Buettner at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kelly Buettner

Project Manager

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WORK ORDER #: 1405490C

Work Order Summary

CLIENT:	Mr. Russ Cirillo Stantec Consulting Corporation 2000 South Colorado Boulevard Suite 2-300 Denver, CO 80222	**BILL TO:**	Mr. Pat Vaughan Stantec Consulting Corporation 9400 SW Barnes Road Suite 200 Portland, OR 97225
PHONE:	303-758-4058	**P.O. #**	212205045
FAX:	303-758-4828	**PROJECT #**	Lobell
DATE RECEIVED:	05/28/2014	**CONTACT:**	Kelly Buettner
DATE COMPLETED:	06/11/2014		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	SVE-1D	Modified ASTM D-1946	11.4 "Hg	14.9 psi
02A	SVE-1S	Modified ASTM D-1946	12.8 "Hg	15 psi
03A	VP-01	Modified ASTM D-1946	11.4 "Hg	15.4 psi
04A	VP-02	Modified ASTM D-1946	11.8 "Hg	15.1 psi
05A	VP-03	Modified ASTM D-1946	11.8 "Hg	15.1 psi
06A	VP-04	Modified ASTM D-1946	0.5 "Hg	15 psi
07A	VP-06	Modified ASTM D-1946	12.0 "Hg	15 psi
08A	VP-09	Modified ASTM D-1946	11.0 "Hg	15 psi
09A	VP-10	Modified ASTM D-1946	12.0 "Hg	16 psi
10A	VP-11R	Modified ASTM D-1946	12.0 "Hg	15 psi
11A	VP-12	Modified ASTM D-1946	12.5 "Hg	15 psi
12A	VP-13	Modified ASTM D-1946	12.0 "Hg	15 psi
13A	VP-14	Modified ASTM D-1946	11.0 "Hg	15 psi
14A	VP-101	Modified ASTM D-1946	11.8 "Hg	15.1 psi
15A	VP-102	Modified ASTM D-1946	11.6 "Hg	15.3 psi
16A	VP-103	Modified ASTM D-1946	10.6 "Hg	15.5 psi
17A	VP-104	Modified ASTM D-1946	11.8 "Hg	15.5 psi
18A	VP-105	Modified ASTM D-1946	11.2 "Hg	15 psi
19A	VP-106	Modified ASTM D-1946	10.8 "Hg	15.4 psi
20A	L-001	Modified ASTM D-1946	10 "Hg	14.5 psi
21A	Lab Blank	Modified ASTM D-1946	NA	NA
22A	LCS	Modified ASTM D-1946	NA	NA
22AA	LCSD	Modified ASTM D-1946	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 06/11/14

Technical Director

Certification numbers: AZ Licensure AZ0775, CA NELAP - 12282CA, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-13-6, UT NELAP CA009332013-4, VA NELAP - 460197, WA NELAP - C935
Name of Accrediting Agency: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2013, Expiration date: 10/17/2014.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 9563
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
Modified ASTM D-1946
Stantec Consulting Corporation
Workorder# 1405490C

Twenty 1 Liter Summa Canister samples were received on May 28, 2014. The laboratory performed analysis via Modified ASTM Method D-1946 for Helium in air using GC/TCD. The method involves direct injection of 1.0 mL of sample.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	***ASTM D-1946***	***ATL Modifications***
Calibration	A single point calibration is performed using a reference standard closely matching the composition of the unknown.	A minimum of 5-point calibration curve is performed. Quantitation is based on average Response Factor.
Reference Standard	The composition of any reference standard must be known to within 0.01 mol % for any component.	The standards used by ATL are blended to a >/= 95% accuracy.
Sample Injection Volume	Components whose concentrations are in excess of 5 % should not be analyzed by using sample volumes greater than 0.5 mL.	The sample container is connected directly to a fixed volume sample loop of 1.0 mL on the GC. Linear range is defined by the calibration curve. Bags are loaded by vacuum.
Normalization	Normalize the mole percent values by multiplying each value by 100 and dividing by the sum of the original values. The sum of the original values should not differ from 100% by more than 1.0%.	Results are not normalized. The sum of the reported values can differ from 100% by as much as 15%, either due to analytical variability or an unusual sample matrix.
Precision	Precision requirements established at each concentration level.	Duplicates should agree within 25% RPD for detections > 5 X's the RL.

Receiving Notes

The Chain of Custody (COC) was not relinquished properly. A signature and date were not provided by the field sampler.

There was a significant difference (greater than 5.0" Hg) between the measured canister receipt vacuum and that which was reported on the Chain of Custody (COC) for sample VP-04. A leak test

indicated that the valve was functioning properly.

Analytical Notes

There were no analytical discrepancies.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:
B - Compound present in laboratory blank greater than reporting limit.
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the detection limit.
M - Reported value may be biased due to apparent matrix interferences.
File extensions may have been used on the data analysis sheets and indicates as follows:
a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

Client Sample ID: SVE-1D

Lab ID#: 1405490C-01A
No Detections Were Found.

Client Sample ID: SVE-1S

Lab ID#: 1405490C-02A
No Detections Were Found.

Client Sample ID: VP-01

Lab ID#: 1405490C-03A
No Detections Were Found.

Client Sample ID: VP-02

Lab ID#: 1405490C-04A
No Detections Were Found.

Client Sample ID: VP-03

Lab ID#: 1405490C-05A
No Detections Were Found.

Client Sample ID: VP-04

Lab ID#: 1405490C-06A
No Detections Were Found.

Client Sample ID: VP-06

Lab ID#: 1405490C-07A
No Detections Were Found.

Client Sample ID: VP-09

Lab ID#: 1405490C-08A
No Detections Were Found.

Client Sample ID: VP-10

Lab ID#: 1405490C-09A

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Summary of Detected Compounds
NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

Client Sample ID: VP-10

Lab ID#: 1405490C-09A
No Detections Were Found.

Client Sample ID: VP-11R

Lab ID#: 1405490C-10A
No Detections Were Found.

Client Sample ID: VP-12

Lab ID#: 1405490C-11A
No Detections Were Found.

Client Sample ID: VP-13

Lab ID#: 1405490C-12A
No Detections Were Found.

Client Sample ID: VP-14

Lab ID#: 1405490C-13A
No Detections Were Found.

Client Sample ID: VP-101

Lab ID#: 1405490C-14A
No Detections Were Found.

Client Sample ID: VP-102

Lab ID#: 1405490C-15A
No Detections Were Found.

Client Sample ID: VP-103

Lab ID#: 1405490C-16A
No Detections Were Found.

Client Sample ID: VP-104

Lab ID#: 1405490C-17A

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Summary of Detected Compounds
NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

Client Sample ID: VP-104

Lab ID#: 1405490C-17A

No Detections Were Found.

Client Sample ID: VP-105

Lab ID#: 1405490C-18A

No Detections Were Found.

Client Sample ID: VP-106

Lab ID#: 1405490C-19A

No Detections Were Found.

Client Sample ID: L-001

Lab ID#: 1405490C-20A

No Detections Were Found.

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Client Sample ID: SVE-1D

Lab ID#: 1405490C-01A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052904**	**Date of Collection: 5/21/14 1:30:00 PM**	
Dil. Factor:	**3.25**	**Date of Analysis: 5/29/14 03:53 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.16	Not Detected

Container Type: 1 Liter Summa Canister

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Client Sample ID: SVE-1S

Lab ID#: 1405490C-02A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052905**	**Date of Collection: 5/22/14 11:30:00 AM**	
Dil. Factor:	**3.54**	**Date of Analysis: 5/29/14 04:01 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.18	Not Detected

Container Type: 1 Liter Summa Canister

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Client Sample ID: VP-01

Lab ID#: 1405490C-03A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052906**	**Date of Collection: 5/20/14 4:05:00 PM**	
Dil. Factor:	**3.31**	**Date of Analysis: 5/29/14 04:18 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.16	Not Detected

Container Type: 1 Liter Summa Canister

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Client Sample ID: VP-02

Lab ID#: 1405490C-04A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052907**	**Date of Collection: 5/21/14 12:25:00 PM**	
Dil. Factor:	**3.35**	**Date of Analysis: 5/29/14 04:33 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.17	Not Detected

Container Type: 1 Liter Summa Canister

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Client Sample ID: VP-03

Lab ID#: 1405490C-05A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052908**	**Date of Collection: 5/20/14 7:05:00 PM**	
Dil. Factor:	**3.35**	**Date of Analysis: 5/29/14 04:41 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.17	Not Detected

Container Type: 1 Liter Summa Canister

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Client Sample ID: VP-04

Lab ID#: 1405490C-06A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052909**	**Date of Collection: 5/20/14 6:15:00 PM**	
Dil. Factor:	**2.05**	**Date of Analysis: 5/29/14 04:53 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.10	Not Detected

Container Type: 1 Liter Summa Canister

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Client Sample ID: VP-06

Lab ID#: 1405490C-07A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052910**	**Date of Collection: 5/21/14 11:15:00 AM**	
Dil. Factor:	**3.37**	**Date of Analysis: 5/29/14 05:03 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.17	Not Detected

Container Type: 1 Liter Summa Canister

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Client Sample ID: VP-09

Lab ID#: 1405490C-08A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052911**	**Date of Collection: 5/21/14 3:50:00 PM**	
Dil. Factor:	**3.19**	**Date of Analysis: 5/29/14 06:21 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.16	Not Detected

Container Type: 1 Liter Summa Canister

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Client Sample ID: VP-10

Lab ID#: 1405490C-09A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052912**	**Date of Collection: 5/20/14 3:10:00 PM**	
Dil. Factor:	**3.48**	**Date of Analysis: 5/29/14 06:34 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.17	Not Detected

Container Type: 1 Liter Summa Canister

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Client Sample ID: VP-11R

Lab ID#: 1405490C-10A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052913**	**Date of Collection: 5/20/14 5:50:00 PM**	
Dil. Factor:	**3.37**	**Date of Analysis: 5/29/14 06:45 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.17	Not Detected

Container Type: 1 Liter Summa Canister

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Client Sample ID: VP-12

Lab ID#: 1405490C-11A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052914**	**Date of Collection: 5/20/14 3:40:00 PM**	
Dil. Factor:	**3.46**	**Date of Analysis: 5/29/14 06:53 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.17	Not Detected

Container Type: 1 Liter Summa Canister

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Client Sample ID: VP-13

Lab ID#: 1405490C-12A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052915**	**Date of Collection: 5/21/14 11:50:00 AM**	
Dil. Factor:	**3.37**	**Date of Analysis: 5/29/14 07:03 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.17	Not Detected

Container Type: 1 Liter Summa Canister

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Client Sample ID: VP-14

Lab ID#: 1405490C-13A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052916**	**Date of Collection: 5/21/14 11:35:00 AM**	
Dil. Factor:	**3.19**	**Date of Analysis: 5/29/14 07:21 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.16	Not Detected

Container Type: 1 Liter Summa Canister

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Client Sample ID: VP-101

Lab ID#: 1405490C-14A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052917**	**Date of Collection: 5/21/14 10:40:00 AM**	
Dil. Factor:	**3.35**	**Date of Analysis: 5/29/14 07:39 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.17	Not Detected

Container Type: 1 Liter Summa Canister

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Client Sample ID: VP-102

Lab ID#: 1405490C-15A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052918**	**Date of Collection: 5/20/14 5:30:00 PM**	
Dil. Factor:	**3.33**	**Date of Analysis: 5/29/14 08:23 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.17	Not Detected

Container Type: 1 Liter Summa Canister

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Client Sample ID: VP-103

Lab ID#: 1405490C-16A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052919**	**Date of Collection: 5/21/14 2:40:00 PM**	
Dil. Factor:	**3.18**	**Date of Analysis: 5/29/14 08:32 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.16	Not Detected

Container Type: 1 Liter Summa Canister

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Client Sample ID: VP-104

Lab ID#: 1405490C-17A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052920**	**Date of Collection: 5/21/14 3:15:00 PM**	
Dil. Factor:	**3.39**	**Date of Analysis: 5/29/14 08:40 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.17	Not Detected

Container Type: 1 Liter Summa Canister

eurofins | Air Toxics

Client Sample ID: VP-105

Lab ID#: 1405490C-18A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052921**	**Date of Collection: 5/20/14 6:35:00 PM**	
Dil. Factor:	**3.23**	**Date of Analysis: 5/29/14 08:51 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.16	Not Detected

Container Type: 1 Liter Summa Canister

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Client Sample ID: VP-106

Lab ID#: 1405490C-19A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052922**	**Date of Collection: 5/21/14 2:30:00 PM**	
Dil. Factor:	**3.20**	**Date of Analysis: 5/29/14 08:58 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.16	Not Detected

Container Type: 1 Liter Summa Canister

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Client Sample ID: L-001

Lab ID#: 1405490C-20A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052923**	**Date of Collection: 5/21/14 3:30:00 PM**	
Dil. Factor:	**2.98**	**Date of Analysis: 5/29/14 09:08 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.15	Not Detected

Container Type: 1 Liter Summa Canister

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Client Sample ID: Lab Blank

Lab ID#: 1405490C-21A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052903**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/29/14 03:21 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.050	Not Detected

Container Type: NA - Not Applicable

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Client Sample ID: LCS

Lab ID#: 1405490C-22A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052902**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/29/14 03:10 PM**	

Compound	%Recovery	Method Limits
Helium	101	85-115

Container Type: NA - Not Applicable

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Client Sample ID: LCSD

Lab ID#: 1405490C-22AA

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052924**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/29/14 09:27 PM**	

Compound	%Recovery	Method Limits
Helium	101	85-115

Container Type: NA - Not Applicable

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Sample Transportation Notice
Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection, handling or shipping of these samples. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action, of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922

180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630-4719
(916) 985-1000 FAX (916) 985-1020

Project Manager Russ Cirillo

Collected by: (Print and Sign) Byron Collins

Company Stantec Email

Address 2000 S. Colorado Suite 2-300 City Denver State CO Zip 80222

Phone 303 285 1600 Fax

Project Info:
P.O. # 2122050145
Project #
Project Name Lobell

Turn Around Time:
❑ Normal
❑ Rush
specify

Lab Use Only
Pressurized by:
Date:
Pressurization Gas: N_2 He

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum Initial	Final	Receipt	Final (psi)
01A	SVE-1D	1L1627	5/21/14	1330	TO15, Helium	-24	-7		
02A	SVE-1S	36543	5/22/14	1130		-24	-7		
03A	VP-01	36450	5/20/14	1605		-23.5	-7		
04A	VP-02	37751	5/21/14	1225		-24	-7		
05A	VP-03	1L1626	5/20/14	1905		-24	-7		
06A	VP-04	2100	5/20/14	1815		-24.5	-7		
07A	VP-06	35545	5/21/14	1115		-25	-7		
08A	VP-09	1L1598	5/21/14	1550		-25	-7		
09A	VP-10	34174	5/20/14	1510		-25	-7		
10A	VP-11R	1L1565	5/20/14	1750		-24	-7		

Relinquished by: (signature) Date/Time	Received by: (signature) Date/Time
	EAT 05/28/14 1035
Relinquished by: (signature) Date/Time	Received by: (signature) Date/Time
Relinquished by: (signature) Date/Time	Received by: (signature) Date/Time

Notes:

Lab Use Only

Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
Fedex		N/A	SOR	Yes No None	1405490

Form 1293 rev.11

eurofins | Air Toxics

Sample Transportation Notice
Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection, handling or shipping of these samples. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action, of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922

180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630-4719
(916) 985-1000 FAX (916) 985-1020

Project Manager Russ Cirillo

Collected by: (Print and Sign) Byron Collins

Company Stantec Email Russ.Cirillo@stantec.com

Address 2000 S. Colorado Suite 2-300 City Denver State CO Zip 80222

Phone 303 285 4600 Fax

Project Info:
P.O. # 2122050415
Project #
Project Name Lobell

Turn Around Time:
❑ Normal
❑ Rush
specify

Lab Use Only
Pressurized by:
Date:
Pressurization Gas: N_2 He

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum Initial	Final	Receipt	Final (psi)
11A	VP-12	35552	5/20/14	1540	TO15, Helium	-24	-7		
12A	VP-13	36465	5/21/14	1150		-25	-7		
13A	VP-14	14507	5/21/14	1135		-24.5	-7		
14A	VP-101	37711	5/21/14	1040		-24.5	-7		
15A	VP-102	IL1611	5/20/14	1730		-24	-7		
16A	VP-103	34126	5/21/14	1440		-23.5	-7		
17A	VP-104	IL1666	5/21/14	1515		-24	-7		
18A	VP-105	IL1650	5/20/14	1835		-24	-7		
19A	VP-106	37710	5/21/14	1430		-25	-7		
20A	L-001	20771	5/21/14	1530	TO15, Helium	-25	-7		

Relinquished by: (signature) Date/Time	Received by: (signature) Date/Time	Notes:
	[illegible] EAT 05/28/14 1035	
Relinquished by: (signature) Date/Time	Received by: (signature) Date/Time	
Relinquished by: (signature) Date/Time	Received by: (signature) Date/Time	

Lab Use Only	Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
	Fedex		NA	SDR	Yes No None	1405490

eurofins | Air Toxics

6/11/2014
Mr. Russ Cirillo
Stantec Consulting Corporation
2000 South Colorado Boulevard
Suite 2-300
Denver CO 80222

Project Name: Lobell
Project #:
Workorder #: 1405490B

Dear Mr. Russ Cirillo

The following report includes the data for the above referenced project for sample(s) received on 5/28/2014 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 SIM are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kelly Buettner at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kelly Buettner

Project Manager

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WORK ORDER #: 1405490B

Work Order Summary

CLIENT:	Mr. Russ Cirillo Stantec Consulting Corporation 2000 South Colorado Boulevard Suite 2-300 Denver, CO 80222	**BILL TO:**	Mr. Pat Vaughan Stantec Consulting Corporation 9400 SW Barnes Road Suite 200 Portland, OR 97225
PHONE:	303-758-4058	**P.O. #**	212205045
FAX:	303-758-4828	**PROJECT #**	Lobell
DATE RECEIVED:	05/28/2014	**CONTACT:**	Kelly Buettner
DATE COMPLETED:	06/09/2014		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
21A	IA-10	Modified TO-15 SIM	6.3 "Hg	5.2 psi
22A	IA-11	Modified TO-15 SIM	6.9 "Hg	5 psi
23A	Lab Blank	Modified TO-15 SIM	NA	NA
24A	CCV	Modified TO-15 SIM	NA	NA
25A	LCS	Modified TO-15 SIM	NA	NA
25AA	LCSD	Modified TO-15 SIM	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 06/11/14

Technical Director

Certification numbers: AZ Licensure AZ0775, CA NELAP - 12282CA, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-13-6, UT NELAP CA009332013-4, VA NELAP - 460197, WA NELAP - C935
Name of Accrediting Agency: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2013, Expiration date: 10/17/2014.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 9563
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
Modified TO-15 SIM
Stantec Consulting Corporation
Workorder# 1405490B

Two 6 Liter Summa Canister (SIM Certified) samples were received on May 28, 2014. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the SIM acquisition mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	***TO-15***	***ATL Modifications***
ICAL %RSD acceptance criteria	</=30% RSD with 2 compounds allowed out to < 40% RSD	Project specific; default criteria is </=30% RSD with 10% of compounds allowed out to < 40% RSD
Daily Calibration	+- 30% Difference	Project specific; default criteria is </= 30% Difference with 10% of compounds allowed out up to </=40%.; flag and narrate outliers
Blank and standards	Zero air	Nitrogen
Method Detection Limit	Follow 40CFR Pt.136 App. B	The MDL met all relevant requirements in Method TO-15 (statistical MDL less than the LOQ). The concentration of the spiked replicate may have exceeded 10X the calculated MDL in some cases

Receiving Notes

The Chain of Custody (COC) was not relinquished properly. A signature and date were not provided by the field sampler.

Analytical Notes

There were no analytical discrepancies.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
MODIFIED EPA METHOD TO-15 GC/MS SIM

Client Sample ID: IA-10

Lab ID#: 1405490B-21A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1,1-Trichloroethane	0.034	0.096	0.19	0.52
Benzene	0.086	0.24	0.27	0.78
Trichloroethene	0.034	0.038	0.18	0.21
Toluene	0.034	0.73	0.13	2.7
Tetrachloroethene	0.034	20	0.23	130
Ethyl Benzene	0.034	0.11	0.15	0.48
m,p-Xylene	0.069	0.33	0.30	1.4
o-Xylene	0.034	0.11	0.15	0.47

Client Sample ID: IA-11

Lab ID#: 1405490B-22A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1,1-Trichloroethane	0.035	0.10	0.19	0.56
Benzene	0.087	0.30	0.28	0.94
Toluene	0.035	0.92	0.13	3.5
Tetrachloroethene	0.035	9.0	0.24	61
Ethyl Benzene	0.035	0.14	0.15	0.62
m,p-Xylene	0.070	0.45	0.30	2.0
o-Xylene	0.035	0.15	0.15	0.64

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Client Sample ID: IA-10

Lab ID#: 1405490B-21A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**v060225sim**	**Date of Collection:**	**5/21/14 8:10:00 AM**
Dil. Factor:	**1.72**	**Date of Analysis:**	**6/3/14 12:22 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.017	Not Detected	0.044	Not Detected
1,1-Dichloroethene	0.017	Not Detected	0.068	Not Detected
1,1-Dichloroethane	0.034	Not Detected	0.14	Not Detected
cis-1,2-Dichloroethene	0.034	Not Detected	0.14	Not Detected
1,1,1-Trichloroethane	0.034	0.096	0.19	0.52
Benzene	0.086	0.24	0.27	0.78
1,2-Dichloroethane	0.034	Not Detected	0.14	Not Detected
Trichloroethene	0.034	0.038	0.18	0.21
Toluene	0.034	0.73	0.13	2.7
1,1,2-Trichloroethane	0.034	Not Detected	0.19	Not Detected
Tetrachloroethene	0.034	20	0.23	130
Ethyl Benzene	0.034	0.11	0.15	0.48
m,p-Xylene	0.069	0.33	0.30	1.4
o-Xylene	0.034	0.11	0.15	0.47
1,1,2,2-Tetrachloroethane	0.034	Not Detected	0.24	Not Detected
trans-1,2-Dichloroethene	0.17	Not Detected	0.68	Not Detected
Methyl tert-butyl ether	0.17	Not Detected	0.62	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	89	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	102	70-130

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Client Sample ID: IA-11

Lab ID#: 1405490B-22A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**v060226sim**	**Date of Collection:**	**5/23/14 9:00:00 AM**
Dil. Factor:	**1.74**	**Date of Analysis:**	**6/3/14 01:36 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.017	Not Detected	0.044	Not Detected
1,1-Dichloroethene	0.017	Not Detected	0.069	Not Detected
1,1-Dichloroethane	0.035	Not Detected	0.14	Not Detected
cis-1,2-Dichloroethene	0.035	Not Detected	0.14	Not Detected
1,1,1-Trichloroethane	0.035	0.10	0.19	0.56
Benzene	0.087	0.30	0.28	0.94
1,2-Dichloroethane	0.035	Not Detected	0.14	Not Detected
Trichloroethene	0.035	Not Detected	0.19	Not Detected
Toluene	0.035	0.92	0.13	3.5
1,1,2-Trichloroethane	0.035	Not Detected	0.19	Not Detected
Tetrachloroethene	0.035	9.0	0.24	61
Ethyl Benzene	0.035	0.14	0.15	0.62
m,p-Xylene	0.070	0.45	0.30	2.0
o-Xylene	0.035	0.15	0.15	0.64
1,1,2,2-Tetrachloroethane	0.035	Not Detected	0.24	Not Detected
trans-1,2-Dichloroethene	0.17	Not Detected	0.69	Not Detected
Methyl tert-butyl ether	0.17	Not Detected	0.63	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	91	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	108	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1405490B-23A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**v060219sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/2/14 11:07 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.010	Not Detected	0.026	Not Detected
1,1-Dichloroethene	0.010	Not Detected	0.040	Not Detected
1,1-Dichloroethane	0.020	Not Detected	0.081	Not Detected
cis-1,2-Dichloroethene	0.020	Not Detected	0.079	Not Detected
1,1,1-Trichloroethane	0.020	Not Detected	0.11	Not Detected
Benzene	0.050	Not Detected	0.16	Not Detected
1,2-Dichloroethane	0.020	Not Detected	0.081	Not Detected
Trichloroethene	0.020	Not Detected	0.11	Not Detected
Toluene	0.020	Not Detected	0.075	Not Detected
1,1,2-Trichloroethane	0.020	Not Detected	0.11	Not Detected
Tetrachloroethene	0.020	Not Detected	0.14	Not Detected
Ethyl Benzene	0.020	Not Detected	0.087	Not Detected
m,p-Xylene	0.040	Not Detected	0.17	Not Detected
o-Xylene	0.020	Not Detected	0.087	Not Detected
1,1,2,2-Tetrachloroethane	0.020	Not Detected	0.14	Not Detected
trans-1,2-Dichloroethene	0.10	Not Detected	0.40	Not Detected
Methyl tert-butyl ether	0.10	Not Detected	0.36	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	84	70-130
Toluene-d8	95	70-130
4-Bromofluorobenzene	109	70-130

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Client Sample ID: CCV

Lab ID#: 1405490B-24A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**v060215sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/2/14 08:08 PM**	

Compound	%Recovery
Vinyl Chloride	74
1,1-Dichloroethene	90
1,1-Dichloroethane	84
cis-1,2-Dichloroethene	94
1,1,1-Trichloroethane	88
Benzene	86
1,2-Dichloroethane	83
Trichloroethene	96
Toluene	88
1,1,2-Trichloroethane	98
Tetrachloroethene	102
Ethyl Benzene	105
m,p-Xylene	109
o-Xylene	113
1,1,2,2-Tetrachloroethane	91
trans-1,2-Dichloroethene	92
Methyl tert-butyl ether	87

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	86	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	115	70-130

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Client Sample ID: LCS

Lab ID#: 1405490B-25A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**v060216sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/2/14 08:53 PM**	

Compound	%Recovery	Method Limits
Vinyl Chloride	71	70-130
1,1-Dichloroethene	99	70-130
1,1-Dichloroethane	84	70-130
cis-1,2-Dichloroethene	104	70-130
1,1,1-Trichloroethane	85	70-130
Benzene	84	70-130
1,2-Dichloroethane	82	70-130
Trichloroethene	96	70-130
Toluene	84	70-130
1,1,2-Trichloroethane	95	70-130
Tetrachloroethene	102	70-130
Ethyl Benzene	101	70-130
m,p-Xylene	103	70-130
o-Xylene	105	70-130
1,1,2,2-Tetrachloroethane	88	70-130
trans-1,2-Dichloroethene	78	70-130
Methyl tert-butyl ether	85	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	85	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	114	70-130

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Client Sample ID: LCSD

Lab ID#: 1405490B-25AA

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**v060217sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/2/14 09:39 PM**	

Compound	%Recovery	Method Limits
Vinyl Chloride	71	70-130
1,1-Dichloroethene	99	70-130
1,1-Dichloroethane	83	70-130
cis-1,2-Dichloroethene	103	70-130
1,1,1-Trichloroethane	85	70-130
Benzene	83	70-130
1,2-Dichloroethane	80	70-130
Trichloroethene	95	70-130
Toluene	83	70-130
1,1,2-Trichloroethane	93	70-130
Tetrachloroethene	102	70-130
Ethyl Benzene	100	70-130
m,p-Xylene	103	70-130
o-Xylene	103	70-130
1,1,2,2-Tetrachloroethane	86	70-130
trans-1,2-Dichloroethene	78	70-130
Methyl tert-butyl ether	86	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	85	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	114	70-130

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6/11/2014
Mr. Russ Cirillo
Stantec Consulting Corporation
2000 South Colorado Boulevard
Suite 2-300
Denver CO 80222

Project Name: Lobell
Project #:
Workorder #: 1405490C

Dear Mr. Russ Cirillo

The following report includes the data for the above referenced project for sample(s) received on 5/28/2014 at Air Toxics Ltd.

The data and associated QC analyzed by Modified ASTM D-1946 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kelly Buettner at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kelly Buettner

Project Manager

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WORK ORDER #: 1405490C

Work Order Summary

CLIENT:	Mr. Russ Cirillo Stantec Consulting Corporation 2000 South Colorado Boulevard Suite 2-300 Denver, CO 80222	**BILL TO:**	Mr. Pat Vaughan Stantec Consulting Corporation 9400 SW Barnes Road Suite 200 Portland, OR 97225
PHONE:	303-758-4058	**P.O. #**	212205045
FAX:	303-758-4828	**PROJECT #**	Lobell
DATE RECEIVED:	05/28/2014	**CONTACT:**	Kelly Buettner
DATE COMPLETED:	06/11/2014		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	SVE-1D	Modified ASTM D-1946	11.4 "Hg	14.9 psi
02A	SVE-1S	Modified ASTM D-1946	12.8 "Hg	15 psi
03A	VP-01	Modified ASTM D-1946	11.4 "Hg	15.4 psi
04A	VP-02	Modified ASTM D-1946	11.8 "Hg	15.1 psi
05A	VP-03	Modified ASTM D-1946	11.8 "Hg	15.1 psi
06A	VP-04	Modified ASTM D-1946	0.5 "Hg	15 psi
07A	VP-06	Modified ASTM D-1946	12.0 "Hg	15 psi
08A	VP-09	Modified ASTM D-1946	11.0 "Hg	15 psi
09A	VP-10	Modified ASTM D-1946	12.0 "Hg	16 psi
10A	VP-11R	Modified ASTM D-1946	12.0 "Hg	15 psi
11A	VP-12	Modified ASTM D-1946	12.5 "Hg	15 psi
12A	VP-13	Modified ASTM D-1946	12.0 "Hg	15 psi
13A	VP-14	Modified ASTM D-1946	11.0 "Hg	15 psi
14A	VP-101	Modified ASTM D-1946	11.8 "Hg	15.1 psi
15A	VP-102	Modified ASTM D-1946	11.6 "Hg	15.3 psi
16A	VP-103	Modified ASTM D-1946	10.6 "Hg	15.5 psi
17A	VP-104	Modified ASTM D-1946	11.8 "Hg	15.5 psi
18A	VP-105	Modified ASTM D-1946	11.2 "Hg	15 psi
19A	VP-106	Modified ASTM D-1946	10.8 "Hg	15.4 psi
20A	L-001	Modified ASTM D-1946	10 "Hg	14.5 psi
21A	Lab Blank	Modified ASTM D-1946	NA	NA
22A	LCS	Modified ASTM D-1946	NA	NA
22AA	LCSD	Modified ASTM D-1946	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 06/11/14

Technical Director

Certification numbers: AZ Licensure AZ0775, CA NELAP - 12282CA, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-13-6, UT NELAP CA009332013-4, VA NELAP - 460197, WA NELAP - C935
Name of Accrediting Agency: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2013, Expiration date: 10/17/2014.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 9563
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
Modified ASTM D-1946
Stantec Consulting Corporation
Workorder# 1405490C

Twenty 1 Liter Summa Canister samples were received on May 28, 2014. The laboratory performed analysis via Modified ASTM Method D-1946 for Helium in air using GC/TCD. The method involves direct injection of 1.0 mL of sample.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	***ASTM D-1946***	***ATL Modifications***
Calibration	A single point calibration is performed using a reference standard closely matching the composition of the unknown.	A minimum of 5-point calibration curve is performed. Quantitation is based on average Response Factor.
Reference Standard	The composition of any reference standard must be known to within 0.01 mol % for any component.	The standards used by ATL are blended to a >/= 95% accuracy.
Sample Injection Volume	Components whose concentrations are in excess of 5 % should not be analyzed by using sample volumes greater than 0.5 mL.	The sample container is connected directly to a fixed volume sample loop of 1.0 mL on the GC. Linear range is defined by the calibration curve. Bags are loaded by vacuum.
Normalization	Normalize the mole percent values by multiplying each value by 100 and dividing by the sum of the original values. The sum of the original values should not differ from 100% by more than 1.0%.	Results are not normalized. The sum of the reported values can differ from 100% by as much as 15%, either due to analytical variability or an unusual sample matrix.
Precision	Precision requirements established at each concentration level.	Duplicates should agree within 25% RPD for detections > 5 X's the RL.

Receiving Notes

The Chain of Custody (COC) was not relinquished properly. A signature and date were not provided by the field sampler.

There was a significant difference (greater than 5.0" Hg) between the measured canister receipt vacuum and that which was reported on the Chain of Custody (COC) for sample VP-04. A leak test

indicated that the valve was functioning properly.

Analytical Notes

There were no analytical discrepancies.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:
B - Compound present in laboratory blank greater than reporting limit.
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the detection limit.
M - Reported value may be biased due to apparent matrix interferences.
File extensions may have been used on the data analysis sheets and indicates as follows:
a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

Client Sample ID: SVE-1D

Lab ID#: 1405490C-01A
No Detections Were Found.

Client Sample ID: SVE-1S

Lab ID#: 1405490C-02A
No Detections Were Found.

Client Sample ID: VP-01

Lab ID#: 1405490C-03A
No Detections Were Found.

Client Sample ID: VP-02

Lab ID#: 1405490C-04A
No Detections Were Found.

Client Sample ID: VP-03

Lab ID#: 1405490C-05A
No Detections Were Found.

Client Sample ID: VP-04

Lab ID#: 1405490C-06A
No Detections Were Found.

Client Sample ID: VP-06

Lab ID#: 1405490C-07A
No Detections Were Found.

Client Sample ID: VP-09

Lab ID#: 1405490C-08A
No Detections Were Found.

Client Sample ID: VP-10

Lab ID#: 1405490C-09A

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Summary of Detected Compounds
NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

Client Sample ID: VP-10

Lab ID#: 1405490C-09A
No Detections Were Found.

Client Sample ID: VP-11R

Lab ID#: 1405490C-10A
No Detections Were Found.

Client Sample ID: VP-12

Lab ID#: 1405490C-11A
No Detections Were Found.

Client Sample ID: VP-13

Lab ID#: 1405490C-12A
No Detections Were Found.

Client Sample ID: VP-14

Lab ID#: 1405490C-13A
No Detections Were Found.

Client Sample ID: VP-101

Lab ID#: 1405490C-14A
No Detections Were Found.

Client Sample ID: VP-102

Lab ID#: 1405490C-15A
No Detections Were Found.

Client Sample ID: VP-103

Lab ID#: 1405490C-16A
No Detections Were Found.

Client Sample ID: VP-104

Lab ID#: 1405490C-17A

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Summary of Detected Compounds
NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

Client Sample ID: VP-104

Lab ID#: 1405490C-17A

No Detections Were Found.

Client Sample ID: VP-105

Lab ID#: 1405490C-18A

No Detections Were Found.

Client Sample ID: VP-106

Lab ID#: 1405490C-19A

No Detections Were Found.

Client Sample ID: L-001

Lab ID#: 1405490C-20A

No Detections Were Found.

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Client Sample ID: SVE-1D

Lab ID#: 1405490C-01A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052904**	**Date of Collection: 5/21/14 1:30:00 PM**	
Dil. Factor:	**3.25**	**Date of Analysis: 5/29/14 03:53 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.16	Not Detected

Container Type: 1 Liter Summa Canister

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Client Sample ID: SVE-1S

Lab ID#: 1405490C-02A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052905**	**Date of Collection: 5/22/14 11:30:00 AM**	
Dil. Factor:	**3.54**	**Date of Analysis: 5/29/14 04:01 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.18	Not Detected

Container Type: 1 Liter Summa Canister

eurofins | Air Toxics

Client Sample ID: VP-01

Lab ID#: 1405490C-03A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052906**	**Date of Collection: 5/20/14 4:05:00 PM**	
Dil. Factor:	**3.31**	**Date of Analysis: 5/29/14 04:18 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.16	Not Detected

Container Type: 1 Liter Summa Canister

eurofins | Air Toxics

Client Sample ID: VP-02

Lab ID#: 1405490C-04A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052907**	**Date of Collection: 5/21/14 12:25:00 PM**	
Dil. Factor:	**3.35**	**Date of Analysis: 5/29/14 04:33 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.17	Not Detected

Container Type: 1 Liter Summa Canister

eurofins | Air Toxics

Client Sample ID: VP-03

Lab ID#: 1405490C-05A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052908**	**Date of Collection: 5/20/14 7:05:00 PM**	
Dil. Factor:	**3.35**	**Date of Analysis: 5/29/14 04:41 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.17	Not Detected

Container Type: 1 Liter Summa Canister

eurofins | Air Toxics

Client Sample ID: VP-04

Lab ID#: 1405490C-06A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052909**	**Date of Collection: 5/20/14 6:15:00 PM**	
Dil. Factor:	**2.05**	**Date of Analysis: 5/29/14 04:53 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.10	Not Detected

Container Type: 1 Liter Summa Canister

eurofins | Air Toxics

Client Sample ID: VP-06

Lab ID#: 1405490C-07A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052910**	**Date of Collection: 5/21/14 11:15:00 AM**	
Dil. Factor:	**3.37**	**Date of Analysis: 5/29/14 05:03 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.17	Not Detected

Container Type: 1 Liter Summa Canister

eurofins | Air Toxics

Client Sample ID: VP-09

Lab ID#: 1405490C-08A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052911**	**Date of Collection: 5/21/14 3:50:00 PM**	
Dil. Factor:	**3.19**	**Date of Analysis: 5/29/14 06:21 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.16	Not Detected

Container Type: 1 Liter Summa Canister

eurofins | Air Toxics

Client Sample ID: VP-10

Lab ID#: 1405490C-09A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052912**	**Date of Collection: 5/20/14 3:10:00 PM**	
Dil. Factor:	**3.48**	**Date of Analysis: 5/29/14 06:34 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.17	Not Detected

Container Type: 1 Liter Summa Canister

eurofins | Air Toxics

Client Sample ID: VP-11R

Lab ID#: 1405490C-10A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052913**	**Date of Collection: 5/20/14 5:50:00 PM**	
Dil. Factor:	**3.37**	**Date of Analysis: 5/29/14 06:45 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.17	Not Detected

Container Type: 1 Liter Summa Canister

eurofins | Air Toxics

Client Sample ID: VP-12

Lab ID#: 1405490C-11A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052914**	**Date of Collection: 5/20/14 3:40:00 PM**	
Dil. Factor:	**3.46**	**Date of Analysis: 5/29/14 06:53 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.17	Not Detected

Container Type: 1 Liter Summa Canister

eurofins | Air Toxics

Client Sample ID: VP-13

Lab ID#: 1405490C-12A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052915**	**Date of Collection: 5/21/14 11:50:00 AM**	
Dil. Factor:	**3.37**	**Date of Analysis: 5/29/14 07:03 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.17	Not Detected

Container Type: 1 Liter Summa Canister

eurofins | Air Toxics

Client Sample ID: VP-14

Lab ID#: 1405490C-13A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052916**	**Date of Collection: 5/21/14 11:35:00 AM**	
Dil. Factor:	**3.19**	**Date of Analysis: 5/29/14 07:21 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.16	Not Detected

Container Type: 1 Liter Summa Canister

eurofins | Air Toxics

Client Sample ID: VP-101

Lab ID#: 1405490C-14A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052917**	**Date of Collection: 5/21/14 10:40:00 AM**	
Dil. Factor:	**3.35**	**Date of Analysis: 5/29/14 07:39 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.17	Not Detected

Container Type: 1 Liter Summa Canister

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Client Sample ID: VP-102

Lab ID#: 1405490C-15A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052918**	**Date of Collection: 5/20/14 5:30:00 PM**	
Dil. Factor:	**3.33**	**Date of Analysis: 5/29/14 08:23 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.17	Not Detected

Container Type: 1 Liter Summa Canister

eurofins | Air Toxics

Client Sample ID: VP-103

Lab ID#: 1405490C-16A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052919**	**Date of Collection: 5/21/14 2:40:00 PM**	
Dil. Factor:	**3.18**	**Date of Analysis: 5/29/14 08:32 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.16	Not Detected

Container Type: 1 Liter Summa Canister

eurofins | Air Toxics

Client Sample ID: VP-104

Lab ID#: 1405490C-17A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052920**	**Date of Collection: 5/21/14 3:15:00 PM**	
Dil. Factor:	**3.39**	**Date of Analysis: 5/29/14 08:40 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.17	Not Detected

Container Type: 1 Liter Summa Canister

eurofins | Air Toxics

Client Sample ID: VP-105

Lab ID#: 1405490C-18A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052921**	**Date of Collection: 5/20/14 6:35:00 PM**	
Dil. Factor:	**3.23**	**Date of Analysis: 5/29/14 08:51 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.16	Not Detected

Container Type: 1 Liter Summa Canister

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Client Sample ID: VP-106

Lab ID#: 1405490C-19A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052922**	**Date of Collection: 5/21/14 2:30:00 PM**	
Dil. Factor:	**3.20**	**Date of Analysis: 5/29/14 08:58 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.16	Not Detected

Container Type: 1 Liter Summa Canister

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Client Sample ID: L-001

Lab ID#: 1405490C-20A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052923**	**Date of Collection: 5/21/14 3:30:00 PM**	
Dil. Factor:	**2.98**	**Date of Analysis: 5/29/14 09:08 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.15	Not Detected

Container Type: 1 Liter Summa Canister

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Client Sample ID: Lab Blank

Lab ID#: 1405490C-21A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052903**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/29/14 03:21 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.050	Not Detected

Container Type: NA - Not Applicable

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Client Sample ID: LCS

Lab ID#: 1405490C-22A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052902**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/29/14 03:10 PM**	

Compound	%Recovery	Method Limits
Helium	101	85-115

Container Type: NA - Not Applicable

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Client Sample ID: LCSD

Lab ID#: 1405490C-22AA

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9052924**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/29/14 09:27 PM**	

Compound	%Recovery	Method Limits
Helium	101	85-115

Container Type: NA - Not Applicable

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Sample Transportation Notice
Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection, handling or shipping of these samples. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action, of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922

180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630-4719
(916) 985-1000 FAX (916) 985-1020

Project Manager Russ Crillo

Collected by: (Print and Sign) Byron Collins

Company Stantec Email Russ.Crillo@Stantec.com

Address 2000 S. Colorado Suite 2-300 City Denver State Co Zip 80222

Phone 3032859600 Fax

Project Info:
P.O. # 212205045
Project #
Project Name Lobell

Turn Around Time:
❑ Normal
❑ Rush
specify

Lab Use Only
Pressurized by:
Date:
Pressurization Gas: N_2 He

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum Initial	Final	Receipt	Final (psi)
21A	IA-10	5707	5/21/14	0810	TO15 Selective ion (SIM) mode	-25	-7		
22A	IA-11	35168	5/23/14	0900	↓	-25	-4		

Relinquished by: (signature) Date/Time
Received by: (signature) Date/Time EAT 05/23/14 1035

Relinquished by: (signature) Date/Time
Received by: (signature) Date/Time

Relinquished by: (signature) Date/Time
Received by: (signature) Date/Time

Notes:

Lab Use Only	Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
	FedEx		NA	SDR	(Yes) No None	1405490

Form 1293 rev.11

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6/11/2014

Mr. Russ Cirillo
Stantec Consulting Corporation
2000 South Colorado Boulevard
Suite 2-300
Denver CO 80222

Project Name: Lobell
Project #:
Workorder #: 1405490A

Dear Mr. Russ Cirillo

The following report includes the data for the above referenced project for sample(s) received on 5/28/2014 at Air Toxics Ltd.

The data and associated QC analyzed by TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kelly Buettner at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kelly Buettner

Project Manager

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WORK ORDER #: 1405490A

Work Order Summary

CLIENT:	Mr. Russ Cirillo Stantec Consulting Corporation 2000 South Colorado Boulevard Suite 2-300 Denver, CO 80222	**BILL TO:**	Mr. Pat Vaughan Stantec Consulting Corporation 9400 SW Barnes Road Suite 200 Portland, OR 97225
PHONE:	303-758-4058	**P.O. #**	212205045
FAX:	303-758-4828	**PROJECT #**	Lobell
DATE RECEIVED:	05/28/2014	**CONTACT:**	Kelly Buettner
DATE COMPLETED:	06/11/2014		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	SVE-1D	TO-15	11.4 "Hg	14.9 psi
02A	SVE-1S	TO-15	12.8 "Hg	15 psi
03A	VP-01	TO-15	11.4 "Hg	15.4 psi
04A	VP-02	TO-15	11.8 "Hg	15.1 psi
05A	VP-03	TO-15	11.8 "Hg	15.1 psi
06A	VP-04	TO-15	0.5 "Hg	15 psi
07A	VP-06	TO-15	12.0 "Hg	15 psi
08A	VP-09	TO-15	11.0 "Hg	15 psi
09A	VP-10	TO-15	12.0 "Hg	16 psi
10A	VP-11R	TO-15	12.0 "Hg	15 psi
11A	VP-12	TO-15	12.5 "Hg	15 psi
12A	VP-13	TO-15	12.0 "Hg	15 psi
13A	VP-14	TO-15	11.0 "Hg	15 psi
14A	VP-101	TO-15	11.8 "Hg	15.1 psi
15A	VP-102	TO-15	11.6 "Hg	15.3 psi
16A	VP-103	TO-15	10.6 "Hg	15.5 psi
17A	VP-104	TO-15	11.8 "Hg	15.5 psi
18A	VP-105	TO-15	11.2 "Hg	15 psi
19A	VP-106	TO-15	10.8 "Hg	15.4 psi
20A	L-001	TO-15	10 "Hg	14.5 psi
21A	Lab Blank	TO-15	NA	NA
21B	Lab Blank	TO-15	NA	NA
22A	CCV	TO-15	NA	NA

Continued on next page

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WORK ORDER #: 1405490A

Work Order Summary

CLIENT:	Mr. Russ Cirillo Stantec Consulting Corporation 2000 South Colorado Boulevard Suite 2-300 Denver, CO 80222	**BILL TO:**	Mr. Pat Vaughan Stantec Consulting Corporation 9400 SW Barnes Road Suite 200 Portland, OR 97225
PHONE:	303-758-4058	**P.O. #**	212205045
FAX:	303-758-4828	**PROJECT #**	Lobell
DATE RECEIVED:	05/28/2014	**CONTACT:**	Kelly Buettner
DATE COMPLETED:	06/11/2014		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
22B	CCV	TO-15	NA	NA
23A	LCS	TO-15	NA	NA
23AA	LCSD	TO-15	NA	NA
23B	LCS	TO-15	NA	NA
23BB	LCSD	TO-15	NA	NA

CERTIFIED BY:  DATE: 06/11/14

Technical Director

Certification numbers: AZ Licensure AZ0775, CA NELAP - 12282CA, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-13-6, UT NELAP CA009332013-4, VA NELAP - 460197, WA NELAP - C935
Name of Accrediting Agency: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2013, Expiration date: 10/17/2014.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 9563
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
EPA Method TO-15
Stantec Consulting Corporation
Workorder# 1405490A

Twenty 1 Liter Summa Canister samples were received on May 28, 2014. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Receiving Notes

The Chain of Custody (COC) was not relinquished properly. A signature and date were not provided by the field sampler.

There was a significant difference (greater than 5.0" Hg) between the measured canister receipt vacuum and that which was reported on the Chain of Custody (COC) for sample VP-04. A leak test indicated that the valve was functioning properly.

Analytical Notes

All Quality Control Limit exceedances and affected sample results are noted by flags. Each flag is defined at the bottom of this Case Narrative and on each Sample Result Summary page. Target compound non-detects in the samples that are associated with high bias in QC analyses have not been flagged.

Dilution was performed on samples SVE-1D, SVE-1S, VP-01, VP-10, VP-11R, VP-12 and VP-14 due to the presence of high level target species.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: SVE-1D

Lab ID#: 1405490A-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Acetone	650	1800	1500	4300
Tetrachloroethene	65	11000	440	73000

Client Sample ID: SVE-1S

Lab ID#: 1405490A-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrahydrofuran	8.8	34	26	100
Tetrachloroethene	8.8	3000	60	20000
1,2,4-Trimethylbenzene	8.8	13	43	65

Client Sample ID: VP-01

Lab ID#: 1405490A-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethanol	33	110	62	200
Trichloroethene	8.2	12	44	66
Tetrachloroethene	8.2	3000	56	20000

Client Sample ID: VP-02

Lab ID#: 1405490A-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethanol	6.7	25	12	46
Trichloroethene	1.7	4.9	9.0	26
Tetrachloroethene	1.7	200	11	1400

Client Sample ID: VP-03

Lab ID#: 1405490A-05A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethanol	6.7	31	12	59

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: VP-03

Lab ID#: 1405490A-05A

Acetone	17	36	40	85
2-Butanone (Methyl Ethyl Ketone)	6.7	7.9	20	23
Tetrachloroethene	1.7	37	11	250

Client Sample ID: VP-04

Lab ID#: 1405490A-06A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethanol	4.1	20	7.7	38
2-Propanol	4.1	6.5	10	16
Tetrachloroethene	1.0	110	7.0	740

Client Sample ID: VP-06

Lab ID#: 1405490A-07A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethanol	6.7	39	13	74
cis-1,2-Dichloroethene	1.7	8.3	6.7	33
Trichloroethene	1.7	20	9.0	100
Tetrachloroethene	1.7	600	11	4000

Client Sample ID: VP-09

Lab ID#: 1405490A-08A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethanol	6.4	17	12	33
Acetone	16	19	38	46
Tetrachloroethene	1.6	4.2	11	29

Client Sample ID: VP-10

Lab ID#: 1405490A-09A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethanol	28	140	52	260

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: VP-10

Lab ID#: 1405490A-09A

Tetrachloroethene	7.0	2100	47	14000

Client Sample ID: VP-11R

Lab ID#: 1405490A-10A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethanol	34	42	63	80
Trichloroethene	8.4	17	45	93
Tetrachloroethene	8.4	3300	57	22000

Client Sample ID: VP-12

Lab ID#: 1405490A-11A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethanol	34	79	64	150
Tetrachloroethene	8.5	1200	58	7900

Client Sample ID: VP-13

Lab ID#: 1405490A-12A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethanol	6.7	28	13	53
Tetrachloroethene	1.7	85	11	580

Client Sample ID: VP-14

Lab ID#: 1405490A-13A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethanol	13	21	24	40
Trichloroethene	3.2	11	17	60
Tetrachloroethene	3.2	1200	22	7900

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: VP-101

Lab ID#: 1405490A-14A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethanol	6.7	80	12	150
Acetone	17	20	40	46
Tetrachloroethene	1.7	120	11	790

Client Sample ID: VP-102

Lab ID#: 1405490A-15A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethanol	6.7	83	12	160
Acetone	17	21	40	50
Tetrachloroethene	1.7	120	11	820

Client Sample ID: VP-103

Lab ID#: 1405490A-16A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethanol	6.4	16	12	29
Tetrachloroethene	1.6	2.4	11	16

Client Sample ID: VP-104

Lab ID#: 1405490A-17A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethanol	6.8	18	13	34
2-Propanol	6.8	13	17	32
Tetrachloroethene	1.7	30	12	200

Client Sample ID: VP-105

Lab ID#: 1405490A-18A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethanol	6.4	34	12	64

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: VP-105

Lab ID#: 1405490A-18A

Tetrachloroethene	1.6	62	11	420
m,p-Xylene	1.6	5.0	6.9	22
4-Ethyltoluene	1.6	2.9	7.9	14
1,2,4-Trimethylbenzene	1.6	2.7	7.9	13

Client Sample ID: VP-106

Lab ID#: 1405490A-19A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethanol	6.4	16	12	30
Tetrachloroethene	1.6	3.6	11	24

Client Sample ID: L-001

Lab ID#: 1405490A-20A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethanol	6.0	12	11	23
Tetrachloroethene	1.5	2.6	10	17

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Client Sample ID: SVE-1D

Lab ID#: 1405490A-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060920**	**Date of Collection:**	**5/21/14 1:30:00 PM**
Dil. Factor:	**130**	**Date of Analysis:**	**6/9/14 06:01 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	65	Not Detected	320	Not Detected
Freon 114	65	Not Detected	450	Not Detected
Chloromethane	650	Not Detected	1300	Not Detected
Vinyl Chloride	65	Not Detected	170	Not Detected
1,3-Butadiene	65	Not Detected	140	Not Detected
Bromomethane	650	Not Detected	2500	Not Detected
Chloroethane	260	Not Detected	690	Not Detected
Freon 11	65	Not Detected	360	Not Detected
Ethanol	260	Not Detected	490	Not Detected
Freon 113	65	Not Detected	500	Not Detected
1,1-Dichloroethene	65	Not Detected	260	Not Detected
Acetone	650	1800	1500	4300
2-Propanol	260	Not Detected	640	Not Detected
Carbon Disulfide	260	Not Detected	810	Not Detected
3-Chloropropene	260	Not Detected	810	Not Detected
Methylene Chloride	650	Not Detected	2200	Not Detected
Methyl tert-butyl ether	65	Not Detected	230	Not Detected
trans-1,2-Dichloroethene	65	Not Detected	260	Not Detected
Hexane	65	Not Detected	230	Not Detected
1,1-Dichloroethane	65	Not Detected	260	Not Detected
2-Butanone (Methyl Ethyl Ketone)	260	Not Detected	770	Not Detected
cis-1,2-Dichloroethene	65	Not Detected	260	Not Detected
Tetrahydrofuran	65	Not Detected	190	Not Detected
Chloroform	65	Not Detected	320	Not Detected
1,1,1-Trichloroethane	65	Not Detected	350	Not Detected
Cyclohexane	65	Not Detected	220	Not Detected
Carbon Tetrachloride	65	Not Detected	410	Not Detected
2,2,4-Trimethylpentane	65	Not Detected	300	Not Detected
Benzene	65	Not Detected	210	Not Detected
1,2-Dichloroethane	65	Not Detected	260	Not Detected
Heptane	65	Not Detected	270	Not Detected
Trichloroethene	65	Not Detected	350	Not Detected
1,2-Dichloropropane	65	Not Detected	300	Not Detected
1,4-Dioxane	260	Not Detected	940	Not Detected
Bromodichloromethane	65	Not Detected	440	Not Detected
cis-1,3-Dichloropropene	65	Not Detected	300	Not Detected
4-Methyl-2-pentanone	65	Not Detected	270	Not Detected
Toluene	65	Not Detected	240	Not Detected
trans-1,3-Dichloropropene	65	Not Detected	300	Not Detected
1,1,2-Trichloroethane	65	Not Detected	350	Not Detected
Tetrachloroethene	65	11000	440	73000
2-Hexanone	260	Not Detected	1100	Not Detected

eurofins | Air Toxics

Client Sample ID: SVE-1D

Lab ID#: 1405490A-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060920**	**Date of Collection:**	**5/21/14 1:30:00 PM**
Dil. Factor:	**130**	**Date of Analysis:**	**6/9/14 06:01 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	65	Not Detected	550	Not Detected
1,2-Dibromoethane (EDB)	65	Not Detected	500	Not Detected
Chlorobenzene	65	Not Detected	300	Not Detected
Ethyl Benzene	65	Not Detected	280	Not Detected
m,p-Xylene	65	Not Detected	280	Not Detected
o-Xylene	65	Not Detected	280	Not Detected
Styrene	65	Not Detected	280	Not Detected
Bromoform	65	Not Detected	670	Not Detected
Cumene	65	Not Detected	320	Not Detected
1,1,2,2-Tetrachloroethane	65	Not Detected	450	Not Detected
Propylbenzene	65	Not Detected	320	Not Detected
4-Ethyltoluene	65	Not Detected	320	Not Detected
1,3,5-Trimethylbenzene	65	Not Detected	320	Not Detected
1,2,4-Trimethylbenzene	65	Not Detected	320	Not Detected
1,3-Dichlorobenzene	65	Not Detected	390	Not Detected
1,4-Dichlorobenzene	65	Not Detected	390	Not Detected
alpha-Chlorotoluene	65	Not Detected	340	Not Detected
1,2-Dichlorobenzene	65	Not Detected	390	Not Detected
1,2,4-Trichlorobenzene	260	Not Detected	1900	Not Detected
Hexachlorobutadiene	260	Not Detected	2800	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	97	70-130
4-Bromofluorobenzene	99	70-130

eurofins | Air Toxics

Client Sample ID: SVE-1S

Lab ID#: 1405490A-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060908**	**Date of Collection:**	**5/22/14 11:30:00 AM**
Dil. Factor:	**17.6**	**Date of Analysis:**	**6/9/14 12:17 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	8.8	Not Detected	44	Not Detected
Freon 114	8.8	Not Detected	62	Not Detected
Chloromethane	88	Not Detected	180	Not Detected
Vinyl Chloride	8.8	Not Detected	22	Not Detected
1,3-Butadiene	8.8	Not Detected	19	Not Detected
Bromomethane	88	Not Detected	340	Not Detected
Chloroethane	35	Not Detected	93	Not Detected
Freon 11	8.8	Not Detected	49	Not Detected
Ethanol	35	Not Detected	66	Not Detected
Freon 113	8.8	Not Detected	67	Not Detected
1,1-Dichloroethene	8.8	Not Detected	35	Not Detected
Acetone	88	Not Detected	210	Not Detected
2-Propanol	35	Not Detected	86	Not Detected
Carbon Disulfide	35	Not Detected	110	Not Detected
3-Chloropropene	35	Not Detected	110	Not Detected
Methylene Chloride	88	Not Detected	300	Not Detected
Methyl tert-butyl ether	8.8	Not Detected	32	Not Detected
trans-1,2-Dichloroethene	8.8	Not Detected	35	Not Detected
Hexane	8.8	Not Detected	31	Not Detected
1,1-Dichloroethane	8.8	Not Detected	36	Not Detected
2-Butanone (Methyl Ethyl Ketone)	35	Not Detected	100	Not Detected
cis-1,2-Dichloroethene	8.8	Not Detected	35	Not Detected
Tetrahydrofuran	8.8	34	26	100
Chloroform	8.8	Not Detected	43	Not Detected
1,1,1-Trichloroethane	8.8	Not Detected	48	Not Detected
Cyclohexane	8.8	Not Detected	30	Not Detected
Carbon Tetrachloride	8.8	Not Detected	55	Not Detected
2,2,4-Trimethylpentane	8.8	Not Detected	41	Not Detected
Benzene	8.8	Not Detected	28	Not Detected
1,2-Dichloroethane	8.8	Not Detected	36	Not Detected
Heptane	8.8	Not Detected	36	Not Detected
Trichloroethene	8.8	Not Detected	47	Not Detected
1,2-Dichloropropane	8.8	Not Detected	41	Not Detected
1,4-Dioxane	35	Not Detected	130	Not Detected
Bromodichloromethane	8.8	Not Detected	59	Not Detected
cis-1,3-Dichloropropene	8.8	Not Detected	40	Not Detected
4-Methyl-2-pentanone	8.8	Not Detected	36	Not Detected
Toluene	8.8	Not Detected	33	Not Detected
trans-1,3-Dichloropropene	8.8	Not Detected	40	Not Detected
1,1,2-Trichloroethane	8.8	Not Detected	48	Not Detected
Tetrachloroethene	8.8	3000	60	20000
2-Hexanone	35	Not Detected	140	Not Detected

eurofins | Air Toxics

Client Sample ID: SVE-1S

Lab ID#: 1405490A-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060908**	**Date of Collection:**	**5/22/14 11:30:00 AM**
Dil. Factor:	**17.6**	**Date of Analysis:**	**6/9/14 12:17 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	8.8	Not Detected	75	Not Detected
1,2-Dibromoethane (EDB)	8.8	Not Detected	68	Not Detected
Chlorobenzene	8.8	Not Detected	40	Not Detected
Ethyl Benzene	8.8	Not Detected	38	Not Detected
m,p-Xylene	8.8	Not Detected	38	Not Detected
o-Xylene	8.8	Not Detected	38	Not Detected
Styrene	8.8	Not Detected	37	Not Detected
Bromoform	8.8	Not Detected	91	Not Detected
Cumene	8.8	Not Detected	43	Not Detected
1,1,2,2-Tetrachloroethane	8.8	Not Detected	60	Not Detected
Propylbenzene	8.8	Not Detected	43	Not Detected
4-Ethyltoluene	8.8	Not Detected	43	Not Detected
1,3,5-Trimethylbenzene	8.8	Not Detected	43	Not Detected
1,2,4-Trimethylbenzene	8.8	13	43	65
1,3-Dichlorobenzene	8.8	Not Detected	53	Not Detected
1,4-Dichlorobenzene	8.8	Not Detected	53	Not Detected
alpha-Chlorotoluene	8.8	Not Detected	46	Not Detected
1,2-Dichlorobenzene	8.8	Not Detected	53	Not Detected
1,2,4-Trichlorobenzene	35	Not Detected	260	Not Detected
Hexachlorobutadiene	35	Not Detected	380	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	94	70-130
4-Bromofluorobenzene	103	70-130

eurofins | Air Toxics

Client Sample ID: VP-01

Lab ID#: 1405490A-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060919**	**Date of Collection:**	**5/20/14 4:05:00 PM**
Dil. Factor:	**16.5**	**Date of Analysis:**	**6/9/14 05:34 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	8.2	Not Detected	41	Not Detected
Freon 114	8.2	Not Detected	58	Not Detected
Chloromethane	82	Not Detected	170	Not Detected
Vinyl Chloride	8.2	Not Detected	21	Not Detected
1,3-Butadiene	8.2	Not Detected	18	Not Detected
Bromomethane	82	Not Detected	320	Not Detected
Chloroethane	33	Not Detected	87	Not Detected
Freon 11	8.2	Not Detected	46	Not Detected
Ethanol	33	110	62	200
Freon 113	8.2	Not Detected	63	Not Detected
1,1-Dichloroethene	8.2	Not Detected	33	Not Detected
Acetone	82	Not Detected	200	Not Detected
2-Propanol	33	Not Detected	81	Not Detected
Carbon Disulfide	33	Not Detected	100	Not Detected
3-Chloropropene	33	Not Detected	100	Not Detected
Methylene Chloride	82	Not Detected	290	Not Detected
Methyl tert-butyl ether	8.2	Not Detected	30	Not Detected
trans-1,2-Dichloroethene	8.2	Not Detected	33	Not Detected
Hexane	8.2	Not Detected	29	Not Detected
1,1-Dichloroethane	8.2	Not Detected	33	Not Detected
2-Butanone (Methyl Ethyl Ketone)	33	Not Detected	97	Not Detected
cis-1,2-Dichloroethene	8.2	Not Detected	33	Not Detected
Tetrahydrofuran	8.2	Not Detected	24	Not Detected
Chloroform	8.2	Not Detected	40	Not Detected
1,1,1-Trichloroethane	8.2	Not Detected	45	Not Detected
Cyclohexane	8.2	Not Detected	28	Not Detected
Carbon Tetrachloride	8.2	Not Detected	52	Not Detected
2,2,4-Trimethylpentane	8.2	Not Detected	38	Not Detected
Benzene	8.2	Not Detected	26	Not Detected
1,2-Dichloroethane	8.2	Not Detected	33	Not Detected
Heptane	8.2	Not Detected	34	Not Detected
Trichloroethene	8.2	12	44	66
1,2-Dichloropropane	8.2	Not Detected	38	Not Detected
1,4-Dioxane	33	Not Detected	120	Not Detected
Bromodichloromethane	8.2	Not Detected	55	Not Detected
cis-1,3-Dichloropropene	8.2	Not Detected	37	Not Detected
4-Methyl-2-pentanone	8.2	Not Detected	34	Not Detected
Toluene	8.2	Not Detected	31	Not Detected
trans-1,3-Dichloropropene	8.2	Not Detected	37	Not Detected
1,1,2-Trichloroethane	8.2	Not Detected	45	Not Detected
Tetrachloroethene	8.2	3000	56	20000
2-Hexanone	33	Not Detected	140	Not Detected

eurofins | Air Toxics

Client Sample ID: VP-01

Lab ID#: 1405490A-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060919**	**Date of Collection:**	**5/20/14 4:05:00 PM**
Dil. Factor:	**16.5**	**Date of Analysis:**	**6/9/14 05:34 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	8.2	Not Detected	70	Not Detected
1,2-Dibromoethane (EDB)	8.2	Not Detected	63	Not Detected
Chlorobenzene	8.2	Not Detected	38	Not Detected
Ethyl Benzene	8.2	Not Detected	36	Not Detected
m,p-Xylene	8.2	Not Detected	36	Not Detected
o-Xylene	8.2	Not Detected	36	Not Detected
Styrene	8.2	Not Detected	35	Not Detected
Bromoform	8.2	Not Detected	85	Not Detected
Cumene	8.2	Not Detected	40	Not Detected
1,1,2,2-Tetrachloroethane	8.2	Not Detected	57	Not Detected
Propylbenzene	8.2	Not Detected	40	Not Detected
4-Ethyltoluene	8.2	Not Detected	40	Not Detected
1,3,5-Trimethylbenzene	8.2	Not Detected	40	Not Detected
1,2,4-Trimethylbenzene	8.2	Not Detected	40	Not Detected
1,3-Dichlorobenzene	8.2	Not Detected	50	Not Detected
1,4-Dichlorobenzene	8.2	Not Detected	50	Not Detected
alpha-Chlorotoluene	8.2	Not Detected	43	Not Detected
1,2-Dichlorobenzene	8.2	Not Detected	50	Not Detected
1,2,4-Trichlorobenzene	33	Not Detected	240	Not Detected
Hexachlorobutadiene	33	Not Detected	350	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	97	70-130
4-Bromofluorobenzene	101	70-130

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Client Sample ID: VP-02

Lab ID#: 1405490A-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060910**	**Date of Collection:**	**5/21/14 12:25:00 PM**
Dil. Factor:	**3.34**	**Date of Analysis:**	**6/9/14 01:06 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.7	Not Detected	8.2	Not Detected
Freon 114	1.7	Not Detected	12	Not Detected
Chloromethane	17	Not Detected	34	Not Detected
Vinyl Chloride	1.7	Not Detected	4.3	Not Detected
1,3-Butadiene	1.7	Not Detected	3.7	Not Detected
Bromomethane	17	Not Detected	65	Not Detected
Chloroethane	6.7	Not Detected	18	Not Detected
Freon 11	1.7	Not Detected	9.4	Not Detected
Ethanol	6.7	25	12	46
Freon 113	1.7	Not Detected	13	Not Detected
1,1-Dichloroethene	1.7	Not Detected	6.6	Not Detected
Acetone	17	Not Detected	40	Not Detected
2-Propanol	6.7	Not Detected	16	Not Detected
Carbon Disulfide	6.7	Not Detected	21	Not Detected
3-Chloropropene	6.7	Not Detected	21	Not Detected
Methylene Chloride	17	Not Detected	58	Not Detected
Methyl tert-butyl ether	1.7	Not Detected	6.0	Not Detected
trans-1,2-Dichloroethene	1.7	Not Detected	6.6	Not Detected
Hexane	1.7	Not Detected	5.9	Not Detected
1,1-Dichloroethane	1.7	Not Detected	6.8	Not Detected
2-Butanone (Methyl Ethyl Ketone)	6.7	Not Detected	20	Not Detected
cis-1,2-Dichloroethene	1.7	Not Detected	6.6	Not Detected
Tetrahydrofuran	1.7	Not Detected	4.9	Not Detected
Chloroform	1.7	Not Detected	8.2	Not Detected
1,1,1-Trichloroethane	1.7	Not Detected	9.1	Not Detected
Cyclohexane	1.7	Not Detected	5.7	Not Detected
Carbon Tetrachloride	1.7	Not Detected	10	Not Detected
2,2,4-Trimethylpentane	1.7	Not Detected	7.8	Not Detected
Benzene	1.7	Not Detected	5.3	Not Detected
1,2-Dichloroethane	1.7	Not Detected	6.8	Not Detected
Heptane	1.7	Not Detected	6.8	Not Detected
Trichloroethene	1.7	4.9	9.0	26
1,2-Dichloropropane	1.7	Not Detected	7.7	Not Detected
1,4-Dioxane	6.7	Not Detected	24	Not Detected
Bromodichloromethane	1.7	Not Detected	11	Not Detected
cis-1,3-Dichloropropene	1.7	Not Detected	7.6	Not Detected
4-Methyl-2-pentanone	1.7	Not Detected	6.8	Not Detected
Toluene	1.7	Not Detected	6.3	Not Detected
trans-1,3-Dichloropropene	1.7	Not Detected	7.6	Not Detected
1,1,2-Trichloroethane	1.7	Not Detected	9.1	Not Detected
Tetrachloroethene	1.7	200	11	1400
2-Hexanone	6.7	Not Detected	27	Not Detected

eurofins | Air Toxics

Client Sample ID: VP-02

Lab ID#: 1405490A-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060910**	**Date of Collection:**	**5/21/14 12:25:00 PM**
Dil. Factor:	**3.34**	**Date of Analysis:**	**6/9/14 01:06 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.7	Not Detected	14	Not Detected
1,2-Dibromoethane (EDB)	1.7	Not Detected	13	Not Detected
Chlorobenzene	1.7	Not Detected	7.7	Not Detected
Ethyl Benzene	1.7	Not Detected	7.2	Not Detected
m,p-Xylene	1.7	Not Detected	7.2	Not Detected
o-Xylene	1.7	Not Detected	7.2	Not Detected
Styrene	1.7	Not Detected	7.1	Not Detected
Bromoform	1.7	Not Detected	17	Not Detected
Cumene	1.7	Not Detected	8.2	Not Detected
1,1,2,2-Tetrachloroethane	1.7	Not Detected	11	Not Detected
Propylbenzene	1.7	Not Detected	8.2	Not Detected
4-Ethyltoluene	1.7	Not Detected	8.2	Not Detected
1,3,5-Trimethylbenzene	1.7	Not Detected	8.2	Not Detected
1,2,4-Trimethylbenzene	1.7	Not Detected	8.2	Not Detected
1,3-Dichlorobenzene	1.7	Not Detected	10	Not Detected
1,4-Dichlorobenzene	1.7	Not Detected	10	Not Detected
alpha-Chlorotoluene	1.7	Not Detected	8.6	Not Detected
1,2-Dichlorobenzene	1.7	Not Detected	10	Not Detected
1,2,4-Trichlorobenzene	6.7	Not Detected	50	Not Detected
Hexachlorobutadiene	6.7	Not Detected	71	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	103	70-130
1,2-Dichloroethane-d4	93	70-130
4-Bromofluorobenzene	101	70-130

eurofins | Air Toxics

Client Sample ID: VP-03

Lab ID#: 1405490A-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060911**	**Date of Collection:**	**5/20/14 7:05:00 PM**
Dil. Factor:	**3.34**	**Date of Analysis:**	**6/9/14 01:33 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.7	Not Detected	8.2	Not Detected
Freon 114	1.7	Not Detected	12	Not Detected
Chloromethane	17	Not Detected	34	Not Detected
Vinyl Chloride	1.7	Not Detected	4.3	Not Detected
1,3-Butadiene	1.7	Not Detected	3.7	Not Detected
Bromomethane	17	Not Detected	65	Not Detected
Chloroethane	6.7	Not Detected	18	Not Detected
Freon 11	1.7	Not Detected	9.4	Not Detected
Ethanol	6.7	31	12	59
Freon 113	1.7	Not Detected	13	Not Detected
1,1-Dichloroethene	1.7	Not Detected	6.6	Not Detected
Acetone	17	36	40	85
2-Propanol	6.7	Not Detected	16	Not Detected
Carbon Disulfide	6.7	Not Detected	21	Not Detected
3-Chloropropene	6.7	Not Detected	21	Not Detected
Methylene Chloride	17	Not Detected	58	Not Detected
Methyl tert-butyl ether	1.7	Not Detected	6.0	Not Detected
trans-1,2-Dichloroethene	1.7	Not Detected	6.6	Not Detected
Hexane	1.7	Not Detected	5.9	Not Detected
1,1-Dichloroethane	1.7	Not Detected	6.8	Not Detected
2-Butanone (Methyl Ethyl Ketone)	6.7	7.9	20	23
cis-1,2-Dichloroethene	1.7	Not Detected	6.6	Not Detected
Tetrahydrofuran	1.7	Not Detected	4.9	Not Detected
Chloroform	1.7	Not Detected	8.2	Not Detected
1,1,1-Trichloroethane	1.7	Not Detected	9.1	Not Detected
Cyclohexane	1.7	Not Detected	5.7	Not Detected
Carbon Tetrachloride	1.7	Not Detected	10	Not Detected
2,2,4-Trimethylpentane	1.7	Not Detected	7.8	Not Detected
Benzene	1.7	Not Detected	5.3	Not Detected
1,2-Dichloroethane	1.7	Not Detected	6.8	Not Detected
Heptane	1.7	Not Detected	6.8	Not Detected
Trichloroethene	1.7	Not Detected	9.0	Not Detected
1,2-Dichloropropane	1.7	Not Detected	7.7	Not Detected
1,4-Dioxane	6.7	Not Detected	24	Not Detected
Bromodichloromethane	1.7	Not Detected	11	Not Detected
cis-1,3-Dichloropropene	1.7	Not Detected	7.6	Not Detected
4-Methyl-2-pentanone	1.7	Not Detected	6.8	Not Detected
Toluene	1.7	Not Detected	6.3	Not Detected
trans-1,3-Dichloropropene	1.7	Not Detected	7.6	Not Detected
1,1,2-Trichloroethane	1.7	Not Detected	9.1	Not Detected
Tetrachloroethene	1.7	37	11	250
2-Hexanone	6.7	Not Detected	27	Not Detected

eurofins | Air Toxics

Client Sample ID: VP-03

Lab ID#: 1405490A-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060911**	**Date of Collection:**	**5/20/14 7:05:00 PM**
Dil. Factor:	**3.34**	**Date of Analysis:**	**6/9/14 01:33 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.7	Not Detected	14	Not Detected
1,2-Dibromoethane (EDB)	1.7	Not Detected	13	Not Detected
Chlorobenzene	1.7	Not Detected	7.7	Not Detected
Ethyl Benzene	1.7	Not Detected	7.2	Not Detected
m,p-Xylene	1.7	Not Detected	7.2	Not Detected
o-Xylene	1.7	Not Detected	7.2	Not Detected
Styrene	1.7	Not Detected	7.1	Not Detected
Bromoform	1.7	Not Detected	17	Not Detected
Cumene	1.7	Not Detected	8.2	Not Detected
1,1,2,2-Tetrachloroethane	1.7	Not Detected	11	Not Detected
Propylbenzene	1.7	Not Detected	8.2	Not Detected
4-Ethyltoluene	1.7	Not Detected	8.2	Not Detected
1,3,5-Trimethylbenzene	1.7	Not Detected	8.2	Not Detected
1,2,4-Trimethylbenzene	1.7	Not Detected	8.2	Not Detected
1,3-Dichlorobenzene	1.7	Not Detected	10	Not Detected
1,4-Dichlorobenzene	1.7	Not Detected	10	Not Detected
alpha-Chlorotoluene	1.7	Not Detected	8.6	Not Detected
1,2-Dichlorobenzene	1.7	Not Detected	10	Not Detected
1,2,4-Trichlorobenzene	6.7	Not Detected	50	Not Detected
Hexachlorobutadiene	6.7	Not Detected	71	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	97	70-130
4-Bromofluorobenzene	101	70-130

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Client Sample ID: VP-04

Lab ID#: 1405490A-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060912**	**Date of Collection:**	**5/20/14 6:15:00 PM**
Dil. Factor:	**2.05**	**Date of Analysis:**	**6/9/14 02:00 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.0	Not Detected	5.1	Not Detected
Freon 114	1.0	Not Detected	7.2	Not Detected
Chloromethane	10	Not Detected	21	Not Detected
Vinyl Chloride	1.0	Not Detected	2.6	Not Detected
1,3-Butadiene	1.0	Not Detected	2.3	Not Detected
Bromomethane	10	Not Detected	40	Not Detected
Chloroethane	4.1	Not Detected	11	Not Detected
Freon 11	1.0	Not Detected	5.8	Not Detected
Ethanol	4.1	20	7.7	38
Freon 113	1.0	Not Detected	7.8	Not Detected
1,1-Dichloroethene	1.0	Not Detected	4.1	Not Detected
Acetone	10	Not Detected	24	Not Detected
2-Propanol	4.1	6.5	10	16
Carbon Disulfide	4.1	Not Detected	13	Not Detected
3-Chloropropene	4.1	Not Detected	13	Not Detected
Methylene Chloride	10	Not Detected	36	Not Detected
Methyl tert-butyl ether	1.0	Not Detected	3.7	Not Detected
trans-1,2-Dichloroethene	1.0	Not Detected	4.1	Not Detected
Hexane	1.0	Not Detected	3.6	Not Detected
1,1-Dichloroethane	1.0	Not Detected	4.1	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.1	Not Detected	12	Not Detected
cis-1,2-Dichloroethene	1.0	Not Detected	4.1	Not Detected
Tetrahydrofuran	1.0	Not Detected	3.0	Not Detected
Chloroform	1.0	Not Detected	5.0	Not Detected
1,1,1-Trichloroethane	1.0	Not Detected	5.6	Not Detected
Cyclohexane	1.0	Not Detected	3.5	Not Detected
Carbon Tetrachloride	1.0	Not Detected	6.4	Not Detected
2,2,4-Trimethylpentane	1.0	Not Detected	4.8	Not Detected
Benzene	1.0	Not Detected	3.3	Not Detected
1,2-Dichloroethane	1.0	Not Detected	4.1	Not Detected
Heptane	1.0	Not Detected	4.2	Not Detected
Trichloroethene	1.0	Not Detected	5.5	Not Detected
1,2-Dichloropropane	1.0	Not Detected	4.7	Not Detected
1,4-Dioxane	4.1	Not Detected	15	Not Detected
Bromodichloromethane	1.0	Not Detected	6.9	Not Detected
cis-1,3-Dichloropropene	1.0	Not Detected	4.6	Not Detected
4-Methyl-2-pentanone	1.0	Not Detected	4.2	Not Detected
Toluene	1.0	Not Detected	3.9	Not Detected
trans-1,3-Dichloropropene	1.0	Not Detected	4.6	Not Detected
1,1,2-Trichloroethane	1.0	Not Detected	5.6	Not Detected
Tetrachloroethene	1.0	110	7.0	740
2-Hexanone	4.1	Not Detected	17	Not Detected

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Client Sample ID: VP-04

Lab ID#: 1405490A-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060912**	**Date of Collection:**	**5/20/14 6:15:00 PM**
Dil. Factor:	**2.05**	**Date of Analysis:**	**6/9/14 02:00 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.0	Not Detected	8.7	Not Detected
1,2-Dibromoethane (EDB)	1.0	Not Detected	7.9	Not Detected
Chlorobenzene	1.0	Not Detected	4.7	Not Detected
Ethyl Benzene	1.0	Not Detected	4.4	Not Detected
m,p-Xylene	1.0	Not Detected	4.4	Not Detected
o-Xylene	1.0	Not Detected	4.4	Not Detected
Styrene	1.0	Not Detected	4.4	Not Detected
Bromoform	1.0	Not Detected	10	Not Detected
Cumene	1.0	Not Detected	5.0	Not Detected
1,1,2,2-Tetrachloroethane	1.0	Not Detected	7.0	Not Detected
Propylbenzene	1.0	Not Detected	5.0	Not Detected
4-Ethyltoluene	1.0	Not Detected	5.0	Not Detected
1,3,5-Trimethylbenzene	1.0	Not Detected	5.0	Not Detected
1,2,4-Trimethylbenzene	1.0	Not Detected	5.0	Not Detected
1,3-Dichlorobenzene	1.0	Not Detected	6.2	Not Detected
1,4-Dichlorobenzene	1.0	Not Detected	6.2	Not Detected
alpha-Chlorotoluene	1.0	Not Detected	5.3	Not Detected
1,2-Dichlorobenzene	1.0	Not Detected	6.2	Not Detected
1,2,4-Trichlorobenzene	4.1	Not Detected	30	Not Detected
Hexachlorobutadiene	4.1	Not Detected	44	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	97	70-130
4-Bromofluorobenzene	101	70-130

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Client Sample ID: VP-06

Lab ID#: 1405490A-07A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060913**	**Date of Collection:**	**5/21/14 11:15:00 AM**
Dil. Factor:	**3.37**	**Date of Analysis:**	**6/9/14 02:27 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.7	Not Detected	8.3	Not Detected
Freon 114	1.7	Not Detected	12	Not Detected
Chloromethane	17	Not Detected	35	Not Detected
Vinyl Chloride	1.7	Not Detected	4.3	Not Detected
1,3-Butadiene	1.7	Not Detected	3.7	Not Detected
Bromomethane	17	Not Detected	65	Not Detected
Chloroethane	6.7	Not Detected	18	Not Detected
Freon 11	1.7	Not Detected	9.5	Not Detected
Ethanol	6.7	39	13	74
Freon 113	1.7	Not Detected	13	Not Detected
1,1-Dichloroethene	1.7	Not Detected	6.7	Not Detected
Acetone	17	Not Detected	40	Not Detected
2-Propanol	6.7	Not Detected	16	Not Detected
Carbon Disulfide	6.7	Not Detected	21	Not Detected
3-Chloropropene	6.7	Not Detected	21	Not Detected
Methylene Chloride	17	Not Detected	58	Not Detected
Methyl tert-butyl ether	1.7	Not Detected	6.1	Not Detected
trans-1,2-Dichloroethene	1.7	Not Detected	6.7	Not Detected
Hexane	1.7	Not Detected	5.9	Not Detected
1,1-Dichloroethane	1.7	Not Detected	6.8	Not Detected
2-Butanone (Methyl Ethyl Ketone)	6.7	Not Detected	20	Not Detected
cis-1,2-Dichloroethene	1.7	8.3	6.7	33
Tetrahydrofuran	1.7	Not Detected	5.0	Not Detected
Chloroform	1.7	Not Detected	8.2	Not Detected
1,1,1-Trichloroethane	1.7	Not Detected	9.2	Not Detected
Cyclohexane	1.7	Not Detected	5.8	Not Detected
Carbon Tetrachloride	1.7	Not Detected	11	Not Detected
2,2,4-Trimethylpentane	1.7	Not Detected	7.9	Not Detected
Benzene	1.7	Not Detected	5.4	Not Detected
1,2-Dichloroethane	1.7	Not Detected	6.8	Not Detected
Heptane	1.7	Not Detected	6.9	Not Detected
Trichloroethene	1.7	20	9.0	100
1,2-Dichloropropane	1.7	Not Detected	7.8	Not Detected
1,4-Dioxane	6.7	Not Detected	24	Not Detected
Bromodichloromethane	1.7	Not Detected	11	Not Detected
cis-1,3-Dichloropropene	1.7	Not Detected	7.6	Not Detected
4-Methyl-2-pentanone	1.7	Not Detected	6.9	Not Detected
Toluene	1.7	Not Detected	6.3	Not Detected
trans-1,3-Dichloropropene	1.7	Not Detected	7.6	Not Detected
1,1,2-Trichloroethane	1.7	Not Detected	9.2	Not Detected
Tetrachloroethene	1.7	600	11	4000
2-Hexanone	6.7	Not Detected	28	Not Detected

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Client Sample ID: VP-06

Lab ID#: 1405490A-07A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060913**	**Date of Collection:**	**5/21/14 11:15:00 AM**
Dil. Factor:	**3.37**	**Date of Analysis:**	**6/9/14 02:27 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.7	Not Detected	14	Not Detected
1,2-Dibromoethane (EDB)	1.7	Not Detected	13	Not Detected
Chlorobenzene	1.7	Not Detected	7.8	Not Detected
Ethyl Benzene	1.7	Not Detected	7.3	Not Detected
m,p-Xylene	1.7	Not Detected	7.3	Not Detected
o-Xylene	1.7	Not Detected	7.3	Not Detected
Styrene	1.7	Not Detected	7.2	Not Detected
Bromoform	1.7	Not Detected	17	Not Detected
Cumene	1.7	Not Detected	8.3	Not Detected
1,1,2,2-Tetrachloroethane	1.7	Not Detected	12	Not Detected
Propylbenzene	1.7	Not Detected	8.3	Not Detected
4-Ethyltoluene	1.7	Not Detected	8.3	Not Detected
1,3,5-Trimethylbenzene	1.7	Not Detected	8.3	Not Detected
1,2,4-Trimethylbenzene	1.7	Not Detected	8.3	Not Detected
1,3-Dichlorobenzene	1.7	Not Detected	10	Not Detected
1,4-Dichlorobenzene	1.7	Not Detected	10	Not Detected
alpha-Chlorotoluene	1.7	Not Detected	8.7	Not Detected
1,2-Dichlorobenzene	1.7	Not Detected	10	Not Detected
1,2,4-Trichlorobenzene	6.7	Not Detected	50	Not Detected
Hexachlorobutadiene	6.7	Not Detected	72	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	96	70-130
4-Bromofluorobenzene	102	70-130

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Client Sample ID: VP-09

Lab ID#: 1405490A-08A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060914**	**Date of Collection:**	**5/21/14 3:50:00 PM**
Dil. Factor:	**3.19**	**Date of Analysis:**	**6/9/14 02:54 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.6	Not Detected	7.9	Not Detected
Freon 114	1.6	Not Detected	11	Not Detected
Chloromethane	16	Not Detected	33	Not Detected
Vinyl Chloride	1.6	Not Detected	4.1	Not Detected
1,3-Butadiene	1.6	Not Detected	3.5	Not Detected
Bromomethane	16	Not Detected	62	Not Detected
Chloroethane	6.4	Not Detected	17	Not Detected
Freon 11	1.6	Not Detected	9.0	Not Detected
Ethanol	6.4	17	12	33
Freon 113	1.6	Not Detected	12	Not Detected
1,1-Dichloroethene	1.6	Not Detected	6.3	Not Detected
Acetone	16	19	38	46
2-Propanol	6.4	Not Detected	16	Not Detected
Carbon Disulfide	6.4	Not Detected	20	Not Detected
3-Chloropropene	6.4	Not Detected	20	Not Detected
Methylene Chloride	16	Not Detected	55	Not Detected
Methyl tert-butyl ether	1.6	Not Detected	5.8	Not Detected
trans-1,2-Dichloroethene	1.6	Not Detected	6.3	Not Detected
Hexane	1.6	Not Detected	5.6	Not Detected
1,1-Dichloroethane	1.6	Not Detected	6.4	Not Detected
2-Butanone (Methyl Ethyl Ketone)	6.4	Not Detected	19	Not Detected
cis-1,2-Dichloroethene	1.6	Not Detected	6.3	Not Detected
Tetrahydrofuran	1.6	Not Detected	4.7	Not Detected
Chloroform	1.6	Not Detected	7.8	Not Detected
1,1,1-Trichloroethane	1.6	Not Detected	8.7	Not Detected
Cyclohexane	1.6	Not Detected	5.5	Not Detected
Carbon Tetrachloride	1.6	Not Detected	10	Not Detected
2,2,4-Trimethylpentane	1.6	Not Detected	7.4	Not Detected
Benzene	1.6	Not Detected	5.1	Not Detected
1,2-Dichloroethane	1.6	Not Detected	6.4	Not Detected
Heptane	1.6	Not Detected	6.5	Not Detected
Trichloroethene	1.6	Not Detected	8.6	Not Detected
1,2-Dichloropropane	1.6	Not Detected	7.4	Not Detected
1,4-Dioxane	6.4	Not Detected	23	Not Detected
Bromodichloromethane	1.6	Not Detected	11	Not Detected
cis-1,3-Dichloropropene	1.6	Not Detected	7.2	Not Detected
4-Methyl-2-pentanone	1.6	Not Detected	6.5	Not Detected
Toluene	1.6	Not Detected	6.0	Not Detected
trans-1,3-Dichloropropene	1.6	Not Detected	7.2	Not Detected
1,1,2-Trichloroethane	1.6	Not Detected	8.7	Not Detected
Tetrachloroethene	1.6	4.2	11	29
2-Hexanone	6.4	Not Detected	26	Not Detected

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Client Sample ID: VP-09

Lab ID#: 1405490A-08A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060914**	**Date of Collection:**	**5/21/14 3:50:00 PM**
Dil. Factor:	**3.19**	**Date of Analysis:**	**6/9/14 02:54 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.6	Not Detected	14	Not Detected
1,2-Dibromoethane (EDB)	1.6	Not Detected	12	Not Detected
Chlorobenzene	1.6	Not Detected	7.3	Not Detected
Ethyl Benzene	1.6	Not Detected	6.9	Not Detected
m,p-Xylene	1.6	Not Detected	6.9	Not Detected
o-Xylene	1.6	Not Detected	6.9	Not Detected
Styrene	1.6	Not Detected	6.8	Not Detected
Bromoform	1.6	Not Detected	16	Not Detected
Cumene	1.6	Not Detected	7.8	Not Detected
1,1,2,2-Tetrachloroethane	1.6	Not Detected	11	Not Detected
Propylbenzene	1.6	Not Detected	7.8	Not Detected
4-Ethyltoluene	1.6	Not Detected	7.8	Not Detected
1,3,5-Trimethylbenzene	1.6	Not Detected	7.8	Not Detected
1,2,4-Trimethylbenzene	1.6	Not Detected	7.8	Not Detected
1,3-Dichlorobenzene	1.6	Not Detected	9.6	Not Detected
1,4-Dichlorobenzene	1.6	Not Detected	9.6	Not Detected
alpha-Chlorotoluene	1.6	Not Detected	8.2	Not Detected
1,2-Dichlorobenzene	1.6	Not Detected	9.6	Not Detected
1,2,4-Trichlorobenzene	6.4	Not Detected	47	Not Detected
Hexachlorobutadiene	6.4	Not Detected	68	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	95	70-130
4-Bromofluorobenzene	104	70-130

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Client Sample ID: VP-10

Lab ID#: 1405490A-09A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060916**	**Date of Collection:**	**5/20/14 3:10:00 PM**
Dil. Factor:	**13.9**	**Date of Analysis:**	**6/9/14 03:39 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	7.0	Not Detected	34	Not Detected
Freon 114	7.0	Not Detected	48	Not Detected
Chloromethane	70	Not Detected	140	Not Detected
Vinyl Chloride	7.0	Not Detected	18	Not Detected
1,3-Butadiene	7.0	Not Detected	15	Not Detected
Bromomethane	70	Not Detected	270	Not Detected
Chloroethane	28	Not Detected	73	Not Detected
Freon 11	7.0	Not Detected	39	Not Detected
Ethanol	28	140	52	260
Freon 113	7.0	Not Detected	53	Not Detected
1,1-Dichloroethene	7.0	Not Detected	28	Not Detected
Acetone	70	Not Detected	160	Not Detected
2-Propanol	28	Not Detected	68	Not Detected
Carbon Disulfide	28	Not Detected	86	Not Detected
3-Chloropropene	28	Not Detected	87	Not Detected
Methylene Chloride	70	Not Detected	240	Not Detected
Methyl tert-butyl ether	7.0	Not Detected	25	Not Detected
trans-1,2-Dichloroethene	7.0	Not Detected	28	Not Detected
Hexane	7.0	Not Detected	24	Not Detected
1,1-Dichloroethane	7.0	Not Detected	28	Not Detected
2-Butanone (Methyl Ethyl Ketone)	28	Not Detected	82	Not Detected
cis-1,2-Dichloroethene	7.0	Not Detected	28	Not Detected
Tetrahydrofuran	7.0	Not Detected	20	Not Detected
Chloroform	7.0	Not Detected	34	Not Detected
1,1,1-Trichloroethane	7.0	Not Detected	38	Not Detected
Cyclohexane	7.0	Not Detected	24	Not Detected
Carbon Tetrachloride	7.0	Not Detected	44	Not Detected
2,2,4-Trimethylpentane	7.0	Not Detected	32	Not Detected
Benzene	7.0	Not Detected	22	Not Detected
1,2-Dichloroethane	7.0	Not Detected	28	Not Detected
Heptane	7.0	Not Detected	28	Not Detected
Trichloroethene	7.0	Not Detected	37	Not Detected
1,2-Dichloropropane	7.0	Not Detected	32	Not Detected
1,4-Dioxane	28	Not Detected	100	Not Detected
Bromodichloromethane	7.0	Not Detected	46	Not Detected
cis-1,3-Dichloropropene	7.0	Not Detected	32	Not Detected
4-Methyl-2-pentanone	7.0	Not Detected	28	Not Detected
Toluene	7.0	Not Detected	26	Not Detected
trans-1,3-Dichloropropene	7.0	Not Detected	32	Not Detected
1,1,2-Trichloroethane	7.0	Not Detected	38	Not Detected
Tetrachloroethene	7.0	2100	47	14000
2-Hexanone	28	Not Detected	110	Not Detected

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Client Sample ID: VP-10

Lab ID#: 1405490A-09A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060916**	**Date of Collection:**	**5/20/14 3:10:00 PM**
Dil. Factor:	**13.9**	**Date of Analysis:**	**6/9/14 03:39 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	7.0	Not Detected	59	Not Detected
1,2-Dibromoethane (EDB)	7.0	Not Detected	53	Not Detected
Chlorobenzene	7.0	Not Detected	32	Not Detected
Ethyl Benzene	7.0	Not Detected	30	Not Detected
m,p-Xylene	7.0	Not Detected	30	Not Detected
o-Xylene	7.0	Not Detected	30	Not Detected
Styrene	7.0	Not Detected	30	Not Detected
Bromoform	7.0	Not Detected	72	Not Detected
Cumene	7.0	Not Detected	34	Not Detected
1,1,2,2-Tetrachloroethane	7.0	Not Detected	48	Not Detected
Propylbenzene	7.0	Not Detected	34	Not Detected
4-Ethyltoluene	7.0	Not Detected	34	Not Detected
1,3,5-Trimethylbenzene	7.0	Not Detected	34	Not Detected
1,2,4-Trimethylbenzene	7.0	Not Detected	34	Not Detected
1,3-Dichlorobenzene	7.0	Not Detected	42	Not Detected
1,4-Dichlorobenzene	7.0	Not Detected	42	Not Detected
alpha-Chlorotoluene	7.0	Not Detected	36	Not Detected
1,2-Dichlorobenzene	7.0	Not Detected	42	Not Detected
1,2,4-Trichlorobenzene	28	Not Detected	210	Not Detected
Hexachlorobutadiene	28	Not Detected	300	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	96	70-130
4-Bromofluorobenzene	103	70-130

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Client Sample ID: VP-11R

Lab ID#: 1405490A-10A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060915**	**Date of Collection:**	**5/20/14 5:50:00 PM**
Dil. Factor:	**16.8**	**Date of Analysis:**	**6/9/14 03:16 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	8.4	Not Detected	42	Not Detected
Freon 114	8.4	Not Detected	59	Not Detected
Chloromethane	84	Not Detected	170	Not Detected
Vinyl Chloride	8.4	Not Detected	21	Not Detected
1,3-Butadiene	8.4	Not Detected	18	Not Detected
Bromomethane	84	Not Detected	330	Not Detected
Chloroethane	34	Not Detected	89	Not Detected
Freon 11	8.4	Not Detected	47	Not Detected
Ethanol	34	42	63	80
Freon 113	8.4	Not Detected	64	Not Detected
1,1-Dichloroethene	8.4	Not Detected	33	Not Detected
Acetone	84	Not Detected	200	Not Detected
2-Propanol	34	Not Detected	82	Not Detected
Carbon Disulfide	34	Not Detected	100	Not Detected
3-Chloropropene	34	Not Detected	100	Not Detected
Methylene Chloride	84	Not Detected	290	Not Detected
Methyl tert-butyl ether	8.4	Not Detected	30	Not Detected
trans-1,2-Dichloroethene	8.4	Not Detected	33	Not Detected
Hexane	8.4	Not Detected	30	Not Detected
1,1-Dichloroethane	8.4	Not Detected	34	Not Detected
2-Butanone (Methyl Ethyl Ketone)	34	Not Detected	99	Not Detected
cis-1,2-Dichloroethene	8.4	Not Detected	33	Not Detected
Tetrahydrofuran	8.4	Not Detected	25	Not Detected
Chloroform	8.4	Not Detected	41	Not Detected
1,1,1-Trichloroethane	8.4	Not Detected	46	Not Detected
Cyclohexane	8.4	Not Detected	29	Not Detected
Carbon Tetrachloride	8.4	Not Detected	53	Not Detected
2,2,4-Trimethylpentane	8.4	Not Detected	39	Not Detected
Benzene	8.4	Not Detected	27	Not Detected
1,2-Dichloroethane	8.4	Not Detected	34	Not Detected
Heptane	8.4	Not Detected	34	Not Detected
Trichloroethene	8.4	17	45	93
1,2-Dichloropropane	8.4	Not Detected	39	Not Detected
1,4-Dioxane	34	Not Detected	120	Not Detected
Bromodichloromethane	8.4	Not Detected	56	Not Detected
cis-1,3-Dichloropropene	8.4	Not Detected	38	Not Detected
4-Methyl-2-pentanone	8.4	Not Detected	34	Not Detected
Toluene	8.4	Not Detected	32	Not Detected
trans-1,3-Dichloropropene	8.4	Not Detected	38	Not Detected
1,1,2-Trichloroethane	8.4	Not Detected	46	Not Detected
Tetrachloroethene	8.4	3300	57	22000
2-Hexanone	34	Not Detected	140	Not Detected

eurofins | Air Toxics

Client Sample ID: VP-11R

Lab ID#: 1405490A-10A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060915**	**Date of Collection:**	**5/20/14 5:50:00 PM**
Dil. Factor:	**16.8**	**Date of Analysis:**	**6/9/14 03:16 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	8.4	Not Detected	72	Not Detected
1,2-Dibromoethane (EDB)	8.4	Not Detected	64	Not Detected
Chlorobenzene	8.4	Not Detected	39	Not Detected
Ethyl Benzene	8.4	Not Detected	36	Not Detected
m,p-Xylene	8.4	Not Detected	36	Not Detected
o-Xylene	8.4	Not Detected	36	Not Detected
Styrene	8.4	Not Detected	36	Not Detected
Bromoform	8.4	Not Detected	87	Not Detected
Cumene	8.4	Not Detected	41	Not Detected
1,1,2,2-Tetrachloroethane	8.4	Not Detected	58	Not Detected
Propylbenzene	8.4	Not Detected	41	Not Detected
4-Ethyltoluene	8.4	Not Detected	41	Not Detected
1,3,5-Trimethylbenzene	8.4	Not Detected	41	Not Detected
1,2,4-Trimethylbenzene	8.4	Not Detected	41	Not Detected
1,3-Dichlorobenzene	8.4	Not Detected	50	Not Detected
1,4-Dichlorobenzene	8.4	Not Detected	50	Not Detected
alpha-Chlorotoluene	8.4	Not Detected	43	Not Detected
1,2-Dichlorobenzene	8.4	Not Detected	50	Not Detected
1,2,4-Trichlorobenzene	34	Not Detected	250	Not Detected
Hexachlorobutadiene	34	Not Detected	360	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	94	70-130
4-Bromofluorobenzene	102	70-130

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Client Sample ID: VP-12

Lab ID#: 1405490A-11A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17061119**	**Date of Collection:**	**5/20/14 3:40:00 PM**
Dil. Factor:	**17.0**	**Date of Analysis:**	**6/11/14 03:58 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	8.5	Not Detected	42	Not Detected
Freon 114	8.5	Not Detected	59	Not Detected
Chloromethane	85	Not Detected	180	Not Detected
Vinyl Chloride	8.5	Not Detected	22	Not Detected
1,3-Butadiene	8.5	Not Detected	19	Not Detected
Bromomethane	85	Not Detected	330	Not Detected
Chloroethane	34	Not Detected	90	Not Detected
Freon 11	8.5	Not Detected	48	Not Detected
Ethanol	34	79	64	150
Freon 113	8.5	Not Detected	65	Not Detected
1,1-Dichloroethene	8.5	Not Detected	34	Not Detected
Acetone	85	Not Detected	200	Not Detected
2-Propanol	34	Not Detected	84	Not Detected
Carbon Disulfide	34	Not Detected	100	Not Detected
3-Chloropropene	34	Not Detected	110	Not Detected
Methylene Chloride	85	Not Detected	300	Not Detected
Methyl tert-butyl ether	8.5	Not Detected	31	Not Detected
trans-1,2-Dichloroethene	8.5	Not Detected	34	Not Detected
Hexane	8.5	Not Detected	30	Not Detected
1,1-Dichloroethane	8.5	Not Detected	34	Not Detected
2-Butanone (Methyl Ethyl Ketone)	34	Not Detected	100	Not Detected
cis-1,2-Dichloroethene	8.5	Not Detected	34	Not Detected
Tetrahydrofuran	8.5	Not Detected	25	Not Detected
Chloroform	8.5	Not Detected	42	Not Detected
1,1,1-Trichloroethane	8.5	Not Detected	46	Not Detected
Cyclohexane	8.5	Not Detected	29	Not Detected
Carbon Tetrachloride	8.5	Not Detected	53	Not Detected
2,2,4-Trimethylpentane	8.5	Not Detected	40	Not Detected
Benzene	8.5	Not Detected	27	Not Detected
1,2-Dichloroethane	8.5	Not Detected	34	Not Detected
Heptane	8.5	Not Detected	35	Not Detected
Trichloroethene	8.5	Not Detected	46	Not Detected
1,2-Dichloropropane	8.5	Not Detected	39	Not Detected
1,4-Dioxane	34	Not Detected	120	Not Detected
Bromodichloromethane	8.5	Not Detected	57	Not Detected
cis-1,3-Dichloropropene	8.5	Not Detected	38	Not Detected
4-Methyl-2-pentanone	8.5	Not Detected	35	Not Detected
Toluene	8.5	Not Detected	32	Not Detected
trans-1,3-Dichloropropene	8.5	Not Detected	38	Not Detected
1,1,2-Trichloroethane	8.5	Not Detected	46	Not Detected
Tetrachloroethene	8.5	1200	58	7900
2-Hexanone	34	Not Detected	140	Not Detected

eurofins | Air Toxics

Client Sample ID: VP-12

Lab ID#: 1405490A-11A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17061119**	**Date of Collection:**	**5/20/14 3:40:00 PM**
Dil. Factor:	**17.0**	**Date of Analysis:**	**6/11/14 03:58 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	8.5	Not Detected	72	Not Detected
1,2-Dibromoethane (EDB)	8.5	Not Detected	65	Not Detected
Chlorobenzene	8.5	Not Detected	39	Not Detected
Ethyl Benzene	8.5	Not Detected	37	Not Detected
m,p-Xylene	8.5	Not Detected	37	Not Detected
o-Xylene	8.5	Not Detected	37	Not Detected
Styrene	8.5	Not Detected	36	Not Detected
Bromoform	8.5	Not Detected	88	Not Detected
Cumene	8.5	Not Detected	42	Not Detected
1,1,2,2-Tetrachloroethane	8.5	Not Detected	58	Not Detected
Propylbenzene	8.5	Not Detected	42	Not Detected
4-Ethyltoluene	8.5	Not Detected	42	Not Detected
1,3,5-Trimethylbenzene	8.5	Not Detected	42	Not Detected
1,2,4-Trimethylbenzene	8.5	Not Detected	42	Not Detected
1,3-Dichlorobenzene	8.5	Not Detected	51	Not Detected
1,4-Dichlorobenzene	8.5	Not Detected	51	Not Detected
alpha-Chlorotoluene	8.5	Not Detected	44	Not Detected
1,2-Dichlorobenzene	8.5	Not Detected	51	Not Detected
1,2,4-Trichlorobenzene	34	Not Detected	250	Not Detected
Hexachlorobutadiene	34	Not Detected	360	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	97	70-130
4-Bromofluorobenzene	86	70-130

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Client Sample ID: VP-13

Lab ID#: 1405490A-12A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060921**	**Date of Collection:**	**5/21/14 11:50:00 AM**
Dil. Factor:	**3.37**	**Date of Analysis:**	**6/9/14 09:00 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.7	Not Detected	8.3	Not Detected
Freon 114	1.7	Not Detected	12	Not Detected
Chloromethane	17	Not Detected	35	Not Detected
Vinyl Chloride	1.7	Not Detected	4.3	Not Detected
1,3-Butadiene	1.7	Not Detected	3.7	Not Detected
Bromomethane	17	Not Detected	65	Not Detected
Chloroethane	6.7	Not Detected	18	Not Detected
Freon 11	1.7	Not Detected	9.5	Not Detected
Ethanol	6.7	28	13	53
Freon 113	1.7	Not Detected	13	Not Detected
1,1-Dichloroethene	1.7	Not Detected	6.7	Not Detected
Acetone	17	Not Detected	40	Not Detected
2-Propanol	6.7	Not Detected	16	Not Detected
Carbon Disulfide	6.7	Not Detected	21	Not Detected
3-Chloropropene	6.7	Not Detected	21	Not Detected
Methylene Chloride	17	Not Detected	58	Not Detected
Methyl tert-butyl ether	1.7	Not Detected	6.1	Not Detected
trans-1,2-Dichloroethene	1.7	Not Detected	6.7	Not Detected
Hexane	1.7	Not Detected	5.9	Not Detected
1,1-Dichloroethane	1.7	Not Detected	6.8	Not Detected
2-Butanone (Methyl Ethyl Ketone)	6.7	Not Detected	20	Not Detected
cis-1,2-Dichloroethene	1.7	Not Detected	6.7	Not Detected
Tetrahydrofuran	1.7	Not Detected	5.0	Not Detected
Chloroform	1.7	Not Detected	8.2	Not Detected
1,1,1-Trichloroethane	1.7	Not Detected	9.2	Not Detected
Cyclohexane	1.7	Not Detected	5.8	Not Detected
Carbon Tetrachloride	1.7	Not Detected	11	Not Detected
2,2,4-Trimethylpentane	1.7	Not Detected	7.9	Not Detected
Benzene	1.7	Not Detected	5.4	Not Detected
1,2-Dichloroethane	1.7	Not Detected	6.8	Not Detected
Heptane	1.7	Not Detected	6.9	Not Detected
Trichloroethene	1.7	Not Detected	9.0	Not Detected
1,2-Dichloropropane	1.7	Not Detected	7.8	Not Detected
1,4-Dioxane	6.7	Not Detected	24	Not Detected
Bromodichloromethane	1.7	Not Detected	11	Not Detected
cis-1,3-Dichloropropene	1.7	Not Detected	7.6	Not Detected
4-Methyl-2-pentanone	1.7	Not Detected	6.9	Not Detected
Toluene	1.7	Not Detected	6.3	Not Detected
trans-1,3-Dichloropropene	1.7	Not Detected	7.6	Not Detected
1,1,2-Trichloroethane	1.7	Not Detected	9.2	Not Detected
Tetrachloroethene	1.7	85	11	580
2-Hexanone	6.7	Not Detected	28	Not Detected

eurofins | Air Toxics

Client Sample ID: VP-13

Lab ID#: 1405490A-12A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060921**	**Date of Collection:**	**5/21/14 11:50:00 AM**
Dil. Factor:	**3.37**	**Date of Analysis:**	**6/9/14 09:00 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.7	Not Detected	14	Not Detected
1,2-Dibromoethane (EDB)	1.7	Not Detected	13	Not Detected
Chlorobenzene	1.7	Not Detected	7.8	Not Detected
Ethyl Benzene	1.7	Not Detected	7.3	Not Detected
m,p-Xylene	1.7	Not Detected	7.3	Not Detected
o-Xylene	1.7	Not Detected	7.3	Not Detected
Styrene	1.7	Not Detected	7.2	Not Detected
Bromoform	1.7	Not Detected	17	Not Detected
Cumene	1.7	Not Detected	8.3	Not Detected
1,1,2,2-Tetrachloroethane	1.7	Not Detected	12	Not Detected
Propylbenzene	1.7	Not Detected	8.3	Not Detected
4-Ethyltoluene	1.7	Not Detected	8.3	Not Detected
1,3,5-Trimethylbenzene	1.7	Not Detected	8.3	Not Detected
1,2,4-Trimethylbenzene	1.7	Not Detected	8.3	Not Detected
1,3-Dichlorobenzene	1.7	Not Detected	10	Not Detected
1,4-Dichlorobenzene	1.7	Not Detected	10	Not Detected
alpha-Chlorotoluene	1.7	Not Detected	8.7	Not Detected
1,2-Dichlorobenzene	1.7	Not Detected	10	Not Detected
1,2,4-Trichlorobenzene	6.7	Not Detected	50	Not Detected
Hexachlorobutadiene	6.7	Not Detected	72	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	94	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: VP-14

Lab ID#: 1405490A-13A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060922**	**Date of Collection:**	**5/21/14 11:35:00 AM**
Dil. Factor:	**6.38**	**Date of Analysis:**	**6/9/14 09:24 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	3.2	Not Detected	16	Not Detected
Freon 114	3.2	Not Detected	22	Not Detected
Chloromethane	32	Not Detected	66	Not Detected
Vinyl Chloride	3.2	Not Detected	8.2	Not Detected
1,3-Butadiene	3.2	Not Detected	7.0	Not Detected
Bromomethane	32	Not Detected	120	Not Detected
Chloroethane	13	Not Detected	34	Not Detected
Freon 11	3.2	Not Detected	18	Not Detected
Ethanol	13	21	24	40
Freon 113	3.2	Not Detected	24	Not Detected
1,1-Dichloroethene	3.2	Not Detected	13	Not Detected
Acetone	32	Not Detected	76	Not Detected
2-Propanol	13	Not Detected	31	Not Detected
Carbon Disulfide	13	Not Detected	40	Not Detected
3-Chloropropene	13	Not Detected	40	Not Detected
Methylene Chloride	32	Not Detected	110	Not Detected
Methyl tert-butyl ether	3.2	Not Detected	12	Not Detected
trans-1,2-Dichloroethene	3.2	Not Detected	13	Not Detected
Hexane	3.2	Not Detected	11	Not Detected
1,1-Dichloroethane	3.2	Not Detected	13	Not Detected
2-Butanone (Methyl Ethyl Ketone)	13	Not Detected	38	Not Detected
cis-1,2-Dichloroethene	3.2	Not Detected	13	Not Detected
Tetrahydrofuran	3.2	Not Detected	9.4	Not Detected
Chloroform	3.2	Not Detected	16	Not Detected
1,1,1-Trichloroethane	3.2	Not Detected	17	Not Detected
Cyclohexane	3.2	Not Detected	11	Not Detected
Carbon Tetrachloride	3.2	Not Detected	20	Not Detected
2,2,4-Trimethylpentane	3.2	Not Detected	15	Not Detected
Benzene	3.2	Not Detected	10	Not Detected
1,2-Dichloroethane	3.2	Not Detected	13	Not Detected
Heptane	3.2	Not Detected	13	Not Detected
Trichloroethene	3.2	11	17	60
1,2-Dichloropropane	3.2	Not Detected	15	Not Detected
1,4-Dioxane	13	Not Detected	46	Not Detected
Bromodichloromethane	3.2	Not Detected	21	Not Detected
cis-1,3-Dichloropropene	3.2	Not Detected	14	Not Detected
4-Methyl-2-pentanone	3.2	Not Detected	13	Not Detected
Toluene	3.2	Not Detected	12	Not Detected
trans-1,3-Dichloropropene	3.2	Not Detected	14	Not Detected
1,1,2-Trichloroethane	3.2	Not Detected	17	Not Detected
Tetrachloroethene	3.2	1200	22	7900
2-Hexanone	13	Not Detected	52	Not Detected

eurofins | Air Toxics

Client Sample ID: VP-14

Lab ID#: 1405490A-13A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060922**	**Date of Collection:**	**5/21/14 11:35:00 AM**
Dil. Factor:	**6.38**	**Date of Analysis:**	**6/9/14 09:24 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	3.2	Not Detected	27	Not Detected
1,2-Dibromoethane (EDB)	3.2	Not Detected	24	Not Detected
Chlorobenzene	3.2	Not Detected	15	Not Detected
Ethyl Benzene	3.2	Not Detected	14	Not Detected
m,p-Xylene	3.2	Not Detected	14	Not Detected
o-Xylene	3.2	Not Detected	14	Not Detected
Styrene	3.2	Not Detected	14	Not Detected
Bromoform	3.2	Not Detected	33	Not Detected
Cumene	3.2	Not Detected	16	Not Detected
1,1,2,2-Tetrachloroethane	3.2	Not Detected	22	Not Detected
Propylbenzene	3.2	Not Detected	16	Not Detected
4-Ethyltoluene	3.2	Not Detected	16	Not Detected
1,3,5-Trimethylbenzene	3.2	Not Detected	16	Not Detected
1,2,4-Trimethylbenzene	3.2	Not Detected	16	Not Detected
1,3-Dichlorobenzene	3.2	Not Detected	19	Not Detected
1,4-Dichlorobenzene	3.2	Not Detected	19	Not Detected
alpha-Chlorotoluene	3.2	Not Detected	16	Not Detected
1,2-Dichlorobenzene	3.2	Not Detected	19	Not Detected
1,2,4-Trichlorobenzene	13	Not Detected	95	Not Detected
Hexachlorobutadiene	13	Not Detected	140	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	92	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: VP-101

Lab ID#: 1405490A-14A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060923**	**Date of Collection:**	**5/21/14 10:40:00 AM**
Dil. Factor:	**3.34**	**Date of Analysis:**	**6/9/14 09:51 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.7	Not Detected	8.2	Not Detected
Freon 114	1.7	Not Detected	12	Not Detected
Chloromethane	17	Not Detected	34	Not Detected
Vinyl Chloride	1.7	Not Detected	4.3	Not Detected
1,3-Butadiene	1.7	Not Detected	3.7	Not Detected
Bromomethane	17	Not Detected	65	Not Detected
Chloroethane	6.7	Not Detected	18	Not Detected
Freon 11	1.7	Not Detected	9.4	Not Detected
Ethanol	6.7	80	12	150
Freon 113	1.7	Not Detected	13	Not Detected
1,1-Dichloroethene	1.7	Not Detected	6.6	Not Detected
Acetone	17	20	40	46
2-Propanol	6.7	Not Detected	16	Not Detected
Carbon Disulfide	6.7	Not Detected	21	Not Detected
3-Chloropropene	6.7	Not Detected	21	Not Detected
Methylene Chloride	17	Not Detected	58	Not Detected
Methyl tert-butyl ether	1.7	Not Detected	6.0	Not Detected
trans-1,2-Dichloroethene	1.7	Not Detected	6.6	Not Detected
Hexane	1.7	Not Detected	5.9	Not Detected
1,1-Dichloroethane	1.7	Not Detected	6.8	Not Detected
2-Butanone (Methyl Ethyl Ketone)	6.7	Not Detected	20	Not Detected
cis-1,2-Dichloroethene	1.7	Not Detected	6.6	Not Detected
Tetrahydrofuran	1.7	Not Detected	4.9	Not Detected
Chloroform	1.7	Not Detected	8.2	Not Detected
1,1,1-Trichloroethane	1.7	Not Detected	9.1	Not Detected
Cyclohexane	1.7	Not Detected	5.7	Not Detected
Carbon Tetrachloride	1.7	Not Detected	10	Not Detected
2,2,4-Trimethylpentane	1.7	Not Detected	7.8	Not Detected
Benzene	1.7	Not Detected	5.3	Not Detected
1,2-Dichloroethane	1.7	Not Detected	6.8	Not Detected
Heptane	1.7	Not Detected	6.8	Not Detected
Trichloroethene	1.7	Not Detected	9.0	Not Detected
1,2-Dichloropropane	1.7	Not Detected	7.7	Not Detected
1,4-Dioxane	6.7	Not Detected	24	Not Detected
Bromodichloromethane	1.7	Not Detected	11	Not Detected
cis-1,3-Dichloropropene	1.7	Not Detected	7.6	Not Detected
4-Methyl-2-pentanone	1.7	Not Detected	6.8	Not Detected
Toluene	1.7	Not Detected	6.3	Not Detected
trans-1,3-Dichloropropene	1.7	Not Detected	7.6	Not Detected
1,1,2-Trichloroethane	1.7	Not Detected	9.1	Not Detected
Tetrachloroethene	1.7	120	11	790
2-Hexanone	6.7	Not Detected	27	Not Detected

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Client Sample ID: VP-101

Lab ID#: 1405490A-14A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060923**	**Date of Collection:**	**5/21/14 10:40:00 AM**
Dil. Factor:	**3.34**	**Date of Analysis:**	**6/9/14 09:51 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.7	Not Detected	14	Not Detected
1,2-Dibromoethane (EDB)	1.7	Not Detected	13	Not Detected
Chlorobenzene	1.7	Not Detected	7.7	Not Detected
Ethyl Benzene	1.7	Not Detected	7.2	Not Detected
m,p-Xylene	1.7	Not Detected	7.2	Not Detected
o-Xylene	1.7	Not Detected	7.2	Not Detected
Styrene	1.7	Not Detected	7.1	Not Detected
Bromoform	1.7	Not Detected	17	Not Detected
Cumene	1.7	Not Detected	8.2	Not Detected
1,1,2,2-Tetrachloroethane	1.7	Not Detected	11	Not Detected
Propylbenzene	1.7	Not Detected	8.2	Not Detected
4-Ethyltoluene	1.7	Not Detected	8.2	Not Detected
1,3,5-Trimethylbenzene	1.7	Not Detected	8.2	Not Detected
1,2,4-Trimethylbenzene	1.7	Not Detected	8.2	Not Detected
1,3-Dichlorobenzene	1.7	Not Detected	10	Not Detected
1,4-Dichlorobenzene	1.7	Not Detected	10	Not Detected
alpha-Chlorotoluene	1.7	Not Detected	8.6	Not Detected
1,2-Dichlorobenzene	1.7	Not Detected	10	Not Detected
1,2,4-Trichlorobenzene	6.7	Not Detected	50	Not Detected
Hexachlorobutadiene	6.7	Not Detected	71	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	94	70-130
4-Bromofluorobenzene	100	70-130

eurofins | Air Toxics

Client Sample ID: VP-102

Lab ID#: 1405490A-15A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060924**	**Date of Collection:**	**5/20/14 5:30:00 PM**
Dil. Factor:	**3.33**	**Date of Analysis:**	**6/9/14 10:20 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.7	Not Detected	8.2	Not Detected
Freon 114	1.7	Not Detected	12	Not Detected
Chloromethane	17	Not Detected	34	Not Detected
Vinyl Chloride	1.7	Not Detected	4.2	Not Detected
1,3-Butadiene	1.7	Not Detected	3.7	Not Detected
Bromomethane	17	Not Detected	65	Not Detected
Chloroethane	6.7	Not Detected	18	Not Detected
Freon 11	1.7	Not Detected	9.4	Not Detected
Ethanol	6.7	83	12	160
Freon 113	1.7	Not Detected	13	Not Detected
1,1-Dichloroethene	1.7	Not Detected	6.6	Not Detected
Acetone	17	21	40	50
2-Propanol	6.7	Not Detected	16	Not Detected
Carbon Disulfide	6.7	Not Detected	21	Not Detected
3-Chloropropene	6.7	Not Detected	21	Not Detected
Methylene Chloride	17	Not Detected	58	Not Detected
Methyl tert-butyl ether	1.7	Not Detected	6.0	Not Detected
trans-1,2-Dichloroethene	1.7	Not Detected	6.6	Not Detected
Hexane	1.7	Not Detected	5.9	Not Detected
1,1-Dichloroethane	1.7	Not Detected	6.7	Not Detected
2-Butanone (Methyl Ethyl Ketone)	6.7	Not Detected	20	Not Detected
cis-1,2-Dichloroethene	1.7	Not Detected	6.6	Not Detected
Tetrahydrofuran	1.7	Not Detected	4.9	Not Detected
Chloroform	1.7	Not Detected	8.1	Not Detected
1,1,1-Trichloroethane	1.7	Not Detected	9.1	Not Detected
Cyclohexane	1.7	Not Detected	5.7	Not Detected
Carbon Tetrachloride	1.7	Not Detected	10	Not Detected
2,2,4-Trimethylpentane	1.7	Not Detected	7.8	Not Detected
Benzene	1.7	Not Detected	5.3	Not Detected
1,2-Dichloroethane	1.7	Not Detected	6.7	Not Detected
Heptane	1.7	Not Detected	6.8	Not Detected
Trichloroethene	1.7	Not Detected	8.9	Not Detected
1,2-Dichloropropane	1.7	Not Detected	7.7	Not Detected
1,4-Dioxane	6.7	Not Detected	24	Not Detected
Bromodichloromethane	1.7	Not Detected	11	Not Detected
cis-1,3-Dichloropropene	1.7	Not Detected	7.6	Not Detected
4-Methyl-2-pentanone	1.7	Not Detected	6.8	Not Detected
Toluene	1.7	Not Detected	6.3	Not Detected
trans-1,3-Dichloropropene	1.7	Not Detected	7.6	Not Detected
1,1,2-Trichloroethane	1.7	Not Detected	9.1	Not Detected
Tetrachloroethene	1.7	120	11	820
2-Hexanone	6.7	Not Detected	27	Not Detected

eurofins | Air Toxics

Client Sample ID: VP-102

Lab ID#: 1405490A-15A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060924**	**Date of Collection:**	**5/20/14 5:30:00 PM**
Dil. Factor:	**3.33**	**Date of Analysis:**	**6/9/14 10:20 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.7	Not Detected	14	Not Detected
1,2-Dibromoethane (EDB)	1.7	Not Detected	13	Not Detected
Chlorobenzene	1.7	Not Detected	7.7	Not Detected
Ethyl Benzene	1.7	Not Detected	7.2	Not Detected
m,p-Xylene	1.7	Not Detected	7.2	Not Detected
o-Xylene	1.7	Not Detected	7.2	Not Detected
Styrene	1.7	Not Detected	7.1	Not Detected
Bromoform	1.7	Not Detected	17	Not Detected
Cumene	1.7	Not Detected	8.2	Not Detected
1,1,2,2-Tetrachloroethane	1.7	Not Detected	11	Not Detected
Propylbenzene	1.7	Not Detected	8.2	Not Detected
4-Ethyltoluene	1.7	Not Detected	8.2	Not Detected
1,3,5-Trimethylbenzene	1.7	Not Detected	8.2	Not Detected
1,2,4-Trimethylbenzene	1.7	Not Detected	8.2	Not Detected
1,3-Dichlorobenzene	1.7	Not Detected	10	Not Detected
1,4-Dichlorobenzene	1.7	Not Detected	10	Not Detected
alpha-Chlorotoluene	1.7	Not Detected	8.6	Not Detected
1,2-Dichlorobenzene	1.7	Not Detected	10	Not Detected
1,2,4-Trichlorobenzene	6.7	Not Detected	49	Not Detected
Hexachlorobutadiene	6.7	Not Detected	71	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	95	70-130
4-Bromofluorobenzene	101	70-130

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Client Sample ID: VP-103

Lab ID#: 1405490A-16A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060925**	**Date of Collection:**	**5/21/14 2:40:00 PM**
Dil. Factor:	**3.18**	**Date of Analysis:**	**6/9/14 10:47 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.6	Not Detected	7.9	Not Detected
Freon 114	1.6	Not Detected	11	Not Detected
Chloromethane	16	Not Detected	33	Not Detected
Vinyl Chloride	1.6	Not Detected	4.1	Not Detected
1,3-Butadiene	1.6	Not Detected	3.5	Not Detected
Bromomethane	16	Not Detected	62	Not Detected
Chloroethane	6.4	Not Detected	17	Not Detected
Freon 11	1.6	Not Detected	8.9	Not Detected
Ethanol	6.4	16	12	29
Freon 113	1.6	Not Detected	12	Not Detected
1,1-Dichloroethene	1.6	Not Detected	6.3	Not Detected
Acetone	16	Not Detected	38	Not Detected
2-Propanol	6.4	Not Detected	16	Not Detected
Carbon Disulfide	6.4	Not Detected	20	Not Detected
3-Chloropropene	6.4	Not Detected	20	Not Detected
Methylene Chloride	16	Not Detected	55	Not Detected
Methyl tert-butyl ether	1.6	Not Detected	5.7	Not Detected
trans-1,2-Dichloroethene	1.6	Not Detected	6.3	Not Detected
Hexane	1.6	Not Detected	5.6	Not Detected
1,1-Dichloroethane	1.6	Not Detected	6.4	Not Detected
2-Butanone (Methyl Ethyl Ketone)	6.4	Not Detected	19	Not Detected
cis-1,2-Dichloroethene	1.6	Not Detected	6.3	Not Detected
Tetrahydrofuran	1.6	Not Detected	4.7	Not Detected
Chloroform	1.6	Not Detected	7.8	Not Detected
1,1,1-Trichloroethane	1.6	Not Detected	8.7	Not Detected
Cyclohexane	1.6	Not Detected	5.5	Not Detected
Carbon Tetrachloride	1.6	Not Detected	10	Not Detected
2,2,4-Trimethylpentane	1.6	Not Detected	7.4	Not Detected
Benzene	1.6	Not Detected	5.1	Not Detected
1,2-Dichloroethane	1.6	Not Detected	6.4	Not Detected
Heptane	1.6	Not Detected	6.5	Not Detected
Trichloroethene	1.6	Not Detected	8.5	Not Detected
1,2-Dichloropropane	1.6	Not Detected	7.3	Not Detected
1,4-Dioxane	6.4	Not Detected	23	Not Detected
Bromodichloromethane	1.6	Not Detected	11	Not Detected
cis-1,3-Dichloropropene	1.6	Not Detected	7.2	Not Detected
4-Methyl-2-pentanone	1.6	Not Detected	6.5	Not Detected
Toluene	1.6	Not Detected	6.0	Not Detected
trans-1,3-Dichloropropene	1.6	Not Detected	7.2	Not Detected
1,1,2-Trichloroethane	1.6	Not Detected	8.7	Not Detected
Tetrachloroethene	1.6	2.4	11	16
2-Hexanone	6.4	Not Detected	26	Not Detected

eurofins | Air Toxics

Client Sample ID: VP-103

Lab ID#: 1405490A-16A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060925**	**Date of Collection:**	**5/21/14 2:40:00 PM**
Dil. Factor:	**3.18**	**Date of Analysis:**	**6/9/14 10:47 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.6	Not Detected	14	Not Detected
1,2-Dibromoethane (EDB)	1.6	Not Detected	12	Not Detected
Chlorobenzene	1.6	Not Detected	7.3	Not Detected
Ethyl Benzene	1.6	Not Detected	6.9	Not Detected
m,p-Xylene	1.6	Not Detected	6.9	Not Detected
o-Xylene	1.6	Not Detected	6.9	Not Detected
Styrene	1.6	Not Detected	6.8	Not Detected
Bromoform	1.6	Not Detected	16	Not Detected
Cumene	1.6	Not Detected	7.8	Not Detected
1,1,2,2-Tetrachloroethane	1.6	Not Detected	11	Not Detected
Propylbenzene	1.6	Not Detected	7.8	Not Detected
4-Ethyltoluene	1.6	Not Detected	7.8	Not Detected
1,3,5-Trimethylbenzene	1.6	Not Detected	7.8	Not Detected
1,2,4-Trimethylbenzene	1.6	Not Detected	7.8	Not Detected
1,3-Dichlorobenzene	1.6	Not Detected	9.6	Not Detected
1,4-Dichlorobenzene	1.6	Not Detected	9.6	Not Detected
alpha-Chlorotoluene	1.6	Not Detected	8.2	Not Detected
1,2-Dichlorobenzene	1.6	Not Detected	9.6	Not Detected
1,2,4-Trichlorobenzene	6.4	Not Detected	47	Not Detected
Hexachlorobutadiene	6.4	Not Detected	68	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	102	70-130

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Client Sample ID: VP-104

Lab ID#: 1405490A-17A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060926**	**Date of Collection:**	**5/21/14 3:15:00 PM**
Dil. Factor:	**3.40**	**Date of Analysis:**	**6/9/14 11:14 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.7	Not Detected	8.4	Not Detected
Freon 114	1.7	Not Detected	12	Not Detected
Chloromethane	17	Not Detected	35	Not Detected
Vinyl Chloride	1.7	Not Detected	4.3	Not Detected
1,3-Butadiene	1.7	Not Detected	3.8	Not Detected
Bromomethane	17	Not Detected	66	Not Detected
Chloroethane	6.8	Not Detected	18	Not Detected
Freon 11	1.7	Not Detected	9.6	Not Detected
Ethanol	6.8	18	13	34
Freon 113	1.7	Not Detected	13	Not Detected
1,1-Dichloroethene	1.7	Not Detected	6.7	Not Detected
Acetone	17	Not Detected	40	Not Detected
2-Propanol	6.8	13	17	32
Carbon Disulfide	6.8	Not Detected	21	Not Detected
3-Chloropropene	6.8	Not Detected	21	Not Detected
Methylene Chloride	17	Not Detected	59	Not Detected
Methyl tert-butyl ether	1.7	Not Detected	6.1	Not Detected
trans-1,2-Dichloroethene	1.7	Not Detected	6.7	Not Detected
Hexane	1.7	Not Detected	6.0	Not Detected
1,1-Dichloroethane	1.7	Not Detected	6.9	Not Detected
2-Butanone (Methyl Ethyl Ketone)	6.8	Not Detected	20	Not Detected
cis-1,2-Dichloroethene	1.7	Not Detected	6.7	Not Detected
Tetrahydrofuran	1.7	Not Detected	5.0	Not Detected
Chloroform	1.7	Not Detected	8.3	Not Detected
1,1,1-Trichloroethane	1.7	Not Detected	9.3	Not Detected
Cyclohexane	1.7	Not Detected	5.8	Not Detected
Carbon Tetrachloride	1.7	Not Detected	11	Not Detected
2,2,4-Trimethylpentane	1.7	Not Detected	7.9	Not Detected
Benzene	1.7	Not Detected	5.4	Not Detected
1,2-Dichloroethane	1.7	Not Detected	6.9	Not Detected
Heptane	1.7	Not Detected	7.0	Not Detected
Trichloroethene	1.7	Not Detected	9.1	Not Detected
1,2-Dichloropropane	1.7	Not Detected	7.8	Not Detected
1,4-Dioxane	6.8	Not Detected	24	Not Detected
Bromodichloromethane	1.7	Not Detected	11	Not Detected
cis-1,3-Dichloropropene	1.7	Not Detected	7.7	Not Detected
4-Methyl-2-pentanone	1.7	Not Detected	7.0	Not Detected
Toluene	1.7	Not Detected	6.4	Not Detected
trans-1,3-Dichloropropene	1.7	Not Detected	7.7	Not Detected
1,1,2-Trichloroethane	1.7	Not Detected	9.3	Not Detected
Tetrachloroethene	1.7	30	12	200
2-Hexanone	6.8	Not Detected	28	Not Detected

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Client Sample ID: VP-104

Lab ID#: 1405490A-17A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060926**	**Date of Collection:**	**5/21/14 3:15:00 PM**
Dil. Factor:	**3.40**	**Date of Analysis:**	**6/9/14 11:14 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.7	Not Detected	14	Not Detected
1,2-Dibromoethane (EDB)	1.7	Not Detected	13	Not Detected
Chlorobenzene	1.7	Not Detected	7.8	Not Detected
Ethyl Benzene	1.7	Not Detected	7.4	Not Detected
m,p-Xylene	1.7	Not Detected	7.4	Not Detected
o-Xylene	1.7	Not Detected	7.4	Not Detected
Styrene	1.7	Not Detected	7.2	Not Detected
Bromoform	1.7	Not Detected	18	Not Detected
Cumene	1.7	Not Detected	8.4	Not Detected
1,1,2,2-Tetrachloroethane	1.7	Not Detected	12	Not Detected
Propylbenzene	1.7	Not Detected	8.4	Not Detected
4-Ethyltoluene	1.7	Not Detected	8.4	Not Detected
1,3,5-Trimethylbenzene	1.7	Not Detected	8.4	Not Detected
1,2,4-Trimethylbenzene	1.7	Not Detected	8.4	Not Detected
1,3-Dichlorobenzene	1.7	Not Detected	10	Not Detected
1,4-Dichlorobenzene	1.7	Not Detected	10	Not Detected
alpha-Chlorotoluene	1.7	Not Detected	8.8	Not Detected
1,2-Dichlorobenzene	1.7	Not Detected	10	Not Detected
1,2,4-Trichlorobenzene	6.8	Not Detected	50	Not Detected
Hexachlorobutadiene	6.8	Not Detected	72	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	94	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: VP-105

Lab ID#: 1405490A-18A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060927**	**Date of Collection:**	**5/20/14 6:35:00 PM**
Dil. Factor:	**3.20**	**Date of Analysis:**	**6/9/14 11:41 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.6	Not Detected	7.9	Not Detected
Freon 114	1.6	Not Detected	11	Not Detected
Chloromethane	16	Not Detected	33	Not Detected
Vinyl Chloride	1.6	Not Detected	4.1	Not Detected
1,3-Butadiene	1.6	Not Detected	3.5	Not Detected
Bromomethane	16	Not Detected	62	Not Detected
Chloroethane	6.4	Not Detected	17	Not Detected
Freon 11	1.6	Not Detected	9.0	Not Detected
Ethanol	6.4	34	12	64
Freon 113	1.6	Not Detected	12	Not Detected
1,1-Dichloroethene	1.6	Not Detected	6.3	Not Detected
Acetone	16	Not Detected	38	Not Detected
2-Propanol	6.4	Not Detected	16	Not Detected
Carbon Disulfide	6.4	Not Detected	20	Not Detected
3-Chloropropene	6.4	Not Detected	20	Not Detected
Methylene Chloride	16	Not Detected	56	Not Detected
Methyl tert-butyl ether	1.6	Not Detected	5.8	Not Detected
trans-1,2-Dichloroethene	1.6	Not Detected	6.3	Not Detected
Hexane	1.6	Not Detected	5.6	Not Detected
1,1-Dichloroethane	1.6	Not Detected	6.5	Not Detected
2-Butanone (Methyl Ethyl Ketone)	6.4	Not Detected	19	Not Detected
cis-1,2-Dichloroethene	1.6	Not Detected	6.3	Not Detected
Tetrahydrofuran	1.6	Not Detected	4.7	Not Detected
Chloroform	1.6	Not Detected	7.8	Not Detected
1,1,1-Trichloroethane	1.6	Not Detected	8.7	Not Detected
Cyclohexane	1.6	Not Detected	5.5	Not Detected
Carbon Tetrachloride	1.6	Not Detected	10	Not Detected
2,2,4-Trimethylpentane	1.6	Not Detected	7.5	Not Detected
Benzene	1.6	Not Detected	5.1	Not Detected
1,2-Dichloroethane	1.6	Not Detected	6.5	Not Detected
Heptane	1.6	Not Detected	6.6	Not Detected
Trichloroethene	1.6	Not Detected	8.6	Not Detected
1,2-Dichloropropane	1.6	Not Detected	7.4	Not Detected
1,4-Dioxane	6.4	Not Detected	23	Not Detected
Bromodichloromethane	1.6	Not Detected	11	Not Detected
cis-1,3-Dichloropropene	1.6	Not Detected	7.3	Not Detected
4-Methyl-2-pentanone	1.6	Not Detected	6.6	Not Detected
Toluene	1.6	Not Detected	6.0	Not Detected
trans-1,3-Dichloropropene	1.6	Not Detected	7.3	Not Detected
1,1,2-Trichloroethane	1.6	Not Detected	8.7	Not Detected
Tetrachloroethene	1.6	62	11	420
2-Hexanone	6.4	Not Detected	26	Not Detected

eurofins | Air Toxics

Client Sample ID: VP-105

Lab ID#: 1405490A-18A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060927**	**Date of Collection:**	**5/20/14 6:35:00 PM**
Dil. Factor:	**3.20**	**Date of Analysis:**	**6/9/14 11:41 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.6	Not Detected	14	Not Detected
1,2-Dibromoethane (EDB)	1.6	Not Detected	12	Not Detected
Chlorobenzene	1.6	Not Detected	7.4	Not Detected
Ethyl Benzene	1.6	Not Detected	6.9	Not Detected
m,p-Xylene	1.6	5.0	6.9	22
o-Xylene	1.6	Not Detected	6.9	Not Detected
Styrene	1.6	Not Detected	6.8	Not Detected
Bromoform	1.6	Not Detected	16	Not Detected
Cumene	1.6	Not Detected	7.9	Not Detected
1,1,2,2-Tetrachloroethane	1.6	Not Detected	11	Not Detected
Propylbenzene	1.6	Not Detected	7.9	Not Detected
4-Ethyltoluene	1.6	2.9	7.9	14
1,3,5-Trimethylbenzene	1.6	Not Detected	7.9	Not Detected
1,2,4-Trimethylbenzene	1.6	2.7	7.9	13
1,3-Dichlorobenzene	1.6	Not Detected	9.6	Not Detected
1,4-Dichlorobenzene	1.6	Not Detected	9.6	Not Detected
alpha-Chlorotoluene	1.6	Not Detected	8.3	Not Detected
1,2-Dichlorobenzene	1.6	Not Detected	9.6	Not Detected
1,2,4-Trichlorobenzene	6.4	Not Detected	47	Not Detected
Hexachlorobutadiene	6.4	Not Detected	68	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	95	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: VP-106

Lab ID#: 1405490A-19A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060928**	**Date of Collection:**	**5/21/14 2:30:00 PM**
Dil. Factor:	**3.20**	**Date of Analysis:**	**6/10/14 12:09 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.6	Not Detected	7.9	Not Detected
Freon 114	1.6	Not Detected	11	Not Detected
Chloromethane	16	Not Detected	33	Not Detected
Vinyl Chloride	1.6	Not Detected	4.1	Not Detected
1,3-Butadiene	1.6	Not Detected	3.5	Not Detected
Bromomethane	16	Not Detected	62	Not Detected
Chloroethane	6.4	Not Detected	17	Not Detected
Freon 11	1.6	Not Detected	9.0	Not Detected
Ethanol	6.4	16	12	30
Freon 113	1.6	Not Detected	12	Not Detected
1,1-Dichloroethene	1.6	Not Detected	6.3	Not Detected
Acetone	16	Not Detected	38	Not Detected
2-Propanol	6.4	Not Detected	16	Not Detected
Carbon Disulfide	6.4	Not Detected	20	Not Detected
3-Chloropropene	6.4	Not Detected	20	Not Detected
Methylene Chloride	16	Not Detected	56	Not Detected
Methyl tert-butyl ether	1.6	Not Detected	5.8	Not Detected
trans-1,2-Dichloroethene	1.6	Not Detected	6.3	Not Detected
Hexane	1.6	Not Detected	5.6	Not Detected
1,1-Dichloroethane	1.6	Not Detected	6.5	Not Detected
2-Butanone (Methyl Ethyl Ketone)	6.4	Not Detected	19	Not Detected
cis-1,2-Dichloroethene	1.6	Not Detected	6.3	Not Detected
Tetrahydrofuran	1.6	Not Detected	4.7	Not Detected
Chloroform	1.6	Not Detected	7.8	Not Detected
1,1,1-Trichloroethane	1.6	Not Detected	8.7	Not Detected
Cyclohexane	1.6	Not Detected	5.5	Not Detected
Carbon Tetrachloride	1.6	Not Detected	10	Not Detected
2,2,4-Trimethylpentane	1.6	Not Detected	7.5	Not Detected
Benzene	1.6	Not Detected	5.1	Not Detected
1,2-Dichloroethane	1.6	Not Detected	6.5	Not Detected
Heptane	1.6	Not Detected	6.6	Not Detected
Trichloroethene	1.6	Not Detected	8.6	Not Detected
1,2-Dichloropropane	1.6	Not Detected	7.4	Not Detected
1,4-Dioxane	6.4	Not Detected	23	Not Detected
Bromodichloromethane	1.6	Not Detected	11	Not Detected
cis-1,3-Dichloropropene	1.6	Not Detected	7.3	Not Detected
4-Methyl-2-pentanone	1.6	Not Detected	6.6	Not Detected
Toluene	1.6	Not Detected	6.0	Not Detected
trans-1,3-Dichloropropene	1.6	Not Detected	7.3	Not Detected
1,1,2-Trichloroethane	1.6	Not Detected	8.7	Not Detected
Tetrachloroethene	1.6	3.6	11	24
2-Hexanone	6.4	Not Detected	26	Not Detected

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Client Sample ID: VP-106

Lab ID#: 1405490A-19A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060928**	**Date of Collection:**	**5/21/14 2:30:00 PM**
Dil. Factor:	**3.20**	**Date of Analysis:**	**6/10/14 12:09 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.6	Not Detected	14	Not Detected
1,2-Dibromoethane (EDB)	1.6	Not Detected	12	Not Detected
Chlorobenzene	1.6	Not Detected	7.4	Not Detected
Ethyl Benzene	1.6	Not Detected	6.9	Not Detected
m,p-Xylene	1.6	Not Detected	6.9	Not Detected
o-Xylene	1.6	Not Detected	6.9	Not Detected
Styrene	1.6	Not Detected	6.8	Not Detected
Bromoform	1.6	Not Detected	16	Not Detected
Cumene	1.6	Not Detected	7.9	Not Detected
1,1,2,2-Tetrachloroethane	1.6	Not Detected	11	Not Detected
Propylbenzene	1.6	Not Detected	7.9	Not Detected
4-Ethyltoluene	1.6	Not Detected	7.9	Not Detected
1,3,5-Trimethylbenzene	1.6	Not Detected	7.9	Not Detected
1,2,4-Trimethylbenzene	1.6	Not Detected	7.9	Not Detected
1,3-Dichlorobenzene	1.6	Not Detected	9.6	Not Detected
1,4-Dichlorobenzene	1.6	Not Detected	9.6	Not Detected
alpha-Chlorotoluene	1.6	Not Detected	8.3	Not Detected
1,2-Dichlorobenzene	1.6	Not Detected	9.6	Not Detected
1,2,4-Trichlorobenzene	6.4	Not Detected	47	Not Detected
Hexachlorobutadiene	6.4	Not Detected	68	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	94	70-130
4-Bromofluorobenzene	103	70-130

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Client Sample ID: L-001

Lab ID#: 1405490A-20A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060929**	**Date of Collection:**	**5/21/14 3:30:00 PM**
Dil. Factor:	**2.98**	**Date of Analysis:**	**6/10/14 12:35 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.5	Not Detected	7.4	Not Detected
Freon 114	1.5	Not Detected	10	Not Detected
Chloromethane	15	Not Detected	31	Not Detected
Vinyl Chloride	1.5	Not Detected	3.8	Not Detected
1,3-Butadiene	1.5	Not Detected	3.3	Not Detected
Bromomethane	15	Not Detected	58	Not Detected
Chloroethane	6.0	Not Detected	16	Not Detected
Freon 11	1.5	Not Detected	8.4	Not Detected
Ethanol	6.0	12	11	23
Freon 113	1.5	Not Detected	11	Not Detected
1,1-Dichloroethene	1.5	Not Detected	5.9	Not Detected
Acetone	15	Not Detected	35	Not Detected
2-Propanol	6.0	Not Detected	15	Not Detected
Carbon Disulfide	6.0	Not Detected	18	Not Detected
3-Chloropropene	6.0	Not Detected	19	Not Detected
Methylene Chloride	15	Not Detected	52	Not Detected
Methyl tert-butyl ether	1.5	Not Detected	5.4	Not Detected
trans-1,2-Dichloroethene	1.5	Not Detected	5.9	Not Detected
Hexane	1.5	Not Detected	5.2	Not Detected
1,1-Dichloroethane	1.5	Not Detected	6.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	6.0	Not Detected	18	Not Detected
cis-1,2-Dichloroethene	1.5	Not Detected	5.9	Not Detected
Tetrahydrofuran	1.5	Not Detected	4.4	Not Detected
Chloroform	1.5	Not Detected	7.3	Not Detected
1,1,1-Trichloroethane	1.5	Not Detected	8.1	Not Detected
Cyclohexane	1.5	Not Detected	5.1	Not Detected
Carbon Tetrachloride	1.5	Not Detected	9.4	Not Detected
2,2,4-Trimethylpentane	1.5	Not Detected	7.0	Not Detected
Benzene	1.5	Not Detected	4.8	Not Detected
1,2-Dichloroethane	1.5	Not Detected	6.0	Not Detected
Heptane	1.5	Not Detected	6.1	Not Detected
Trichloroethene	1.5	Not Detected	8.0	Not Detected
1,2-Dichloropropane	1.5	Not Detected	6.9	Not Detected
1,4-Dioxane	6.0	Not Detected	21	Not Detected
Bromodichloromethane	1.5	Not Detected	10	Not Detected
cis-1,3-Dichloropropene	1.5	Not Detected	6.8	Not Detected
4-Methyl-2-pentanone	1.5	Not Detected	6.1	Not Detected
Toluene	1.5	Not Detected	5.6	Not Detected
trans-1,3-Dichloropropene	1.5	Not Detected	6.8	Not Detected
1,1,2-Trichloroethane	1.5	Not Detected	8.1	Not Detected
Tetrachloroethene	1.5	2.6	10	17
2-Hexanone	6.0	Not Detected	24	Not Detected

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Client Sample ID: L-001

Lab ID#: 1405490A-20A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060929**	**Date of Collection:**	**5/21/14 3:30:00 PM**
Dil. Factor:	**2.98**	**Date of Analysis:**	**6/10/14 12:35 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.5	Not Detected	13	Not Detected
1,2-Dibromoethane (EDB)	1.5	Not Detected	11	Not Detected
Chlorobenzene	1.5	Not Detected	6.8	Not Detected
Ethyl Benzene	1.5	Not Detected	6.5	Not Detected
m,p-Xylene	1.5	Not Detected	6.5	Not Detected
o-Xylene	1.5	Not Detected	6.5	Not Detected
Styrene	1.5	Not Detected	6.3	Not Detected
Bromoform	1.5	Not Detected	15	Not Detected
Cumene	1.5	Not Detected	7.3	Not Detected
1,1,2,2-Tetrachloroethane	1.5	Not Detected	10	Not Detected
Propylbenzene	1.5	Not Detected	7.3	Not Detected
4-Ethyltoluene	1.5	Not Detected	7.3	Not Detected
1,3,5-Trimethylbenzene	1.5	Not Detected	7.3	Not Detected
1,2,4-Trimethylbenzene	1.5	Not Detected	7.3	Not Detected
1,3-Dichlorobenzene	1.5	Not Detected	9.0	Not Detected
1,4-Dichlorobenzene	1.5	Not Detected	9.0	Not Detected
alpha-Chlorotoluene	1.5	Not Detected	7.7	Not Detected
1,2-Dichlorobenzene	1.5	Not Detected	9.0	Not Detected
1,2,4-Trichlorobenzene	6.0	Not Detected	44	Not Detected
Hexachlorobutadiene	6.0	Not Detected	64	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	96	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1405490A-21A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060905**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/9/14 10:37 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.50	Not Detected	2.5	Not Detected
Freon 114	0.50	Not Detected	3.5	Not Detected
Chloromethane	5.0	Not Detected	10	Not Detected
Vinyl Chloride	0.50	Not Detected	1.3	Not Detected
1,3-Butadiene	0.50	Not Detected	1.1	Not Detected
Bromomethane	5.0	Not Detected	19	Not Detected
Chloroethane	2.0	Not Detected	5.3	Not Detected
Freon 11	0.50	Not Detected	2.8	Not Detected
Ethanol	2.0	Not Detected	3.8	Not Detected
Freon 113	0.50	Not Detected	3.8	Not Detected
1,1-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Acetone	5.0	Not Detected	12	Not Detected
2-Propanol	2.0	Not Detected	4.9	Not Detected
Carbon Disulfide	2.0	Not Detected	6.2	Not Detected
3-Chloropropene	2.0	Not Detected	6.3	Not Detected
Methylene Chloride	5.0	Not Detected	17	Not Detected
Methyl tert-butyl ether	0.50	Not Detected	1.8	Not Detected
trans-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Hexane	0.50	Not Detected	1.8	Not Detected
1,1-Dichloroethane	0.50	Not Detected	2.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.0	Not Detected	5.9	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Tetrahydrofuran	0.50	Not Detected	1.5	Not Detected
Chloroform	0.50	Not Detected	2.4	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Cyclohexane	0.50	Not Detected	1.7	Not Detected
Carbon Tetrachloride	0.50	Not Detected	3.1	Not Detected
2,2,4-Trimethylpentane	0.50	Not Detected	2.3	Not Detected
Benzene	0.50	Not Detected	1.6	Not Detected
1,2-Dichloroethane	0.50	Not Detected	2.0	Not Detected
Heptane	0.50	Not Detected	2.0	Not Detected
Trichloroethene	0.50	Not Detected	2.7	Not Detected
1,2-Dichloropropane	0.50	Not Detected	2.3	Not Detected
1,4-Dioxane	2.0	Not Detected	7.2	Not Detected
Bromodichloromethane	0.50	Not Detected	3.4	Not Detected
cis-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
4-Methyl-2-pentanone	0.50	Not Detected	2.0	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
trans-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
1,1,2-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Tetrachloroethene	0.50	Not Detected	3.4	Not Detected
2-Hexanone	2.0	Not Detected	8.2	Not Detected

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Client Sample ID: Lab Blank

Lab ID#: 1405490A-21A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060905**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/9/14 10:37 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.50	Not Detected	4.2	Not Detected
1,2-Dibromoethane (EDB)	0.50	Not Detected	3.8	Not Detected
Chlorobenzene	0.50	Not Detected	2.3	Not Detected
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected
m,p-Xylene	0.50	Not Detected	2.2	Not Detected
o-Xylene	0.50	Not Detected	2.2	Not Detected
Styrene	0.50	Not Detected	2.1	Not Detected
Bromoform	0.50	Not Detected	5.2	Not Detected
Cumene	0.50	Not Detected	2.4	Not Detected
1,1,2,2-Tetrachloroethane	0.50	Not Detected	3.4	Not Detected
Propylbenzene	0.50	Not Detected	2.4	Not Detected
4-Ethyltoluene	0.50	Not Detected	2.4	Not Detected
1,3,5-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,2,4-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,3-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,4-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
alpha-Chlorotoluene	0.50	Not Detected	2.6	Not Detected
1,2-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,2,4-Trichlorobenzene	2.0	Not Detected	15	Not Detected
Hexachlorobutadiene	2.0	Not Detected	21	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	97	70-130
4-Bromofluorobenzene	103	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1405490A-21B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17061107**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/11/14 10:42 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.50	Not Detected	2.5	Not Detected
Freon 114	0.50	Not Detected	3.5	Not Detected
Chloromethane	5.0	Not Detected	10	Not Detected
Vinyl Chloride	0.50	Not Detected	1.3	Not Detected
1,3-Butadiene	0.50	Not Detected	1.1	Not Detected
Bromomethane	5.0	Not Detected	19	Not Detected
Chloroethane	2.0	Not Detected	5.3	Not Detected
Freon 11	0.50	Not Detected	2.8	Not Detected
Ethanol	2.0	Not Detected	3.8	Not Detected
Freon 113	0.50	Not Detected	3.8	Not Detected
1,1-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Acetone	5.0	Not Detected	12	Not Detected
2-Propanol	2.0	Not Detected	4.9	Not Detected
Carbon Disulfide	2.0	Not Detected	6.2	Not Detected
3-Chloropropene	2.0	Not Detected	6.3	Not Detected
Methylene Chloride	5.0	Not Detected	17	Not Detected
Methyl tert-butyl ether	0.50	Not Detected	1.8	Not Detected
trans-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Hexane	0.50	Not Detected	1.8	Not Detected
1,1-Dichloroethane	0.50	Not Detected	2.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.0	Not Detected	5.9	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Tetrahydrofuran	0.50	Not Detected	1.5	Not Detected
Chloroform	0.50	Not Detected	2.4	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Cyclohexane	0.50	Not Detected	1.7	Not Detected
Carbon Tetrachloride	0.50	Not Detected	3.1	Not Detected
2,2,4-Trimethylpentane	0.50	Not Detected	2.3	Not Detected
Benzene	0.50	Not Detected	1.6	Not Detected
1,2-Dichloroethane	0.50	Not Detected	2.0	Not Detected
Heptane	0.50	Not Detected	2.0	Not Detected
Trichloroethene	0.50	Not Detected	2.7	Not Detected
1,2-Dichloropropane	0.50	Not Detected	2.3	Not Detected
1,4-Dioxane	2.0	Not Detected	7.2	Not Detected
Bromodichloromethane	0.50	Not Detected	3.4	Not Detected
cis-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
4-Methyl-2-pentanone	0.50	Not Detected	2.0	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
trans-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
1,1,2-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Tetrachloroethene	0.50	Not Detected	3.4	Not Detected
2-Hexanone	2.0	Not Detected	8.2	Not Detected

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Client Sample ID: Lab Blank

Lab ID#: 1405490A-21B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17061107**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/11/14 10:42 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.50	Not Detected	4.2	Not Detected
1,2-Dibromoethane (EDB)	0.50	Not Detected	3.8	Not Detected
Chlorobenzene	0.50	Not Detected	2.3	Not Detected
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected
m,p-Xylene	0.50	Not Detected	2.2	Not Detected
o-Xylene	0.50	Not Detected	2.2	Not Detected
Styrene	0.50	Not Detected	2.1	Not Detected
Bromoform	0.50	Not Detected	5.2	Not Detected
Cumene	0.50	Not Detected	2.4	Not Detected
1,1,2,2-Tetrachloroethane	0.50	Not Detected	3.4	Not Detected
Propylbenzene	0.50	Not Detected	2.4	Not Detected
4-Ethyltoluene	0.50	Not Detected	2.4	Not Detected
1,3,5-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,2,4-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,3-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,4-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
alpha-Chlorotoluene	0.50	Not Detected	2.6	Not Detected
1,2-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,2,4-Trichlorobenzene	2.0	Not Detected	15	Not Detected
Hexachlorobutadiene	2.0	Not Detected	21	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	94	70-130
4-Bromofluorobenzene	90	70-130

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Client Sample ID: CCV

Lab ID#: 1405490A-22A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060902**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/9/14 08:37 AM**	

Compound	%Recovery
Freon 12	93
Freon 114	95
Chloromethane	94
Vinyl Chloride	91
1,3-Butadiene	90
Bromomethane	97
Chloroethane	89
Freon 11	96
Ethanol	94
Freon 113	93
1,1-Dichloroethene	94
Acetone	93
2-Propanol	91
Carbon Disulfide	92
3-Chloropropene	89
Methylene Chloride	91
Methyl tert-butyl ether	93
trans-1,2-Dichloroethene	93
Hexane	90
1,1-Dichloroethane	92
2-Butanone (Methyl Ethyl Ketone)	90
cis-1,2-Dichloroethene	94
Tetrahydrofuran	89
Chloroform	94
1,1,1-Trichloroethane	94
Cyclohexane	93
Carbon Tetrachloride	95
2,2,4-Trimethylpentane	90
Benzene	90
1,2-Dichloroethane	95
Heptane	89
Trichloroethene	91
1,2-Dichloropropane	91
1,4-Dioxane	87
Bromodichloromethane	95
cis-1,3-Dichloropropene	93
4-Methyl-2-pentanone	86
Toluene	90
trans-1,3-Dichloropropene	94
1,1,2-Trichloroethane	90
Tetrachloroethene	92
2-Hexanone	88

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Client Sample ID: CCV

Lab ID#: 1405490A-22A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060902**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/9/14 08:37 AM**	

Compound	%Recovery
Dibromochloromethane	96
1,2-Dibromoethane (EDB)	95
Chlorobenzene	92
Ethyl Benzene	92
m,p-Xylene	93
o-Xylene	92
Styrene	92
Bromoform	97
Cumene	91
1,1,2,2-Tetrachloroethane	90
Propylbenzene	91
4-Ethyltoluene	93
1,3,5-Trimethylbenzene	90
1,2,4-Trimethylbenzene	93
1,3-Dichlorobenzene	96
1,4-Dichlorobenzene	94
alpha-Chlorotoluene	92
1,2-Dichlorobenzene	94
1,2,4-Trichlorobenzene	99
Hexachlorobutadiene	100

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	101	70-130
4-Bromofluorobenzene	102	70-130

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Client Sample ID: CCV

Lab ID#: 1405490A-22B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17061105**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/11/14 09:42 AM**	

Compound	%Recovery
Freon 12	96
Freon 114	94
Chloromethane	113
Vinyl Chloride	116
1,3-Butadiene	118
Bromomethane	102
Chloroethane	100
Freon 11	93
Ethanol	113
Freon 113	92
1,1-Dichloroethene	94
Acetone	104
2-Propanol	112
Carbon Disulfide	102
3-Chloropropene	104
Methylene Chloride	110
Methyl tert-butyl ether	105
trans-1,2-Dichloroethene	98
Hexane	115
1,1-Dichloroethane	101
2-Butanone (Methyl Ethyl Ketone)	107
cis-1,2-Dichloroethene	97
Tetrahydrofuran	112
Chloroform	93
1,1,1-Trichloroethane	91
Cyclohexane	102
Carbon Tetrachloride	90
2,2,4-Trimethylpentane	113
Benzene	100
1,2-Dichloroethane	93
Heptane	107
Trichloroethene	94
1,2-Dichloropropane	103
1,4-Dioxane	96
Bromodichloromethane	96
cis-1,3-Dichloropropene	97
4-Methyl-2-pentanone	106
Toluene	96
trans-1,3-Dichloropropene	100
1,1,2-Trichloroethane	97
Tetrachloroethene	89
2-Hexanone	113

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Client Sample ID: CCV

Lab ID#: 1405490A-22B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17061105**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/11/14 09:42 AM**	

Compound	%Recovery
Dibromochloromethane	92
1,2-Dibromoethane (EDB)	99
Chlorobenzene	93
Ethyl Benzene	97
m,p-Xylene	99
o-Xylene	100
Styrene	104
Bromoform	88
Cumene	100
1,1,2,2-Tetrachloroethane	99
Propylbenzene	98
4-Ethyltoluene	102
1,3,5-Trimethylbenzene	99
1,2,4-Trimethylbenzene	99
1,3-Dichlorobenzene	94
1,4-Dichlorobenzene	93
alpha-Chlorotoluene	100
1,2-Dichlorobenzene	94
1,2,4-Trichlorobenzene	93
Hexachlorobutadiene	92

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	100	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: LCS

Lab ID#: 1405490A-23A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060903**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/9/14 09:05 AM**	

Compound	%Recovery	Method Limits
Freon 12	106	70-130
Freon 114	110	70-130
Chloromethane	109	70-130
Vinyl Chloride	108	70-130
1,3-Butadiene	103	70-130
Bromomethane	107	70-130
Chloroethane	105	70-130
Freon 11	112	70-130
Ethanol	107	70-130
Freon 113	125	70-130
1,1-Dichloroethene	124	70-130
Acetone	103	70-130
2-Propanol	107	70-130
Carbon Disulfide	98	70-130
3-Chloropropene	108	70-130
Methylene Chloride	116	70-130
Methyl tert-butyl ether	111	70-130
trans-1,2-Dichloroethene	96	70-130
Hexane	108	70-130
1,1-Dichloroethane	114	70-130
2-Butanone (Methyl Ethyl Ketone)	107	70-130
cis-1,2-Dichloroethene	128	70-130
Tetrahydrofuran	105	70-130
Chloroform	113	70-130
1,1,1-Trichloroethane	113	70-130
Cyclohexane	112	70-130
Carbon Tetrachloride	113	70-130
2,2,4-Trimethylpentane	111	70-130
Benzene	106	70-130
1,2-Dichloroethane	113	70-130
Heptane	107	70-130
Trichloroethene	106	70-130
1,2-Dichloropropane	104	70-130
1,4-Dioxane	106	70-130
Bromodichloromethane	115	70-130
cis-1,3-Dichloropropene	112	70-130
4-Methyl-2-pentanone	104	70-130
Toluene	104	70-130
trans-1,3-Dichloropropene	100	70-130
1,1,2-Trichloroethane	103	70-130
Tetrachloroethene	105	70-130
2-Hexanone	106	70-130

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Client Sample ID: LCS

Lab ID#: 1405490A-23A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060903**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/9/14 09:05 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	113	70-130
1,2-Dibromoethane (EDB)	108	70-130
Chlorobenzene	105	70-130
Ethyl Benzene	105	70-130
m,p-Xylene	106	70-130
o-Xylene	104	70-130
Styrene	109	70-130
Bromoform	117	70-130
Cumene	108	70-130
1,1,2,2-Tetrachloroethane	103	70-130
Propylbenzene	108	70-130
4-Ethyltoluene	110	70-130
1,3,5-Trimethylbenzene	107	70-130
1,2,4-Trimethylbenzene	108	70-130
1,3-Dichlorobenzene	110	70-130
1,4-Dichlorobenzene	108	70-130
alpha-Chlorotoluene	112	70-130
1,2-Dichlorobenzene	109	70-130
1,2,4-Trichlorobenzene	121	70-130
Hexachlorobutadiene	120	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	102	70-130
4-Bromofluorobenzene	99	70-130

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Client Sample ID: LCSD

Lab ID#: 1405490A-23AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060904**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/9/14 09:34 AM**	

Compound	%Recovery	Method Limits
Freon 12	106	70-130
Freon 114	108	70-130
Chloromethane	106	70-130
Vinyl Chloride	106	70-130
1,3-Butadiene	101	70-130
Bromomethane	107	70-130
Chloroethane	104	70-130
Freon 11	109	70-130
Ethanol	107	70-130
Freon 113	122	70-130
1,1-Dichloroethene	123	70-130
Acetone	101	70-130
2-Propanol	107	70-130
Carbon Disulfide	97	70-130
3-Chloropropene	108	70-130
Methylene Chloride	114	70-130
Methyl tert-butyl ether	110	70-130
trans-1,2-Dichloroethene	93	70-130
Hexane	106	70-130
1,1-Dichloroethane	112	70-130
2-Butanone (Methyl Ethyl Ketone)	105	70-130
cis-1,2-Dichloroethene	123	70-130
Tetrahydrofuran	103	70-130
Chloroform	112	70-130
1,1,1-Trichloroethane	112	70-130
Cyclohexane	110	70-130
Carbon Tetrachloride	112	70-130
2,2,4-Trimethylpentane	108	70-130
Benzene	106	70-130
1,2-Dichloroethane	113	70-130
Heptane	108	70-130
Trichloroethene	106	70-130
1,2-Dichloropropane	105	70-130
1,4-Dioxane	107	70-130
Bromodichloromethane	115	70-130
cis-1,3-Dichloropropene	112	70-130
4-Methyl-2-pentanone	106	70-130
Toluene	106	70-130
trans-1,3-Dichloropropene	99	70-130
1,1,2-Trichloroethane	101	70-130
Tetrachloroethene	104	70-130
2-Hexanone	106	70-130

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Client Sample ID: LCSD

Lab ID#: 1405490A-23AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060904**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/9/14 09:34 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	112	70-130
1,2-Dibromoethane (EDB)	105	70-130
Chlorobenzene	104	70-130
Ethyl Benzene	104	70-130
m,p-Xylene	106	70-130
o-Xylene	103	70-130
Styrene	108	70-130
Bromoform	116	70-130
Cumene	107	70-130
1,1,2,2-Tetrachloroethane	103	70-130
Propylbenzene	108	70-130
4-Ethyltoluene	109	70-130
1,3,5-Trimethylbenzene	107	70-130
1,2,4-Trimethylbenzene	108	70-130
1,3-Dichlorobenzene	110	70-130
1,4-Dichlorobenzene	108	70-130
alpha-Chlorotoluene	110	70-130
1,2-Dichlorobenzene	108	70-130
1,2,4-Trichlorobenzene	122	70-130
Hexachlorobutadiene	119	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	102	70-130
1,2-Dichloroethane-d4	103	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: LCS

Lab ID#: 1405490A-23B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17061103**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/11/14 08:48 AM**	

Compound	%Recovery	Method Limits
Freon 12	108	70-130
Freon 114	104	70-130
Chloromethane	126	70-130
Vinyl Chloride	128	70-130
1,3-Butadiene	128	70-130
Bromomethane	115	70-130
Chloroethane	111	70-130
Freon 11	104	70-130
Ethanol	117	70-130
Freon 113	113	70-130
1,1-Dichloroethene	116	70-130
Acetone	112	70-130
2-Propanol	124	70-130
Carbon Disulfide	103	70-130
3-Chloropropene	110	70-130
Methylene Chloride	136 Q	70-130
Methyl tert-butyl ether	108	70-130
trans-1,2-Dichloroethene	93	70-130
Hexane	126	70-130
1,1-Dichloroethane	114	70-130
2-Butanone (Methyl Ethyl Ketone)	117	70-130
cis-1,2-Dichloroethene	114	70-130
Tetrahydrofuran	124	70-130
Chloroform	102	70-130
1,1,1-Trichloroethane	100	70-130
Cyclohexane	111	70-130
Carbon Tetrachloride	101	70-130
2,2,4-Trimethylpentane	123	70-130
Benzene	110	70-130
1,2-Dichloroethane	102	70-130
Heptane	113	70-130
Trichloroethene	103	70-130
1,2-Dichloropropane	112	70-130
1,4-Dioxane	110	70-130
Bromodichloromethane	108	70-130
cis-1,3-Dichloropropene	107	70-130
4-Methyl-2-pentanone	117	70-130
Toluene	102	70-130
trans-1,3-Dichloropropene	100	70-130
1,1,2-Trichloroethane	103	70-130
Tetrachloroethene	96	70-130
2-Hexanone	120	70-130

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Client Sample ID: LCS

Lab ID#: 1405490A-23B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17061103**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/11/14 08:48 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	102	70-130
1,2-Dibromoethane (EDB)	104	70-130
Chlorobenzene	97	70-130
Ethyl Benzene	103	70-130
m,p-Xylene	104	70-130
o-Xylene	101	70-130
Styrene	109	70-130
Bromoform	99	70-130
Cumene	106	70-130
1,1,2,2-Tetrachloroethane	102	70-130
Propylbenzene	103	70-130
4-Ethyltoluene	106	70-130
1,3,5-Trimethylbenzene	100	70-130
1,2,4-Trimethylbenzene	98	70-130
1,3-Dichlorobenzene	92	70-130
1,4-Dichlorobenzene	91	70-130
alpha-Chlorotoluene	108	70-130
1,2-Dichlorobenzene	92	70-130
1,2,4-Trichlorobenzene	73	70-130
Hexachlorobutadiene	74	70-130

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	102	70-130
1,2-Dichloroethane-d4	100	70-130
4-Bromofluorobenzene	97	70-130

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Client Sample ID: LCSD

Lab ID#: 1405490A-23BB

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17061104**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/11/14 09:10 AM**	

Compound	%Recovery	Method Limits
Freon 12	107	70-130
Freon 114	103	70-130
Chloromethane	126	70-130
Vinyl Chloride	124	70-130
1,3-Butadiene	128	70-130
Bromomethane	116	70-130
Chloroethane	110	70-130
Freon 11	103	70-130
Ethanol	117	70-130
Freon 113	113	70-130
1,1-Dichloroethene	116	70-130
Acetone	114	70-130
2-Propanol	121	70-130
Carbon Disulfide	102	70-130
3-Chloropropene	110	70-130
Methylene Chloride	135 Q	70-130
Methyl tert-butyl ether	107	70-130
trans-1,2-Dichloroethene	93	70-130
Hexane	126	70-130
1,1-Dichloroethane	113	70-130
2-Butanone (Methyl Ethyl Ketone)	115	70-130
cis-1,2-Dichloroethene	116	70-130
Tetrahydrofuran	126	70-130
Chloroform	104	70-130
1,1,1-Trichloroethane	100	70-130
Cyclohexane	113	70-130
Carbon Tetrachloride	100	70-130
2,2,4-Trimethylpentane	123	70-130
Benzene	110	70-130
1,2-Dichloroethane	102	70-130
Heptane	117	70-130
Trichloroethene	105	70-130
1,2-Dichloropropane	114	70-130
1,4-Dioxane	110	70-130
Bromodichloromethane	108	70-130
cis-1,3-Dichloropropene	109	70-130
4-Methyl-2-pentanone	122	70-130
Toluene	102	70-130
trans-1,3-Dichloropropene	99	70-130
1,1,2-Trichloroethane	103	70-130
Tetrachloroethene	95	70-130
2-Hexanone	123	70-130

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Client Sample ID: LCSD

Lab ID#: 1405490A-23BB

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17061104**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/11/14 09:10 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	102	70-130
1,2-Dibromoethane (EDB)	103	70-130
Chlorobenzene	96	70-130
Ethyl Benzene	102	70-130
m,p-Xylene	104	70-130
o-Xylene	103	70-130
Styrene	110	70-130
Bromoform	98	70-130
Cumene	108	70-130
1,1,2,2-Tetrachloroethane	102	70-130
Propylbenzene	104	70-130
4-Ethyltoluene	102	70-130
1,3,5-Trimethylbenzene	107	70-130
1,2,4-Trimethylbenzene	101	70-130
1,3-Dichlorobenzene	95	70-130
1,4-Dichlorobenzene	94	70-130
alpha-Chlorotoluene	111	70-130
1,2-Dichlorobenzene	95	70-130
1,2,4-Trichlorobenzene	82	70-130
Hexachlorobutadiene	84	70-130

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	104	70-130
1,2-Dichloroethane-d4	102	70-130
4-Bromofluorobenzene	97	70-130

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Sample Transportation Notice
Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection, handling or shipping of these samples. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action, of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922

180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630-4719
(916) 985-1000 FAX (916) 985-1020

Project Manager Russ Cirillo

Collected by: (Print and Sign) Byron Collins

Company Stantec Email

Address 2000 S. Colorado Suite 2-300 City Denver State CO Zip 80222

Phone 303 285 1600 Fax

Project Info:
P.O. # 2122050145
Project #
Project Name Lobell

Turn Around Time:
❑ Normal
❑ Rush
specify

Lab Use Only
Pressurized by:
Date:
Pressurization Gas: N_2 He

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum Initial	Final	Receipt	Final (psi)
01A	SVE-1D	1L1627	5/21/14	1330	TO15, Helium	-24	-7		
02A	SVE-1S	36543	5/22/14	1130		-24	-7		
03A	VP-01	36450	5/20/14	1605		-23.5	-7		
04A	VP-02	37751	5/21/14	1225		-24	-7		
05A	VP-03	1L1626	5/20/14	1905		-24	-7		
06A	VP-04	2100	5/20/14	1815		-24.5	-7		
07A	VP-06	35545	5/21/14	1115		-25	-7		
08A	VP-09	1L1598	5/21/14	1550		-25	-7		
09A	VP-10	34174	5/20/14	1510		-25	-7		
10A	VP-11R	1L1565	5/20/14	1750		-24	-7		

Relinquished by: (signature) Date/Time	Received by: (signature) Date/Time
	EAT 05/28/14 1035
Relinquished by: (signature) Date/Time	Received by: (signature) Date/Time
Relinquished by: (signature) Date/Time	Received by: (signature) Date/Time

Notes:

Lab Use Only

Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
Fedex		N/A	SOR	Yes No None	1405490

Form 1293 rev.11

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Sample Transportation Notice
Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection, handling or shipping of these samples. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action, of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922

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(916) 985-1000 FAX (916) 985-1020

Project Manager Russ Cirillo

Collected by: (Print and Sign) Byron Collins

Company Stantec Email Russ.Cirillo@stantec.com

Address 2000 S. Colorado Suite 2-300 City Denver State CO Zip 80222

Phone 303 285 4600 Fax

Project Info:
P.O. # 2122050415
Project #
Project Name Lobell

Turn Around Time:
❑ Normal
❑ Rush
specify

Lab Use Only
Pressurized by:
Date:
Pressurization Gas: N_2 He

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum Initial	Final	Receipt	Final (psi)
11A	VP-12	35552	5/20/14	1540	TO15, Helium	-24	-7		
12A	VP-13	36465	5/21/14	1150		-25	-7		
13A	VP-14	14507	5/21/14	1135		-24.5	-7		
14A	VP-101	37711	5/21/14	1040		-24.5	-7		
15A	VP-102	IL1611	5/20/14	1730		-24	-7		
16A	VP-103	34126	5/21/14	1440		-23.5	-7		
17A	VP-104	IL1666	5/21/14	1515		-24	-7		
18A	VP-105	IL1650	5/20/14	1835		-24	-7		
19A	VP-106	37710	5/21/14	1430		-25	-7		
20A	L-001	20771	5/21/14	1530	TO15, Helium	-25	-7		

Relinquished by: (signature) Date/Time	Received by: (signature) Date/Time	Notes:
	[illegible] EAT 05/28/14 1035	
Relinquished by: (signature) Date/Time	Received by: (signature) Date/Time	
Relinquished by: (signature) Date/Time	Received by: (signature) Date/Time	

Lab Use Only	Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
	Fedex		NA	SDR	Yes No None	1405490

APPENDIX H

DATA VERIFICATION FORM

Site/Event: Former Lobell Refinery Orphan Site, Casper, Wyoming	**Client:** Stantec Consulting Services, Inc.
Work Order #: 1405490C, 1405490B, 1405490A	**Sample Collection Date(s):** May 20 – 23, 2014
Matrix: Helium, indoor air, and soil vapor	**Sample Analysis Date(s):** May 29, 2014 for helium, June 2 -3 , 2014 for indoor air, and June 9 -11, 2014 for soil vapor samples
Method: Modified ASTM D-1946 for helium, Modified TO-15 SIM for indoor air, and Modified TO-15 full scan for soil vapor samples	**Date Reviewed:** August 18 - 20, 2014
Laboratory: Eurofins/Air Toxics, Folsom, CA	**QA Reviewed by:** QA/QC Solutions, LLC

Item No.	Parameter or Question	Applicable Control Limits[1]	Control Limits met ? (Y/N)
1*	Samples properly preserved?	See method requirements	Y
2	Holding Time[(2)]	30 days	Y
3*	Calibration met method requirements?	Initial Calibration for VOCs by TO-15: ≤30% RSD with 10% of target compounds allowed out to < 40% RSD. Continuing Calibration Verification for VOCs by TO-15: 70 – 130 % recovery	Y
4	Method Blanks	No target compounds should be detected	Y
5	Trip Blanks	-	Not Applicable
6*	Laboratory Control Spike (LCS) criteria met?[(3)]	70-130%	N
7	MS/MSD criteria met?[(4)]	-	Not Applicable
8	MS/MSD Precision[(4)]	-	Not Applicable
9*	Lab Duplicate Precision	< 30% relative percent difference	Y (see LCS/LCS duplicate)
10	Surrogate Recovery	70-130%	Y
11	Field Duplicate Precision	-	None collected
12*	Field blanks and/or Equipment Rinsate Blanks	No target compounds should be detected	N
13*	All required samples collected?	-	Y
14*	All required analyses performed?	-	Y
15*	All required analytes reported?	-	Y
16*	All required reporting limits met?	-	Y
17*	Data usable for their intended purpose(s)?	Client Determination	To be determined by client

* See comments below

(1) If the control limits were not met for any parameters, list the item number(s) below and provide additional explanation.

(2) List the applicable holding time under the control limits column.

(3) LCS limits specific to laboratory determined QC limits

(4) MS/MSD and RPD limits specific to laboratory determined QC limits

Required Attachments: LCS, MS/MSD, and Surrogate Recovery results for any outliers; field duplicate results table (RPDs); and data tables with sample results for any data qualifiers applied. These are addressed in comment table and Qualifier Summary table below.

Item	Comment
1	Eurofins/Air Toxics noted there was a significant difference (greater than 5.0" Hg) between the measured canister receipt vacuum and that which was reported on the Chain of Custody (COC) for sample VP-04. A leak test indicated that the valve was functioning properly.
3	Only CCV summaries were provided by the laboratory.
6	In one LCS/LCS duplicate pair in work order 1405490A that was analyzed on June 11, 2014 at 0848 and 0910, the recoveries for dichloromethane (i.e., methylene chloride) were reported at 136 percent and 135 percent, respectively. These recoveries are above the laboratory-established upper control limit of 130 percent. No qualification was necessary because dichloromethane was not reported as detected in the associated samples.
9	A laboratory duplicate was not included; however, LCS/LCSD analyses were provided. Although RPDs were not summarized by the laboratory, a comparison of the percent recoveries indicate that the RPDs were <30.
12	Sample L001 is a "equipment blank" per client. Ethanol and Tetrachloroethene were reported as detected at 23 ug/m^3 and 17 ug/m^3, respectively. No sample results were qualified for this reason; however, it may be possible results reported for these two VOCs at concentrations <5x (i.e., 115 ug/m^3 for ethanol and 85 ug/m^3 for Tetrachloroethene) may exhibit a high bias or possibly be a false positive. A total of 11 ethanol and 3 Tetrachloroethene results may be affected.
13, 14, 15, 16, 17, and 18	Per the Stantec Consulting Services, Inc. project manager
16	Dilutions were performed on samples SVE-1D, SVE-1S, VP-01, VP-10, VP-11R, VP-12, and VP-14 due to the presence of high concentrati0n of some target compounds.

DATA VERIFICATION FORM

Site/Event: Former Lobell Refinery Orphan Site located in Casper, Wyoming	**Client:** Stantec Consulting Services, Inc.
Work Order #: STN115	**Sample Collection Date(s):** May 22-23, 2014
Matrix: Aqueous	**Samples:** 14 and 1 trip blank
Method: SW-846 Method 8260C	**Date Reviewed:** August 18 - 20, 2014
Laboratory: ChemSolutions, Centennial, CO	**QA Reviewed by:** QA/QC Solutions, LLC

Item No.	Parameter or Question	Applicable Control Limits[1]	Control Limits met? (Y/N)
1	Samples properly preserved?	Ship and store 4 ºC and pH ≤2 with HCl	Unknown; insufficient information reported
2*	Holding times met?[(2)]	14 days if pH ≤2	Y; samples analyzed within 14 days pH of samples could not be confirmed
3*	Initial calibration criteria met?	SW-846 Method 8000C and 8260C requirements specify the %RSD for all target VOCs be ≤20, or have a minimum correlation coefficient >0.990. In addition, it SW-846 Method 8260C recommends that RRFs (or RFs) be within the limits specified in Table 4. SW-846 Method 8000C states minimum RRF for least responsive compounds be ≥0.01 using the internal standard method.	Y
4*	Continuing calibration verification criteria met?	SW-846 Method 8260C states the %D or % Drift be ≤ 20 for all target VOCs. SW-846 Method 8260C recommends that RRFs (or RFs) be within the limits specified in Table 4. SW-846 Method 8000C states minimum RRF for least responsive compounds be ≥0.01 using the internal standard method.	Unknown
5*	Method Blanks	No target VOCs should be detected	Y
6*	Trip Blanks	No target VOCs should be detected	Y
7	Laboratory Control Spike (LCS) criteria met?[(3)]	1,1-Dichloroethene: 60 – 148% Benzene: 75 – 133% Trichloroethene: 71 – 137% Toluene: 80 – 129%% Chlorobenzene: 80 – 120%	Y

8	MS/MSD criteria met?(4)	1,1-Dichloroethene: 60 – 148% Benzene: 75 – 133% Trichloroethene: 71 – 137% Toluene: 80 – 129%% Chlorobenzene: 80 – 120%	Y
9	MS/MSD precision criteria met?(4)	≤20 relative percent difference	Y
10	Lab Sample Duplicate analysis precision met?	-	Y (see MS/MSD)
11	Surrogate recovery criteria met?	Dibromofluoromethane: 77 -128% Dichloroethane-d4: 73 – 137% Toluene-d8: 80 – 125% Bromofluorobenzene: 74 – 136%	Y
12*	Field duplicate sample analysis precision met?	-	None collected
13*	Field blanks and/or Equipment Rinsate Blanks	No target VOCs should be detected	None collected
14*	All required samples collected?	-	Y
15*	All required samples analyses performed?	-	Y
16*	All required analytes reported?	-	Y
17*	All required reporting limits met?	-	Y
18*	Data usable for their intended purpose(s)?	Client Determination	To be determined by client

* See comments below

(1) If the control limits were not met for any parameters, list the item number(s) below and provide additional explanation.

(2) List the applicable holding time under the control limits column.

(3) LCS limits specific to laboratory determined QC limits

(4) MS/MSD and RPD limits specific to laboratory determined QC limits

Required Attachments: LCS, MS/MSD, and Surrogate Recovery results for any outliers; field duplicate results table (RPDs); and data tables with sample results for any data qualifiers applied. These are addressed in comment table and Qualifier Summary table below.

Item	Comment
2	Insufficient information was reported by the laboratory to verify if the samples were preserved to pH ≤2 with HCl
3	For the initial calibration, a %RSD of 29.92 was reported for vinyl chloride. Linearity was assessed by use of a quadratic fit, which was acceptable per method requirements.

4	Results of the second source confirmation analysis (as noted by laboratory) were acceptable, with the exception of dichlorodifluoromethane (% drift of -59.9) and vinyl acetate (% drift of -46.7). These outliers were due to greater instrument sensitivity, therefore, no data required qualification because these two VOCs were not detected in the samples. No other CCV was analyzed in the analytical sequence or reported by the laboratory.
5 - 6	No target VOCs were detected in the associated method blank and trip blank. Trip blank was labeled as Sample TB-01.
12, 13, 14, 15, 16, 17, and 18	Per the Stantec Consulting Services, Inc. project manager
17	Dilutions were required to completed analysis of samples MW-04-052214, MW-06-052214, MW-07-052214, and MW-10-052214.