



February 15, 2018

Mr. Craig Rankine, Site Manager
Department of Ecology
12121 NE 99th Street, Suite 2100
Vancouver, Washington 98677

Re: Semi-Annual Groundwater Monitoring Report
July through December 2017
NuStar Vancouver Facility
Vancouver, Washington
1126-20

Dear Mr. Rankine:

Enclosed, please find the *Semi-Annual Groundwater Monitoring Report: July through December 2017*. The report was prepared on behalf of NuStar Terminals Services, Inc. (NuStar) by Apex Companies, LLC (Apex) and presents data collected from July through December 2017. Also included in this report are the groundwater monitoring results for the first comprehensive sampling event for nitrate, nitrite and ammonia. These constituents are related to fertilizer products, which the terminal currently handles and distributes. Additional information about bulk product handling and storage is currently being collected. The information will be used to inform a draft work plan for nitrate, nitrite and ammonia investigation that will be submitted to Ecology during second quarter 2018.

If you have any questions or would like to discuss this further, please contact me at (503) 924-4704 ext. 1925.

Sincerely,

A handwritten signature in blue ink that reads 'Stephanie Bosze Salisbury'.

Stephanie Bosze Salisbury, L.G.
Senior Associate Geologist

ENCLOSURE

Semi-Annual Groundwater Monitoring Report July through December 2017 (2 hard copies)

cc: Ms. Renee Robinson, NuStar Energy, L.P. (electronic deliverable)
Ms. Chris Chan, NuStar Energy, L.P. (electronic deliverable)
Ms. Patty Boyden, Port of Vancouver (1 digital [CD] copy)
Mr. Richard Roché, Parametrix (1 digital [CD] copy)
Mr. Stephan Rosen, NuStar Energy L.P. (1 digital [CD] copy)
Mr. Aaron Flett, NuStar Energy L.P. (1 digital [CD] copy)



*Semi-Annual Groundwater
Monitoring Report
July through December 2017
NuStar Vancouver Facility
Vancouver, Washington*

Prepared for:
NuStar Terminals Services, Inc.

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*Stephanie Bosze Salisbury, L.G.
Associate Geologist*

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1.0 Introduction

This semi-annual groundwater monitoring report was prepared by Apex Companies, LLC (Apex) on behalf of NuStar Terminals Services, Inc. (NuStar) for the NuStar Vancouver Facility (Facility) in Vancouver, Washington (Figure 1). This report presents the results of the groundwater monitoring activities completed at the Facility during the third and fourth quarters of 2017. Additionally, the report includes a summary and evaluation of interim action monitoring data for the reporting period.

The Facility is located at the Port of Vancouver (POV) Terminal No. 2 in Vancouver, Washington (Figure 1). The Facility Site Plan is shown on Figure 2. The property address is 2565 NW Harborside Drive, Port of Vancouver, Vancouver, Washington 98660 (Latitude: N45° 38.26', Longitude: W122° 42.20'). The property is owned by the POV and leased by NuStar. Until 2006, NuStar consisted of a roughly rectangular area with nominal dimensions of 600 by 1,300 feet. In 2006, the leasehold was expanded to include additional area to the north (see Figure 2). The total area is approximately 19 acres, which includes the leasehold extent up to 2006, and the additional leased area after 2006. The NuStar facility is on the north shore of the Columbia River. Land on all other sides is industrial property also owned by the POV. The NuStar facility is located on Clark County Tax Lot Nos.: 151979-000, 502010-002, 502010-000, and a portion of 502020-000, as well as a portion of the Washington Department of Natural Resources tideland area managed by the POV.

2.0 Groundwater Monitoring Field Activities

The groundwater monitoring was performed in accordance with the *Groundwater Monitoring Plan* (GWMP; Ash Creek, 2008), which was approved by the Washington State Department of Ecology (Ecology) in a letter to NuStar dated July 30, 2009. The monitoring program for the third and fourth quarters of 2017 is summarized in Table 1.

Two monitoring events were conducted during this period: the third quarter 2017 groundwater monitoring event was conducted from September 25 through 29, 2017 and the fourth quarter 2017 event was conducted from November 6 through 10, 2017.

2.1 Water Level Measurements

Third quarter 2017 groundwater levels were measured on September 25, 2017 and fourth quarter 2017 groundwater levels were measured on November 6, 2017. Monitoring well locations are shown on Figure 2. Depth to groundwater and groundwater elevation data are summarized in Table 2. The wells are screened in three different groundwater zones: Shallow, Intermediate, and Deep. The depth to groundwater was measured at Facility monitoring wells, multi-level groundwater monitoring (MGMS) wells, and selected off-site wells (MW-14, MW-17, MW-23i, MW-25i, MW-26, MW-30i, MW-31i (fourth quarter only), MW-F, MW-G, S-1,

and S-2). Well MW-31i was inaccessible during the September 25, 2017 gauging event and was gauged the following day on September 26, 2017.

2.2 Monitoring Well Sampling and Analysis

The sampling and analysis program for third and fourth quarter 2017 is summarized in Table 1. Groundwater monitoring data sheets for the sampling events are included in Appendix A. For quality assurance/quality control (QA/QC), field blanks and equipment blanks were prepared, and sample duplicates were collected from wells MGMS3-40, MW-7, MW-12, and MW-19 during third and fourth quarter 2017.

For both sampling events, the samples were uniquely labeled, stored in insulated coolers with ice, and transported under chain-of-custody protocol to Pace Analytical Laboratory (Pace) in Davis, California laboratory analysis. Samples were analyzed for halogenated volatile organic compounds (HVOCs) by U.S. Environmental Protection Agency (EPA) Method 8260B. Groundwater analytical results for both events are shown in Table 3. Historical data are tabulated in Appendix B.

The terminal currently handles and distributes bulk fertilizer products, primarily urea but also mono-ammonium phosphate. Urea cannot be measured directly in water but can be measured in groundwater by analysis of ammonia, nitrate, and nitrite. During the fourth quarter 2017 monitoring event, site monitoring wells were also sampled for nitrate as nitrogen and nitrite as nitrogen by EPA Method 300.0 and ammonia as nitrogen by EPA Method 350.1. Samples were submitted to ALS Group USA, Corp. of Kelso, Washington, using chain-of-custody protocols, for laboratory analysis.

3.0 Groundwater Elevations

Groundwater elevations and estimated elevation contours for the Shallow and Intermediate Zone wells for the third quarter 2017 are shown on Figures 3 and 4, respectively. Groundwater elevations and estimated elevation contours for the Shallow and Intermediate Zone wells for the fourth quarter 2017 are shown on Figures 5 and 6, respectively.

3.1 Third Quarter 2017

Shallow Zone. On September 25, 2017, depth-to-groundwater measurements were made at Shallow Zone monitoring wells in accordance with the groundwater monitoring plan provided in Table 1. The observed depths to groundwater in these wells ranged from 26.52 to 33.42 feet below the ground surface (bgs), and the corresponding groundwater elevations in these wells ranged from 1.92 to 6.91 feet above mean sea level (MSL; Figure 3).

During the third quarter 2017 monitoring event, gauging of the Shallow Zone wells was completed between 9:03 am and 12:00 p.m. (except for the Shallow Zone ports of the multi-port wells). During the time interval in which Shallow Zone monitoring wells were gauged, the water level in the adjacent Columbia River decreased by 0.58 feet. River stage data were obtained from the nearest National Oceanographic and Atmospheric Administration (NOAA) tide station (Columbia River – Vancouver), which is located approximately 0.5 mile upstream of the Facility.

As shown in Table 2, groundwater elevations decreased about ten feet on average from June 2017 to September 2017. During the third quarter 2017 gauging event, groundwater elevations in the Shallow Zone were variable, with groundwater highs in the northwest and southeastern corners of the terminal, near wells MW-10 and MW-6, respectively. Between wells MW-10 and MW-6 there is a groundwater divide; to the south/southwest of the divide groundwater flow is to the river; and to the north/northeast of the divide, groundwater flow is away from the river to the east/northeast. From the groundwater high at well MW-10, groundwater flow was to the southwest and east at gradients of 0.008 ft/ft and 0.003 ft/ft, respectively. From the groundwater high at well MW-6, groundwater flow was to the northeast and southwest at gradients of 0.007 ft/ft and 0.0025 ft/ft, respectively. There is also an isolated groundwater high around well MW-15 that is inconsistent with the divide that trends from the northwest to the southeast across the facility.

Intermediate Zone. On September 25, 2017, depth-to-groundwater measurements were made at Intermediate Zone monitoring wells in accordance with the groundwater monitoring plan provided in Table 1. The building housing MW-31i was locked on September 25, 2017; therefore, depth-to-groundwater measurements from this well were recorded on September 26, 2017. Groundwater levels in Intermediate Zone wells were measured collectively during a predicted tidal inflection to minimize the magnitude of tidal influence on water levels during the gauging event. Water levels were collected from Intermediate Zone wells within 78 minutes on September 25, 2017 (between 2:42 p.m. and 4:10 p.m.). During the time interval in which Intermediate Zone wells were gauged, water levels in the adjacent Columbia River decreased by 0.48 feet.

During the September 25, 2017 water level measurements, the observed depths to groundwater in the Intermediate Zone wells ranged from 26.36 to 31.03 feet bgs, and groundwater elevations in these wells ranged from 2.67 to 3.56 feet above MSL (Figure 4). Similar to the Shallow Zone, groundwater elevations in the Intermediate Zone decreased approximately 10 feet from June 2017 to December 2017 (Table 2). During the September 25, 2017 gauging event, groundwater flow was towards the south with a generally flat gradient of approximately 0.0005 ft/ft.

Deep Zone. Depth to groundwater was measured in well MW-24d, which is screened from 210 to 230 feet bgs, within the Troutdale Formation. Depth to water in well MW-24d was 29.80 feet bgs, corresponding to an elevation of 4.11 feet above MSL. A groundwater potentiometric map was not prepared for Deep Zone groundwater.

3.2 Fourth Quarter 2017

Shallow Zone. On November 6, 2017, depth-to-groundwater measurements were made at Shallow Zone monitoring wells in accordance with the groundwater monitoring plan provided in Table 1. The observed depths to groundwater in these wells ranged from 25.70 to 33.34 feet bgs, with groundwater elevations ranging from 3.81 to 6.34 feet above MSL (Figure 5).

During the fourth quarter 2017 monitoring event gauging of the Shallow Zone wells was completed between 1:48 p.m. and 3:57 p.m., except for well MW-E, which was gauged at 8:51 a.m. During the gauging activities, the water level in the adjacent Columbia River increased by 0.70 feet.

Groundwater elevations were typically one to two feet higher during the November gauging event than during the September 2017 event. A northwest to southeast trending groundwater divide was observed across the property, with groundwater flow to the northeast on the northern side of the divide and toward the river on the southern side of the divide, as shown on Figure 5. Groundwater elevations were highest in the northwest and eastern corners of the terminal at MW-10 and MW-15. At the northwestern corner of the facility groundwater flow was to the southwest and northeast at gradients of 0.003 ft/ft and 0.002 ft/ft, respectively. The groundwater flow at well MW-15 was to the northeast and southwest at gradients of 0.003 ft/ft and 0.01 ft/ft, respectively. Water levels along the majority of the shoreline were slightly elevated, resulting in a groundwater stagnation zone through the central portion of the Facility, as shown on Figure 5.

Intermediate Zone. During the November 6, 2017 gauging event, depth-to-groundwater measurements were collected from Intermediate Zone wells between 1:37 p.m. and 3:53 p.m. This was inconsistent with historical monitoring events in which Intermediate Zone wells were typically gauged within a shorter timeframe. During the November 2017 gauging event, water levels in the adjacent Columbia River increased by 0.66 feet. The observed depths to groundwater in Intermediate Zone wells ranged from 26.72 to 29.34 feet bgs, and groundwater elevations in these wells ranged from 1.99 to 5.41 feet above MSL (Figure 6). Intermediate Zone groundwater was generally flat during the November gauging event with a slight gradient to the east/southeast of 0.0004 ft/ft. Gradients in the Intermediate Zone are typically very slight and trend to the east/northeast. Given that the gauging event occurred over a 2.5-hour time period, it is likely that the “snapshot” of water levels presented on the groundwater potentiometric map (Figure 6) are more representative of an averaging of tidal fluctuations superimposed over groundwater flow rather than solely representative of groundwater flow.

Deep Zone. Depth to water in Deep Zone well MW-24d was 28.80 feet bgs, corresponding to an elevation of 4.11 feet above MSL.

4.0 Groundwater Sample Analytical Results

Complete copies of the laboratory reports for the third and fourth quarter 2017 groundwater monitoring events, including the quality assurance evaluation report and chain-of-custody documentation, are included in Appendix C.

4.1 Third Quarter 2017

The September 2017 monitoring program included the collection of groundwater samples from the wells listed in the first column of Table 1. The sample results for HVOCs for third quarter 2017 are summarized in Table 3 and select VOCs are shown on Figure 7.

4.2 Fourth Quarter 2017

The November 2017 monitoring program included the collection of groundwater samples from the wells listed in the second column of Table 1. These wells were analyzed for nitrate as nitrogen, nitrite as nitrogen, and ammonia as nitrogen in addition to HVOCs. The sample results for fourth quarter 2017 are summarized in Tables 3 and 11; select VOCs are shown on Figure 8, and nitrate and ammonia results are shown on Figure 9.

4.3 Evaluation of Results

VOC concentration trend plots for each monitoring well are provided in Appendix D. Monitoring results demonstrate decreasing VOC concentration trends in Shallow and Intermediate Zone groundwater in 31 of 33 monitoring wells. VOC concentration trends were slightly increasing for TCE in wells MW-17 and MGMS3-132 and PCE in well MGMS3-132. The concentrations in both wells have always been variable and relatively low (i.e. PCE ranging from 1 microgram per liter [$\mu\text{g/L}$] to 13 $\mu\text{g/L}$ for MGMS3-132 and TCE ranging from 0.8 $\mu\text{g/L}$ to 22.7 $\mu\text{g/L}$ for MW-17) and it is difficult to identify a discernable concentration trend for the wells. Monitoring wells in the source area exhibit concentration decreases of over 99% for tetrachloroethene (PCE) and trichloroethene (TCE) since initiating interim actions in 2008. VOCs in monitoring wells on the periphery or outside of the source area also reflect historical decreasing trends.

Ammonia, nitrate and nitrite results are provided in Table 11 as a baseline for future quarterly groundwater monitoring. The highest concentration of ammonia and nitrate results were found in the north/northwestern area of the property both in Shallow and Intermediate Zone groundwater. Isopleths depicting nitrate and ammonia concentrations in Shallow and Intermediate Zone groundwater are shown on Figures 10 through 13.

Fertilizer products have historically been stored at the terminal, although the specific products and storage areas have changed over time. Historical operations ceased in late August 2008. The facility obtained a few contract in 2014 and resumed fertilizer handling and distribution processes. Historical nitrate results are provided in Table 11. For wells in which historical data are available, the concentrations of nitrate and

ammonia in November 2017 are generally similar to (within an order of magnitude) or less than historical results.

5.0 Interim Action Measure Activities

Several interim actions have been implemented at the Facility, including:

- Bioremediation injections for remediation of Facility groundwater and the installation of a soil vapor extraction (SVE) system for the remediation of VOCs in vadose-zone soils in the spring/summer of 2008. These activities are herein referred to as the 2008 interim action.
- Expanding the SVE system and performing additional bioremediation injections during the summer of 2011, which is referred to herein as the 2011 interim action. The 2011 interim action included 17 additional SVE well locations (involving shallow and deeper SVE well pairs at each location) for a total of 34 wells and additional bioremediation injections in and around the 2008 interim action area (shown on Figure 14). Details of the 2008 and 2011 interim actions are provided in the *Interim Action Installation Report* (Ash Creek, 2009b) and the *2011 Interim Action Evaluation Report* (Ash Creek, 2012), respectively.
- Additional bioremediation injections adjacent to the riverbank at the Facility in accordance with the *2015 Interim Action Work Plan* (Apex, 2016). This work is referred to as the 2016 interim action and an *Interim Action Summary Report* (Apex, 2017) describes the scope and preliminary results.

These interim actions and results to date are described in the following subsections.

5.1 Summary of 2008 and 2011 Interim Actions

The 2008 interim action consisted of SVE in the vadose zone and enhanced anaerobic bioremediation of the Shallow Zone groundwater. The 2008 enhanced bioremediation locations and the SVE system layout are provided in Appendix E. The 2008 SVE system removed approximately 3,150 pounds of VOCs between startup in September 2008 and the expansion in 2011. The mass removal rate at startup in 2008 was 58.8 pounds per day (lbs/day) and had decreased to an average of 1.7 lbs/day by the third quarter of 2011. Historical monitoring tables and a mass removal chart are provided in Appendix E.

A soil and groundwater investigation in 2010 indicated that the 2008 interim action had reduced VOCs in vadose-zone soils by 90 percent for PCE and 98 percent for TCE, and had reduced total molar ethene concentrations in source area groundwater by 77 percent (Ash Creek, 2011). The investigation results were summarized in an appendix to the *2011 Interim Action Work Plan* (Work Plan; Ash Creek, 2011) that was submitted to Ecology on March 25, 2011. The Work Plan included a proposal for the expansion of the SVE system to include 17 additional SVE well locations, additional bioremediation injections in the 2008 interim action area, and bioremediation injections in an expanded interim action area. On May 23, 2011, Ecology

approved the Work Plan. The bioinjection activities were conducted from July 21 through August 31, 2011, and the SVE installation activities were conducted from August 2 through 5, 2011 and August 29 through October 3, 2011. The 2008 and 2011 bioremediation injection locations are shown on Figure 14.

The initial Facility SVE system installed in 2008, herein referred to as the 2008 SVE system, was comprised of 17 wells, divided among five branches, which were connected by a network of underground piping as shown on drawings provided in Appendix E. As part of the 2011 SVE system expansion, Branches 4 and 5 were disconnected from the other System branches and were connected to a new blower unit located approximately 150 feet to the northeast of the railroad tracks (Figure 16). The wells and piping associated with Branches 4 and 5 and the associated blower unit are herein referred to as the "North System".

From August 2 through 5, 2011, 17 additional SVE well pairs (for a total of 34 additional SVE wells) were installed within and to the south of Warehouse No. 13 (a.k.a. the Butler building), in general accordance with the *2011 Interim Action Work Plan* (Ash Creek, 2011; Figure 16). For each well pair, one well is screened in vadose-zone soils from 10 to 15 feet bgs and the second well is screened in vadose-zone soils from 15 to 25 feet bgs. These 17 well pairs, along with the Branch 1 through 3 wells from the 2008 SVE system, are piped underground to a blower unit located outside of the southeast corner of Warehouse No. 13. These SVE wells, associated underground piping, and the blower unit are herein referred to as the "South System". Effluent from the South System is treated with a series of two carbon vessels prior to discharge. Monitoring of the North and South Systems occurs on a monthly basis as described in Section 5.3.2.

5.2 Summary of 2016 Interim Action

NuStar and the Port of Vancouver originally submitted a joint Feasibility Study (FS) to Ecology in March 2014 (Apex and Parametrix, 2014). The FS approval process is ongoing. To avoid potential delays in groundwater treatment while working through the FS and the associated regulatory approval process, NuStar proposed to implement a portion of the recommended remedial action for the NuStar source area as an interim action. The details of the proposed interim action were submitted to Ecology in an *Interim Action Work Plan* on September 15, 2015. After a 30-day public comment period from May 12 to June 10, 2016, the work plan was approved on June 14, 2016. The interim action consisted of bioremediation injections along the southern portion of the NuStar terminal near the seawall. Per Ecology's request, the interim action also included baseline sediment and surface water sampling in the Columbia River. Additionally, enhanced bioremediation injections were implemented in an isolated area to the northwest of the NuStar terminal which has been less responsive to monitored natural attenuation than the VOCs at the NuStar terminal. The "NW Area bioremediation injections" were completed as a joint project between NuStar and the Port of Vancouver.

The NW Area injections were implemented in July 2016 and included the injection of 52,000 gallons of bioremediation oil substrate (EosPro; diluted with water) into the shallow zone groundwater through 30 boreholes in the vicinity of and between (NuStar) monitoring wells MW-14 and MW-26. Figure 15 illustrates the approximate boring locations in the "NW Area". The same substrate material was injected at the NuStar

terminal in August and September 2016 and included the injection of 100,000 gallons of EosPro substrate (diluted with water) into 72 borings along the southern portion of the NuStar facility, adjacent to the seawall. Figure 15 identifies the approximate locations of the injection borings near the NuStar seawall. In accordance with the approved *Interim Action Work Plan*, a summary of the groundwater injection and surface/water sampling activities was provided to Ecology in an *Interim Action Summary Report* on June 29, 2017 (Apex, 2017). The report included the results of the baseline surface water and sediment sampling as well as the results of two quarters of post interim action groundwater monitoring. A brief evaluation of the groundwater monitoring results from the interim action area is summarized in Section 5.4 below.

5.3 Interim Action Monitoring and Evaluation

5.3.1 Enhanced Bioremediation Injections

Groundwater samples collected from wells MW-7, MP-1, EX, MW-12, MW-24i, MGMS2-40, MW-13, MW-14, MW-19, MW-26, MGMS1-43 and MGMS3-40 during the third quarter 2017 monitoring event, and from wells MW-7, MP-1, MW-12, MW-24i, MGMS2-40, MW-13, MW-14, MW-19, MW-26, MGMS1-43 and MGMS3-40 during the fourth quarter 2017 event were analyzed for total organic carbon (TOC) by EPA Method 5310 D and ethene by EPA Method RSK-175M, to evaluate the performance of the bioremediation injections. TOC and ethene analyses were performed by Pace Analytical.

In addition to the laboratory analysis of groundwater samples, field measurements of oxidation-reduction potential (ORP) and dissolved oxygen (DO) were collected from the monitoring wells during the third and fourth quarter 2017 monitoring events. Table 4 shows the results of interim action groundwater monitoring from the February 2007 baseline event through the fourth quarter 2017 monitoring event. Wells MW-24i and MGMS2-40 were not located within the 2008 interim action injection area but are located within the footprint of the 2011 and 2016 interim action areas; therefore, interim action monitoring data for these wells are only presented from the second quarter 2011 baseline event through fourth quarter 2017. Wells MW-13, MW-14, MW-19, MW-26, MGMS-1, and MGMS-3 were not located within the 2008 or 2011 interim action areas, but are within the 2016 interim action area; therefore, monitoring data for those wells are only presented from September 2016 through November 2017.

A discussion of reductive dechlorination of VOCs in groundwater from prior to the 2008 interim action through fourth quarter 2017 is provided below.

5.3.1.1 VOC Concentrations Evaluation

Bioremediation injections in the primary source area at the Facility were initiated in 2008 and expanded in 2011; bioremediation injections along the riverbank and in the NW Area were initiated in 2016. Additionally, seven injection boreholes were advanced in 2016 in the area of wells MP-1 and EX, located on the western side of the historical primary source area. VOC concentrations are generally decreasing at the Facility and

rebound is not occurring in the area of the 2008/2011 interim action. VOC concentrations are also decreasing in the 2016 interim action area. The following paragraphs evaluate the results to date in each of these areas.

Primary Source Area. Concentration trend plots for PCE, TCE, total dichloroethene (DCE), and vinyl chloride (VC) in 2008/2011 interim action area wells MW-7, EX, MP-1, and MGMS2-40 are provided in Appendix F. VOC data are included from the baseline event prior to the 2008 interim action (first quarter 2007; second quarter 2007 for well MGMS2-40) through November 2017. The concentration of PCE and TCE has decreased in each well, with observed reductions through November 2017 exceeding 97 percent in wells MW-7, EX, and MP-1. The concentrations of PCE and TCE in well MP-1 have decreased by about 80% since enhanced bioremediation injections were initiated. It should be noted that well MW-7 is not in the 2016 interim action area; however, the groundwater concentrations in well MW-7 have decreased dramatically since the 2008 interim action and, to date, there is no indication of concentrations rebounding.

Another indicator of effective reduction of chlorinated ethenes is a decrease in the total molar chloroethene concentration (the molar concentration of PCE, TCE, DCE, and VC combined). The use of total molar concentrations allows an assessment of changes in the total number of related contaminant molecules as the reductive dechlorination process transitions from the relatively heavy PCE to the progressively lighter TCE, DCE, and VC. Molar concentration trend plots for wells MW-7, EX, MP-1, and MGMS2-40 are provided in Appendix F. Between the February 2007 baseline event and the November 2017 monitoring event, the decrease in total molar concentration in the interim action monitoring wells MP-1, MW-7, EX and MGMS2-40 ranged from 83 percent in well MP-1 to 99 percent in wells EX and MW-7.

Riverbank Area. Wells MW-12, MW-13, MW-19, MGMS1-43, and MGMS3-40 are located within the 2016 riverbank interim action area and concentration trend plots for PCE, TCE, DCE, and VC in these wells are provided in Appendix F. As shown on the trend plots, monitoring results from the 2016 interim action area indicate reductions in concentrations of PCE and TCE of three orders of magnitude in groundwater from wells MW-12, MW-13, and MGMS3-40 after the 2016 enhanced bioremediation injections. For example, concentrations of PCE and TCE in well MW-13 in June 2016, prior to the injection event, were 2,470 and 1,820 µg/L, respectively. By November 2017, PCE and TCE concentrations in well MW-13 had been reduced to below reporting limits (<4.2 µg/L, respectively). Recent data through November 2017 suggest that DCE concentrations are also decreasing, along with PCE and TCE, in wells MW-12 and MGMS3-40. Wells with increasing DCE concentrations include MW-13 and MW-19, which are still undergoing reductive dechlorination of PCE and TCE. In addition, the September and November 2017 vinyl chloride concentrations in well MW-19 were the highest measured since monitoring of the well was initiated in 2002. Ethene concentrations have also increased in well MW-19, indicating that reductive dechlorination is occurring through the vinyl chloride stage to the final end stage of ethene generation and that the chlorinated hydrocarbons are successfully being destroyed. Additional discussion of ethene production is provided in the sections below. Future quarterly monitoring will be utilized to further evaluate these concentration trends,

both in the Shallow Zone source area as well as outside of the source area treatment zone and in Intermediate Zone groundwater.

Northwest Area. Wells MW-14 and MW-26 are located within the 2016 NW Area interim action area and concentration trend plots for PCE, TCE, DCE, and VC in these wells are provided in Appendix F. Response to the 2016 interim action injections has been delayed in these wells, likely due to the typically flat or north/northwest groundwater gradient slowing the spread of the oil substrate. Initial signs of reductive dechlorination are now present in MW-14 and MW-26, with DCE trends now increasing since the 2016 enhanced bioremediation injections. While PCE and TCE concentrations have been stable in well MW-14 since the 2016 enhanced bioremediation injections, well MW-26 has shown reductions of up to 65 percent and 44 percent of PCE and TCE, respectively. Continued quarterly groundwater monitoring will be conducted to further evaluate concentration trends.

5.3.1.2 Ethene Evaluation

Ethene is an end product of the reductive dechlorination process. The detection of ethene confirms the completion of the reductive dechlorination pathway and the destruction of the target VOCs at the Facility. Ethene degrades quickly in most natural environments and observing increases in ethene concentration can be difficult. As of the November 2017 monitoring event, ethene has been measured in eight of the ten 2016 interim action area monitoring wells (MW-12, MW-13, MW-19, MGMS1-43, MGMS2-40, MGMS3-40, EX, and MP-1). Further discussion of ethene results are provided below.

Primary Source Area. While the focus of the 2016 interim actions was not located in the area historically identified as the “primary source area”, there was some overlap between the 2008/2011 interim action injection areas and the 2016 interim action injection area, namely in the vicinity of wells MP-1 and EX. Concentrations of ethene in well MP-1 reached a maximum of 328 µg/L in March 2017, decreased to 83.2 µg/L in June 2017, and then decreased further to below reporting limits in September and November 2017. These data suggest that the 2016 bioremediation substrate injected near well MP-1 may be diminished. Ethene samples were not collected from well EX during the September and December 2016 monitoring events; however, ethene has been detected in well EX since the analysis was resumed in March 2017. Monitoring well MGMS2-40 is located near, but outside of, the 2016 interim action injection area, and within the footprint of the 2011 interim action injection area. Ethene concentrations in well MGMS2-40 increased in response to the 2011 injections and have remained elevated and relatively stable through November 2017. The presence of ethene, along with continuous decreases in PCE and TCE, indicate that reductive dechlorination has been ongoing near this well since the 2011 injections.

Since approximately three years after the 2011 injections, ethene has not been detected in groundwater in well MW-7. The lack of ethene in well MW-7, coupled with VOC data at or near reporting limits, suggest that there is little residual chlorinated hydrocarbon mass in what was historically the most impacted portion of the primary source area.

Riverbank Area. Prior to the 2016 interim action injections, ethene was not present in groundwater in wells located in the interim action area, including MW-12, MW-13, MW-19, and MGMS3-40. Since the completion of the 2016 interim action injections, ethene has been detected in all four interim action area wells. The presence of ethene suggests that the 2016 injections have successfully resulted in the complete degradation of chlorinated hydrocarbon mass.

Ethene concentrations in well MW-12 increased from non-detect prior to the 2016 interim action to 75.2 µg/L in March 2017 and remained elevated between March 2017 and September 2017. Concentrations of ethene in well MW-12 tapered off to below the reporting limit (less than 10.0 µg/L) by November 2017. From June 2016 through November 2017, PCE and TCE concentrations in well MW-12 have continued to decrease suggesting that reductive dechlorination is ongoing near this well. PCE and TCE concentrations in MW-13 have decreased significantly between September 2016 and November 2017 (from 5,090 µg/L and 951 µg/L, respectively, to below the reporting limit of 4.2 µg/L), but it was not until November 2017 that ethene was detected in the well. Ethene was first detected in well MW-19 during the September 2017 monitoring event and was detected again during November 2017. As previously stated, vinyl chloride data for well MW-19 were the highest in September and November 2017 compared to the historical results observed in this well since monitoring began in 2002. Collectively, these data confirm that reductive dechlorination is occurring and that chlorinated VOC mass is being completely degraded in the process. Future monitoring will be used to determine if PCE and TCE concentration reductions are measurable in response to the bioremediation injections.

Northwest Area. Ethene concentrations in wells MW-14 and MW-26 have not been detected above the 10 µg/L reporting limit since ethene monitoring was initiated in September 2016. End stages of the reductive dechlorination process are difficult to identify in this area and may be due to limited mass in the preceding VC reduction stage. Reductions in concentrations of PCE and TCE, namely in well MW-26, were not observed until the September and November 2017 monitoring events. These recent data suggest that reductive dechlorination of chlorinated hydrocarbons is occurring in the northwest area, but the complete degradation of these ethenes has not yet been quantified.

5.3.1.3 Total Organic Carbon Evaluation

The presence of elevated TOC indicates that the bioremediation injections have increased the electron donor carbon source needed to reductively dechlorinate the VOCs present in groundwater at the Facility. While a baseline monitoring event was not intentionally conducted prior to the 2016 injection event, data are available for wells MP-1 and MW-12 for the event prior to the injections (June 2016) and the two events concurrent with and following the injections (September and December 2016). TOC was further analyzed between March and November 2017 at select wells. A discussion of the TOC results is provided below.

Primary Source Area. Seven bioremediation injections were located near well MP-1 during the 2016 interim action. In well MP-1, TOC values increased by over three orders of magnitude between June and September 2016, with concentrations remaining elevated during the December 2016 event. During the March 2017 event, the TOC value remained stable; however, TOC values then decreased in June 2017 by an order of magnitude and further decreased in September 2017 by another order of magnitude before remaining stable in November 2017. At well EX, the TOC concentration increased by two orders of magnitude following the 2016 interim action injections and then decreased an order of magnitude during the June 2017 event with a slight increase in September 2017. These results indicate utilization of the oil substrate in the dechlorination of VOCs, supporting the significant decreases in VOC concentrations observed following the 2016 bioremediation injections in this area.

Riverbank Area. In groundwater collected from well MW-12, TOC values increased by over 3 orders of magnitude between June and September 2016, with concentrations remaining elevated during the December 2016 monitoring event. Between December 2016 and March 2017, the TOC concentration in well MW-12 decreased by an order of magnitude and then remained stable through November 2017. At well MW-13, TOC concentrations were high during the September 2016 sampling event, and then decreased by three orders of magnitude by the November 2017 event. At well MW-19, TOC values are low and stable, and one to two orders of magnitude below concentrations observed in wells MP-1 and MW-12. At well MGMS3-40, TOC concentrations increased during the September and December 2016 groundwater monitoring events, and then decreased by an order of magnitude during the March 2017 event and has remained stable through November 2017. Concentrations of PCE and TCE are also decreasing at this location. The TOC concentration in groundwater collected from well MGMS1-43 has remained stable from September 2016 through November 2017 even though concentration of PCE and TCE have decreased since the 2016 enhanced bioremediation injections.

NW Area. In wells MW-14 and MW-26, TOC concentrations did not increase after the September 2016 injections. TOC levels in these wells remain low and stable.

Summary of Enhanced Bioremediation Results Following the 2016 Interim Action. The 2016 groundwater interim action was implemented in July through September 2016 and included over 72 bioremediation injections across the NuStar source area and 30 bioremediation injections at the off-site Northwest Area. Since implementation, groundwater in the 2016 interim action area has been monitored for five quarters for indicators of reductive dechlorination. The results from the third and fourth quarter 2017 events provide an indication that enhanced reductive dechlorination is occurring at the Facility in response to the interim action, as follows:

- Observed trends in breakdown product concentrations are consistent with reductive dechlorination of chlorinated ethene compounds
- Up to three orders of magnitude reduction of PCE and TCE concentrations in the 2016 interim action area have been observed between the September 2016 and November 2017 monitoring events.

-
- For the first time since the 2016 injections, PCE and TCE concentrations in Northwest Area well MW-26 have decreased, with concentration reductions of 65 and 44 percent, respectively.
 - DCE and VC concentrations generally increased or stayed approximately the same in these wells, supporting that dechlorination of PCE and TCE is occurring and has led to an anticipated short-term increase in the daughter product concentrations in the wells within the treatment zone.
 - After the 2016 injections, ethene was first detected in four interim action monitoring wells in March 2017. By November 2017, ethene was present in five interim action monitoring wells. The presence of ethene indicates that the chlorinated hydrocarbon mass is successfully being reduced to the final stage in the dechlorination process.
 - Total molar ethene concentrations from wells located within the 2016 treatment area have also decreased, indicating that VOC mass is being significantly reduced.

5.3.2 SVE Monitoring Evaluation

The following paragraphs summarize the monitoring and analytical results as well as the total VOC mass removal for the North and South SVE Systems at the Facility. Field vapor measurements were collected with a photoionization detector (PID). Effluent vapor samples from the SVE systems were collected into Summa™ canisters and submitted to TestAmerica Laboratories (Test America) in West Sacramento, California, for analysis of VOCs by method TO-15.

Monthly SVE monitoring events occurred on July 31, August 28, September 25, October 26, November 29, and December 21 during this reporting period. North SVE System operating and analytical data are provided in Tables 5 and 6, respectively. South SVE System operating and analytical data are provided in Tables 7 and 8, respectively.

The North SVE System has been non-operational since May 2017 due to the blower motor failing. The rotor is locked and blown fuses were noted on two of the three legs. A replacement blower is required to return the North SVE system to operation. The terminal is planning modifications to the rail alignment at the Facility to accommodate modifications to one of its storage areas; part of the planned work will require the abandonment and potential relocation of several of the SVE wells in the North system. As of December 2017, the modifications to the terminal infrastructure have not been initiated and the North SVE system remains non-operational.

SVE System Mass Removal. The approximate VOC mass removed by the North and South SVE Systems through November 2017 is presented in Tables 9 and 10 and on Figures 17 and 18, respectively. The South SVE System was sampled in December 2017 but the Pre-Carbon sampling canister malfunctioned and could not be used to collect a sample. Mass removal during this time period is estimated using effluent data from the November 2017 sampling event.

The North and South Systems have removed approximately 232 and 3,530 pounds of VOCs, respectively, since startup in October 2011. Including the mass removed from the 2008 SVE System, the total mass removal by SVE at the Facility to date is approximately 6,912 pounds.

6.0 Future Activities

Quarterly groundwater monitoring for the first and second quarters of 2018 will be conducted in March and June, respectively. The proposed sampling will be completed in accordance with the GWMP (Ash Creek, 2008). SVE operations and maintenance will occur monthly in accordance with the schedule proposed in the *2011 Interim Action Evaluation Report* (Ash Creek, 2012) at the South SVE system only until the North SVE system is repaired.

As discussed in the February 2018 joint NuStar, Port of Vancouver and Ecology meeting, the sampling of site wells for nitrate, nitrite, and ammonia will continue on a quarterly basis; the results from the November 2017 event are considered recent “baseline” results. The nitrate and ammonia results, along with a description of current and historical products handled at the facility, as well as the timing and implementation of any “best management” practices for handling such products, will ultimately be summarized in either an addendum or revision to the *Final 2013 Remedial Investigation Report* (Apex, 2013). However, prior to the preparation of the addendum to the RI, a work plan will be prepared and submitted to Ecology summarizing plans for any data collection that will be incorporated into the addendum/Revised RI. Additional information about bulk product handling and storage is currently being collected. The information will be used to inform the draft work plan for nitrate, nitrite and ammonia investigation that will be submitted to Ecology during second quarter 2018.

7.0 References

- Apex Companies, LLC (Apex; 2013). *Final 2013 Remedial Investigation Report. NuStar Terminals Services, Inc. Vancouver Terminal Vancouver, Washington.* August 14, 2013.
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- Apex and Parametrix Inc., 2014. *Feasibility Study Report NuStar, Cadet, and Swan Manufacturing Company Sites.* March 14, 2004.
- Ash Creek Associates, Inc. (Ash Creek), 2007. *Release Area Interim Action Design, Support Terminals Services Vancouver Facility.* May 8, 2007.
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- Ash Creek, 2011. *2011 Interim Action Work Plan NuStar Vancouver Facility, Vancouver, Washington.* March 25, 2011.
- Ash Creek, 2012. *2011 Interim Action Evaluation Report. NuStar Vancouver Facility, Vancouver, Washington.* March 29, 2012.

Table 1
 Groundwater Monitoring Plan: Third and Fourth Quarters 2017
 NuStar Vancouver Facility
 Vancouver, Washington

Monitoring Program	Well ID	Groundwater Zone	Included Monitoring Wells	
			Third Quarter	Fourth Quarter
Groundwater monitoring includes depth-to-water measurement.	MW-1	Shallow	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	MW-2	Shallow	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	MW-3	Shallow	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	MW-5	Shallow	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	MW-6	Shallow	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	MW-7	Shallow	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	MW-8	Shallow	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	MW-9	Shallow	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	MW-10	Shallow	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	MW-12	Shallow	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	MW-13	Shallow	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	MW-14	Shallow	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	MW-15	Shallow	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	MW-16	Shallow	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	MW-17	Shallow	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	MW-18i	Intermediate	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	MW-19	Shallow	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	MW-19i	Intermediate	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	MW-20i	Intermediate	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	MW-21i-40	Intermediate	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	MW-21i-105	Intermediate	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	MW-22i	Intermediate	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	MW-23i	Intermediate	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	MW-24i	Intermediate	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	MW-24d	Deep	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	MW-25i	Intermediate	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	MW-26	Shallow	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	MW-30i	Intermediate	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	MW-31i	Intermediate	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	MW-32s	Shallow	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	MW-32i	Intermediate	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	MGMS1-3(43)	Shallow	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	MGMS1-2 (60)	Intermediate	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	MGMS1-1(110)	Lower Intermediate	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	MGMS2-4(40)	Shallow	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	MGMS2-3 (60)	Intermediate	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	MGMS2-2(110)	Lower Intermediate	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	MGMS2-1(132)	Lower Intermediate	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	MGMS3-4(40)	Shallow	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Please refer to notes at end of table.

Table 1
 Groundwater Monitoring Plan: Third and Fourth Quarters 2017
 NuStar Vancouver Facility
 Vancouver, Washington

Monitoring Program	Well ID	Groundwater Zone	Included Monitoring Wells	
			Third Quarter	Fourth Quarter
Groundwater monitoring includes depth-to-water measurement.	MGMS3-3(60)	Intermediate	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	MGMS3-2(101)	Lower Intermediate	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	MGMS3-1(132)	Lower Intermediate	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	MW-E	Shallow	<input type="checkbox"/>	<input type="checkbox"/>
	MW-F	Shallow	<input type="checkbox"/>	<input type="checkbox"/>
	MW-G	Shallow	<input type="checkbox"/>	<input type="checkbox"/>
	EW-1	Shallow	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	EX	Shallow	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	MP-1	Shallow	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	MP-2	Shallow	<input type="checkbox"/>	<input type="checkbox"/>
	MP-3	Shallow	<input type="checkbox"/>	<input type="checkbox"/>
	MP-4	Shallow	<input type="checkbox"/>	<input type="checkbox"/>
	S-1	Intermediate	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	S-2	Shallow	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Notes:

- = Included in sampling program represented in this report.
- = Not included in sampling program represented in this report: water level measurement only.
- Wells MW-E, MW-G, MW-30i, MW-31i, and MW-32i are sampled by the Port of Vancouver.

Table 2
 Groundwater Elevation Data: 2017
 NuStar Vancouver Facility
 Vancouver, Washington

Well Number/ (TOC Elevation)	Date of Measurement	Depth to Water (feet BTOC)	Groundwater Elevation (feet)
<i>Groundwater Monitoring Wells</i>			
MW-1 (32.60)	03/27/17	14.17	18.43
	06/12/17	17.79	14.81
	09/25/17	28.36	4.24
	11/06/17	27.14	5.46
MW-2 (34.04)	03/27/17	16.04	18.00
	06/12/17	19.38	14.66
	09/25/17	29.89	4.15
	11/06/17	28.80	5.24
MW-3 (34.41)	03/27/17	16.77	17.64
	06/12/17	19.18	15.23
	09/25/17	29.48	4.93
	11/06/17	29.04	5.37
MW-5 (33.86)	03/27/17	16.94	16.92
	06/12/17	18.54	15.32
	09/25/17	28.83	5.03
	11/06/17	28.62	5.24
MW-6 (32.83)	03/27/17	15.10	17.73
	06/12/17	17.79	15.04
	09/25/17	27.66	5.17
	11/06/17	27.08	5.75
MW-7 (33.74)	03/27/17	16.93	16.81
	06/12/17	18.36	15.38
	09/25/17	28.60	5.14
	11/06/17	28.61	5.13
MW-8 (33.97)	03/27/17	17.60	16.37
	06/12/17	18.74	15.23
	09/25/17	28.01	5.96
	11/06/17	28.01	5.96
MW-9 (33.86)	03/27/17	17.25	16.61
	06/12/17	18.53	15.33
	09/25/17	28.68	5.18
	11/06/17	28.75	5.11
MW-10 (34.83)	03/27/17	19.44	15.39
	06/12/17	19.51	15.32
	09/25/17	27.92	6.91
	11/06/17	28.49	6.34

Please refer to notes at end of table.

Table 2
 Groundwater Elevation Data: 2017
 NuStar Vancouver Facility
 Vancouver, Washington

Well Number/ (TOC Elevation)	Date of Measurement	Depth to Water (feet BTOC)	Groundwater Elevation (feet)
MW-12 (31.43)	03/27/17	13.05	18.38
	06/12/17	16.55	14.88
	09/25/17	26.98	4.45
	11/06/17	25.76	5.67
MW-13 (33.15)	03/27/17	14.99	18.16
	06/12/17	17.80	15.35
	09/25/17	26.52	6.63
	11/06/17	27.92	5.23
MW-14 (33.81)	03/27/17	17.14	16.67
	06/12/17	18.51	15.30
	09/25/17	28.65	5.16
	11/06/17	28.77	5.04
MW-15 (39.13)	03/27/17	22.50	16.63
	06/12/17	24.08	15.05
	09/25/17	33.42	5.71
	11/06/17	33.34	5.79
MW-16 (33.05)	03/27/17	14.95	18.10
	06/12/17	18.60	14.45
	09/25/17	28.67	4.38
	11/06/17	27.76	5.29
MW-17 (32.65)	03/27/17	14.72	17.93
	06/12/17	17.60	15.05
	09/25/17	27.91	4.74
	11/06/17	27.38	5.27
MW-18i (33.40)	03/27/17	14.98	18.42
	06/12/17	19.15	14.25
	09/25/17	29.84	3.56
	11/06/17	28.24	5.16
MW-19 (33.59)	03/27/17	15.98	17.61
	06/12/17	18.42	15.17
	09/25/17	28.63	4.96
	11/06/17	28.37	5.22
MW-19i (33.62)	03/27/17	15.20	18.42
	06/12/17	19.42	14.20
	09/25/17	30.39	3.23
	11/06/17	28.54	5.08

Please refer to notes at end of table.

Table 2
 Groundwater Elevation Data: 2017
 NuStar Vancouver Facility
 Vancouver, Washington

Well Number/ (TOC Elevation)	Date of Measurement	Depth to Water (feet BTOC)	Groundwater Elevation (feet)
MW-20i (33.14)	03/27/17	14.77	18.37
	06/12/17	18.97	14.17
	09/25/17	30.05	3.09
	11/06/17	28.04	5.10
MW21i-40 (34.10)	03/27/17	15.75	18.35
	06/12/17	19.96	14.14
	09/25/17	30.74	3.36
	11/06/17	28.93	5.17
MW-21i-105 (33.99)	03/27/17	15.64	18.35
	06/12/17	19.77	14.22
	09/25/17	30.57	3.42
	11/06/17	28.81	5.18
MW-22i (34.39)	03/27/17	16.01	18.38
	06/12/17	20.19	14.20
	09/25/17	31.00	3.39
	11/06/17	29.21	5.18
MW-23i (33.80)	03/27/17	15.35	18.45
	06/12/17	19.60	14.20
	09/25/17	30.56	3.24
	11/06/17	28.44	5.36
MW-24i (33.47)	03/27/17	14.98	18.49
	06/12/17	19.26	14.21
	09/25/17	30.23	3.24
	11/06/17	28.28	5.19
MW-25i (33.58)	03/27/17	15.22	18.36
	06/12/17	19.40	14.18
	09/25/17	30.30	3.28
	11/06/17	28.28	5.30
MW-26 (33.73)	03/27/17	17.76	15.97
	06/12/17	18.40	15.33
	09/25/17	28.53	5.20
	11/06/17	28.72	5.01
MW-24d (33.91)	03/27/17	15.53	18.38
	06/12/17	19.45	14.46
	09/25/17	29.80	4.11
	11/06/17	28.80	5.11

Please refer to notes at end of table.

Table 2
 Groundwater Elevation Data: 2017
 NuStar Vancouver Facility
 Vancouver, Washington

Well Number/ (TOC Elevation)	Date of Measurement	Depth to Water (feet BTOC)	Groundwater Elevation (feet)
EW-1 (31.40)	03/27/17	12.64	18.76
	06/12/17	16.83	14.57
	09/25/17	27.05	4.35
	11/06/17	25.70	5.70
<i>Secor Interim Action Pilot Study Wells</i>			
S-1 (33.24)	03/27/17	14.81	18.43
	06/12/17	19.03	14.21
	09/25/17	29.95	3.29
	11/06/17	27.83	5.41
S-2 (33.15)	03/27/17	14.76	18.39
	06/12/17	18.71	14.44
	09/25/17	29.06	4.09
	11/06/17	27.83	5.32
<i>Multi-Level Monitoring Wells</i>			
MGMS1-3 (43)* (32.86)	03/27/17	15.04	17.82
	06/12/17	17.91	14.95
	09/25/17	28.53	4.33
	11/06/17	27.56	5.30
MGMS1-2(60)* (32.86)	03/27/17	14.41	18.45
	06/12/17	18.48	14.38
	09/25/17	30.17	2.69
	11/06/17	27.80	5.06
MGMS1-1(110)* (32.86)	03/27/17	14.38	18.48
	06/12/17	18.48	14.38
	09/25/17	30.11	2.75
	11/06/17	27.82	5.04
MGMS2-4(40)* (32.59)	03/27/17	15.11	17.48
	06/12/17	17.00	15.59
	09/25/17	27.77	4.82
	11/06/17	27.32	5.27
MGMS2-3(60)* (32.59)	03/27/17	14.05	18.54
	06/12/17	18.14	14.45
	09/25/17	29.53	3.06
	11/06/17	27.48	5.11
MGMS2-2(110)* (32.59)	03/27/17	13.98	18.61
	06/12/17	18.15	14.44
	09/25/17	29.64	2.95
	11/06/17	27.57	5.02

Please refer to notes at end of table.

Table 2
 Groundwater Elevation Data: 2017
 NuStar Vancouver Facility
 Vancouver, Washington

Well Number/ (TOC Elevation)	Date of Measurement	Depth to Water (feet BTOC)	Groundwater Elevation (feet)
MGMS2-1(132)* (32.59)	03/27/17	14.02	18.57
	06/12/17	18.19	14.40
	09/25/17	29.60	2.99
	11/06/17	27.46	5.13
MGMS3-4(40)* (31.65)	03/27/17	15.11	16.54
	06/12/17	16.19	15.46
	09/25/17	28.30	3.35
	11/06/17	26.47	5.18
MGMS3-3(60)* (31.65)	03/27/17	13.08	18.57
	06/12/17	17.35	14.30
	09/25/17	28.95	2.70
	11/06/17	26.74	4.91
MGMS3-2(101)* (31.65)	03/27/17	13.09	18.56
	06/12/17	17.32	14.33
	09/25/17	28.98	2.67
	11/06/17	26.72	4.93
MGMS3-1(132)* (31.65)	03/27/17	13.03	18.62
	06/12/17	17.29	14.36
	09/25/17	28.98	2.67
	11/06/17	26.74	4.91
<i>Port of Vancouver Wells</i>			
MW-30i (29.77)	03/27/17	11.42	18.35
	06/12/17	15.55	14.22
	09/25/17	26.36	3.41
	11/06/17	Well Abandoned	
MW-31i** (31.33)	03/27/17	16.15	15.18
	06/12/17	20.32	11.01
	09/26/17	31.18	0.15
	11/06/17	29.34	1.99
MW-32s (34.34)	03/27/17	23.45	10.89
	06/12/17	19.44	14.90
	09/25/17	29.45	4.89
	11/06/17	28.68	5.66
MW-32i (34.41)	03/27/17	16.08	18.33
	06/12/17	20.22	14.19
	09/25/17	31.03	3.38
	11/06/17	29.28	5.13

Please refer to notes at end of table.

Table 2
 Groundwater Elevation Data: 2017
 NuStar Vancouver Facility
 Vancouver, Washington

Well Number/ (TOC Elevation)	Date of Measurement	Depth to Water (feet BTOC)	Groundwater Elevation (feet)
MW-E ** (30.64)	03/27/17	14.39	16.25
	06/12/17	18.26	12.38
	09/25/17	28.72	1.92
	11/06/17	26.83	3.81
MW-F (33.48)	03/27/17	15.65	17.83
	06/12/17	19.64	13.84
	09/25/17	29.90	3.58
	11/06/17	28.93	4.55
MW-G (31.50)	03/27/17	13.92	17.58
	06/12/17	17.99	13.51
	09/25/17	29.10	2.40
	11/06/17	27.34	4.16

Notes:

1. TOC = Top of casing; BTOC = Below top of casing.
2. Utilizes new survey information from June 2010. NGVD29 datum (ft MSL).
3. * Water levels measurement points are located at the top of the plastic fittings mounted on the well covers.
4. NM = Not measured.
5. ** The casing has been modified at Port of Vancouver wells MW-E and MW-31i. The TOC elevation has not yet been re-surveyed, so groundwater elevation data for these wells is likely inaccurate.

Table 3
Groundwater Analytical Results: 2017
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Bromo-form	Chloro-ethane	Chloro-form	Dibromo-chloro-methane	1,1-Dichloro-ethane	1,2-Dichloro-ethane	1,1-Dichloro-ethene	cis-1,2-Dichloro-ethene	trans-1,2-Dichloro-ethene	1,2-Dichloro-propane	Tetra-chloro-ethene	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Trichloro-ethene	Vinyl Chloride
MW-1	3/30/2017	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	1.6	<0.50	<0.50	4.6	<0.50	<0.50	1.6	<0.50
	6/12/2017	<2.0	<2.0	<0.50	<0.50	2.1	<1.0	<0.50	9.9	<0.50	<0.50	4.4	<0.50	<0.50	3.1	<0.50
	9/26/2017	<2.0	<2.0	<0.50	<0.50	6.8	<1.0	<0.50	6.7	<0.50	<0.50	1.5	<0.50	<0.50	1.6	22.6
	11/9/2017	<2.0	<2.0	<0.50	<0.50	5.0	<0.50	<0.50	22.8	<0.50	<0.50	9.5	<0.50	<0.50	6.5	1.1
MW-2	9/29/2016	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	3/28/2017	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	9/25/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/6/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-3	3/29/2017	<0.50	<2.0	<0.50	<0.50	7.1	1.3	<0.50	77.9	1.2	<0.50	67.6	0.64	<0.50	20.2	2.5
	6/14/2017	<2.0	<2.0	1.0	<0.50	2.1	<1.0	<0.50	39.0	1.5	<0.50	163	1.7	<0.50	30.4	<0.50
	9/25/2017	<2.0	<2.0	<0.50	<0.50	5.6	<1.0	<0.50	73.3	1.3	<0.50	127	1.5	<0.50	29.5	<0.50
	11/8/2017	<2.0	<2.0	<0.50	<0.50	5.0	<0.50	<0.50	59.5	0.60	<0.50	67.1	0.57	<0.50	16.1	0.68
MW-5	3/28/2017	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	8.4	<0.50	<0.50	6.5	<0.50	<0.50	5.8	<0.50
	6/14/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	4.2	<0.50	<0.50	16.3	<0.50	<0.50	6.8	<0.50
	9/27/2017	<2.0	<2.0	<0.50	<0.50	1.6	<1.0	<0.50	15.6	<0.50	<0.50	26.7	<0.50	<0.50	15.6	0.64
	11/7/2017	<2.0	<2.0	<0.50	<0.50	0.99	<0.50	<0.50	35.6	<0.50	<0.50	3.5	<0.50	<0.50	9.7	5.3
MW-6	9/28/2016	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	3/30/2017	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	9/28/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/7/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-7	3/28/2017	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.1	<0.50	<0.50	0.73	<0.50
	3/28/2017 DUP	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.2	<0.50	<0.50	0.69	<0.50
	6/14/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	2.5	<0.50	<0.50	<0.50	<0.50	<0.50	0.55	2.5
	6/14/2017 DUP	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	2.4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	2.5
	9/27/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	1.7	<0.50	<0.50	2.6	<0.50	<0.50	1.6	1.6
	9/27/2017 DUP	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	1.7	<0.50	<0.50	2.6	<0.50	<0.50	1.6	1.7
	11/7/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	2.6	<0.50	<0.50	6.3 D	<0.50	<0.50	7.8	1.4
11/7/2017 DUP	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	2.5	<0.50	<0.50	3.8 D	<0.50	<0.50	6.4	1.5	
MW-8	3/30/2017	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	35.7	0.96	<0.50	2.3	<0.50	<0.50	0.57	<0.50
	6/13/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	14.3	<0.50	<0.50	4.3	<0.50	<0.50	0.56	<0.50
	9/25/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	4.3	<0.50	<0.50	<0.50	<0.50
	11/6/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	1.2	<0.50	<0.50	4.4	<0.50	<0.50	<0.50	<0.50

Please refer to notes at end of table.

Table 3
Groundwater Analytical Results: 2017
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Bromo-	Chloro-	Chloro-	Dibromo-	1,1-	1,2-	1,1-	cis-1,2-	trans-1,2-	1,2-	Tetra-	1,1,1-	1,1,2-	Trichloro-	Vinyl
		form	ethane	form	chloro-	Dichloro-	Dichloro-	Dichloro-	Dichloro-	Dichloro-	ethene	ethene	chloro-	Trichloro-	ethane	ethene
Concentrations in µg/L (ppb)																
MW-9	3/28/2017	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	0.77	<0.50	<0.50	27.9	0.89	<0.50	12.5	<0.50
	6/14/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	17.5	0.60	<0.50	104	1.3	<0.50	47.2	<0.50
	9/27/2017	<2.0	<2.0	<0.50	<0.50	2.8	<1.0	<0.50	83.1	2.5	<0.50	102	2.4	<0.50	66.7	0.99
	11/7/2017	<2.0	<2.0	<0.50	<0.50	20.3	<0.50	3.3	569	15.2	<0.50	205	4.5	<0.50	167	7.8
MW-10	9/27/2016	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.6	<0.50	<0.50	1.4	<0.50
	3/30/2017	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.4	<0.50	<0.50	1.5	<0.50
	9/27/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	3.7	<0.50	<0.50	2.4	<0.50
	11/6/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	2.5	<0.50	<0.50	1.1	<0.50
MW-12	3/30/2017	<10.0	<40	<10.0	<10.0	<10.0	<10.0	<10.0	1,120	<10.0	<10.0	55.9	<10.0	<10.0	29.6	<37.8
	3/30/2017 DUP	<2.5	<10.0	<2.5	<2.5	11.4	<2.5	3.8	853	6.1	<2.5	49.0	<2.5	<2.5	26.0	28.3
	6/12/2017	<3.1	<12.5	<3.1	<3.1	14.0	<3.1	4.7	893 J	7.6	<3.1	42.4	<3.1	<3.1	18.1	48.4
	6/12/2017 DUP	<3.1	<12.5	<3.1	<3.1	12.8	<3.1	<3.1	860	7.1	<3.1	40.0	<3.1	<3.1	16.5	47.4
	9/28/2017	<3.1	17.4	<3.1	<3.1	19.5	<3.1	<3.1	457	5.4	<3.1	<3.1	<3.1	<3.1	<3.1	47.7
	9/28/2017 DUP	<1.7	16.3	<1.7	<1.7	17.3	<1.7	<1.7	428	5.2	<1.7	<1.7	<1.7	<1.7	<1.7	45.1
	11/9/2017	<2.0	15.4	<0.50	<0.50	4.5	<0.50	<0.50	22.2	1.4	<0.50	<0.50	<0.50	<0.50	<0.50	49.1
	11/9/2017 DUP	<2.0	12.6	<0.50	<0.50	4.5	<0.50	<0.50	21.0	1.6	<0.50	<0.50	<0.50	<0.50	<0.50	36.4
MW-13	12/16/2016	<5.0	<20	<5.0	<5.0	<5.0	<5.0	<5.0	509	<5.0	<5.0	1,020	<5.0	<5.0	394	<5.0
	3/30/2017	<5.0	<20	<5.0	<5.0	<5.0	<5.0	<5.0	101	<5.0	<5.0	176	<5.0	<5.0	57.6	<5.0
	6/15/2017	<1.0	<4.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.2	272	1.6	97.7	<1.0	<1.0	56.3	4.1
	9/27/2017	<1.0	<4.0	<1.0	<1.0	<1.0	<1.0	<1.0	5.0	3,220	7.3	3.3	<1.0	<1.0	1.3	25.0
	11/7/2017	<16.7	<16.7	<4.2	<4.2	<4.2	<4.2	<4.2	1,360	5.4	<4.2	<4.2	<4.2	<4.2	<4.2	25.0
MW-14	3/27/2017	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	0.57	69.2	<0.50	<0.50	14.7	<0.50	<0.50	33.4	0.62
	6/13/2017	<2.0	<2.0	<0.50	<0.50	10	<1.0	5.3	432	2.7	<0.50	58.3	2.1	<0.50	204	2.5
	9/26/2017	<0.84	<3.3	<0.84	<0.84	6.2	<0.84	2.6	279	2.8	<0.84	62.4	<0.84	<0.84	265	<0.84
	11/8/2017	<3.3	<3.3	<0.84	<0.84	4.5	<0.84	2.1	306	2.2	<0.84	39.3	<0.84	<0.84	160	0.91
MW-15	9/30/2016	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.51	<0.50	<0.50	<0.50	<0.50
	3/28/2017	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	9/28/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/6/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.64	<0.50	<0.50	<0.50	<0.50
MW-16	3/29/2017	<0.50	<2.0	<0.50	<0.50	1.6	<0.50	<0.50	19.0	<0.50	<0.50	27.0	<0.50	<0.50	6.4	<0.50
	6/14/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	6.4	<0.50	<0.50	53.7	0.66	<0.50	5.4	<0.50
	9/25/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	1.3	<0.50	<0.50	148	1.0	<0.50	11.1	<0.50
	11/6/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	3.8	<0.50	<0.50	150	0.96	<0.50	17.4	<0.50

Please refer to notes at end of table.

Table 3
Groundwater Analytical Results: 2017
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Bromo-	Chloro-	Chloro-	Dibromo-	1,1-	1,2-	1,1-	cis-1,2-	trans-1,2-	1,2-	Tetra-	1,1,1-	1,1,2-	Trichloro-	Vinyl
		form	ethane	form	chloro-	Dichloro-	Dichloro-	Dichloro-	Dichloro-	Dichloro-	Dichloro-	chloro-	ethane	ethane	ethane	ethene
Concentrations in µg/L (ppb)																
MW-17	9/27/2016	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	1.5	<0.50	<0.50	4.2	<0.50	<0.50	10.4	<0.50
	3/29/2017	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	9/29/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	2.7	<0.50	<0.50	4.6	<0.50	<0.50	11.4	<0.50
	11/8/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	9.3	<0.50	<0.50	9.9	<0.50	<0.50	21.9	<0.50
MW-18i	3/29/2017	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	1.5	<0.50	<0.50	1.4	<0.50	<0.50	1.2	<0.50
	6/13/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	1.1	<0.50	<0.50	0.66	<0.50
	9/27/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	6.4	<0.50	<0.50	1.9	<0.50	<0.50	1.3	<0.50
	11/7/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.90	<0.50	<0.50	0.50	<0.50
MW-19	3/28/2017	<5.0	<20	<5.0	<5.0	197	<5.0	25.5	1,930	19.7	<5.0	664	17.0	<5.0	826	58.5
	3/28/2017 DUP	<5.0	<20	<5.0	<5.0	214	<5.0	26.7	1,990	21.5	<5.0	755	19.9	<5.0	896	63.2
	6/14/2017	<2.5	<10	<2.5	<2.5	40.6	<2.5	15.4	481	6.1	<2.5	531	8.1	<2.5	481	16.5
	6/14/2017 DUP	<2.5	<10	<2.5	<2.5	41.8	<2.5	15.8	486	6.2	<2.5	566	8.2	<2.5	506	17.2
	9/26/2017	<2.5	<10	<2.5	<2.5	<2.5	<2.5	26.5	1,160	5.4	<2.5	3,620	38.9	<2.5	1,450	111
	9/26/2017 DUP	<2.5	<10	<2.5	<2.5	11.1	<2.5	28.9	1,150	5.4	<2.5	3,710	40.4	<2.5	1,480	111
	11/9/2017	<20	<20	<5.0	<5.0	104 D	<5.0	24.9 D	1,660 D	24.0 D	<5.0	1,530 D	20.2 D	<5.0	1,020	109
11/9/2017 DUP	<2.0 UJ	<2.0 UJ	<0.50 UJ	<0.50 UJ	56.5 D, J-	<0.50 UJ	14.7 D, J-	1,040 D	14.7 D, J-	<0.50 UJ	970 D	13.0 D, J-	0.75 J-	790	115	
MW-19i	3/29/2017	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	6/14/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	9/28/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	0.83	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/8/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	0.57	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-20i	3/30/2017	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	1.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	6/14/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	5.6	<0.50	<0.50	1.5	<0.50	<0.50	0.84	<0.50
	9/27/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	0.67	<0.50	<0.50	<0.50	<0.50
	11/7/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	7.7	<0.50	<0.50	2.8	<0.50	<0.50	1.5	<0.50
MW-21i-105	3/29/2017	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	4.8	<0.50	<0.50	5.7	<0.50	<0.50	2.9	<0.50
	6/13/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	4.7	<0.50	<0.50	7.6	<0.50	<0.50	4.1	<0.50
	9/27/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	4.3	<0.50	<0.50	5.7	<0.50	<0.50	3.9	<0.50
	11/8/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	13.0	<0.50	<0.50	7.4	<0.50	<0.50	6.4	<0.50
MW-21i-40	3/29/2017	<0.50	<2.0	<0.50	<0.50	2.6	<0.50	0.91	87.6	0.58	<0.50	21.8	<0.50	<0.50	16.2	<0.50
	6/13/2017	<2.0	<2.0	<0.50	<0.50	2.3	<1.0	0.63	63.6	0.56	<0.50	24.1	<0.50	<0.50	15.1	<0.50
	9/27/2017	<2.0	<2.0	<0.50	<0.50	2.3	<1.0	0.70	60.0	<0.50	<0.50	18.1	<0.50	<0.50	15.0	<0.50
	11/8/2017	<2.0	<2.0	<0.50	<0.50	2.6	<0.50	0.84	65.4	0.63	<0.50	17.4	<0.50	<0.50	14.6	<0.50

Please refer to notes at end of table.

Table 3
Groundwater Analytical Results: 2017
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MW-22i	3/29/2017	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	10.0	<0.50	<0.50	1.1	<0.50	<0.50	9.7	<0.50
	6/13/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	9.6	<0.50	<0.50	0.63	<0.50	<0.50	6.2	<0.50
	9/27/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	8.8	<0.50	<0.50	0.88	<0.50	<0.50	6.3	<0.50
	11/7/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	9.7	<0.50	<0.50	1.2	<0.50	<0.50	6.4	<0.50
MW-23i	3/27/2017	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	6/13/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	9/26/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/8/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-24i	3/30/2017	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	0.7	<0.50	<0.50	1.0	<0.50	<0.50	<0.50	<0.50
	6/15/2017	<0.50	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	3.20	<0.50	<0.50	6.6	<0.50	<0.50	2.80	<0.50
	9/26/2017	<2.0	<2.0	<0.50	<0.50	2.1	<1.0	<0.50	24.5	<0.50	<0.50	30.1	<0.50	<0.50	16.6	<0.50
	11/9/2017	<2.0	<2.0	<0.50	<0.50	1.1	<0.50	<0.50	9.6	<0.50	<0.50	12.7	<0.50	<0.50	5.9	<0.50
MW-24d	3/28/2017	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	6/15/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	9/25/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/6/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-25i	3/29/2017	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	6/15/2017	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	9/27/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/8/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-26	3/29/2017	<5.0	<2.0	<5.0	<5.0	<5.0	<5.0	<5.0	170	<5.0	<5.0	214	<5.0	<5.0	452	<5.0
	6/13/2017	<2.0	<2.0	<0.50	<0.50	6.7	<1.0	1.9	113	2.0	<0.50	160	2.1	<0.50	311 E, J	0.65
	9/26/2017	<2.0	<2.0	<0.50	<0.50	5.1	<1.0	1.0	192	2.1	<0.50	68.4	0.83	<0.50	192	0.98
	11/8/2017	<2.0	2.4	<0.50	<0.50	4.8	<0.50	1.5	204	2.3	<0.50	88.1	1.0	<0.50	170	1.8
MW-32s	6/16/2016	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	12/14/2016	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	6/14/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/10/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-32i	11/10/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	7.0	<0.50	<0.50	8.2	<0.50	<0.50	3.4	<0.50
EW-1	9/29/2016	<0.50	<2.0	1.1	<0.50	<0.50	1.5	<0.50	5.4	<0.50	<0.50	38.6	<0.50	<0.50	10.5	<0.50
	3/30/2017	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	10.7	<0.50	<0.50	2.4	<0.50
	9/28/2017	<2.0	<2.0	2.4	<0.50	<0.50	<1.0	<0.50	1.8	<0.50	<0.50	32.4	<0.50	<0.50	7.2	<0.50
	11/9/2017	<2.0	<2.0	0.91	<0.50	<0.50	<0.50	<0.50	3.3	<0.50	<0.50	33.0	0.66	<0.50	7.3	<0.50

Please refer to notes at end of table.

Table 3
Groundwater Analytical Results: 2017
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
S-1	3/27/2017	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	6/13/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	9/28/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/8/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
S-2	3/27/2017	<0.50	<2.0	<0.50	<0.50	2.6	<0.50	<0.50	4.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	6/13/2017	<2.0	<2.0	<0.50	<0.50	3.3	<1.0	<0.50	4.3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	9/28/2017	<2.0	<2.0	<0.50	<0.50	8.0	<1.0	<0.50	13.2	<0.50	<0.50	<0.50	0.86	<0.50	0.51	<0.50
	11/8/2017	<2.0	<2.0	<0.50	<0.50	7.1	<0.50	<0.50	12.1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MGMS1-3(43)	3/31/2017	<8.4	<33.4	<8.4	<8.4	90.8	<8.4	12.5	1,430	15.2	<8.4	45.8	<8.4	<8.4	119	348
	6/12/2017	<8.3	<33.3	<8.3	<8.3	173	<8.3	16.7	2,620	18.7	<8.3	24.4	<8.3	<8.3	116	681
	9/29/2017	<2.5	<10.0	<2.5	<2.5	60.1	<2.5	6.9	901	12.9	<2.5	70.7	<2.5	<2.5	126	117
	11/7/2017	<10.0	<10.0	<2.5	<2.5	153	<2.5	13.7	2,350 J-	26.6	<2.5	108	<2.5	<2.5	211	181
MGMS1-2(60)	3/31/2017	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	15.6	<0.50	<0.50	13.6	<0.50	<0.50	13.2	<0.50
	6/12/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	6.0	<0.50	<0.50	12.8	<0.50	<0.50	7.1	<0.50
	9/29/2017	<2.0	<2.0	<0.50	<0.50	2.0	<1.0	<0.50	18.3	<0.50	<0.50	18.3	<0.50	<0.50	13.4	<0.50
	11/7/2017	<2.0	<2.0	<0.50	<0.50	1.6	<0.50	<0.50	24.9	<0.50	<0.50	14.0	<0.50	<0.50	14.7	<0.50
MGMS1-1(110)	9/30/2016	<0.50	<0.50	<0.50	<0.50	1.2	<0.50	<0.50	56.7	<0.50	<0.50	18.4	<0.50	<0.50	28.7	<0.50
	3/31/2017	<0.50	<2.0	<0.50	<0.50	13.3	<0.50	1.1	328	<0.50	<0.50	20.1	<0.50	<0.50	62.0	6.5
	9/29/2017	<2.0	<2.0	<0.50	<0.50	5.9	<1.0	0.54	173	<0.50	<0.50	9.0	<0.50	<0.50	32.8	0.56
	11/7/2017	<2.0	<2.0	<0.50	<0.50	10.5	<0.50	0.91	257	0.67	<0.50	11.5	<0.50	<0.50	41.8	0.89
MGMS2-4(40)	3/31/2017	<0.50	<2.0	<0.50	<0.50	57.6	<0.50	14.3	236	0.60	<0.50	4.3	<0.50	<0.50	14.4	235
	6/15/2017	<0.50	<2.0	<0.50	<0.50	38.6	<0.50	3.5	46.2	<0.50	<0.50	5.1	<0.50	<0.50	4.9	98.9
	9/29/2017	<2.0	<2.0	<0.50	<0.50	21.7	<1.0	6.8	195	0.74	<0.50	41.5	0.67	<0.50	31.3	428
	11/9/2017	<2.0	<2.0	<0.50	<0.50	21.3	<0.50	0.86	61.6	0.52	<0.50	13.2	<0.50	<0.50	9.2	170
MGMS2-3(60)	3/31/2017	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	18.5	<0.50	<0.50	26.0	<0.50	<0.50	11.2	0.75
	6/15/2017	<2.0	<2.0	<0.50	<0.50	0.88	<1.0	<0.50	20.7	<0.50	<0.50	40.4	<0.50	<0.50	17.3	1.3
	9/29/2017	<2.0	<2.0	<0.50	<0.50	2.3	<1.0	<0.50	30.4	<0.50	<0.50	17.5	<0.50	<0.50	12.0	6.7
	11/9/2017	<2.0	<2.0	<0.50	<0.50	1.8	<0.50	<0.50	30.2	<0.50	<0.50	34.2	<0.50	<0.50	20.1	1.1
MGMS2-2(110)	9/29/2016	<0.50	<2.0	<0.50	<0.50	0.62	<0.50	<0.50	16.8	<0.50	<0.50	6.5	<0.50	<0.50	6.3	5.8
	3/31/2017	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	19.5	<0.50	<0.50	6.4	<0.50	<0.50	6.6	6.4
	9/29/2017	<2.0	<2.0	<0.50	<0.50	2.80	<1.0	<0.50	63.5	<0.50	<0.50	2.2	<0.50	<0.50	5.3	25.0
	11/9/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	6.3	<0.50	<0.50	3.9	<0.50	<0.50	3.1	1.9
MGMS2-1(132)	9/29/2016	<0.50	<2.0	<0.50	<0.50	0.70	<0.50	<0.50	31.4	<0.50	<0.50	6.4	<0.50	<0.50	7.9	8.2
	3/31/2017	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	15.6	<0.50	<0.50	5.2	<0.50	<0.50	4.7	4.8
	9/29/2017	<2.0	<2.0	<0.50	<0.50	2.2	<1.0	<0.50	64.9	<0.50	<0.50	2.4	0.59	<0.50	6.3	19.4
	11/9/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	14.3	<0.50	<0.50	3.6	<0.50	<0.50	4.5	5.0

Please refer to notes at end of table.

Table 3
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Vancouver, Washington

Well Number	Sample Date	Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MGMS3-4(40)	3/28/2017	<0.50	<2.0	<0.50	<0.50	22.5	0.68	2.8	979	5.5	<0.50	1.4	<0.50	<0.50	0.60	257
	3/28/2017 DUP	<2.5	<10.0	<2.5	<2.5	20.7	<2.5	3.3	1,050	6.0	<2.5	<2.5	<2.5	<2.5	<2.5	323
	6/12/2017	<0.50	<2.0	<0.50	<0.50	3.3	<0.50	<0.50	1.7	<0.50	<0.50	0.97	<0.50	<0.50	<0.50	<0.50
	9/26/2017	<2.0	<2.0	<0.50	<0.50	1.1	<1.0	<0.50	0.69	<0.50	<0.50	0.79	<0.50	<0.50	<0.50	<0.50
	9/26/2017 DUP	<2.0	<2.0	<0.50	<0.50	1.1	<1.0	<0.50	0.82	<0.50	<0.50	0.86	<0.50	<0.50	<0.50	<0.50
	11/10/2017	<2.0	<2.0	<0.50	<0.50	4.2	<0.50	<0.50	7.6	<0.50	<0.50	0.85	<0.50	<0.50	<0.50	<0.50
	11/10/2017 DUP	<2.0	<2.0	<0.50	<0.50	4.3	<0.50	<0.50	8.0	<0.50	<0.50	0.71	<0.50	<0.50	<0.50	<0.50
MGMS3-3(60)	3/28/2017	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	0.62	<0.50	<0.50	1.1	<0.50	<0.50	<0.50	<0.50
	6/12/2017	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	2.3	<0.50	<0.50	1.3	<0.50	<0.50	0.64	<0.50
	9/26/2017	<2.0	<2.0	<0.50	<0.50	1.2	<1.0	<0.50	34.2	<0.50	<0.50	8.6	<0.50	<0.50	7.8	<0.50
	11/10/2017	<2.0	<2.0	<0.50	<0.50	1.7	<0.50	<0.50	37.6	<0.50	<0.50	0.78	<0.50	<0.50	1.5	13.9
MGMS3-2(110)	9/30/2016	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	6.5	<0.50	<0.50	4.4	<0.50	<0.50	3.0	<0.50
	3/28/2017	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	7.0	<0.50	<0.50	7.0	<0.50	<0.50	6.0	<0.50
	9/26/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	4.8	<0.50	<0.50	0.96	<0.50	<0.50	0.80	0.92
	11/10/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	1.6	<0.50	<0.50	2.5	<0.50	<0.50	1.5	<0.50
MGMS3-1(132)	9/30/2016	<0.50	<2.0	<0.50	<0.50	0.84	<0.50	0.54	12.9	<0.50	<0.50	13.8	<0.50	<0.50	11.9	<0.50
	3/28/2017	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	7.9	<0.50	<0.50	13.8	<0.50	<0.50	9.6	<0.50
	9/26/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	3.4	<0.50	<0.50	3.0	<0.50	<0.50	2.8	<0.50
	11/10/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	3.3	<0.50	<0.50	5.1	<0.50	<0.50	3.8	<0.50
EX-1	12/12/2016	<0.50	3.7	<0.50	<0.50	<0.50	<0.50	<0.50	8.1	<0.50	<0.50	4.3	<0.50	<0.50	0.96	51.9
	3/28/2017	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	5.2	<0.50	<0.50	6.1	<0.50	<0.50	1.9	<0.50
	6/14/2017	<2.0	10.2	<0.50	<0.50	10.7	<1.0	<0.50	11.7	0.56	<0.50	9.5	<0.50	<0.50	3.0	1.3
	9/26/2017	<2.0	3.4	<0.50	<0.50	8.8	<1.0	<0.50	6.9	<0.50	<0.50	0.82	<0.50	<0.50	0.63	10.1
MP-1	3/30/2017	<0.50	71.4	<0.50	<0.50	7.5	<0.50	<0.50	177	6.0	<0.50	<0.50	<0.50	<0.50	0.79	186
	6/14/2017	<2.0	4.0	<0.50	<0.50	2.3	<1.0	<0.50	143	1.9	<0.50	16.2	<0.50	<0.50	8.5	29.4
	9/26/2017	<2.0	<2.0	<0.50	<0.50	3.4	<1.0	4.5	83.0	0.83	<0.50	307	<0.50	<0.50	65.9	2.3
	11/9/2017	<2.0	<2.0	<0.50	<0.50	3.3	<0.50	4.3	105	0.91	<0.50	198	<0.50	<0.50	74.0	2.6

Notes:

1. µg/L (ppb) = Micrograms per liter (parts per billion).
2. **Bold** values represents detected concentration of listed analyte.
3. < = Not detected at or above the specified laboratory method reporting limit (MRL).
4. E = Analyte concentration exceeded the calibration range. Reported result is estimated.
5. D = Relative percent difference (RPD) between sample and duplicate is outside of the acceptable range of +/- 30%.
6. J = Result is estimated based on review of laboratory data quality.
7. J- = Result is estimated and may be biased low based on review of laboratory data quality.

Table 4
 Interim Action: Groundwater Analytical Results
 NuStar Vancouver Facility
 Vancouver, Washington

Well Number:	MW-7																																					
	Sample Date:																																					
Analyte	2/6/2007	12/16/2008	3/23/2009	6/18/2009	9/18/2009	12/18/2009	3/16/2010	6/17/2010	9/23/2010	12/10/2010	3/11/2011	6/7/2011	9/19/2011	12/9/2011	3/12/2012	06/22/2012	9/14/2012	12/14/2012	3/15/2013	6/14/2013	9/20/2013	12/16/2013	3/24/2014	6/25/2014	9/30/2014	12/15/2014	3/20/2015	6/17/2015	9/23/2015	12/8/2015	6/17/2016	9/29/2016	12/14/2016	3/28/2017	6/14/2017	9/27/2017	11/7/2017	
	Concentrations in µg/L (ppb)																																					
Volatile Organic Compounds																																						
Tetrachloroethene	31,500	15,000	3,300	890	2,600	1,600	550	200	750	220	420	430	410	200	41	25	28	11	1.6	1.6	<0.50	0.51	9.8	<0.50	<0.50	0.61	<0.50	1.2	4.5	0.94	0.69	<0.50	0.78	1.2	<0.50	2.6	6.3	
Trichloroethene	352	450	270	350	250	160	56	72	110	36	82	110	84	32	8.6	5.2	5.2	6.8	0.78	<0.50	<0.50	<0.50	2.6	<0.50	<0.50	1.5	1.1	1.0	4.2	1.7	2.1	6.0	<0.50	0.73	0.55	1.6	7.8	
cis-1,2-Dichloroethene	<100	130	420	520	930	330	180	360	690	94	150	1,400	1,300	3,400	1,600	500	180	130	110	58	56	6.9	13	0.62	4.5	16	8.4	12	12.7	4.1	10.9	10.9	9.4	<0.50	2.5	1.7	2.6	
trans-1,2-Dichloroethene	<100	<50	<15.0	<3.0	<3.0	<5.0	<2.0	<1.5	<3.0	<0.90	0.91	3.3	<5.0	6.8	<5.0	<2.0	0.70	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
Vinyl chloride	<100	<50	<15.0	<3.0	<3.0	<5.0	<2.0	<1.5	4.8	1.7	9.3	7.9	78	110	600	290	80	18	11	16	10	9.1	7.6	1.4	9.8	21	1.0	12.6	4.8	1.9	5.4	5.5	1.0	<0.50	2.5	1.7	1.5	
Ethene	N/A	N/A	N/A	N/A	<1.0	<1.0	<1.0	<1.0	<1.0	1.19	7.76	<1.0	N/A	38.7	71	130	47	19.5	13.3	5.86	18.6	5.0	220	21.9	<1.0	<1.0	<6.2	<10.0	<10.0	<10.0	<10.0	N/A	N/A	N/A	<10.0	<10.0	<10.0	
1,1-Dichloroethene	<100	<50	<15.0	<3.0	5.5	<5.0	<2.0	<1.5	<3.0	<0.90	1.6	3.4	<5.0	6.9	<5.0	<2.0	0.54	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
1,1-Dichloroethane	<100	<50	<15.0	3.7	9.8	6.7	<2.0	<1.5	3.3	1.8	6.6	4.8	<5.0	8.0	9.2	9.0	3.8	1.9	0.69	0.51	1.5	2.9	1.6	0.19	2.7	4.5	1.0	2.6	1.8	<0.50	0.60	1.1	<0.50	<0.50	<0.50	<0.50		
1,2-Dichloroethane	<100	<50	<0.50	<3.0	<3.0	<5.0	<2.0	<1.5	<3.0	<0.90	<0.90	<2.5	<5.0	<5.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<1.0	<0.50
1,1,1-Trichloroethane	<100	<50	<15.0	5.2	10	6.7	2.0	2.7	3.5	1.6	5.1	4.0	<5.0	<5.0	<5.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Attenuation Chemistry																																						
Total Organic Carbon (mg/L)	<1.0	2.4	6.7	N/A	4.1	2.5	2.6	2.8	8.2	0.84	1.10	4.7	3,400	1,600	1,000	790	790	550	250	220	270	250	77	120	160	28.5	23.5	46	40.6	9.8	18.9	N/A	N/A	N/A	9.1	7.8	3.1	
Field Parameters																																						
Dissolved Oxygen (mg/L)	1.20	0.72	0.69	6.97	0.59	1.23	1.37	1.86	0.64	6.29	6.65	0.45	4.53	1.19	2.97	6.28	2.29	0.34	1.02	0.29	0.45	0.44	0.43	0.6	1.93	1.61	1.19	0.81	0.87	1.98	1.67	0.96	1.13	0.89	1.08	1.75	2.65	
Oxidation Reduction Potential (mV)	245.7	-103.2	-614.5	-16.4	121.7	162.1	147.7	240.0	-483.4	111.6	132.3	108.6	695.8	-117.5	96.8	-137.9	93.3	24.1	53.3	47.9	-189.3	-66.1	76.9	-90.5	-112.0	-34.0	-76.8	-4.9	-30.5	84.1	-120.1	164.1	5.6	-25.4	-60.5	110.2	68.6	

Please refer to notes at end of table.

Table 4
 Interim Action: Groundwater Analytical Results
 NuStar Vancouver Facility
 Vancouver, Washington

Well Number:	MP-1																																							
Sample Date:	2/6/2007	12/16/2008	3/23/2009	6/18/2009	9/18/2009	12/18/2009	3/16/2010	6/17/2010	9/23/2010	12/10/2010	3/14/2011	6/7/2011	9/19/2011	12/9/2011	3/9/2012	6/22/2012	9/14/2012	12/14/2012	3/15/2013	6/14/2013	9/20/2013	12/16/2013	3/24/2014	6/23/2014	9/30/2014	12/15/2014	3/20/2015	6/18/2015	9/22/2015	12/8/2015	3/8/2016	6/17/2016	9/28/2016	12/13/2016	3/30/2017	6/14/2017	9/26/2017	11/9/2017		
Analyte	Concentrations in µg/L (ppb)																																							
Volatile Organic Compounds																																								
Tetrachloroethene	1,610	1,600	1,200	1,500	1,100	1,000	1,500	800	730	1,000	1,200	640	30	640	490	690	340	230	230	330	260	290	360	1,200	360	320	570	376	343	308	433	206	99.4	2.9	<0.50	16.2	307	198		
Trichloroethene	421	230	180	180	310	180	400	140	120	150	180	130	72	120	140	120	83	48	69	70	66	70	54	130	63	59	96	80.8	68.3	62.6	100	67.3	35.5	1.0	0.79	8.5	65.9	74.0		
cis-1,2-Dichloroethene	347	70	89	43	240	58	410	120	41	27	150	75	4.1	49	440	530	170	170	140	190	77	67	240	290	110	58	190	91	38.3	50.9	148	125	40.5	209	177	143	83.0	105		
trans-1,2-Dichloroethene	8.5	<5.0	<4.0	<4.0	8.9	<4.0	13	<3.0	<3.0	<3.0	<3.0	<2.5	<1.5	3.1	6.3	2.9	2.2	1.7	2.5	1.6	1.5	0.92	<1.5	1.7	<2.0	<1.5	1.5	0.87	<1.2	<1.2	1.2	0.97	<0.50	0.55	6.0	1.9	0.83	0.91		
Vinyl chloride	23.6	<5.0	<4.0	<4.0	7.3	<4.0	10	<3.0	<3.0	<3.0	5.9	<2.5	1.6	<2.5	21	48	4.5	1.8	1.8	1.8	<0.90	<0.90	<1.5	5.0	16	<1.5	25	<0.84	<1.2	<1.2	<0.84	<0.50	3.3	4.3	186	29.4	2.3	2.6		
Ethene	N/A	N/A	N/A	N/A	<1.0	<1.0	2.47	<1.0	<1.0	<1.0	<0.0010	<1.0	NA	3.28	15.9	66.6	16	21.1	5.86	2.96	3.17	<1.0	33	19.6	<1.0	<1.0	<6.2	<10.0	<1.0	<1.0	<1.0	<1.0	<10.0	<10.0	<10.0	328	83.2	<10.0	<10.0	
1,1-Dichloroethene	<5.0	<5.0	<4.0	<4.0	<0.40	<4.0	4.7	<3.0	<3.0	<3.0	<3.0	<2.5	<1.5	<2.5	2.8	2.8	<1.5	<0.90	0.94	1.4	<0.90	1.1	<1.5	2.3	<2.0	<1.5	1.5	1.5	1.4	1.5	2.1	1.5	3.1	0.92	<0.50	<0.50	3.4	4.3		
1,1-Dichloroethane	18.4	<5.0	6.0	4.3	14	<4.0	22	3.2	<3.0	<3.0	7.1	4.9	2.4	2.6	9.4	5.6	4.0	2.0	5.1	4.5	2.9	1.7	2.2	4.9	2.8	1.7	3.6	2.9	1.8	1.8	7.5	5.0	1.3	0.64	7.5	2.3	4.5	3.3		
1,2-Dichloroethane	<5.0	<5.0	<4.0	<4.0	<4.0	<4.0	<3.0	<3.0	<3.0	<3.0	<3.0	<2.5	<1.5	<2.5	<1.5	<2.5	<1.5	<0.90	<0.90	<0.90	<0.90	<1.5	<1.5	<2.0	<1.5	<1.0	<0.84	<1.2	<1.2	<0.84	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<1.0	<0.50	
1,1,1-Trichloroethane	11.2	10	10	12	8.2	7.1	8.6	5.4	4.0	4.5	6.4	3.3	1.9	3.1	3.5	12	2.0	1.0	1.0	1.4	0.95	1.2	1.8	9.5	<2.0	<1.5	1.0	<0.84	<1.2	<1.2	<0.84	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Attenuation Chemistry																																								
Total Organic Carbon (mg/L)	< 1.00	1.80	2.0	N/A	1.50	1.60	2.4	2.4	2.0	1.0	0.96	1.6	3.7	8.3	16	26	23	18	35	28	35	26	38	34	29	2.4	7.8	6.0	2.2	9.9	5.1	<1.0	2620	130	137	38.9	4.3	3.7		
Field Parameters																																								
Dissolved Oxygen (mg/L)	0.39	1.37	1.05	3.65	0.48	0.78	0.89	3.22	0.53	0.52	1.35	0.52	0.69	0.83	0.23	0.83	0.43	0.28	0.44	0.34	0.44	1.10	0.69	3.00	4.09	0.88	1.04	1.75	1.66	1.20	1.13	3.71	1.32	3.57	0.79	0.87	0.93	0.66		
Oxidation Reduction Potential (mV)	208.9	-78.5	127.3	-43.7	99.7	155.3	83.2	228.3	-464.0	-4.6	159.6	48.9	913.5	-51.7	77.7	-51.7	98.2	-15.2	60.4	187.2	1.2	10.3	-18.7	-14.0	42.3	-28.6	29.8	-148.5	105.5	82.8	29.5	-8.6	135.2	12.1	-137.7	-53.2	80.5	-104.8		

Please refer to notes at end of table.

Table 4
 Interim Action: Groundwater Analytical Results
 NuStar Vancouver Facility
 Vancouver, Washington

Well Number:	EX																																				
Sample Date:	2/6/2007	12/16/2008	3/23/2009	6/18/2009	9/18/2009	12/18/2009	3/16/2010	6/17/2010	9/23/2010	12/21/2010	3/31/2011	6/7/2011	9/19/2011	12/9/2011	3/9/2012	6/22/2012	9/14/2012	12/14/2012	3/15/2013	6/14/2013	9/20/2013	12/16/2013	3/24/2014	6/23/2014	9/30/2014	12/15/2014	3/19/2015	6/18/2015	9/22/2015	12/8/2015	3/8/2016	6/17/2016	9/28/2016	12/12/2016	3/28/2017	6/14/2017	9/26/2017
Analyte	Concentrations in µg/L (ppb)																																				
Volatile Organic Compounds																																					
Tetrachloroethene	2,810	4,500	1,400	24	2,100	700	150	150	2,400	900	6,800	1,400	4,100	<50	33	3.0	3.0	0.87	1.2	0.79	4.1	2.0	20	29	NS	22	170	186	302	94.4	274	592	39.4	4.3	6.1	9.5	0.82
Trichloroethene	564	830	420	11	380	56	33	39	220	99	910	170	460	<50	10	1.1	<1.5	<0.50	<0.50	<0.50	2.6	1.4	7.5	15	NS	2.7	56	42	61.9	21.3	71.1	90.8	549	0.96	1.9	3.0	0.63
cis-1,2-Dichloroethene	68.2	490	50	4.2	120	5.6	20	92	90	30	240	140	290	12,000	1,400	170	320	26	<0.50	1.6	71	34	30	160	NS	10	690	420	543	427	1,160	1,040	2,230	8.1	5.2	11.7	6.9
trans-1,2-Dichloroethene	<10.0	<15.0	<5.0	<0.50	0.76	<2.5	<0.50	<0.50	0.53	<0.50	<4.0	<4.0	<5.0	9.3	8.6	1.3	<1.5	<0.50	<0.50	<0.50	0.68	<0.50	<0.50	0.97	NS	<0.50	1.9	1.6	2.6	<0.50	3.6	<5.0	3.8	<0.50	<0.50	0.56	<0.50
Vinyl chloride	<10.0	<15.0	<5.0	<0.50	1.1	<2.5	<0.50	2.2	1.8	0.71	5.1	<4.0	14	140	290	120	42	12	4.4	<0.50	30	28	11	38	NS	<0.50	2.8	3.2	24.4	2.1	13.3	<5.0	128	51.9	<0.50	1.3	10.1
Ethene	N/A	N/A	N/A	N/A	<1.0	55.6	<0.50	<1.0	<1.0	<1.0	1.91	<1.0	N/A	11.4	24.2	150	47.2	5.92	<1.0	<1.0	35.4	45.3	91.1	81.5	NS	<1.0	<6.2	<10.0	<1.0	<1.0	<10.0	N/A	N/A	23.5	11.2	17.5	
1,1-Dichloroethene	<10.0	<15.0	<5.0	<0.50	3.3	<2.5	<0.50	<0.50	1.6	0.59	8.1	<4.0	11	19	<4.0	0.68	<1.5	<0.50	<0.50	<0.50	0.54	<0.50	<0.50	1.1	NS	<0.50	2.1	2.6	3.7	<0.50	2.9	<5.0	3.5	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethane	<10.0	54	<5.0	<0.50	4.1	<2.5	<0.50	0.97	1.5	0.83	8.2	<4.0	7.9	16	5.0	3.4	1.5	<0.50	<0.50	<0.50	1.9	3.8	0.80	2.9	NS	<0.50	3.5	2.6	2.9	<0.50	4.0	<5.0	4.6	<0.50	<0.50	10.7	8.8
1,2-Dichloroethane	<10.0	<15.0	<5.0	<0.50	<0.50	<2.5	<0.50	<0.50	<0.50	<0.50	<4.0	<4.0	<5.0	<5.0	<4.0	<0.50	<1.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<1.2	<5.0	<1.7	<0.50	<0.50	<1.0	<1.0	
1,1,1-Trichloroethane	40	71	43	1.1	38	3.7	3.2	2.3	20	6.7	110	15	73	17	<4.0	0.59	<1.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	2.5	0.88	0.65	<0.50	5.0	<5.0	2.5	<0.50	<0.50	<0.50	<0.50	
Attenuation Chemistry																																					
Total Organic Carbon (mg/L)	1.45	3.30	3.0	N/A	4.9	1.8	2.4	3.3	3.6	<0.50	1.9	3.5	560	320	89	110	77	59	64	12	42	46	35	34	NS	158	<5.0	7.5	22.6	7.5	22	1.2	N/A	N/A	347	14.0	25.5
Field Parameters																																					
Dissolved Oxygen (mg/L)	0.24	0.74	0.47	0.37	0.60	2.13	0.88	0.84	0.93	0.91	--	0.70	0.63	1.23	0.14	1.23	0.15	0.25	0.37	0.54	0.43	1.66	0.51	0.41	NS	2.41	1.05	2.29	0.90	--	0.36	2.72	1.61	2.00	1.50	3.48	1.18
Oxidation Reduction Potential (mV)	164.8	-174.5	68.8	-9.3	109.0	170.1	102.6	239.5	-521.6	131.7	--	115.2	907.9	-68.3	-33.6	-68.3	-29.5	3.3	67.0	158.8	-175.4	11.9	158.7	-50	NS	-52.2	18.2	-35.2	23.7	--	113.3	4.8	138.1	-24	89.9	-12.4	-140.5

Please refer to notes at end of table.

Table 4
 Interim Action: Groundwater Analytical Results
 NuStar Vancouver Facility
 Vancouver, Washington

Well Number:	MW-12																											
Sample Date:	6/7/2011	9/19/2011	12/7/2011	3/12/2012	6/22/2012	9/14/2012	12/13/2012	3/15/2013	6/13/2013	9/20/2013	12/16/2014	3/24/2014	6/24/2014	9/30/2014	12/11/2014	3/20/2015	6/19/2015	9/22/2015	12/8/2015	3/8/2016	6/16/2016	9/27/2016	12/14/2016	3/30/2017	6/12/2017	9/28/2017	11/9/2017	
Analyte	Concentrations in µg/L (ppb)																											
Volatile Organic Compounds																												
Tetrachloroethene	53	860	520	770	270	1,100	38	760	610	510	150	180	42	680	25	580	514	343	44.9	325	314	387	62.3	55.9	42.4	<1.7	<0.50	
Trichloroethene	25	690	380	540	200	730	23	540	500	400	110	170	34	480	15	340	356	239	22	209	288	163	42.2	29.6	18.1	<1.7	<0.50	
cis-1,2-Dichloroethene	59	4,700	2,900	3,800	1,700	5,400	62	4,300	4,800	3,400	800	1,900	310	3,500	34	2,110	2,570	2,250	40.1	1,380	3,310	867	744	1,120	893 J	457	22.2	
trans-1,2-Dichloroethene	1.0	55	33	45	39	73	0.97	56	53	49	10	25	2.3	45	0.64	29	25	23.4	0.72	16.2	31.6	11.4	2.3	6.1	7.6	5.4	1.6	
Vinyl chloride	<0.50	63	40	46	22	84	<0.50	54	59	50	9.8	47	<1.5	42	<0.50	37	31.1	22.5	<0.50	21.3	52.3	14.8	20.5	28.3	48.4	47.7	49.1	
Ethene	<1.0	NA	6.15	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<6.2	<10.0	<1.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	75.2	120	16.0	<10.0
1,1-Dichloroethene	<0.50	45	28	44	16	58	<0.50	40	39	37	7.6	18	1.9	39	<0.50	25	28.2	16.9	<0.50	15.4	29.9	11.5	4.7	3.8	4.7	<1.7	<0.50	
1,1-Dichloroethane	1.8	240	130	210	100	270	1.0	200	240	170	36	110	14	190	0.73	102	151	120	0.84	79.9	174	44	16.5	11.4	14.0	19.5	4.5	
1,2-Dichloroethane	<0.50	2.5	1.3	<15.0	<5.0	<15.0	<0.50	1.8	<15.0	1.6	<2.5	0.77	<1.5	<15.0	<0.50	<5.0	<10.0	<8.3	<0.50	<3.6	<8.4	<10.0	<10.0	<2.5	<3.1	<1.7	<0.50	
1,1,1-Trichloroethane	0.70	65	34	48	13	76	0.53	53	46	37	5.8	8.6	1.6	36	<0.50	18	23.6	15.7	0.52	7.7	12.8	3.9	<10.0	<2.5	<3.1	<1.7	<0.50	
Attenuation Chemistry																												
Total Organic Carbon (mg/L)	0.94	8.3	59	65	56	100	4.9	95	62	110	23	41	13	93	1.9	4	4.8	4.4	16.5	5.5	3.7	5240	1930	490	530	243	326 J+	
Field Parameters																												
Dissolved Oxygen (mg/L)	3.16	0.84	1.00	1	0.66	0.43	1.07	0.62	0.39	0.59	1.22	1.94	3.68	6.09	0.65	0.89	0.71	1.06	0.99	0.71	2.68	0.98	0.46	2.92	0.91	1.19	1.61	
Oxidation Reduction Potential (mV)	110.4	906.3	109.0	45.3	117.1	140.7	128.6	117.3	205.2	-10.7	40.4	29.1	1.5	47.1	-110.0	75.7	10.2	65.3	28.1	62.2	59.7	252.5	-91.3	-17.9	-34.2	-87.4	-119.0	

Please refer to notes at end of table.

Table 4
 Interim Action: Groundwater Analytical Results
 NuStar Vancouver Facility
 Vancouver, Washington

Well Number:	MW-24i																											
Sample Date:	6/7/2011	9/16/2011	12/7/2011	3/12/2012	6/22/2012	9/14/2012	12/14/2012	3/15/2013	6/14/2013	9/20/2013	12/16/2013	3/24/2014	6/23/2014	9/30/2014	12/15/2014	3/20/2015	6/18/2015	9/22/2015	12/8/2015	3/8/2016	6/17/2016	9/28/2016	12/12/2016	3/30/2017	6/15/2017	9/26/2017	11/9/2017	
Analyte	Concentrations in µg/L (ppb)																											
Volatile Organic Compounds																												
Tetrachloroethene	6.6	27	19	30	0.85	31	2.1	23	6.2	15	6.7	10	1.3	20	2.4	6.1	<0.50	2.2	189	4.1	11.5	5.8	1.1	1.0	6.6	30.1	12.7	
Trichloroethene	1.4	24	14	11	<0.50	20	0.65	15	3.6	5.9	3.4	5.5	5.2	10	1.1	3.1	<0.50	0.8	36.4	1.6	6.3	3.1	<0.50	<0.50	2.8	16.6	5.9	
cis-1,2-Dichloroethene	2.0	270	100	79	14	58	51	48	28	15	8.4	16	13	21	12	5.9	3.4	4.7	18	3.5	7.8	5.4	<0.50	0.70	3.2	24.5	9.6	
trans-1,2-Dichloroethene	<0.50	1.7	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
Vinyl chloride	<0.50	19	7.5	4.5	2.6	<0.50	<0.50	<0.50	<0.80	<0.80	<0.50	<0.80	2.1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
Ethene	<1.0	NA	2.29	2.03	1.52	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	29.1	<1.0	<1.0	<6.2	<10.0	<1.0	<1.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	
1,1-Dichloroethene	<0.50	2.5	0.84	<0.50	<0.50	0.87	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
1,1-Dichloroethane	<0.50	13	5.0	5.9	1.8	4.4	<0.50	2.8	2.7	1.0	1.3	1.3	1.2	1.8	0.60	0.58	<0.50	1.9	0.74	<0.50	0.99	0.53	<0.50	<0.50	<0.50	2.1	1.1	
1,2-Dichloroethane	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	
1,1,1-Trichloroethane	<0.50	5.6	2.9	2.3	<0.50	0.79	<0.50	0.57	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
Attenuation Chemistry																												
Total Organic Carbon (mg/L)	1.2	7.0	290	33	44	15	16	9.5	11	11	7.9	9.4	8.4	12.0	<1.0	<1.0	1.6	2.3	3.5	1.0	<1.0	5.3	1.5	3.4	1.2	1.2	1.3	
Field Parameters																												
Dissolved Oxygen (mg/L)	6.40	0.61	3.50	2.11	3.50	0.40	2.11	0.79	0.39	1.92	3.08	3.16	4.70	2.01	6.27	10.28	1.08	1.85	1.36	1.75	3.12	2.58	5.64	5.24	3.72	1.21	3.11	
Oxidation Reduction Potential (mV)	59.0	646.9	-147.5	-1.2	-147.5	-54.0	6.3	13.1	130.2	-31.2	16.9	-55.4	-49.7	129.7	-13.9	38.6	-158.7	99.4	99.2	47.8	14.0	123.9	2.6	14.3	-13.4	-10.7	-100.1	

Please refer to notes at end of table.

Table 4
 Interim Action: Groundwater Analytical Results
 NuStar Vancouver Facility
 Vancouver, Washington

Well Number:	MGMS2-40																										
Sample Date:	6/7/2011	9/12/2011	12/7/2011	3/8/2012	6/19/2012	9/12/2012	12/11/2012	3/15/2013	6/11/2013	9/17/2013	12/16/2013	3/24/2014	6/26/2014	9/23/2014	12/12/2014	3/20/2015	6/19/2015	9/25/2015	12/8/2015	3/8/2016	6/17/2016	9/29/2016	12/16/2016	3/31/2017	6/15/2017	9/29/2017	11/9/2017
Analyte	Concentrations in µg/L (ppb)																										
Volatile Organic Compounds																											
Tetrachloroethene	4,400	790	61	9.9	7.2	89	10	5.6	0.94	16	2.4	2.6	21	170	3.4	31	18.4	67.4	4.0	6.5	223	33.3	2.6	4.3	5.1	41.5	13.2
Trichloroethene	1,400	380	39	5.4	2.5	80	3.4	2.2	<0.50	17	1.4	1.8	22	110	2.3	22	12.8	45.9	2.8	6.2	146	24.8	1.9	14.4	4.9	31.3	9.2
cis-1,2-Dichloroethene	1,600	7,400	5,300	470	20	310	33	300	7.9	290	8.4	84	88	590	10	47	53.8	105	7.2	36.0	744	115	5.2	236	46.2	195	61.6
trans-1,2-Dichloroethene	17	20	<15.0	2.8	1.3	3.2	1.3	2.0	<0.50	1.4	<0.50	<0.50	0.84	2.4	<0.50	<0.50	<0.50	0.61	<0.50	<0.50	2.8	<0.50	<0.50	0.60	<0.50	0.74	0.52
Vinyl chloride	48	58	460	260	63	440	4.0	270	4.8	330	3.4	270	90	800	18	17	48.3	57.8	3.3	36	227	142	2.0	235	98.9	428	170
Ethene	<1.0	NA	14.5	368	566	264	110	121	55.6	143	33.3	930	207	12.1	34	8.1	33.7	<10.0	22.8	63.7	31	N/A	N/A	N/A	128	47.4	95.7
1,1-Dichloroethene	30	28	<15.0	2.3	<0.50	2.8	<0.50	1.9	<0.50	4.8	<0.50	2.9	10	30	<0.50	3.9	1.3	4.2	<0.50	1.6	26.4	<0.50	<0.50	14.3	3.5	6.8	0.86
1,1-Dichloroethane	65	44	35	38	53	39	4.8	28	8.3	28	9.7	45	31	30	35	4.3	13.8	12.3	13.5	20.6	24.9	12.1	10.3	57.6	38.6	21.7	21.3
1,2-Dichloroethane	<15.0	<15.0	<15.0	<2.0	<0.50	<1.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
1,1,1-Trichloroethane	57	48	<15.0	5.2	<0.50	5.0	<0.50	2.5	<0.50	1.6	<0.50	<0.50	<0.50	3.2	<0.50	<0.50	<0.50	0.92	<0.50	<0.50	3.1	<0.50	<0.50	<0.50	<0.50	0.67	<0.50
Attenuation Chemistry																											
Total Organic Carbon (mg/L)	2.2	110	300	290	500	140	280	81	110	98	110	120	120	94	7.9	8	11	10.9	7.9	7.4	3.8	N/A	N/A	N/A	7.0	6.4	6.2
Field Parameters																											
Dissolved Oxygen (mg/L)	0.86	2.63	6.28	1.22	6.28	1.16	0.55	0.33	0.42	0.27	1.19	1.06	2.22	1.31	1.41	20.02	13.5	9.67	6.14	5.52	1.60	5.16	0.80	0.68	1.29	1.03	1.24
Oxidation Reduction Potential (mV)	49.5	338.9	-137.9	-73.6	-137.9	-40.1	-82.3	-24.3	-116.7	-209.9	-41.9	-126.1	-23.7	-119.0	-162.1	-83.7	-117.5	-145.1	-96.9	-161.7	-72.2	194.5	-28.1	-92.2	-109.6	-43.7	-113.3

Please refer to notes at end of table.

Table 4
Interim Action: Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number:	MW-13						MW-14						MW-19						MW-26						MGMS1-43						MGMS3-40						
Sample Date:	9/28/2016	12/16/2016	3/30/2017	6/15/2017	9/27/2017	11/7/2017	9/27/2016	12/13/2016	3/27/2017	6/13/2017	9/26/2017	11/8/2017	9/26/2016	12/12/2016	3/28/2017	6/14/2017	9/26/2017	11/9/2017	9/26/2016	12/13/2016	3/29/2017	6/13/2017	9/26/2017	11/8/2017	9/26/2016	12/16/2016	3/31/2017	6/12/2017	9/29/2017	11/7/2017	9/26/2016	12/16/2016	3/28/2017	6/12/2017	9/26/2017	11/10/2017	
Analyte	Concentrations in µg/L (ppb)																																				
Volatile Organic Compounds																																					
Tetrachloroethene	5,090	1,020	176	97.7	3.3	<4.2	100	0.56	14.7	58.3	62.4	39.3	1,520	1,730	755	566	3,710	1,530	160	167	214	160	68.4	88.1	230	64.1	45.8	24.4	70.7	108	1.7	0.63	1.4	0.97	0.79	0.85	
Trichloroethene	951	394	57.6	56.3	1.3	<4.2	218	0.97	33.4	204	265	160	592	975	896	506	1,480	1,020	288	410	452	311 E, J	192	170	366	171	119	116	126	211	1.4	<0.50	0.60	<0.50	<0.50	<0.50	
cis-1,2-Dichloroethene	148	509	101	272	3,220	1,360	61.8	1.3	69.2	432	279	306	235	1,030	1,990	486	1,160	1,660	61.1	85.9	170	113	192	204	1,980	1,810	1,430	2,620	901	2,350 J-	226	1.3	1,050	1.7	0.69	8.0	
trans-1,2-Dichloroethene	<2.5	<5.0	<5.0	1.6	7.3	5.4	0.94	<0.50	<0.50	2.7	2.8	2.2	<5.0	11.6	21.5	6.2	5.4	24.0	1.6	2.0	<0.50	2.0	2.1	6.2	2.3	24.2	20.1	15.2	18.7	12.9	26.6	2.0	0.97	6.0	<0.50	<0.50	<0.50
Vinyl chloride	<2.5	<5.0	<5.0	4.1	25.0	25.0	<0.50	<0.50	0.62	2.5	<0.84	0.91	10.1	31.9	63.2	17.2	111	115	<0.50	<0.50	<0.50	0.65	0.98	1.8	52	239	348	681	117	181	52.1	0.88	323	<0.50	<0.50	15.8	
Ethene	<10.0	<10.0	<10.0	NA	<10.0	11.6	<10.0	<10.0	<10.0	NA	<10.0	<10.0	<10.0	<10.0	<10.0	NA	44.3	11.8	NA	<10.0	<10.0	NA	<10.0	<10.0	<10.0	<10.0	14.8	NA	<10.0	<10.0	<10.0	55.2	68.1	NA	22.8	54.8	
1,1-Dichloroethene	<2.5	<5.0	<5.0	1.2	5.0	<4.2	2.1	<0.50	0.57	5.3	2.6	2.1	11.0	14.2	26.7	15.8	28.9	24.9	1.1	2.4	<0.50	1.9	1.0	1.5	13.5	9.5	12.5	16.7	6.9	13.7	0.60	<0.50	3.3	<0.50	<0.50	<0.50	
1,1-Dichloroethane	<2.5	<5.0	<5.0	<1.0	<1.0	<4.2	7.2	<0.50	<0.50	10	6.2	4.5	10.4	78.7	214	41.8	11.1	104	3.9	8.9	<0.50	6.7	5.1	4.8	81.9	92.6	90.8	173	60.1	153	4.5	1.0	22.5	3.3	1.1	4.3	
1,2-Dichloroethane	<2.5	<5.0	<5.0	<1.0	<1.0	<4.2	<0.50	<0.50	<0.50	<1.0	<0.84	<0.84	<5.0	<5.0	<5.0	<2.5	<2.5	0.75 J-	<0.50	<0.50	<0.50	<1.0	<1.0	<0.50	<8.3	<8.4	<8.4	<8.3	<2.5	<2.5	<0.50	<0.50	0.68	<0.50	<1.0	<0.50	
1,1,1-Trichloroethane	<2.5	<5.0	<5.0	<1.0	<1.0	<4.2	1.7	<0.50	<0.50	2.1	1.1	<0.84	14.5	15.5	19.9	8.2	40.4	20.2	2.4	3.3	<0.50	2.1	0.83	1.0	<8.3	<8.4	<8.4	<8.3	<2.5	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Attenuation Chemistry																																					
Total Organic Carbon (mg/L)	33600	2220	341	N/A	55.8	85.5	8.8	5.1	5.1	N/A	3.8	8.5	1.9	8.1	4.8	N/A	8.1	6.9	N/A	2.4	1.3	N/A	7.1	5.9	9.0	6.2	7.0	N/A	6.1	5.6	36.2	86.9	5.0	N/A	3.8	6.5	
Field Parameters																																					
Dissolved Oxygen (mg/L)	2.71	0.66	4.36	1.41	2.16	2.19	8.1	3.1	3.1	0.94	1.89	1.85	3.27	9.22	2.5	1.54	1.92	2.26	1.64	0.88	1.34	3.80	5.56	1.75	5.09	6.06	3.02	1.17	8.73	2.04	2.7	5.95	1.57	5.22	10.02	0.93	
Oxidation Reduction Potential (mV)	158.7	-111.4	-61.8	-105.7	-103.9	-89.2	221.2	55.0	55.0	61.3	80.6	106.9	174.4	175.2	35.8	-22.7	185.2	-75.2	236.7	102.4	165.2	74.6	77.3	99.8	184.2	-17.5	-40.7	-109.8	90.7	74.5	165.3	-9.20	-125.8	-94.1	-82.8	-111.6	

- Notes:
- µg/L (ppb) = Micrograms per liter (parts per billion).
 - NA = Not analyzed.
 - Ethene is analyzed by EPA Method RSK-175M. All other VOCs were analyzed by EPA Method 8260.
 - Boldface** value represents detected concentration of listed analyte.
 - J = Result is estimated based on review of laboratory data quality.
 - E = Analyte concentration exceeded the calibration range. Reported result is estimated.
 - J+ = Result is estimated and may be biased high based on review of laboratory data quality.
 - J- = Result is estimated and may be biased low based on review of laboratory data quality.

Table 5
North SVE System – Operation Monitoring
NuStar Vancouver Facility
Vancouver, Washington

Date	Branch 4		Branch 5		Post Blower		Notes
	PID	Pressure	PID	Pressure	PID	Pressure	
10/12/2011	0.0	-13.0	0.0	-12.0	7.2	0.1	--
11/2/2011	--*	-25.0	6.7	-25.0	--	--	--
11/17/2011	0.8	-16.0	6.9	-16.0	7.0	0.1	PID complications; Routinely reported error code. Potential moisture issues.
12/5/2011	--	--	--	--	--	--	System off on arrival and would not restart. Contractor identified electrical issues. Blower removed for replacement.
12/14/2011	--	--	--	--	--	--	System not operating, pending blower replacement. Blower reinstalled January 10, 2012
1/23/2012	--	-15.0	6.5	-15.0	3.9	0.1	Water in sample port of Branch 4, could not get PID reading
2/17/2012	0.1	-11.0	0.9	-11.0	2.9	1.0	--
3/22/2012	6.8	-12.0	5.4	-12.0	1.3	0.05	--
4/26/2012	1.3	-4.2	6.4	-4.0	1.0	0.05	--
5/23/2012	0.1	-3.4	3.2	-3.4	0.4	--	--
6/20/2012	0.0	-2.8	0.0	-2.7	0.1	0.2	--
7/24/2012	3.2	-3.2	9.2	-3.2	0.2	0.4	Used Rental PID.
8/22/2012	0.4	-2.4	1.0	-2.4	0.0	0.2	--
9/25/2012	0.1	-1.7	0.5	-1.7	0.0	0.2	Used ACA PID #3.
10/29/2012	--	--	--	--	--	--	System not operating.
11/26/2012	8.4	-4.0	9.2	-4.0	3.0	0.05	Used ACA PID #3.
12/21/2012	0.1	-0.63	0.0	-0.62	0.0	0.1	Used ACA PID #3.
1/24/2013	10.4	-0.45	0.0	-0.15	0.5	0.1	Used ACA PID #3.
2/28/2013	37.1	-0.22	2.1	-0.15	1.3	0.1	Used ACA PID #3.
3/25/2013	--	--	--	--	--	--	System not operating.
4/29/2013	--	--	--	--	--	--	System not operating.
5/24/2013	0.4	-23.0	0.1	-23.0	7.9	0.1	Used APEX PID #3.
6/25/2013	--	-20.0	--	-20.0	--	0.1	--
7/25/2013	6.6	-20.0	13.3	-20.0	6.1	0.1	Used APEX PID #3.
8/27/2013	1.9	-18.0	16.9	-18.0	6.8	0.1	Used APEX PID #3.
9/30/2013	0.0	-20.0	0.0	-20.0	2.1	0.1	Used APEX PID #3.
10/24/2013	1.3	-20.0	1.2	-20.0	2.3	0.1	Used APEX PID #3.
11/25/2013	0.3	-23.0	0.2	-23.0	1.1	0.1	Used APEX PID #3.
12/27/2013	1.0	-21.0	0.6	-21.0	2.6	0.1	Used APEX PID #1

Please refer to notes at end of table.

Table 5
 North SVE System – Operation Monitoring
 NuStar Vancouver Facility
 Vancouver, Washington

Date	Branch 4		Branch 5		Post Blower		Notes
	PID	Pressure	PID	Pressure	PID	Pressure	
1/29/2014	0.2	-20.0	0.1	-20.0	0.0	3.0	--
2/24/2014	2.4	-20.0	2.6	-20.0	2.6	9.0	Used APEX PID #3.
3/31/2014	0.3	-20.0	1.0	-20.0	0.2	1.0	Used APEX PID #4
4/29/2014	2.0	-20.0	1.4	-20.0	0.0	2.0	--
5/27/2014	2.0	-20.0	1.3	-20.0	0.9	2.0	--
7/3/2014	0.5	-20.0	0.3	-18.0	0.4	4.0	--
7/28/2014	4.0	-20.0	2.6	-19.0	0.1	3.0	Used APEX PID #3.
8/25/2014	--	-20.0	--	-19.0	3.7	3.5	Used APEX PID #3.
9/30/2014	2.1	-17.0	0.6	-17.0	1.7	--	--
10/27/2014	0.4	-26.0	1.4	-26.0	2.3	2.0	Used APEX PID #3.
11/25/2014	0.3	-21.0	1.5	-20.0	0.5	--	Used APEX PID #3.
12/29/2014	20.2	-25.0	32.1	-25.0	--	2.0	Used APEX PID #3.
1/26/2015	2.0	-25.0	3.2	-25.0	0.7	3.0	Used APEX PID #3. Knockout drum emptied.
2/26/2015	0.0	-22.0	0.0	-25.0	0.0	0.1	--
3/30/2015	0.0	-23.0	0.2	-27.0	0.0	0.4	Used APEX PID #3.
4/24/2015	0.0	-23.0	0.2	-27.0	0.0	0.4	--
5/28/2015	5.5	-26.0	4.8	-26.0	5.5	0.05	--
7/29/2015	7.5	-17.0	0.3	-17.0	0.5	0.10	Used APEX PID #3.
8/31/2015	0.0	-11.0	0.0	-10.0	0.9	0.05	Used APEX PID #3.
9/28/2015	0.6	-12.0	2.4	-12.0	1.8	0.00	Used APEX PID #3.
10/29/2015	0.5	-12.0	0.3	-13.0	2.9	1.00	Used APEX PID #3.
11/30/2015	0.0	-13.0	0.2	-13.0	0.0	2.00	Used APEX PID #3.
12/28/2015	0.0	-17.0	9.0	-18.0	0.0	0.10	Used APEX PID #3.
2/1/2016	30.4	-28.0	0.0	-25.0	2.6	3.00	Used APEX PID #3.
2/29/2016	0.0	-13.0	0.0	-13.0	0.0	0.10	Used APEX PID #3.
3/29/2016	0.0	-12.0	0.0	-12.0	0.0	0.20	Used APEX PID #3.
4/27/2016	0.2	-11.0	0.0	-5.0	0.0	1.00	Used APEX PID #3. North SVE system turned off.
5/25/2016	--	--	--	--	--	--	North SVE system intertionally turned off for approx . 60 days to evaluate system efficiency.
6/28/2016	20.4	-23.0	14.3	-23.0	0.9	0.10	Used APEX PID #3.

Please refer to notes at end of table.

Table 5
 North SVE System – Operation Monitoring
 NuStar Vancouver Facility
 Vancouver, Washington

Date	Branch 4		Branch 5		Post Blower		Notes
	PID	Pressure	PID	Pressure	PID	Pressure	
7/26/2016	0.0	-20.0	0.4	-20.0	0.6	1.20	Used APEX PID #3.
9/29/2016	1.0	-16.0	0.0	-15.0	0.0	0.10	Used APEX PID #3.
10/25/2016	0.4	-14.0	0.0	-14.0	0.0	0.10	Used APEX PID #3.
11/28/2016	0.0	-12.0	0.0	-12.0	0.0	0.10	Used APEX PID #3.
12/28/2016	0.0	-12.0	0.0	-12.0	0.0	0.10	Used APEX PID #3.
1/30/2017	0.0	-5.0	0.0	-5.0	0.0	0.10	Used APEX PID #3.
2/28/2017	12.5	-15.0	8.7	-14.0	1.0	0.10	--
3/28/2017	0.0	-20.0	0.0	-20.0	0.1	0.00	Used Mini Rae 3000.
4/24/2017	0.8	-20.0	0.0	-20.0	2.0	0.10	Used APEX PID #3.

Notes:

1. PID readings in parts per million (ppm), calibrated to 100 ppm isobutylene.
2. Pressure readings in inches of water, measured with magnahelic gauge.
3. NM = Not measured.
4. -- = Not available; branch not in use or no measurement collected during the site visit.
5. NA = Not available; photoionization detector (PID) malfunction.
6. * = During the 11/2/2011 monitoring event, PID malfunctioned while monitoring Branch 4. Instrument readings would not stabilize.

Table 6
North SVE System – Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Sampling Location	Sample ID	Date	1,1,1- Trichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	Methylene Chloride	Tetrachloro- ethene	Toluene	Trichloro- ethene	Vinyl Chloride
			Concentrations in µg/m3								
System Effluent	North_EFF-20111012	10/12/2011	69	<16	160	<16	<14	9,500	16	700	<10
System Effluent	Post Blower_North_012312	1/23/2012	<170	<120	<120	<120	<110	16,000	<120	530	<79
System Effluent	North_Effluent_0121712	2/17/2012	<140	<100	<100	<100	<91	11,000	<99	300	<67
System Effluent	North Effluent-032212	3/22/2012	<28	<54	<27	<27	<23	6,600	<25	140	<8.6
System Effluent	North_Effluent_062012	6/20/2012	<1.6	<3.2	<1.6	<1.6	5.3	250	<1.5	15	<0.51
System Effluent	North_Effluent_082212	8/22/2012	<1.6	<3.2	<1.6	<1.6	<1.4	140	<1.5	11	<0.51
System Effluent	North_Effluent_112612	11/26/2012	39	<14	52	<7.1	<6.2	22,000	<6.8	510	<4.6
System Effluent	North_Effluent_122112	12/21/2012	<31	<59	<30	<30	<26	3,500	<28	61	<19
System Effluent	North_Effluent_022813	2/28/2013	<36	<70	<35	<35	<31	4,400	<33	160	<22
System Effluent	SVE North	5/24/2013	<240	<170	280	<170	<380	23,000	<160	1,100	<110
System Effluent	SVE North	6/25/2013	76	<51	88	<51	<110	13,000	<49	730	<33
System Effluent	SVE North	8/27/2013	<150	<110	<110	<110	<230	17,000	<100	800	<69
System Effluent	SVE North Effluent	10/24/2013	<82	<60	<60	<60	<130	10,000	<57	570	<39
System Effluent	SVE North Effluent	12/27/2013	<44	<32	<32	<32	<69	7,000	<30	470	<20
System Effluent	SVE North Effluent	1/29/2014	<10	<40	22	<40	<87	1,300	<38	110	<26
System Effluent	SVE_North_Post Carbon	2/24/2014	55	<83	68	<41	<36	8,700	<39	760	<27
System Effluent	SVE North Post Carbon	3/5/2014	25	<39	29	<20	<17	4,600	<19	300	<13
System Effluent	VCP_North_Effluent	3/31/2014	19	<13	18	<13	<28	3,500	<12	200	<8.2
System Effluent	North_SVE_Effluent_042914	4/29/2014	22	<15	17	<15	<33	3,500	<14	220	<9.8
System Effluent	North_SVE_Effluent_052714	5/27/2014	<31	<23	<23	<23	<50	4,100	<22	280	<15
System Effluent	North_VCP_Effluent	7/3/2014	<23	<17	20	<17	<37	4,500	<16	290	<11
System Effluent	SVE North	7/28/2014	<120	<88	<88	<88	<190	7,200	<84	460	<22
System Effluent	North SVE	9/30/2014	<48	<35	48	<35	<76	7,300	<33	480	<22
System Effluent	SVE North Effluent	10/27/2014	<110	<80	<80	<80	<180	15,000	<76	410	<52
System Effluent	SVE North 11.25.14	11/25/2014	<39	<28	<28	<28	<62	7,100	<27	390	<18
System Effluent	SVENorth122914	12/29/2014	<140	<99	<99	<99	<220	15,000	<94	290	<64
System Effluent	SVE North	1/26/2015	16	<31	<16	<16	<14	1,500	<15	130	<10
System Effluent	SVE North	2/26/2015	<1.6	<3.2	<1.6	<1.6	<1.5	32	<1.5	<2.1	<1.0
System Effluent	SVE North	3/30/2015	15	<9.6	9.5	<4.8	<4.2	1,700	<4.6	130	<3.1
System Effluent	SVE N	4/24/2015	<8.5	<16	<8.2	<8.2	<7.2	550	<7.8	50	<5.3

Please refer to notes at end of table.

Table 6
North SVE System – Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Sampling Location	Sample ID	Date	1,1,1- Trichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	Methylene Chloride	Tetrachloro- ethene	Toluene	Trichloro- ethene	Vinyl Chloride
			Concentrations in µg/m ³								
System Effluent	SVE North	5/14/2015	<1.6	<3.2	<1.6	<1.6	<1.4	<2.7	<1.5	<2.1	<1.0
System Effluent	SVE North	5/28/2015	<3.8	<7.3	<3.6	<3.6	<3.2	360	3.6	8.0	<2.4
System Effluent	SVE North	7/29/2015	19	<33	21	<16	<14	2,000	<16	210	<11
System Effluent	SVE North	8/31/2015	65	<65	62	<33	<28	7,100	<31	600	<21
System Effluent	SVE North	9/28/2015	21	<22	<11	<11	<9.7	1,400	<11	190	<7.1
System Effluent	SVE North	10/29/2015	<56	<110	59	<55	<48	6,300	<52	550	<35
System Effluent	SVE_North_Effluent_113015	11/30/2015	<54	<140	<72	<72	<72	2,300	<72	86	<72
System Effluent	SVE_North_Effluent_122815	12/28/2015	<32	<62	<31	<31	<27	5,600	<30	110	<20
System Effluent	North_Effluent_020116	2/1/2016	<53	<100	<51	<51	<45	11,000	<48	150	<33
System Effluent	SVE_North_Effluent_022916	2/29/2016	30	<33	29	<16	<14	7,800	<16	160	<11
System Effluent	SVE_North_Effluent_032916	3/29/2016	19	<14	<7.2	<7.2	<6.3	920	<6.9	19	<4.7
System Effluent	North_Effluent	4/27/2016	<15	<29	<14	<14	<13	1,500	<14	75	<9.2
System Effluent	North_Effluent_62816	6/28/2016	<11	<22	<11	<13	<9.6	1,800	<10	83	<7.1
System Effluent	SVE-North-Effluent 72616	7/26/2016	<1.6	<3.2	<1.6	<1.6	<1.4	84	2.0	6	<1.0
System Effluent	SVE-North-Effluent 83016	8/30/2016	<0.30	<0.80	<0.40	<0.40	<0.40	54	<0.40	2	<0.40
System Effluent	SVE_North_Effluent_092916	9/29/2016	<1.6	<3.2	<1.6	<1.6	<1.4	15	<1.5	<2.1	<1.0
System Effluent	SVE_North_Effluent_102516	10/25/2016	<1.6	<3.2	<1.6	<1.6	<1.4	7.9	3.0	<2.1	<1.0
System Effluent	SVE_North_Effluent_112816	11/28/2016	<1.6	<3.2	<1.6	<1.6	<1.4	2.8	3.9	<2.1	<1.0
System Effluent	SVE_North_Effluent_122816	12/28/2016	<1.6	<3.2	<1.6	<1.6	<1.4	<2.7	1.7	<2.1	<1.0
System Effluent	SVE_North_Effluent_013017	1/30/2017	<1.6	<3.2	<1.6	<1.6	<1.4	<2.7	4.6	<2.1	<1.0
System Effluent	SVE_North_Effluent_022817	2/28/2017	<1.6	<3.2	<1.6	<1.6	<1.4	5.9	<1.5	<2.1	<1.0
System Effluent	SVE_North_Effluent_032817	3/28/2017	<1.6	<3.2	<1.6	<1.6	<1.4	3.2	2.9	<2.1	<1.0
System Effluent	SVE_North_Effluent	4/24/2017	<1.6	<3.2	<1.6	<1.6	<1.4	3.9	3.7	<2.1	<1.0

Notes:

1. µg/m³ = Micrograms per cubic meter.
2. Samples analyzed by Modified EPA Method TO-15.
3. Only analytes detected in at least one sample are presented in this table.
4. **Bold** values represents detected concentration of listed analyte.

Table 7
 South SVE System – Operation Monitoring
 NuStar Vancouver Facility
 Vancouver, Washington

Date	Pre-Blower		Post Blower (Pre-Carbon)		Post Carbon 1		Post Carbon 2		Notes
	PID	Pressure	PID	Pressure	PID	Pressure	PID	Pressure	
10/12/2011	--	-14.0	17.1	24.0	0	12.0	0.2	4.0	--
10/18/2011	--	-14.0	15.5	--	15.5	14.0	0.5	3.0	Pre-carbon, post blower tap is now covered by noise suppression panels.
11/2/2011	--	-15.0	18.2	26.0	0.0	26.0	2.0	7.0	--
11/17/2011	--	-18.0	8.9	27.0	--*	15.0	--*	6.8	--
12/5/2011	8.3	-18.0	10.7	39.0	0.0	19.0	2.2	6.1	System switch off upon arrival. System restarted. Monitoring event conducted approximately 3 hours after restart.
12/14/2011	11.8	-19.0	21.0	28.0	0.0	18.0	0.7	6.2	--
1/9/2012	7.3	-17.0	8.3	29.0	0.0	18.0	0.0	6.2	--
1/23/2012	7.0	-17.0	8.9	29.0	0.0	17.0	0.0	6.9	--
2/17/2012	6.0	-18.0	11.2	29.0	0.0	18.0	0.0	6.0	--
3/22/2012	13.3	-16.0	10.7	27.0	0.0	15.0	0.0	6.5	--
4/26/2012	10.3	-17.0	11.6	27.0	0.0	16.0	0.0	6.4	--
5/23/2012	10.4	-20.0	10.6	31.0	0.0	19.0	0.0	6.6	--
6/20/2012	7.3	-21.0	7.5	33.0	0.5	20.0	0.0	6.3	--
7/24/2012	19.8	-20.0	41.5	32.0	226.3	20.0	98.8	6.2	Used rental PID.
8/22/2012	8.0	-48.0	10.1	29.0	5.5	18.0	1.1	4.6	--
9/25/2012	10.0	-46.0	13.7	29.0	9.5	15.0	12.8	4.3	Used ACA PID #3.
10/29/2012	8.4	-34.0	18.6	47.0	0.3	28.0	12.9	4.3	Used ACA PID #3; Carbon change-out on 10/29/2012
11/26/2012	13.7	<-100	1.6	18.0	0.1	6.6	3.1	0.66	Used ACA PID #3.
12/21/2012	0.5	-107	0.5	17.0	0.0	6.1	0.0	0.49	Used ACA PID #3.
1/24/2013	5.1	-105	0.5	10.0	0.0	6.5	0.0	0.61	Used ACA PID #3.
2/28/2013	2.8	-105	0.1	18.0	0.0	7.0	0.0	0.60	Used ACA PID #3.
3/25/2013	8.4	-102	0.9	16.0	0.1	7.0	0.0	0.58	Used Apex PID #3
4/29/2013	0.2	-98	0.4	15.0	0.0	6.3	0.1	0.49	Used Apex PID #3
5/24/2013	41.0	-18	49.7	47.0	0.2	26	0.7	5.0	Used Apex PID #3
6/25/2013	--	-15	--	51.0	--	31	--	5.1	--
7/25/2013	12.3	-16	13.9	50.0	0.7	32	0.5	6.0	Used Apex PID #3
8/27/2013	13.2	-16	12.1	52.0	3.8	31	1.2	5.2	Used Apex PID #3
9/30/2013	5.2	-15	15.4	45.0	27.4	30	0.4	5.2	Used Apex PID #3
10/24/2013	3.1	-14	13.2	50.0	6.8	32	1.5	5.2	Used Apex PID #3
11/25/2013	1.4	-19	19.3	51.0	12.4	35	2.8	5.3	Used Apex PID #3
12/27/2013	0.3	-19	7.7	55.0	3.1	32	0.0	5.4	Used Apex PID #1
1/29/2014	2.4	-19	6.7	50.0	5.7	30	0.2	10.0	--
2/24/2014	7.7	-19	19.7	50.0	2.4	30	1.4	10.0	Used Apex PID #3
3/31/2014	2.6	-15	4.6	46.0	5.4	30	0.0	8.0	Used APEX PID #4
4/29/2014	2.0	-14	3.4	48.8	9.7	30	0.0	8.0	--
5/27/2014	3.5	-14	5.0	49.0	10.2	28	0.1	7.0	--
7/3/2014	1.6	-18	2.4	50.0	1.4	30	0.1	10.0	--
7/28/2014	8.5	-19	9.0	50.0	11.0	30	8.7	8.0	Used Apex PID #3
8/25/2014	4.6	-17	7.5	49.0	15.8	26	11.0	7.0	Used Apex PID #3

Please refer to notes at end of table.

Table 7
 South SVE System – Operation Monitoring
 NuStar Vancouver Facility
 Vancouver, Washington

Date	Pre-Blower		Post Blower (Pre-Carbon)		Post Carbon 1		Post Carbon 2		Notes
	PID	Pressure	PID	Pressure	PID	Pressure	PID	Pressure	
9/30/2014	0.5	-14	5.2	40.0	4.0	28	2.7	5.0	--
10/27/2014	--	--	--	--	--	--	--	--	System off upon arrival. Unable to turn back on.
11/3/2014	5.0	-20	23.0	50.0	13.1	20	14.6	8.0	Used Apex PID #3
11/25/2014	--	--	--	--	--	--	--	--	System off for drum replacement.
12/29/2014	--	--	--	--	--	--	--	--	System off.
1/26/2015	27.1	-25	34.6	20.0	1.0	17	0.0	10.0	Used Apex PID #3
2/26/2015	0.8	-20	12.9	30.0	0.2	19	0.1	8.0	--
3/30/2015	0.4	-20	14.2	29.0	0.1	20	0.1	8.0	Used Apex PID #3
4/24/2015	0.4	-20	14.2	29.0	0.1	20	0.1	8.0	--
5/28/2015	1.0	-20	57.5	28.0	63.6	17	33.0	7.0	--
7/29/2015	0.0	-16	14.1	25.0	9.6	14	1.2	5.0	Used Apex PID #3
8/31/2015	0.0	-20	1.2	26.0	6.9	14	1.8	6.0	Used Apex PID #3
9/28/2015	3.0	-20	7.4	26.0	3.8	16	1.1	6.0	Used Apex PID #3
10/29/2015	9.0	-22	11.2	27.0	7.6	16	0.2	8.0	Used Apex PID #3
11/30/2015	--	-18	7.0	30.0	33.6	18	0.4	6.0	Used Apex PID #3
12/28/2015	--	-18	12.5	29.0	1.3	18	0.4	8.0	Used Apex PID #3
2/1/2016	0.1	-24	0.3	19.0	9.2	16	0.0	7.0	Used Apex PID #3
2/29/2016	0.2	-18	25.2	30.0	8.5	17	2.3	6.0	Used Apex PID #3
3/29/2016	0.0	-19	54.0	28.0	13.2	16	3.4	7.0	Used Apex PID #3
4/27/2016	5.0	-28	32.0	50.0	21.3	0.2	22.3	1.0	Used Apex PID #3
5/25/2016	0.2	-100	0.3	3.0	23.2	2	9.7	0.6	Used Apex PID #3
6/28/2016	--	--	--	--	--	--	--	--	System shut down
7/26/2016	8.1	-20	30.4	30.0	26.2	20	18.1	10.0	Used Apex PID #3
9/29/2016	26.3	-18	27.4	28.0	36.7	16	35.7	6.0	Used Apex PID #3
10/25/2016	0.8	-18	13.3	30.0	58.0	18	7.7	8.0	Used Apex PID #3
11/28/2016	0.0	-22	70.1	30.0	78.0	18	54.2	8.0	Used Apex PID #3
12/28/2016	0.0	-100	0.0	2.0	0.4	1.0	1.0	1.0	Bleeder valve appears damaged. No sample collected. Turned system off prior to departure.
1/30/2017	0.0	-22	52.3	33.0	0.0	20.0	0.0	10.0	Used Apex PID #3
2/28/2017	--	--	--	--	--	--	--	--	No sample collected.
3/28/2017	--	--	--	--	--	--	--	--	System not working properly. Knock out drum valve was pulled down and sucking in ambient air.
4/24/2017	--	--	--	--	--	--	--	--	No sample collected.
7/31/2017	0.0	-18	31.8	31.0	31.2	18.0	27.2	8.0	Could not get valved to operate properly. System pulling in ambient air.
8/28/2017	0.0	-18	75.0	32.0	60.0	18.0	50.1	9.0	Used Apex PID #3
9/25/2017	39.2	-18	32.7	30.0	19.7	18.0	20.6	7.5	Used Apex PID #3
10/26/2017	2.8	-22	27.7	30.0	19.0	18.0	17.4	7.0	Used Apex PID #3
11/29/2017	5.2	-20	68.0	30.0	54.0	18.0	56.0	7.0	
12/21/2017	0.3	-20	12.4	30.0	6.7	18.0	5.6	8.0	Pre-Carbon was not sampled due to sampling canister malfunction.

Notes:

1. PID readings in parts per million (ppm), calibrated to 100 ppm isobutylene.
2. Pressure readings in inches of water, measured with magnahelic gauge.
3. NM = Not measured.
4. -- = Not available or not applicable.

Table 8
 South SVE System – Analytical Results
 NuStar Vancouver Facility
 Vancouver, Washington

Sampling Location	Sample ID	Date	1,1-Dichloroethane	1,1-Dichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Methylene Chloride	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	Trichloroethene	Vinyl chloride	Total Xylenes
			Concentrations in µg/m ³										
Pre Carbon	INF 1006	10/6/2011	<330	<320	470	<320	<280	40,000	<300	520	5,100	<210	<350
Post Carbon	EFF 1006	10/6/2011	<16	<16	390	<16	<14	<27	<15	140	50	<10	<17
Pre Carbon	Post Blower 110211	11/2/2011	<290	<280	430	<280	<250	26,000	<270	<390	2,100	<180	<310
Pre Carbon	SOUTHSVE_PRECARBON_121411	12/14/2011	<580	<570	620	<570	<500	54,000	<540	<780	2,800	<360	<620
Post Carbon	SOUTHSVE_POSTCARBON_121411	12/14/2011	<16	35	23	<16	17	1,600	<15	78	1,300	12	<17
Pre Carbon	POST CARBON_SOUTH_012312	1/23/2012	<16	<16	<16	<16	<14	<27	<15	<22	<21	<10	<17
Pre Carbon	South_PreCarbon_021712	2/17/2012	<300	<300	460	<300	<260	28,000	<280	<410	1,200	<190	<330
Post Carbon	South_PostCarbon_021712	2/17/2012	<16	<16	<16	<16	<14	<27	<15	<22	<21	<17	<10
Pre Carbon	South Influent - 032212	3/22/2012	<190	<190	310	<95	<84	30,000	<91	99	960	<31	<100
Post Carbon	South Effluent - 032212	3/22/2012	<1.2	<3.2	<1.6	<1.6	4	<2.7	<1.5	<1.6	<2.1	6.4	<3.5
Pre Carbon	South_SVE_PRECARBON	4/26/2012	<210	<560	<280	<280	<240	32,000 S	<270	<290	640 S	<90	<610
Post Carbon	South-SVE_POSTCARBON	4/26/2012	<1.2	<3.2	<1.6	<1.6	4	<2.7	<1.5	<1.6	<2.1	2.4	<3.5
Pre Carbon	SOUTH_SVE_PRECARBON	5/23/2012	<100	<260	200	<130	<120	19,000	<130	<140	780	<43	<290
Post Carbon	SOUTH_SVE_POSTCARBON	5/23/2012	<1.2	<3.2	<1.6	<1.6	3	<2.7	<1.5	<1.6	<2.1	3.7	<3.5
Pre Carbon	South_PreCarbon_062012	6/20/2012	<240	<630	360	<320	<280	35,000	<300	<330	1,400	<100	<1040
Post Carbon	South_PostCarbon_062012	6/20/2012	<0.30	<0.80	<0.40	<0.40	1.0	<0.40	<0.40	<0.30	<0.40	1.2	<1.2
Pre Carbon	South_PreCarbon_072412	7/24/2012	<150	<390	240	<200	<170	33,000	<190	<200	1,100	<63	<640
Post Carbon	South_PostCarbon_072412	7/24/2012	<1.2	11	<1.6	<1.6	3.0	<2.7	2.2	<1.6	<2.1	3.9	<5.2
Pre Carbon	South_PreCarbon_082212	8/22/2012	<250	<660	760	<330	<290	47,000	<310	<340	2,000	<110	1,080
Post Carbon	South_PostCarbon_082212	8/22/2012	<21	<55	<27	<27	<24	<47	<26	<28	<37	<8.8	<90
Pre Carbon	South_PreCarbon_092512	9/25/2012	<270	<700	500	<400	<310	50,000	<330	<360	1,900	<230	<770
Post Carbon	South_PostCarbon_092512	9/25/2012	13	18	1,200	11	5.7	<2.7	<1.5	<1.6	<2.1	6.2	<3.5
Pre Carbon	South_PreCarbon_102912	10/29/2012	<320	<850	440	<480	<370	60,000	<400	<440	2,200	<270	<930
Post Carbon	South_PostCarbon_102912	10/29/2012	<5.3	<14	<7	<7	<7	<7	<7	<7	<7	<7	<14
Pre Carbon	South_PreCarbon_112612	11/26/2012	<95	<250	<120	<120	<110	10,000	<120	<130	530	<80	<410
Post Carbon	South_PostCarbon_112612	11/26/2012	<2.7	<7.2	<3.6	<3.6	<3.6	<3.6	<3.6	<2.7	<3.6	<3.6	<10.8
Pre Carbon	South_PreCarbon_122112	12/21/2012	<71	<190	110	<93	<82	14,000	<89	<96	600	<60	<300
Post Carbon	South_PostCarbon_122112	12/21/2012	<1.2	<3.2	<1.6	<1.6	1.6	<2.7	<1.5	<1.6	<2.1	3.0	<5.2
Pre Carbon	South_PreCarbon_012413	1/24/2013	<9.2	<24	14	<12	<11	1,700	<11	<12	100	<7.8	<39
Post Carbon	South_PostCarbon_012413	1/24/2013	<1.2	<3.2	<1.6	<1.6	3.3	<2.7	<1.5	<1.6	<2.1	3.7	<5.2
Pre Carbon	South_PreCarbon_022813	2/28/2013	<5.9	<15	8.5	<7.7	<6.7	940	<7.3	<7.9	84	<5.0	<25.4
Post Carbon	South_PostCarbon_022813	2/28/2013	<1.2	<3.2	<1.6	<1.6	8.1	<2.7	<1.5	<1.6	<2.1	<1.0	<5.2
Pre Carbon	South_PreCarbon_032513	3/25/2013	<29	<75	<38	<38	<33	3,700	<36	<39	160	<24	<123
Post Carbon	South_PostCarbon_032513	3/25/2013	<1.2	<3.2	<1.6	<1.6	2.0	<2.7	<1.5	<1.6	<2.1	2.0	<5.2
Pre Carbon	SVE South Pre Carbon	4/29/2013	<6.3	<16	10	<8.2	<7.2	950	<7.8	<8.4	48	<5.3	<26.9
Post Carbon	SVE South Post Carbon	4/29/2013	<0.30	<0.80	<0.40	<0.40	<0.40	<0.40	<0.40	<0.30	<0.40	0.93	<1.2
Pre Carbon	SVE South Pre Carbon	5/24/2013	<1,100	<1,100	2,400	<1,100	<2,400	240,000	<1,100	<1,500	8,400	<720	<4,300
Post Carbon	SVE South Post Carbon	5/24/2013	<0.81	<0.79	<0.79	<0.79	<1.7	<1.4	<0.75	<1.1	<1.1	<0.51	<3.1

Please refer to notes at end of table.

Table 8
 South SVE System – Analytical Results
 NuStar Vancouver Facility
 Vancouver, Washington

Sampling Location	Sample ID	Date	1,1-Dichloroethane	1,1-Dichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Methylene Chloride	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	Trichloroethene	Vinyl chloride	Total Xylenes
			Concentrations in µg/m ³										
Pre Carbon	SVE South Pre Carbon	6/25/2013	<150	<150	630	<150	<330	39,000	<140	<210	1,800	<97	<570
Post Carbon	SVE South Post Carbon	6/25/2013	<0.81	8.1	3.8	<0.79	5.6	<1.4	<0.75	<1.1	<1.1	3.1	<3.1
Pre Carbon	SVE South Pre Carbon	7/25/2013	<120	<120	380	<120	<260	22,000	<110	<160	1,200	<77	<460
Post Carbon	SVE South Post Carbon	7/25/2013	<0.81	17	65	2.1	3.4	<1.4	1.2	<1.1	<1.1	2.6	1.4
Pre Carbon	SVE South Pre Carbon	8/27/2013	<150	<150	520	<150	<330	28,000	<140	<210	1,500	<97	<580
Post Carbon	SVE South Post Carbon	8/27/2013	3.3	13	270	7.0	4.7	<2.7	<1.5	<2.2	<2.1	3.7	<6.0
Pre Carbon	SVE South Precarbon	9/30/2013	<110	<110	450	<110	<240	26,000	<110	<150	1,400	<72	<420
Pre Carbon	SVE South Pre Carbon	10/24/2013	<140	<140	430	<140	<310	27,000	<130	<190	1,100	<90	<530
Post Carbon	SVE South Post Carbon	10/24/2013	3.8	4.9	390	3.3	<5.2	4.3	<2.3	5.4	<3.2	2.6	<5.1
Pre Carbon	SVE South Pre Carbon	11/25/2013	<100	<98	250	<98	<220	21,000	<93	<140	840	<63	<380
Post Carbon	SVE South Post Carbon	11/25/2013	<2.8	4.1	250	<2.8	7.3	<4.8	<2.6	17	56	<1.8	<10.6
Pre Carbon	SVE South Pre Carbon	12/27/2013	<110	<110	270	<110	<240	20,000	<100	<150	900	<70	<420
Post Carbon	SVE South Post Carbon	12/27/2013	2.5	4.5	220	2.4	3.8	3.5	<1.1	6.8	62	<0.77	<4.6
Pre Carbon	SVE South Pre-Carbon	1/29/2014	<80	<79	260	<79	<170	20,000	<75	<110	800	<51	<306
Post Carbon	SVE South Post-Carbon	1/29/2014	4.5	7.2	330	4.8	<8.7	7.9	<3.8	13	98	3.1	<15.3
Pre Carbon	SVE_South_Pre_Carbon	2/24/2014	<190	<490	430	<240	240.0	34,000	600	<250	1,500	<160	<800
Post Carbon	SVE_South_Effluent	2/24/2014	<1.2	<3.2	41	<1.6	<1.4	<2.7	<1.5	<1.6	<2.1	<1.0	<5.2
Pre Carbon	SVE South Pre Carbon	3/5/2014	<110	<280	270	<140	<120	16,000	660	<140	660	<90	1,090
Post Carbon	SVE South Effluent	3/5/2014	3.7	<8.3	310	4.2	4.4	<7.1	<4.0	<4.3	21	<2.7	<13.7
Pre Carbon	VCP_South_Post_Blower	3/31/2014	<83	<82	260	<82	<180	20,000	<78	<110	630	<53	<309
Post Carbon	VCP_South_Effluent	3/31/2014	3.3	4.9	290	4.2	<4.3	<3.4	<1.9	3.3	21	1.4	<7.6
Pre Carbon	South_SVE_Postblower_042914	4/29/2014	<47	<46	180	<46	<100	13,000	<44	<63	550	<30	<180
Post Carbon	South_SVE_Effluent_042914	4/29/2014	5.1	5.0	540	<4.8	<11	<8.2	<4.6	<6.6	37	<3.1	<18.3
Pre Carbon	South_SVE_Postblower_052714	5/27/2014	<57	<55	160	<55	<120	12,000	<53	<76	490	<36	<201
Post Carbon	South_SVE_PostCarbon_052714	5/27/2014	5.0	<4.8	530	<4.8	<11	<8.2	<4.6	14	8.1	<3.1	<18.3
Pre Carbon	South_VCP_Post Blower	7/3/2014	<18	<18	56	<18	<45	2,800	<18	<18	150	<18	<63
Post Carbon	South_VCP_Post Carbon	7/3/2014	<16	<16	760	<16	<35	55	<15	430	3,200	<10	<60
Pre Carbon	SVE Pre Carbon	7/28/2014	<69	<67	200	<67	<150	15,000	<64	<93	750	<43	<254
Post Carbon	SVE Post Carbon	7/28/2014	<68	<67	270	<67	<150	13,000	<63	530	12,000	<43	<253
Pre Carbon	South SVE Pre Carbon	8/25/2014	<140	<130	340	<130	<290	20,000	<130	<180	1,100	<86	<520
Post Carbon	South SVE Post Carbon	8/25/2014	<140	<130	270	<130	<290	9,600	<130	<180	2,700	<86	<520
Pre Carbon	South SVE_Pre Carbon	9/30/2014	<110	<110	250	<110	<230	17,000	<100	<150	930	<69	<410
Post Carbon	South SVE_Post Carbon	9/30/2014	<130	<120	280	<120	<270	23,000	<120	<170	620	<80	<480
Pre Carbon	SVE South Post Blower	11/3/2014	<130	<130	320	<130	<280	24,000	<120	<170	1,100	<81	<490
Post Carbon	SVE South Post Carbon	11/3/2014	<81	<81	130	<81	<180	12,000	<77	<110	290	<52	<309
Pre Carbon	SVE South Pre Carbon	1/26/2015	<190	<500	420	<250	<220	21,000	240	<260	860	<160	<820
Post Carbon	SVE South Post Carbon	1/26/2015	<78	<200	<100	<100	<90	<170	190	<110	<140	<66	<330

Please refer to notes at end of table.

Table 8
 South SVE System – Analytical Results
 NuStar Vancouver Facility
 Vancouver, Washington

Sampling Location	Sample ID	Date	1,1-Dichloroethane	1,1-Dichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Methylene Chloride	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	Trichloroethene	Vinyl chloride	Total Xylenes
			Concentrations in µg/m ³										
Pre Carbon	SVE South Pre Carbon	2/26/2015	<150	<390	260	<200	<170	18,000	280	<200	660	<130	<650
Post Carbon	SVE South Post Carbon	2/26/2015	<1.2	<3.2	<1.6	<1.6	3.2	<2.7	<1.5	<1.6	<2.1	2.5	<5.2
Pre Carbon	SVE South Pre Carbon	3/30/2015	<61	<160	200	<79	160	17,000	180	<82	570	<51	<257
Post Carbon	SVE South Post Carbon	3/30/2015	<1.2	<3.2	<1.6	<1.6	2.8	<2.7	2.7	<1.6	51	2.5	<5.2
Pre Carbon	SVE S Pre Carbon	4/24/2015	<37	<97	170	<49	<43	5,400	<46	<50	410	<31	<163
Post Carbon	SVE S Post Carbon	4/24/2015	<6.2	<16	<8.1	<8.1	<7.1	660	<7.7	<8.3	19	<5.2	18
Pre Carbon	SVE South Pre Carbon	5/28/2015	<60	<160	140	<79	92	8,000	240	<81	460	<51	<256
Post Carbon	SVE South Post Carbon	5/28/2015	<4.9	<13	<6.3	<6.3	<5.6	650	<6.0	<6.5	16	<4.1	22.1
Pre Carbon	SVE South Pre Carbon	7/29/2015	<65	<170	190	<85	<75	12,000	<81	<88	790	<55	<183
Post Carbon	SVE South Post Carbon	7/29/2015	10	<27	960	16	<12	440	<13	<14	<18	<8.7	<45
Pre Carbon	SVE South Pre Carbon	8/31/2015	<64	<170	160	<83	<73	12,000	<79	<86	780	<54	<171
Post Carbon	SVE South Post Carbon	8/31/2015	<21	<55	530	<27	<24	3,400	<26	<28	94	<18	<90
Pre Carbon	SVE South Pre Carbon	9/28/2015	<83	<220	170	<110	<94	9,900	<100	<110	660	<70	<360
Post Carbon	SVE South Post Carbon	9/28/2015	3.4	<6.0	340	3.6	<2.6	300	<2.8	39	59	<1.9	<9.8
Pre Carbon	SVE South Pre Carbon	10/29/2015	<130	<350	230	<170	<150	18,000	<170	<180	790	<110	<570
Post Carbon	SVE South Post Carbon	10/29/2015	4.2	5.2	340	4.5	2.6	26	<1.5	67	310	1.7	<5.2
Pre Carbon	SVE_SOUTH_Precarbon_113015	11/30/2015	<29	<77	54	<38	<38	3,000	<38	<29	300	<38	<77
Post Carbon	SVE_SOUTH_Postcarbon_113015	11/30/2015	<0.80	<0.80	27	0.60	<0.40	<0.40	<0.40	6	11	<0.40	<0.80
Pre Carbon	SVE_SOUTH_PRE CARBON_12/28/15	12/28/2015	<120	<320	180	<160	<140	35,000	<150	<170	1,200	<100	<530
Post Carbon	SVE_SOUTH_POST CARBON_12/28/15	12/28/2015	<1.2	<3.2	28	<1.6	<1.4	<2.7	1.5	2	6.5	<1.0	<4.2
Pre Carbon	SVE_SOUTH_PRE CARBON	2/1/2016	<8.6	<22	20	<11	<9.8	2,900	<11	14	120	<7.2	<37
Post Carbon	SVE_SOUTH_POST CARBON	2/1/2016	2.2	<3.2	160	2.90	<1.4	<2.7	<1.5	92	260	<1.0	<5.2
Pre Carbon	SVE_SOUTH_PRE CARBON	3/29/2016	<230	<610	710	<300	<270	71,000	<290	520	2,800	<200	<670
Post Carbon	SVE_SOUTH_POST CARBON	3/29/2016	<69	<180	490	<23	<79	9,300	<86	1500	9,300	<58	<200
Pre Carbon	SVE_SOUTH_PRE CARBON	4/27/2016	<6.4	<17	12	<8.4	<7.4	910	<8.0	<8.7	23	<5.4	<18
Post Carbon	SVE_SOUTH_POST CARBON	4/27/2016	<63	<160	180	<82	<72	11,000	<78	110	2,200	<53	<180
Pre Carbon	SVE_SOUTH_PRE CARBON	5/25/2016	<1.2	<3.2	4	<1.6	<1.4	550	2.9	3	22	<1.0	3.9
Post Carbon	SVE_SOUTH_POST CARBON	5/25/2016	<16	<41	2300	30.00	<18	14,000	<19	130	3,300	<13	<45
Pre Carbon	SVE_SOUTH_PRE CARBON	7/26/2016	<98	<260	340	<130	<110	18,000	<120	<130	970	<83	<420
Post Carbon	SVE_SOUTH_POST CARBON	7/26/2016	<78	<200	760	<120	<89	15,000	<97	220	1,400	<66	<330
Pre Carbon	SVE_SOUTH_PRE CARBON	8/30/2016	<86	<230	340	<110	<99	28,000	<110	<120	1,400	<73	<370
Post Carbon	SVE_SOUTH_POST CARBON	8/30/2016	<81	<210	370	<110	<93	19,000	<100	210	910	<68	<350
Pre Carbon	SVE_SOUTH_PRE CARBON	9/29/2016	<73	<190	340	<95	<83	25,000	<90	110	1,300	<61	<310
Post Carbon	SVE_SOUTH_POST CARBON	9/29/2016	<46	<120	410	<60	<53	14,000	<57	140	1,900	<39	<196

Please refer to notes at end of table.

Table 8
 South SVE System – Analytical Results
 NuStar Vancouver Facility
 Vancouver, Washington

Sampling Location	Sample ID	Date	1,1-Dichloroethane	1,1-Dichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Methylene Chloride	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	Trichloroethene	Vinyl chloride	Total Xylenes
			Concentrations in $\mu\text{g}/\text{m}^3$										
Pre Carbon	SVE-SOUTH_PRE CARBON_102516	10/25/2016	<150	<390	380	<190	<170	32,000	<180	<200	1,500	<120	<630
Post Carbon	SVE-SOUTH_POST CARBON_102516	10/25/2016	<100	<260	530	<130	<120	19,000	<130	180	2,700	<85	<430
Pre Carbon	SVE_SOUTH_PRE CARBON_112816	11/28/2016	<260	<670	420	<340	<290	52,000	<320	<350	2,100	<220	<1110
Post Carbon	SVE_SOUTH_POST CARBON_112816	11/28/2016	<79	<210	<100	<100	<90	18,000	<98	360	3,200	<66	<340
Pre Carbon	SVE_SOUTH_PRE CARBON_013017	1/30/2017	<260	<690	660	<340	<300	61,000	<330	400	2,400	<220	<1130
Post Carbon	SVE_SOUTH_POST CARBON_013017	1/30/2017	<1.2	<3.2	<1.6	<1.6	<1.4	24	1.8	<1.6	<2.1	<1.0	<5.2
Pre Carbon	SVE_SOUTH_PRE CARBON_073117	7/31/2017	<100	<260	400	<130	<110	17,000	340	<130	1,000	<84	<430
Post Carbon	SVE_SOUTH_POST CARBON_073117	7/31/2017	<1.2	<3.2	<1.6	<1.6	2.4	6.5	8.2	<1.6	3.9	2.4	<5.2
Pre Carbon	SVE_SOUTH_PRE CARBON_082817	8/28/2017	<60	<160	320	<79	<69	32,000	<75	90	1,100	<51	<256
Post Carbon	SVE_SOUTH_POST CARBON_082817	8/28/2017	<1.2	5.8	2	<1.6	2.4	160	2.3	<1.6	3.9	2.2	<5.2
Pre Carbon	SVE_SOUTH_PRE CARBON_092517	9/25/2017	<21	<55	200	<27	<24	23,000	<26	45	460	<18	<90
Post Carbon	SVE_SOUTH_POST CARBON_092517	9/25/2017	<1.2	8.0	16	<1.6	5.3	6.8	<1.5	<1.6	<2.1	2.2	<5.2
Pre Carbon	SVE_SOUTH_PRE CARBON_102617	10/26/2017	<40	<100	230	<52	<45	13,000	<49	64	700	<33	<167
Post Carbon	SVE_SOUTH_POST CARBON_102617	10/26/2017	2.0	15	98	2.1	1.6	9.7	<1.5	3.9	<2.1	1.5	<5.2
Pre Carbon	SVE_SOUTH_PRE CARBON_112917	11/29/2017	<140	<370	280	<180	<160	22,000	<170	<190	820	<120	<600
Post Carbon	SVE_SOUTH_POST CARBON_112917	11/29/2017	3.8	8.5	220	4.0	<2.0	<4.0	<2.2	12.0	<3.2	2.5	<5.7
Pre Carbon	SVE_SOUTH_PRE CARBON_122117	12/21/2017	--	--	--	--	--	--	--	--	--	--	--
Post Carbon	SVE_SOUTH_POST CARBON_122117	12/21/2017	4.6	4.9	300	5.2	1.7	<2.7	<1.5	20.0	7.2	1.8	<5.2

Notes:

1. $\mu\text{g}/\text{m}^3$ = Micrograms per cubic meter.
2. Samples analyzed by Modified EPA Method TO-15.
3. Only analytes detected in at least one sample are presented in this table.
4. S= Surrogate recoveries were above acceptable recovery limits. Results may be biased high.
5. **Bold** values represents detected concentration of listed analyte.
6. NS = Not sampled.

37 = average PCE post carbon last 6 months ($\mu\text{g}/\text{m}^3$).
 21,448 = average PCE pre carbon since January 2015 ($\mu\text{g}/\text{m}^3$).

Table 9
 North SVE System – VOC Mass Removal
 NuStar Vancouver Facility
 Vancouver, Washington

Sample Date	Post-Blower Pressure (in H ₂ O)	Air Flow Rate ⁽¹⁾ (cfm)	Total VOCs (mg/m ³)	VOC Removal (lb/day)
10/12/2011	0.1	250	10.5	0.2
1/23/2012	0.1	361	16.5	0.5
2/17/2012	0.05	215	11.3	0.2
3/22/2012	--	210	6.7	0.1
6/20/2012	0.2	217.8	0.3	0.005
8/22/2012	0.2	216	0.2	0.003
11/26/2012	0.05	215	22.6	0.436
12/21/2012	0.1	215	3.6	0.069
2/28/2013	0.1	215	4.6	0.088
5/24/2013	0.1	215	24.4	0.471
6/25/2013	0.1	215	13.8	0.267
8/27/2013	0.1	215	17.8	0.344
10/24/2013	0.1	215	10.6	0.204
12/27/2013	0.1	215	7.5	0.144
1/29/2014	3.0	215	1.4	0.028
2/24/2014	9.0	215	9.5	0.184
3/31/2014	1.0	215	3.7	0.072
4/29/2014	2.0	215	3.7	0.072
5/27/2014	2.0	215	4.4	0.085
7/3/2014	4.0	215	4.8	0.093
7/28/2014	3.0	215	7.7	0.148
9/30/2014	--	215	7.8	0.151
10/27/2014	2.0	215	15.4	0.298
11/25/2014	--	215	7.5	0.145
12/29/2014	2.0	215	15.3	0.296
1/26/2015	3.0	215	1.6	0.032
2/26/2015	0.1	215	0.0	0.001
3/30/2015	0.4	215	1.8	0.036
4/24/2015	0.4	215	0.6	0.012
5/14/2015	--	215	0.0	0.000
5/28/2015	0.05	215	0.4	0.007
7/29/2015	0.10	215	2.2	0.043
8/31/2015	0.05	215	7.8	0.150
9/28/2015	0.00	215	1.6	0.031
10/29/2015	1.00	215	6.9	0.134
11/30/2015	2.00	215	2.4	0.046
12/28/2015	0.10	215	5.7	0.110
2/1/2016	3.00	215	11.2	0.215
2/29/2016	0.10	215	8.0	0.154
3/29/2016	0.20	215	0.9	0.018
4/27/2016	1.00	215	1.6	0.030
5/25/2016	--*	--*	--*	--*
6/28/2016	0.10	215	1.8830	0.036
7/26/2016	1.20	215	0.0916	0.00177
9/29/2016	0.10	215	0.0150	0.00029
10/25/2016	0.10	215	0.0109	0.000211
11/28/2016	0.10	215	0.0067	0.000129
12/28/2016	0.10	215	0.0017	0.0000329
1/30/2017	0.10	215	0.0046	0.0000889
2/28/2017	0.10	215	0.0059	0.000114
3/28/2017	0.10	215	0.0061	0.000118
4/24/2017	0.10	215	0.0076	0.000147

Please refer to notes at end of table.

Table 9
 North SVE System – VOC Mass Removal
 NuStar Vancouver Facility
 Vancouver, Washington

Date	Activity	VOC Removal Rate (lb/day)	Days of Operation	Approximate VOCs Removed (lbs)	Approximate Cumulative VOCs Removed (lbs)
10/10/2011	Startup	--	--	--	--
10/12/2011	Sample	0.2	37	9	9
1/23/2012	Sample	0.5	31	17	26
2/17/2012	Sample	0.2	25	6	32
3/22/2012	Sample	0.1	34	5	37
6/20/2012	Sample	0.005	90	1	38
8/22/2012	Sample	0.003	63	1	39
11/26/2012	Sample	0.436	66	29	68
12/21/2012	Sample	0.069	25	2	70
2/28/2013	Sample	0.088	69	7	77
5/24/2013	Sample	0.471	--	--	77
6/25/2013	Sample	0.267	32	9	86
8/27/2013	Sample	0.344	63	22	108
10/24/2013	Sample	0.204	58	12	120
12/27/2013	Sample	0.144	64	10	130
1/29/2014	Sample	0.028	33	1	131
2/24/2014	Sample	0.184	--	--	131
3/31/2014	Sample	0.072	35	3	134
4/29/2014	Sample	0.072	29	3	137
5/27/2014	Sample	0.085	28	3	140
7/3/2014	Sample	0.093	37	4	144
7/28/2014	Sample	0.148	25	4	148
9/30/2014	Sample	0.151	64	10	158
10/27/2014	Sample	0.298	27	9	167
11/25/2014	Sample	0.145	29	5	172
12/29/2014	Sample	0.296	34	11	183
1/26/2015	Sample	0.032	28	1	184
2/26/2015	Sample	0.001	31	1	185
3/30/2015	Sample	0.036	32	2	187
4/24/2015	Sample	0.012	25	1	188
5/14/2015	Sample	0.000	20	0	188
5/28/2015	Sample	0.007	14	1	189
6/30/2015	Estimate	0.007	33	1	190
6/30/2015	Estimate	0.000	0	0	190
7/29/2015	Sample	0.043	29	2	192
8/31/2015	Sample	0.150	33	5	197
9/28/2015	Sample	0.031	28	1	198
10/29/2015	Sample	0.134	31	5	203
11/30/2015	Sample	0.046	32	2	205
12/28/2015	Sample	0.110	28	4	209
2/1/2016	Sample	0.215	35	8	217
2/29/2016	Sample	0.154	28	5	222
3/29/2016	Sample	0.018	29	1	223
4/27/2016	Sample	0.030	29	1	224
5/25/2016	Sample	--*	28	--*	221
6/28/2016	Sample	0.0364	34	2	223
7/26/2016	Sample	0.00177	28	1	224
9/29/2016	Sample	0.00029	65	1	225
10/25/2016	Sample	0.000211	26	1	226
11/28/2016	Sample	0.000129	34	1	227
12/28/2016	Sample	0.0000329	30	1	228
1/30/2017	Sample	0.0000889	33	1	229
2/28/2017	Sample	0.000114	29	1	230
3/28/2017	Sample	0.000118	28	1	231
4/24/2017	Sample	0.000147	27	1	232

Notes:

- Air flow rate read from system gauge.
- cfm = Cubic feet per minute.
- mg/m3 = Milligrams per cubic meter.
- lb/day = Pounds per day.
- lbs = Pounds.
- * = Not sampled. System intentionally shut down to evaluate system efficiency.

Table 10
 South SVE System – VOC Mass Removal
 NuStar Vancouver Facility
 Vancouver, Washington

Sample Date	Post-Blower Pressure (in H ₂ O)	Air Flow Rate ⁽¹⁾ (cfm)	Total VOCs (mg/m ³)	VOC Removal (lb/day)
10/6/2011	33.0	590	46	2.4
11/2/2011	27.0	590	29	1.5
12/14/2011	27.0	590	57	3.0
2/17/2012	29.0	-- ⁶	30	1.6
3/22/2012	27.0	658	31	1.9
4/26/2012	27.0	--	0	0.0
5/23/2012	31.0	--	20	1.2
6/20/2012	33.0	--	37	2.2
7/24/2012	32.0	--	34	2.0
8/22/2012	29.0	--	51	3.0
9/25/2012	29.0	--	52	3.1
10/29/2012	47.0	--	63	3.7
11/26/2012	18.0	--	11	0.6
12/21/2012	17.0	--	15	0.9
1/24/2013	10.0	--	2	0.1
2/28/2013	18.0	--	1	0.1
3/25/2013	16.0	--	4	0.2
4/29/2013	15.0	--	1	0.1
5/24/2013	47.0	--	251	14.8
6/25/2013	51.0	--	41	2.5
7/25/2013	50.0	--	24	1.4
8/27/2013	52.0	--	30	1.8
9/30/2013	45.0	--	28	1.6
10/24/2013	50.0	--	29	1.7
11/25/2013	51.0	--	22	1.3
12/27/2013	55.0	--	21	1.3
1/29/2014	50.0	--	21	1.2
2/24/2014	50.0	--	37	2.2
3/31/2014	46.0	--	21	1.2
4/29/2014	48.8	--	14	0.8
5/27/2014	49.0	--	13	0.7
7/3/2014	50.0	--	3	0.2
7/28/2014	50.0	--	16	0.9
8/25/2014	49.0	--	21	1.2
9/30/2014	40.0	--	18	1.1
11/3/2014	50.0	--	25	1.5
1/26/2015	20.0	--	23	1.3
2/26/2015	30.0	--	19	1.1
3/30/2015	29.0	--	18	1.1
4/24/2015	29.0	--	6	0.4
5/28/2015	28.0	--	9	0.5
7/29/2015	25.0	--	13	0.8
8/31/2015	26.0	--	13	0.8
9/28/2015	26.0	--	11	0.6
10/29/2015	27.0	--	19	1.1
11/30/2015	30.0	--	3	0.2
12/28/2015	29.0	--	36	2.2
2/1/2016	19.0	--	3	0.2
2/29/2016	30.0	--	3	0.2
3/29/2016	28.0	--	75	4.4
4/27/2016	5.0	--	1	0.1
5/25/2016	3.0	--	1	0.03
6/28/2016	-- *	-- *	-- *	-- *
7/26/2016	30.0	--	19	1.1
9/29/2016	28.0	--	27	1.6
10/25/2016	30.0	--	34	2.0
11/28/2016	30.0	--	55	3.3
1/30/2017	33.0	--	64	3.8
7/31/2017	31.0	--	19	1.1
8/28/2017	32.0	--	34	2.0
9/25/2017	30.0	--	24	1.4
10/26/2017	30.0	--	14	0.8
11/29/2017	30.0	--	23	1.4
12/21/2017	30.0	--	23	1.4

Please refer to notes at end of table.

Table 10
 South SVE System – VOC Mass Removal
 NuStar Vancouver Facility
 Vancouver, Washington

Date	Activity	VOC Removal Rate (lb/day)	Days of Operation	Approximate VOCs Removed (lbs)	Approximate Cumulative VOCs Removed (lbs)
10/6/2011	Startup	2.4	0.5	2	2
11/2/2011	Sample	1.5	27	41	43
12/14/2011	Sample	3.0	42	96	139
2/17/2012	Sample	1.6	65	151	290
3/22/2012	Sample	1.9	34	59	349
4/26/2012	Sample	0.0	35	33	382
5/23/2012	Sample	1.2	29	18	400
6/20/2012	Sample	2.2	28	47	447
7/24/2012	Sample	2.0	34	72	519
8/22/2012	Sample	3.0	29	74	593
9/25/2012	Sample	3.1	34	104	697
10/29/2012	Sample	3.7	34	116	813
11/26/2012	Sample	0.6	28	61	874
12/21/2012	Sample	0.9	25	19	893
1/24/2013	Sample	0.1	34	17	910
2/28/2013	Sample	0.1	35	3	913
3/25/2013	Sample	0.2	25	4	917
4/29/2013	Sample	0.1	35	6	923
5/24/2013	Sample	14.8	--	--	996
6/25/2013	Sample	2.5	32	277	1273
7/25/2013	Sample	1.4	30	58	1331
8/27/2013	Sample	1.8	33	53	1384
9/30/2013	Sample	1.6	34	59	1443
10/24/2013	Sample	1.7	24	41	1484
11/25/2013	Sample	1.3	32	48	1532
12/27/2013	Sample	1.2	32	41	1573
1/29/2014	Sample	1.2	33	41	1614
2/24/2014	Sample	2.2	--	--	1614
3/31/2014	Sample	1.2	35	60	1674
4/29/2014	Sample	0.8	29	30	1704
5/27/2014	Sample	0.7	28	22	1726
7/3/2014	Sample	0.2	37	18	1744
7/28/2014	Sample	0.9	25	15	1759
8/25/2014	Sample	1.2	28	31	1790
9/30/2014	Sample	1.1	36	42	1832
11/3/2014	Sample	1.5	30	39	1871
12/31/2014	Estimated	1.5	22	33	1904
1/26/2015	Sample	1.3	26	37	1941
2/26/2015	Sample	1.1	31	39	1980
3/30/2015	Sample	1.1	32	36	2016
4/24/2015	Sample	0.4	25	18	2034
5/28/2015	Sample	0.5	34	15	2049
7/29/2015	Sample	0.8	62	41	2090
8/31/2015	Sample	0.8	33	26	2116
9/28/2015	Sample	0.6	28	20	2136
10/29/2015	Sample	1.1	31	28	2164
11/30/2015	Sample	0.2	32	22	2186
12/28/2015	Sample	2.2	28	33	2219
2/1/2016	Sample	0.2	35	41	2260
2/29/2016	Sample	0.2	28	6	2266
3/29/2016	Sample	4.4	29	67	2333
4/27/2016	Sample	0.1	29	66	2399
5/25/2016	Sample	0.03	28	2	2401

Please refer to notes at end of table.

Table 10
 South SVE System – VOC Mass Removal
 NuStar Vancouver Facility
 Vancouver, Washington

Date	Activity	VOC Removal Rate (lb/day)	Days of Operation	Approximate VOCs Removed (lbs)	Approximate Cumulative VOCs Removed (lbs)
7/26/2016	Sample	1.1	62	36	2437
9/29/2016	Sample	1.6	65	89	2526
10/25/2016	Sample	2.0	26	47	2573
11/28/2016	Sample	3.3	34	90	2663
1/30/2017	Sample	3.8	63	223	2886
7/31/2017	Sample	1.1	182	449	3335
8/28/2017	Sample	2.0	28	44	3379
9/25/2017	Sample	1.4	28	48	3427
10/26/2017	Sample	0.8	31	35	3462
11/29/2017	Sample	1.4	34	38	3500
12/21/2017	estimated (using November effluent data)	1.4	22	30	3530

Notes:

1. Air flow rate read from system gauge.
2. cfm = cubic feet per minute.
3. mg/m³ = Milligrams per cubic meter.
4. lb/day = Pounds per day.
5. lbs = Pounds.
6. Flow rate was not measured on dates with dashes. For calculations, rate is assumed to be the same as measured the date before.
7. System was down during the October 27, 2014 monitoring event and was restarted on October 29, 2014. It is assumed that the system was down for a total of four days, although the exact duration of shutdown is unknown.
8. * = system was off for part replacement.

Table 11
 Groundwater Analytical Results - Ammonia, Nitrate, and Nitrite
 NuStar Vancouver Facility
 Vancouver, Washington

Well Number:	EX					MW-1	MW-2	MW-3	MW-5	MW-6	MW-7					MW-8		MW-9		MW-10		
Sample Date:	2/6/2007	3/23/2009	3/16/2010	6/7/2011	12/9/2011	11/9/2017	11/6/2017	11/8/2017	11/7/2017	11/7/2017	2/6/2007	6/10/2008	3/23/2009	3/16/2010	6/7/2011	12/9/2011	11/7/2017	6/10/2008	11/6/2017	9/21/2010	11/9/2017	11/6/2017
Analyte	Concentrations in mg/L (ppm)																					
Attenuation Chemistry																						
Ammonia (as Nitrogen)	26.7	14	3.4	--	--	3.96	6.34	1.68	2.86	0.608	3.00	4.89	11	2.4	--	--	9.09	<0.0500	<0.050	1.4	17.4	35.6
Nitrate-Nitrogen	108	43	89	150	<0.50	46.4	0.26	2.7	<0.10	0.35	60.7	67.5	56	99	140	<0.50	<0.10	167	207	89	559	333
Nitrite-Nitrogen	0.49	0.54	0.71	<0.10	<0.10	<1.0	<0.10	<1.0	<0.10	<0.10	<0.100	0.1	<0.10	<0.50	<0.10	<0.10	<0.10	<0.1	<0.10	<0.10	<0.10	0.270

Please refer to notes at end of table.

Table 11
 Groundwater Analytical Results - Ammonia, Nitrate, and Nitrite
 NuStar Vancouver Facility
 Vancouver, Washington

Well Number:	MW-12				MW-13	MW-14	MW-15	MW-16	MW-17	MW-18i		MW-19		MW-19i	MW-20i	MW-21i-40		MW-21i-105		MW-22i	MW-23i	
Sample Date:	10/19/2010	6/7/2011	12/7/2011	11/9/2017	11/7/2017	11/8/2017	11/6/2017	11/6/2017	11/8/2017	6/10/2008	11/7/2017	10/19/2010	11/9/2017	11/8/2017	11/7/2017	6/10/2008	11/8/2017	6/10/2008	11/8/2017	11/7/2017	6/10/2008	11/8/2017
Analyte	Concentrations in mg/L (ppm)																					
Attenuation Chemistry																						
Ammonia (as Nitrogen)	--	--	--	55.4	35.0	34.7	<0.050	<0.050	0.634	<0.0500	<0.050	--	80	0.236	0.125	0.0594	<0.050	0.0645	<0.050	0.354	<0.0500	<0.050
Nitrate-Nitrogen	59	1.1	67	0.57	0.52	50.3	9.78	9.95	43.4	0.35	1.07	19	41	<0.10	0.28	<0.100	1.9	<0.100	1.6	<1.0	0.440	0.78
Nitrite-Nitrogen	--	<0.10	<0.10	<0.25	<0.10	<1.0	<0.10	<0.10	<1.0	<0.1	<0.10	--	<1.0	<0.10	<0.10	<0.100	<1.0	<0.100	<1.0	<1.0	<0.100	<0.10

Please refer to notes at end of table.

Table 11
 Groundwater Analytical Results - Ammonia, Nitrate, and Nitrite
 NuStar Vancouver Facility
 Vancouver, Washington

Well Number:	MW-24i			MW-24d	MW-25i	MW-26	MW-32i	MW-32s	EW-1	S-1	S-2	MGMS1-3(43)		MGMS1-2(60)	MGMS1-1(110)	MGMS2-4(40)				MGMS2-3(60)	MGMS2-2(110)
Sample Date:	6/7/2011	12/7/2011	11/9/2017	11/6/2017	11/8/2017	11/8/2017	11/10/2017	11/10/2017	11/9/2017	11/8/2017	11/8/2017	10/19/2010	11/7/2017	11/7/2017	11/7/2017	9/21/2010	6/7/2011	12/7/2011	11/9/2017	11/9/2017	11/9/2017
Analyte	Concentrations in mg/L (ppm)																				
Attenuation Chemistry																					
Ammonia (as Nitrogen)	--	--	<0.050	0.153	0.138	34.1	<0.050	0.235	<0.050	7.13	5.64	--	217	<0.050	0.822	130	--	--	87.1	1.03	<0.050
Nitrate-Nitrogen	0.50	1.6	3.09	<0.10	0.53	101	1.33	0.58	0.50	4.14	1.05	390	120	1.91	0.73	560	200	8.0	<0.10	0.12	0.37
Nitrite-Nitrogen	<0.10	<0.10	<0.10	<0.10	<0.25	<2.5	<0.10	<0.10	<0.10	<0.10	<0.10	--	<1.0	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10

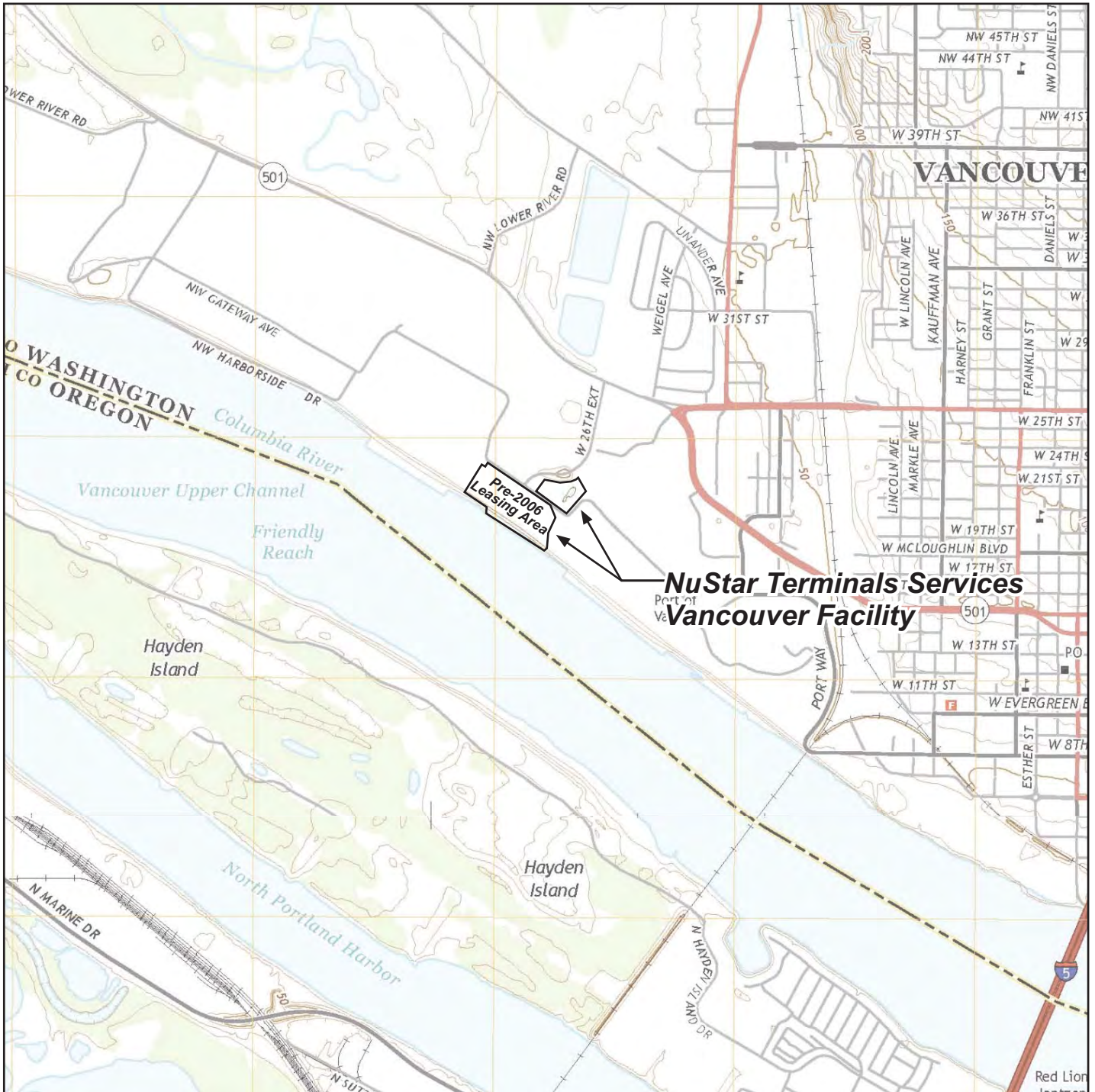
Please refer to notes at end of table.

Table 11
 Groundwater Analytical Results - Ammonia, Nitrate, and Nitrite
 NuStar Vancouver Facility
 Vancouver, Washington

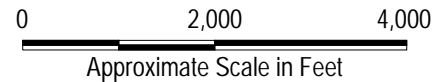
Well Number:	MGMS2-1(132)	MGMS3-4(40)	MGMS3-3(60)	MGMS3-2(110)	MGMS3-1(132)	MP-1					
Sample Date:	11/9/2017	11/10/2017	11/10/2017	11/10/2017	11/10/2017	2/6/2007	3/23/2009	3/16/2010	6/7/2011	12/9/2011	11/9/2017
Analyte	Concentrations in mg/L (ppm)										
Attenuation Chemistry											
Ammonia (as Nitrogen)	<0.050	1.71	<0.050	<0.050	<0.050	42.4	35	37	--	--	12.2
Nitrate-Nitrogen	<0.10	<0.10	<0.10	0.48	0.52	247	210	990	160	120	23.0
Nitrite-Nitrogen	<0.10	<0.10	<0.10	<0.10	<0.10	0.18	1.2	0.76	<0.10	0.91	<0.50

Notes:

1. mg/L (ppm) = Milligrams per liter (parts per million).
2. **Boldface** value represents detected concentration of listed analyte.
3. -- = Not sampled or not analyzed.
4. < = Not detected at or above the specified laboratory method reporting limit (MRL).




Note: Base map prepared from USGS 7.5-minute quadrangles of Vancouver, WA and Portland, OR-WA, dated 2014 as provided by USGS.gov.



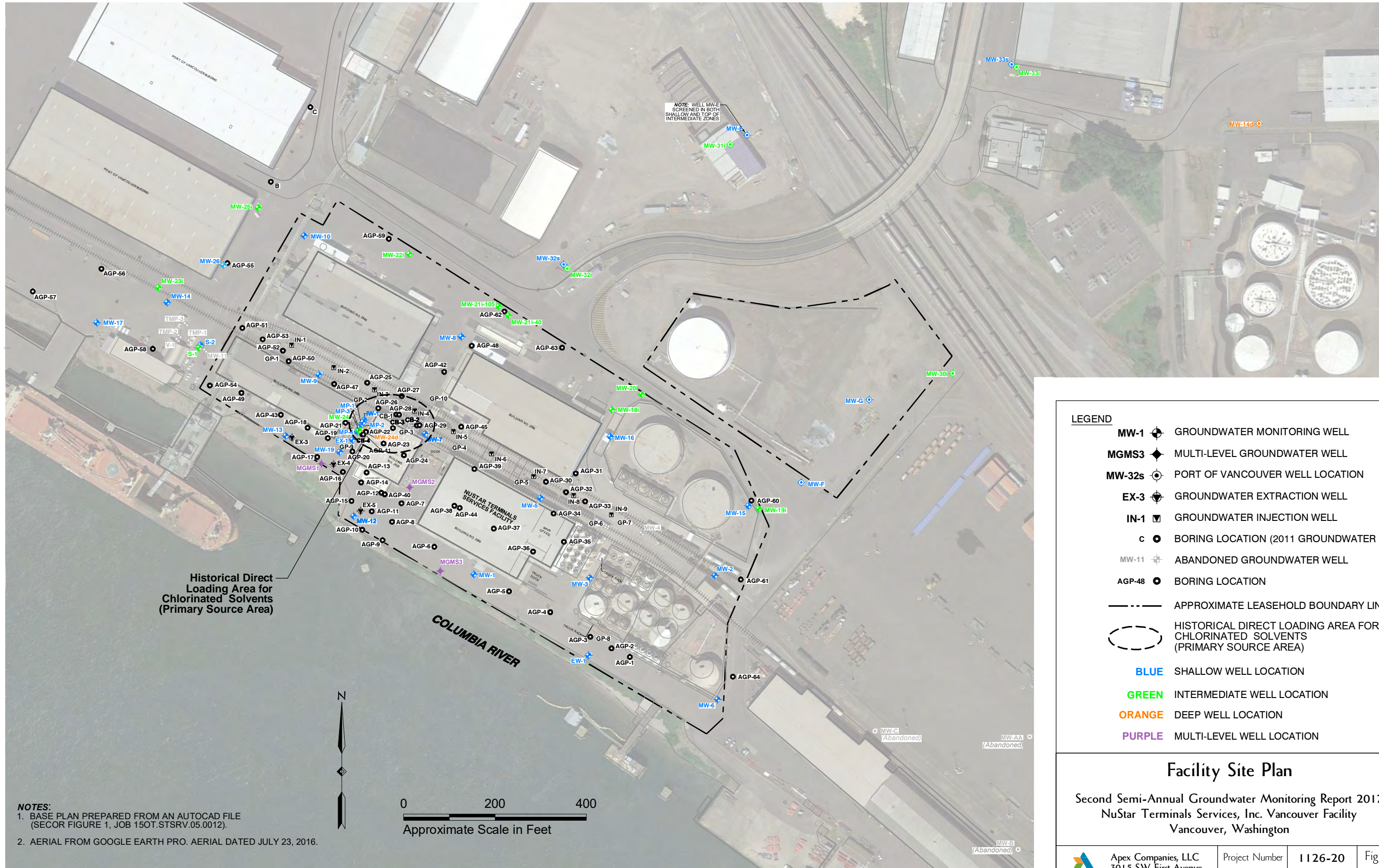
Facility Location Map

Second Semi-Annual Groundwater Monitoring Report 2017
 NuStar Terminals Services, Inc. Vancouver Facility
 Vancouver, Washington

 Apex Companies, LLC
 3015 SW First Avenue
 Portland, Oregon 97201

Project Number	1126-20
January 2018	

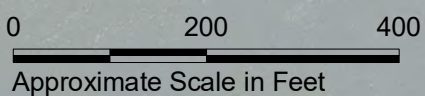
Figure	1
--------	---



NOTE: WELL MW-E SCREENED IN BOTH SHALLOW AND TOP OF INTERMEDIATE ZONES

Historical Direct Loading Area for Chlorinated Solvents (Primary Source Area)

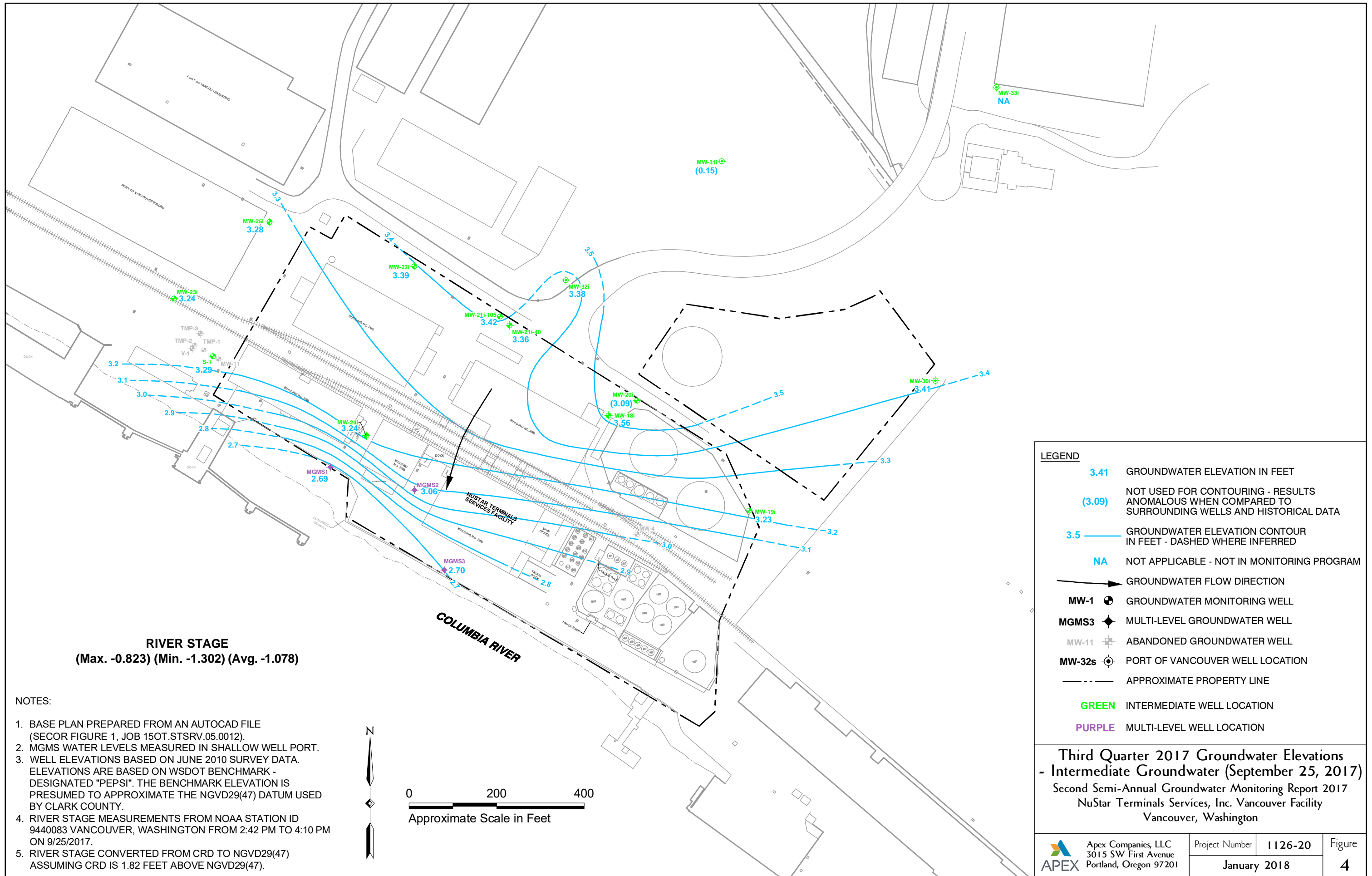
NOTES:
 1. BASE PLAN PREPARED FROM AN AUTOCAD FILE (SECOR FIGURE 1, JOB 150T.STSRV.05.0012).
 2. AERIAL FROM GOOGLE EARTH PRO. AERIAL DATED JULY 23, 2016.

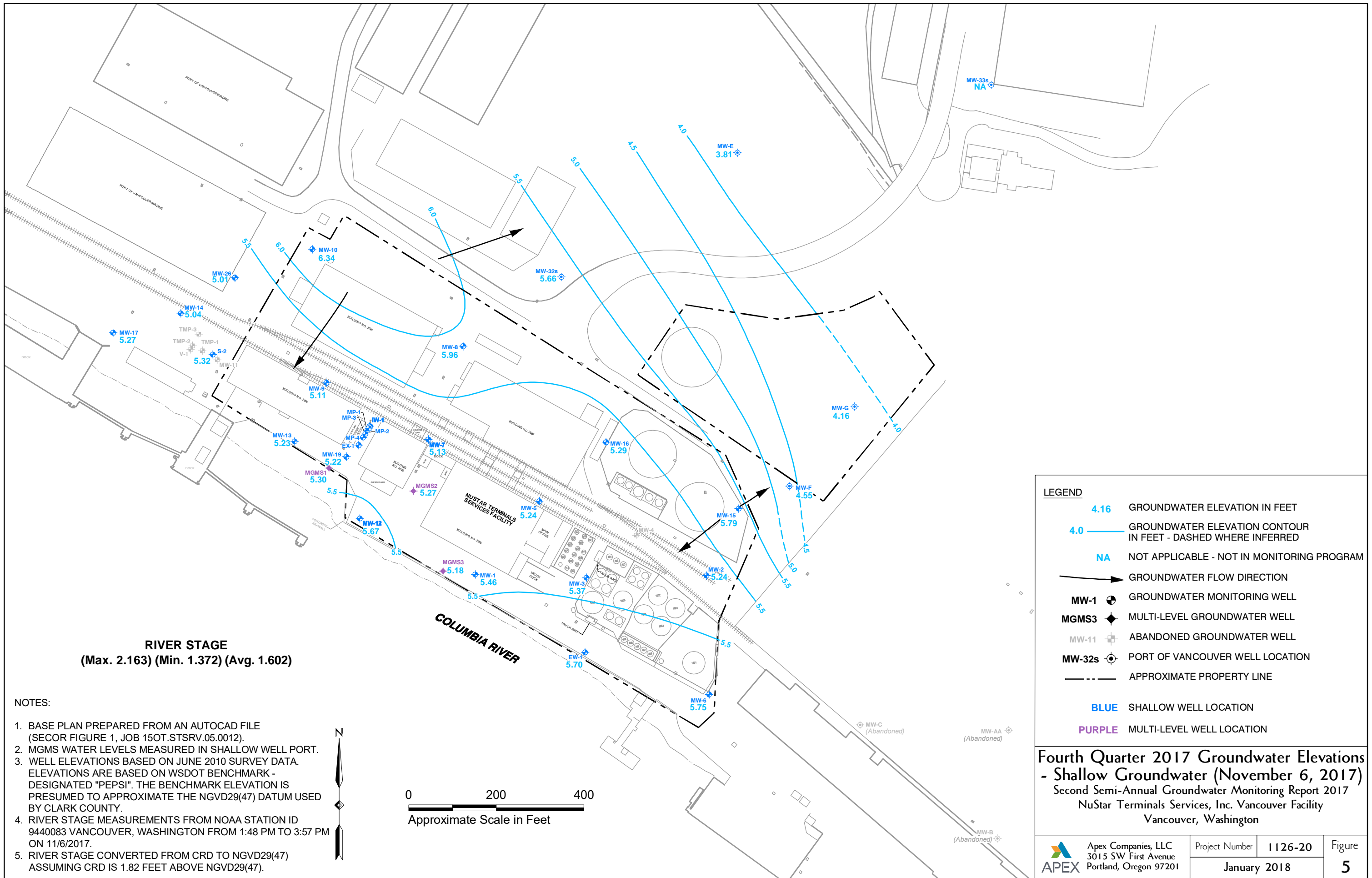


LEGEND

MW-1	GROUNDWATER MONITORING WELL
MGMS3	MULTI-LEVEL GROUNDWATER WELL
MW-32s	PORT OF VANCOUVER WELL LOCATION
EX-3	GROUNDWATER EXTRACTION WELL
IN-1	GROUNDWATER INJECTION WELL
c	BORING LOCATION (2011 GROUNDWATER INV.)
MW-11	ABANDONED GROUNDWATER WELL
AGP-48	BORING LOCATION
	APPROXIMATE LEASEHOLD BOUNDARY LINE
	HISTORICAL DIRECT LOADING AREA FOR CHLORINATED SOLVENTS (PRIMARY SOURCE AREA)
BLUE	SHALLOW WELL LOCATION
GREEN	INTERMEDIATE WELL LOCATION
ORANGE	DEEP WELL LOCATION
PURPLE	MULTI-LEVEL WELL LOCATION

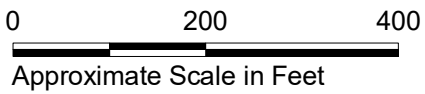
Facility Site Plan
 Second Semi-Annual Groundwater Monitoring Report 2017
 NuStar Terminals Services, Inc. Vancouver Facility
 Vancouver, Washington





RIVER STAGE
 (Max. 2.163) (Min. 1.372) (Avg. 1.602)

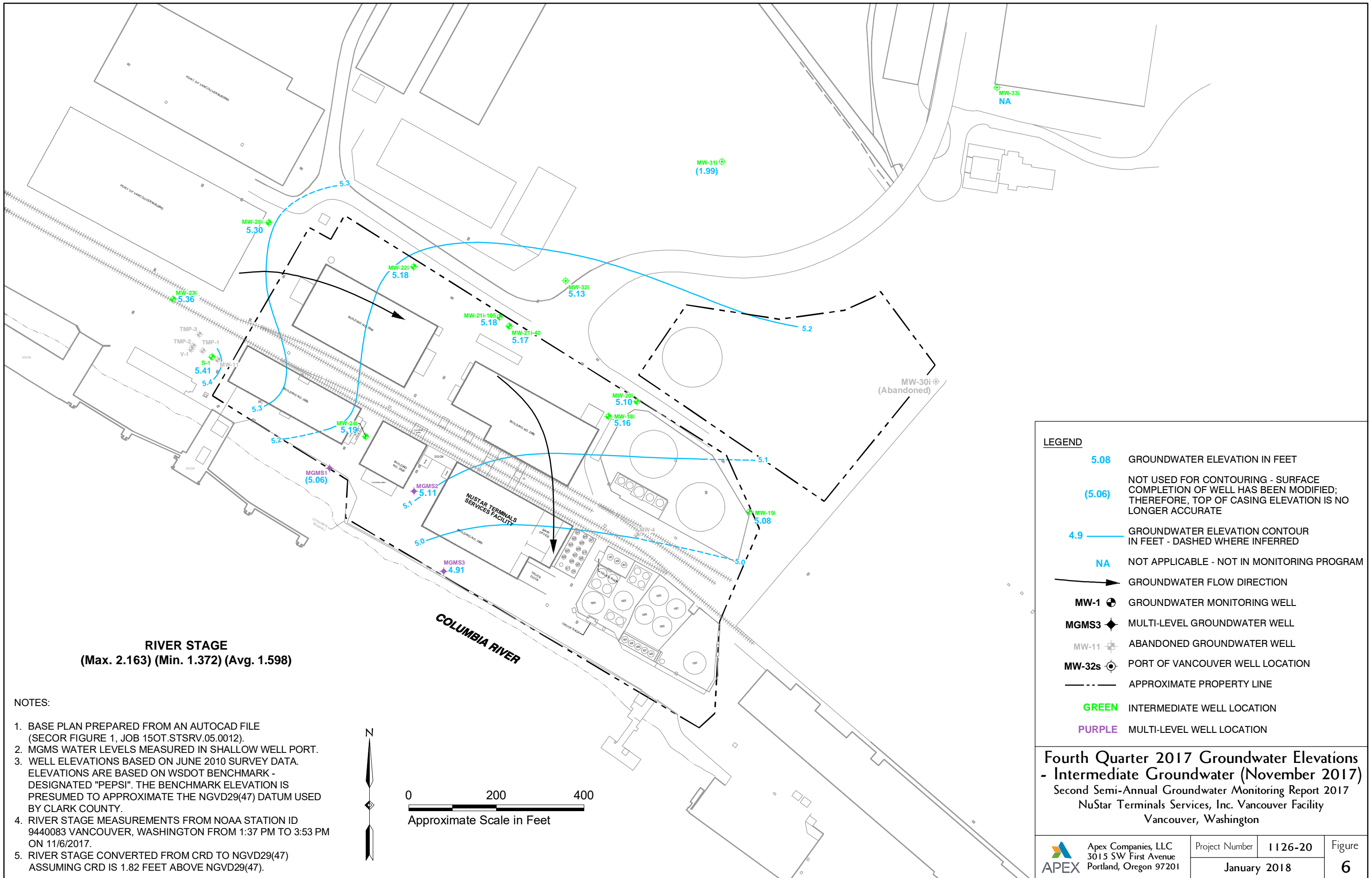
- NOTES:
1. BASE PLAN PREPARED FROM AN AUTOCAD FILE (SECOR FIGURE 1, JOB 150T.STSRV.05.0012).
 2. MGMS WATER LEVELS MEASURED IN SHALLOW WELL PORT.
 3. WELL ELEVATIONS BASED ON JUNE 2010 SURVEY DATA. ELEVATIONS ARE BASED ON WSDOT BENCHMARK - DESIGNATED "PEPSI". THE BENCHMARK ELEVATION IS PRESUMED TO APPROXIMATE THE NGVD29(47) DATUM USED BY CLARK COUNTY.
 4. RIVER STAGE MEASUREMENTS FROM NOAA STATION ID 9440083 VANCOUVER, WASHINGTON FROM 1:48 PM TO 3:57 PM ON 11/6/2017.
 5. RIVER STAGE CONVERTED FROM CRD TO NGVD29(47) ASSUMING CRD IS 1.82 FEET ABOVE NGVD29(47).



LEGEND

4.16	GROUNDWATER ELEVATION IN FEET
4.0	GROUNDWATER ELEVATION CONTOUR IN FEET - DASHED WHERE INFERRED
NA	NOT APPLICABLE - NOT IN MONITORING PROGRAM
→	GROUNDWATER FLOW DIRECTION
MW-1	GROUNDWATER MONITORING WELL
MGMS3	MULTI-LEVEL GROUNDWATER WELL
MW-11	ABANDONED GROUNDWATER WELL
MW-32s	PORT OF VANCOUVER WELL LOCATION
---	APPROXIMATE PROPERTY LINE
BLUE	SHALLOW WELL LOCATION
PURPLE	MULTI-LEVEL WELL LOCATION

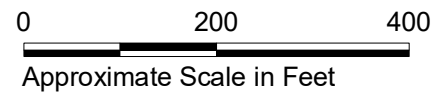
Fourth Quarter 2017 Groundwater Elevations - Shallow Groundwater (November 6, 2017)
 Second Semi-Annual Groundwater Monitoring Report 2017
 NuStar Terminals Services, Inc. Vancouver Facility
 Vancouver, Washington



RIVER STAGE
 (Max. 2.163) (Min. 1.372) (Avg. 1.598)

NOTES:

1. BASE PLAN PREPARED FROM AN AUTOCAD FILE (SECOR FIGURE 1, JOB 150T.STSRV.05.0012).
2. MGMS WATER LEVELS MEASURED IN SHALLOW WELL PORT.
3. WELL ELEVATIONS BASED ON JUNE 2010 SURVEY DATA. ELEVATIONS ARE BASED ON WSDOT BENCHMARK - DESIGNATED "PEPSI". THE BENCHMARK ELEVATION IS PRESUMED TO APPROXIMATE THE NGVD29(47) DATUM USED BY CLARK COUNTY.
4. RIVER STAGE MEASUREMENTS FROM NOAA STATION ID 9440083 VANCOUVER, WASHINGTON FROM 1:37 PM TO 3:53 PM ON 11/6/2017.
5. RIVER STAGE CONVERTED FROM CRD TO NGVD29(47) ASSUMING CRD IS 1.82 FEET ABOVE NGVD29(47).

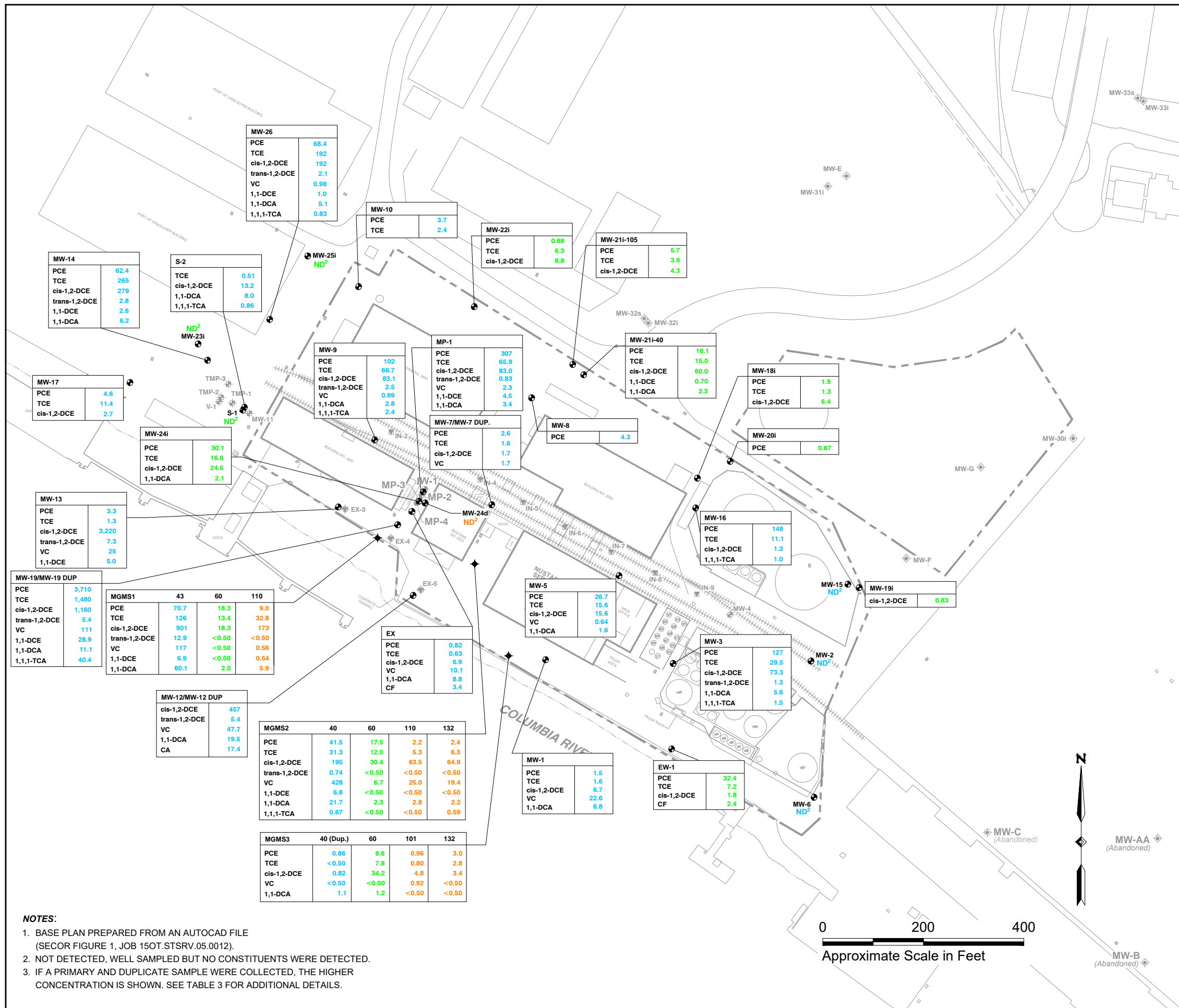


LEGEND

- 5.08** GROUNDWATER ELEVATION IN FEET
- (5.06)** NOT USED FOR CONTOURING - SURFACE COMPLETION OF WELL HAS BEEN MODIFIED; THEREFORE, TOP OF CASING ELEVATION IS NO LONGER ACCURATE
- 4.9** GROUNDWATER ELEVATION CONTOUR IN FEET - DASHED WHERE INFERRED
- NA** NOT APPLICABLE - NOT IN MONITORING PROGRAM
- GROUNDWATER FLOW DIRECTION
- MW-1** GROUNDWATER MONITORING WELL
- MGMS3** MULTI-LEVEL GROUNDWATER WELL
- MW-11** ABANDONED GROUNDWATER WELL
- MW-32s** PORT OF VANCOUVER WELL LOCATION
- APPROXIMATE PROPERTY LINE
- GREEN** INTERMEDIATE WELL LOCATION
- PURPLE** MULTI-LEVEL WELL LOCATION

Fourth Quarter 2017 Groundwater Elevations - Intermediate Groundwater (November 2017)

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 NuStar Terminals Services, Inc. Vancouver Facility
 Vancouver, Washington



LEGEND

WELL IDENTIFICATION

DEPTH OF PORT SAMPLED (IF NOT SPECIFIED - SINGLE PORT WELL)

CHEMICAL CONCENTRATION IN µg/L (ONLY DETECTED COMPOUNDS ARE SHOWN)

MGMS1	60
PCE	18.3
TCE	13.4
cis-1,2-DCE	18.3
trans-1,2-DCE	<0.50
VC	<0.50
1,1-DCE	<0.50
1,1-DCA	2.0

ANALYTE SAMPLED

- EX-3 GROUNDWATER EXTRACTION WELL
- IN-1 GROUNDWATER INJECTION WELL
- MW-1 GROUNDWATER MONITORING WELL
- MGMS3 MULTI-LEVEL GROUNDWATER WELL
- MW-11 ABANDONED GROUNDWATER WELL
- MW-32s PORT OF VANCOUVER WELL LOCATION

- BLUE SHALLOW ZONE CONCENTRATION DATA (DEPTHS OF 0 TO 45 FEET)
- GREEN INTERMEDIATE ZONE CONCENTRATION DATA (DEPTHS OF 45 TO 100 FEET)
- ORANGE DEEP ZONE CONCENTRATION DATA (DEPTHS OVER 100 FEET)

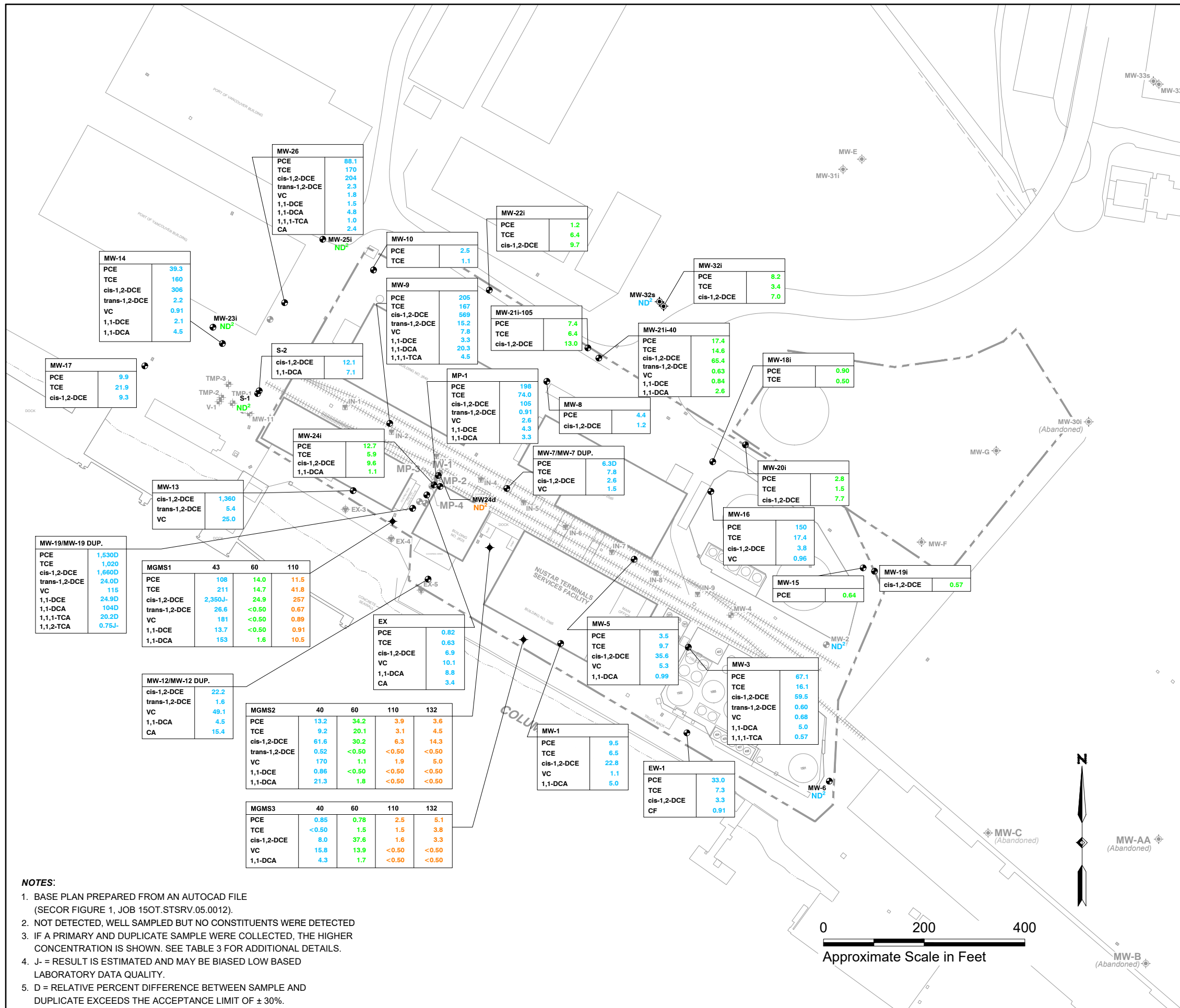
ABBREVIATIONS

PCE	TETRACHLOROETHENE
TCE	TRICHLOROETHENE
cis-1,2-DCE	CIS-1,2-DICHLOROETHENE
trans-1,2-DCE	TRANS-1,2-DICHLOROETHENE
VC	VINYL CHLORIDE
1,1-DCE	1,1-DICHLOROETHENE
1,1-DCA	1,1-DICHLOROETHANE
1,1,1-TCA	1,1,1-TRICHLOROETHANE
CF	CHLOROFORM
CA	CHLOROETHANE

NOTES:

1. BASE PLAN PREPARED FROM AN AUTOCAD FILE (SECOR FIGURE 1, JOB 150T.STSRV.05.0012).
2. NOT DETECTED, WELL SAMPLED BUT NO CONSTITUENTS WERE DETECTED.
3. IF A PRIMARY AND DUPLICATE SAMPLE WERE COLLECTED, THE HIGHER CONCENTRATION IS SHOWN. SEE TABLE 3 FOR ADDITIONAL DETAILS.

Third Quarter 2017 Groundwater Concentrations (September 2017)
 Second Semi-Annual Groundwater Monitoring Report 2017
 NuStar Terminals Services, Inc. Vancouver Facility
 Vancouver, Washington



LEGEND

WELL IDENTIFICATION

DEPTH OF PORT SAMPLED (IF NOT SPECIFIED - SINGLE PORT WELL)

CHEMICAL CONCENTRATION IN µg/L (ONLY DETECTED COMPOUNDS ARE SHOWN)

MGMS1	60
PCE	14.0
TCE	14.7
cis-1,2-DCE	24.9
trans-1,2-DCE	<0.50
VC	<0.50
1,1-DCE	<0.50
1,1-DCA	1.6

ANALYTE SAMPLED

- EX-3 GROUNDWATER EXTRACTION WELL
- IN-1 GROUNDWATER INJECTION WELL
- MW-1 GROUNDWATER MONITORING WELL
- MGMS3 MULTI-LEVEL GROUNDWATER WELL
- MW-11 ABANDONED GROUNDWATER WELL
- MW-32s PORT OF VANCOUVER WELL LOCATION

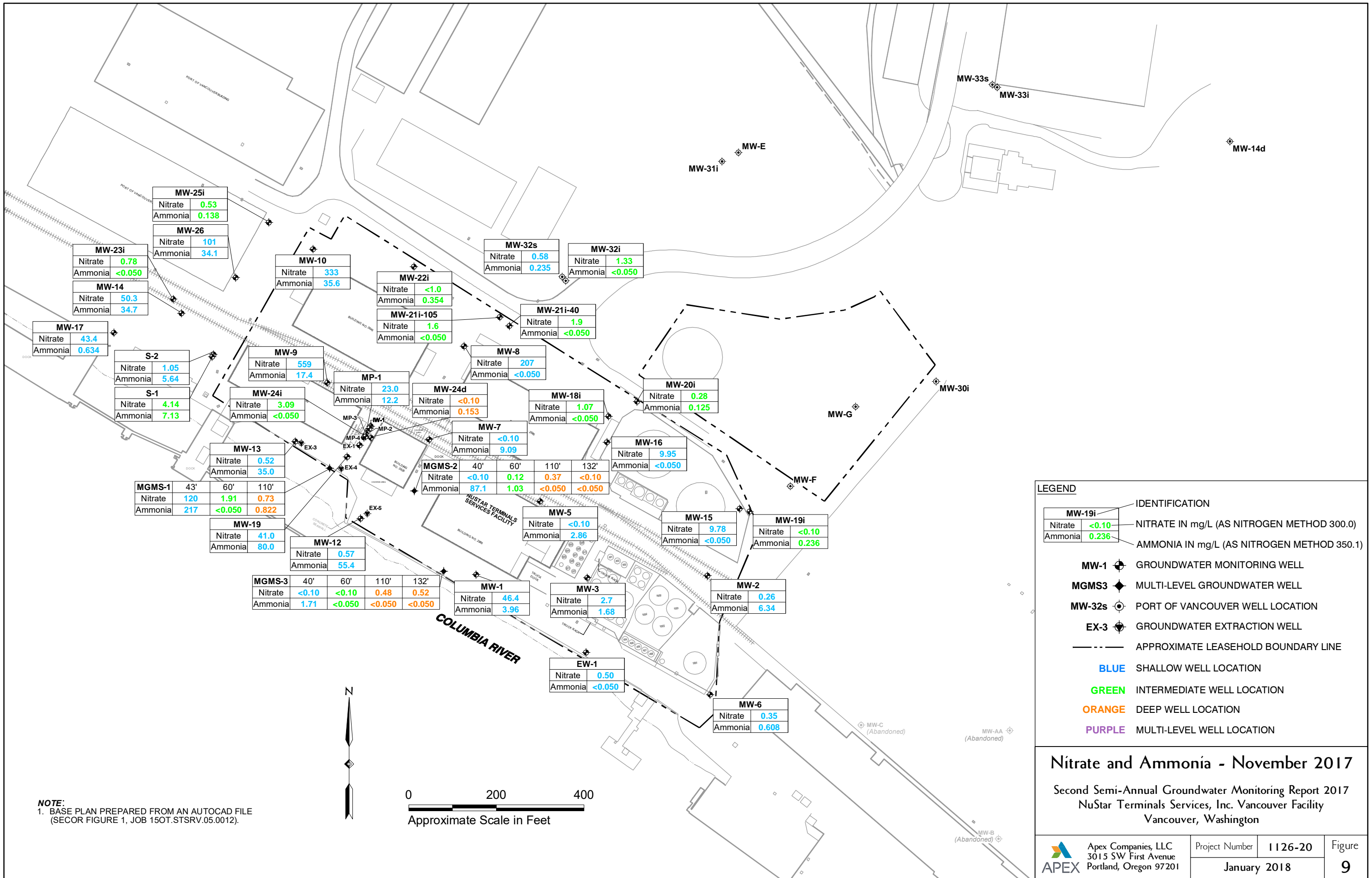
- BLUE SHALLOW ZONE CONCENTRATION DATA (DEPTHS OF 0 TO 45 FEET)
- GREEN INTERMEDIATE ZONE CONCENTRATION DATA (DEPTHS OF 45 TO 100 FEET)
- ORANGE DEEP ZONE CONCENTRATION DATA (DEPTHS OVER 100 FEET)

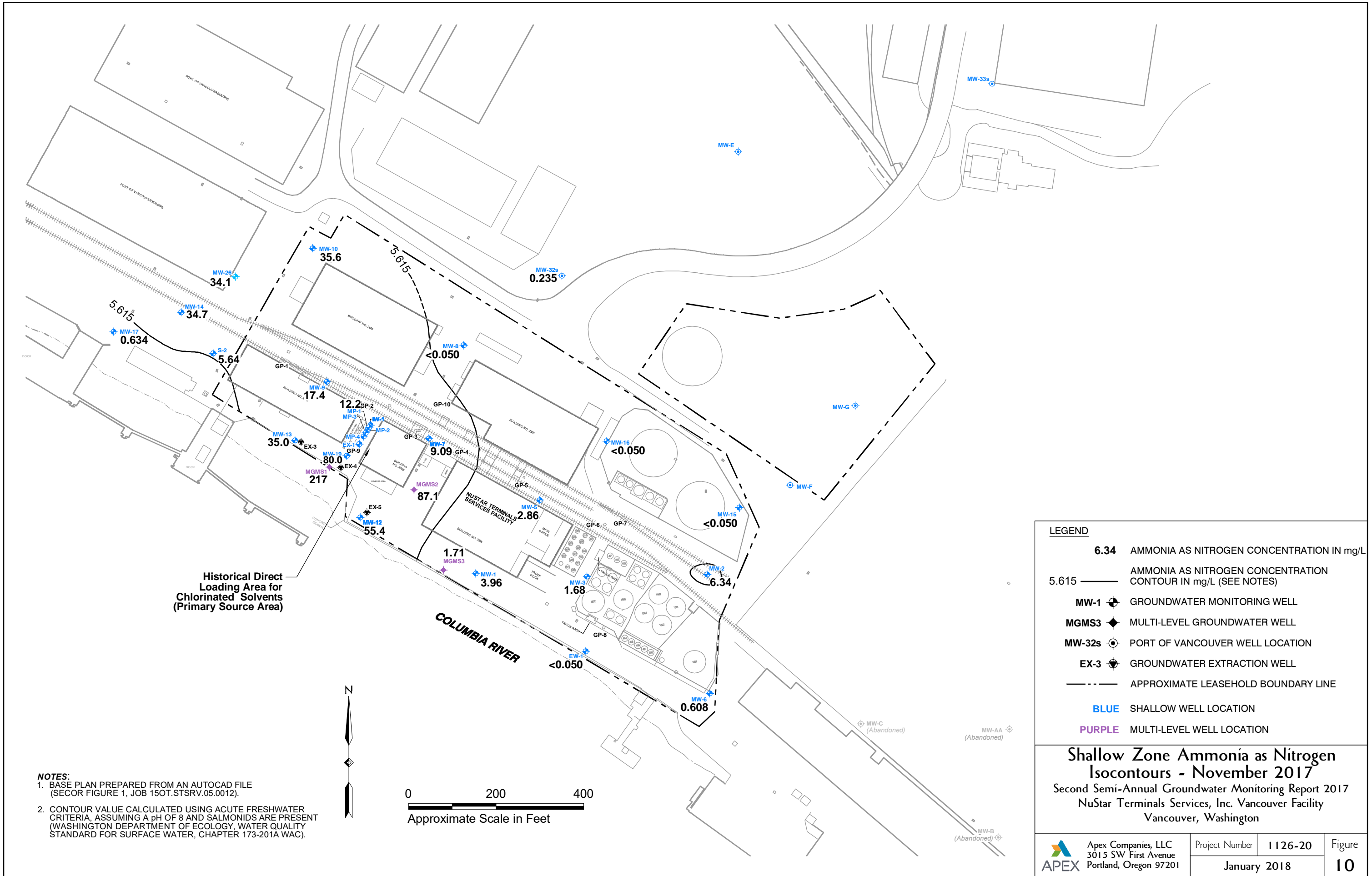
ABBREVIATIONS

PCE	TETRACHLOROETHENE
TCE	TRICHLOROETHENE
cis-1,2-DCE	CIS-1,2-DICHLOROETHENE
trans-1,2-DCE	TRANS-1,2-DICHLOROETHENE
VC	VINYL CHLORIDE
1,1-DCE	1,1-DICHLOROETHENE
1,1-DCA	1,1-DICHLOROETHANE
1,1,1-TCA	1,1,1-TRICHLOROETHANE
1,1,2-TCA	1,1,2-TRICHLOROETHANE
CF	CHLOROFORM
CA	CHLOROETHANE

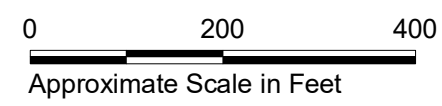
- NOTES:**
1. BASE PLAN PREPARED FROM AN AUTOCAD FILE (SECOR FIGURE 1, JOB 150T.STSRV.05.0012).
 2. NOT DETECTED, WELL SAMPLED BUT NO CONSTITUENTS WERE DETECTED
 3. IF A PRIMARY AND DUPLICATE SAMPLE WERE COLLECTED, THE HIGHER CONCENTRATION IS SHOWN. SEE TABLE 3 FOR ADDITIONAL DETAILS.
 4. J- = RESULT IS ESTIMATED AND MAY BE BIASED LOW BASED LABORATORY DATA QUALITY.
 5. D = RELATIVE PERCENT DIFFERENCE BETWEEN SAMPLE AND DUPLICATE EXCEEDS THE ACCEPTANCE LIMIT OF ± 30%.

Fourth Quarter 2017 Groundwater Concentrations (November 2017)
 Second Semi-Annual Groundwater Monitoring Report 2017
 NuStar Terminals Services, Inc. Vancouver Facility
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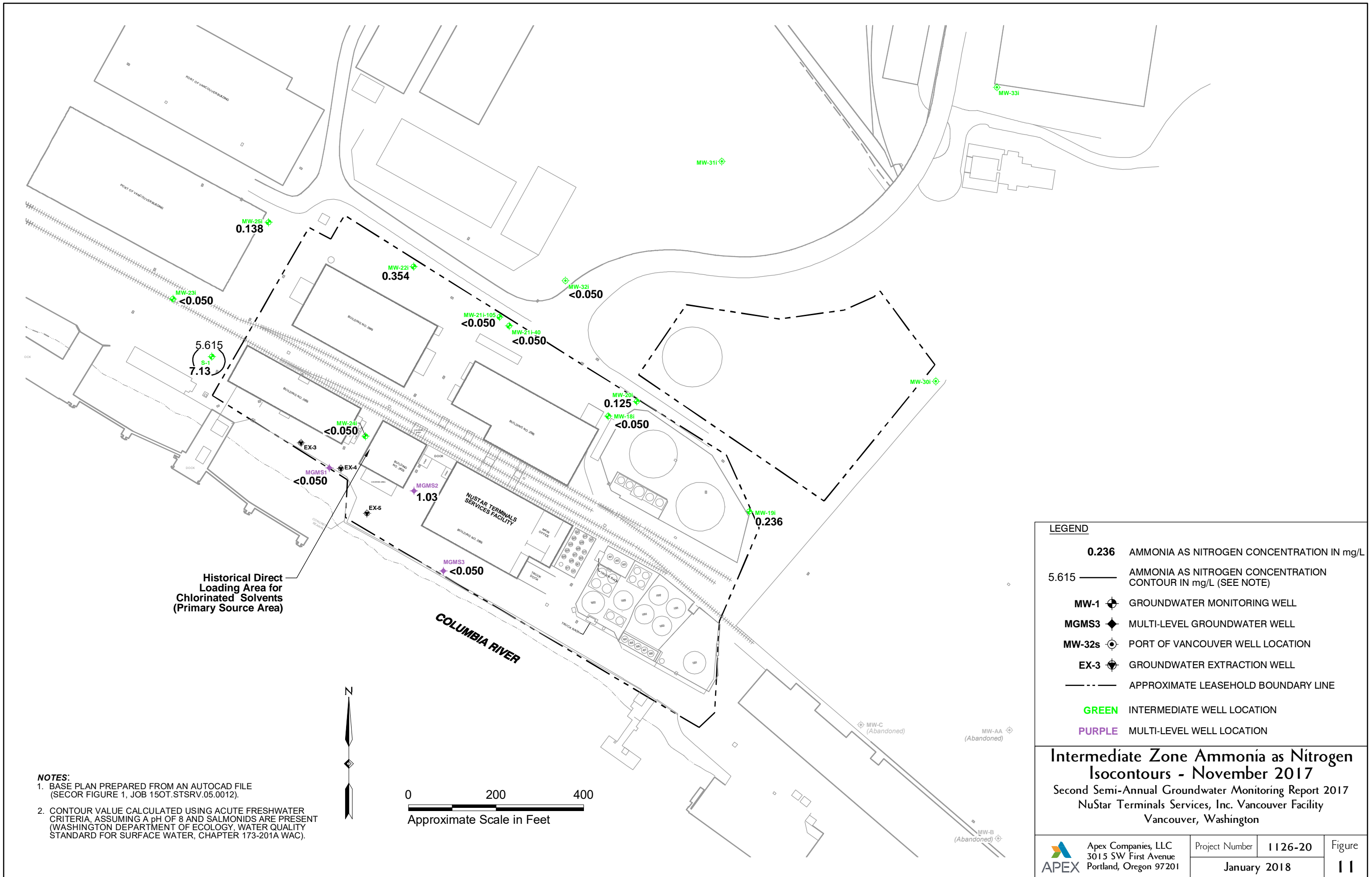


NOTES:
 1. BASE PLAN PREPARED FROM AN AUTOCAD FILE (SECOR FIGURE 1, JOB 150T.STSRV.05.0012).
 2. CONTOUR VALUE CALCULATED USING ACUTE FRESHWATER CRITERIA, ASSUMING A pH OF 8 AND SALMONIDS ARE PRESENT (WASHINGTON DEPARTMENT OF ECOLOGY, WATER QUALITY STANDARD FOR SURFACE WATER, CHAPTER 173-201A WAC).



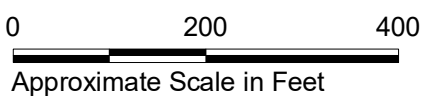
LEGEND	
6.34	AMMONIA AS NITROGEN CONCENTRATION IN mg/L
5.615	AMMONIA AS NITROGEN CONCENTRATION CONTOUR IN mg/L (SEE NOTES)
MW-1	GROUNDWATER MONITORING WELL
MGMS3	MULTI-LEVEL GROUNDWATER WELL
MW-32s	PORT OF VANCOUVER WELL LOCATION
EX-3	GROUNDWATER EXTRACTION WELL
- - -	APPROXIMATE LEASEHOLD BOUNDARY LINE
BLUE	SHALLOW WELL LOCATION
PURPLE	MULTI-LEVEL WELL LOCATION

Shallow Zone Ammonia as Nitrogen Isocontours - November 2017
 Second Semi-Annual Groundwater Monitoring Report 2017
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 Vancouver, Washington



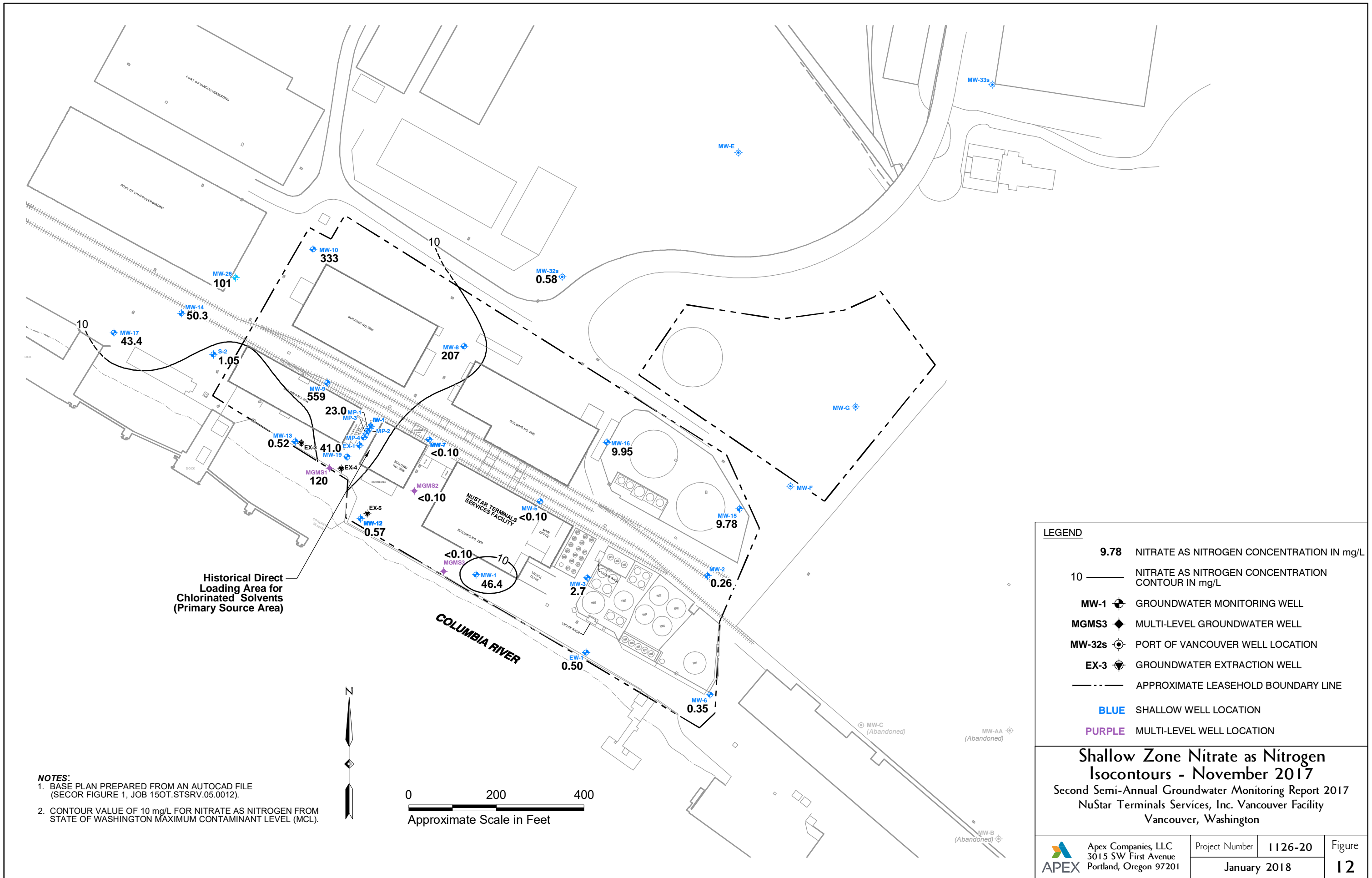
Historical Direct Loading Area for Chlorinated Solvents (Primary Source Area)

NOTES:
 1. BASE PLAN PREPARED FROM AN AUTOCAD FILE (SECOR FIGURE 1, JOB 150T.STSRV.05.0012).
 2. CONTOUR VALUE CALCULATED USING ACUTE FRESHWATER CRITERIA, ASSUMING A pH OF 8 AND SALMONIDS ARE PRESENT (WASHINGTON DEPARTMENT OF ECOLOGY, WATER QUALITY STANDARD FOR SURFACE WATER, CHAPTER 173-201A WAC).



0.236	AMMONIA AS NITROGEN CONCENTRATION IN mg/L
5.615	AMMONIA AS NITROGEN CONCENTRATION CONTOUR IN mg/L (SEE NOTE)
MW-1	GROUNDWATER MONITORING WELL
MGMS3	MULTI-LEVEL GROUNDWATER WELL
MW-32s	PORT OF VANCOUVER WELL LOCATION
EX-3	GROUNDWATER EXTRACTION WELL
---	APPROXIMATE LEASEHOLD BOUNDARY LINE
GREEN	INTERMEDIATE WELL LOCATION
PURPLE	MULTI-LEVEL WELL LOCATION

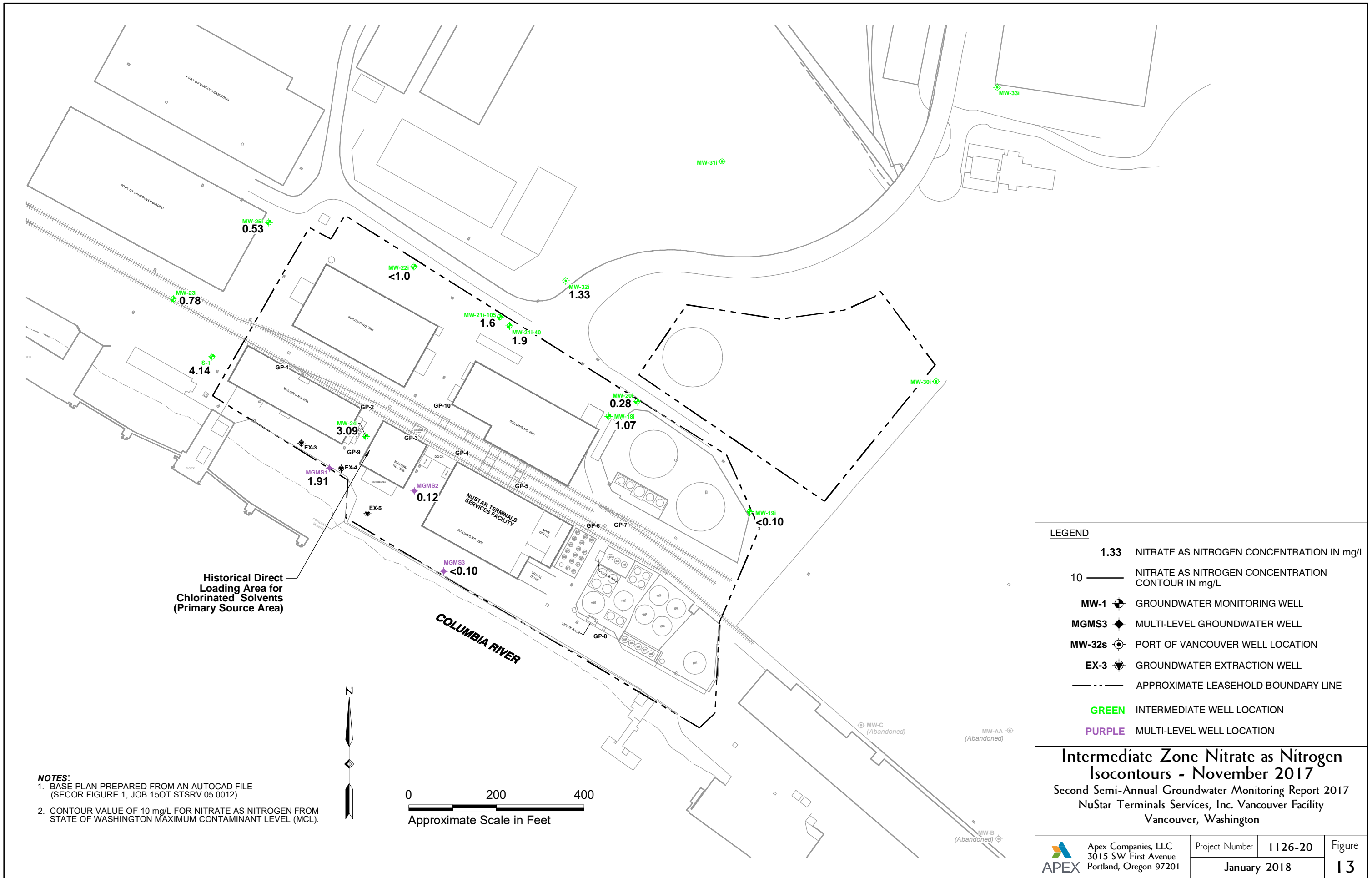
Intermediate Zone Ammonia as Nitrogen Isocontours - November 2017
 Second Semi-Annual Groundwater Monitoring Report 2017
 NuStar Terminals Services, Inc. Vancouver Facility
 Vancouver, Washington



NOTES:
 1. BASE PLAN PREPARED FROM AN AUTOCAD FILE (SECOR FIGURE 1, JOB 150T.STSRV.05.0012).
 2. CONTOUR VALUE OF 10 mg/L FOR NITRATE AS NITROGEN FROM STATE OF WASHINGTON MAXIMUM CONTAMINANT LEVEL (MCL).

LEGEND	
9.78	NITRATE AS NITROGEN CONCENTRATION IN mg/L
10	NITRATE AS NITROGEN CONCENTRATION CONTOUR IN mg/L
MW-1	GROUNDWATER MONITORING WELL
MGMS3	MULTI-LEVEL GROUNDWATER WELL
MW-32s	PORT OF VANCOUVER WELL LOCATION
EX-3	GROUNDWATER EXTRACTION WELL
---	APPROXIMATE LEASEHOLD BOUNDARY LINE
BLUE	SHALLOW WELL LOCATION
PURPLE	MULTI-LEVEL WELL LOCATION

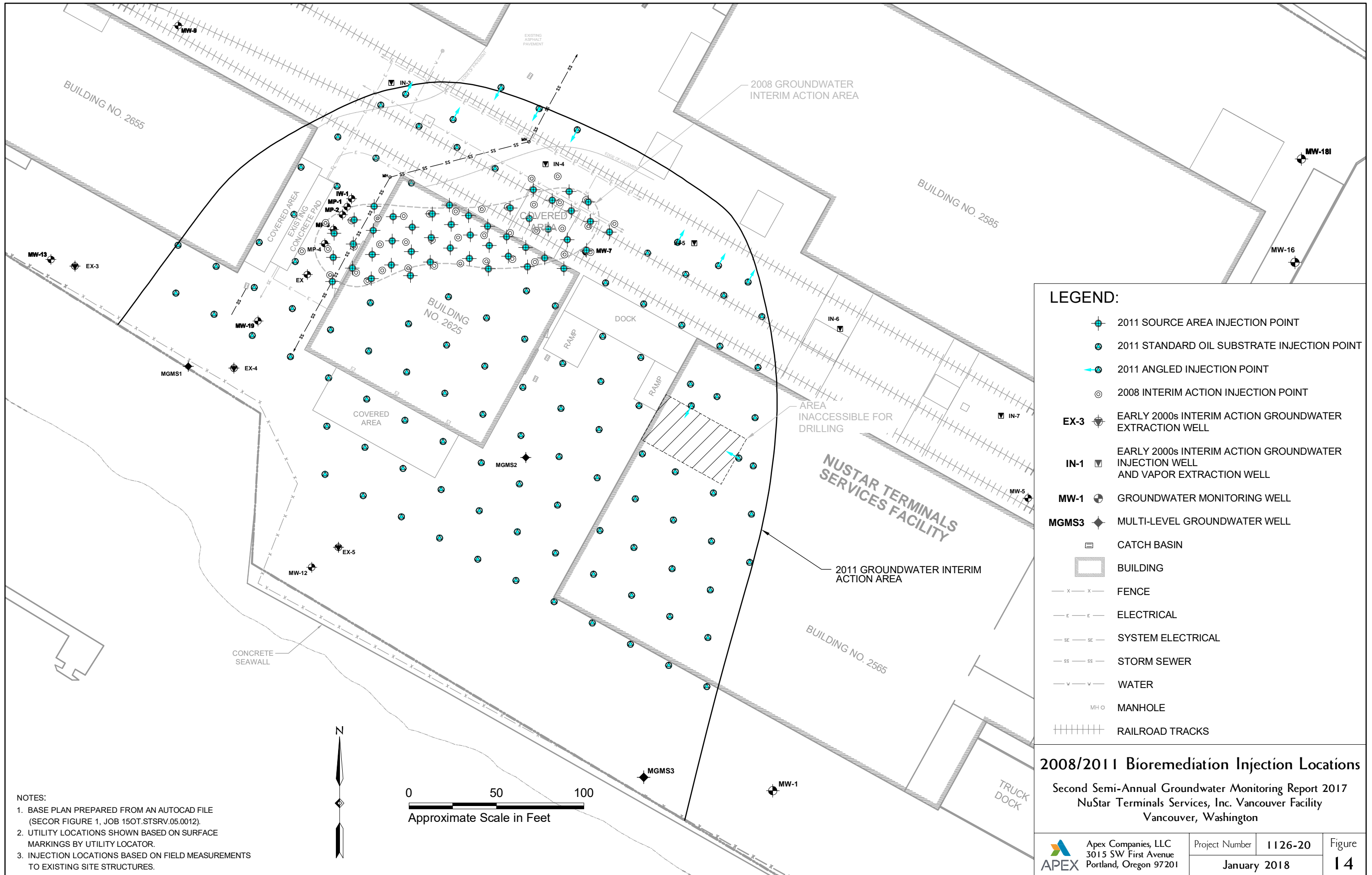
Shallow Zone Nitrate as Nitrogen Isocontours - November 2017
 Second Semi-Annual Groundwater Monitoring Report 2017
 NuStar Terminals Services, Inc. Vancouver Facility
 Vancouver, Washington



NOTES:
 1. BASE PLAN PREPARED FROM AN AUTOCAD FILE (SECOR FIGURE 1, JOB 150T.STSRV.05.0012).
 2. CONTOUR VALUE OF 10 mg/L FOR NITRATE AS NITROGEN FROM STATE OF WASHINGTON MAXIMUM CONTAMINANT LEVEL (MCL).

LEGEND	
1.33	NITRATE AS NITROGEN CONCENTRATION IN mg/L
10	NITRATE AS NITROGEN CONCENTRATION CONTOUR IN mg/L
MW-1	GROUNDWATER MONITORING WELL
MGMS3	MULTI-LEVEL GROUNDWATER WELL
MW-32s	PORT OF VANCOUVER WELL LOCATION
EX-3	GROUNDWATER EXTRACTION WELL
---	APPROXIMATE LEASEHOLD BOUNDARY LINE
GREEN	INTERMEDIATE WELL LOCATION
PURPLE	MULTI-LEVEL WELL LOCATION

Intermediate Zone Nitrate as Nitrogen Isocontours - November 2017
 Second Semi-Annual Groundwater Monitoring Report 2017
 NuStar Terminals Services, Inc. Vancouver Facility
 Vancouver, Washington





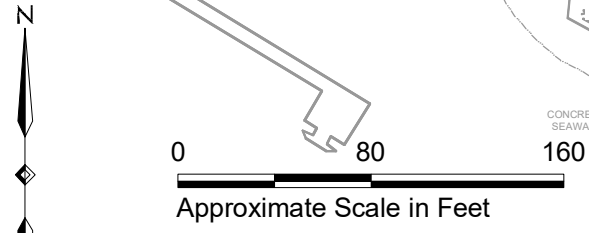
LEGEND:

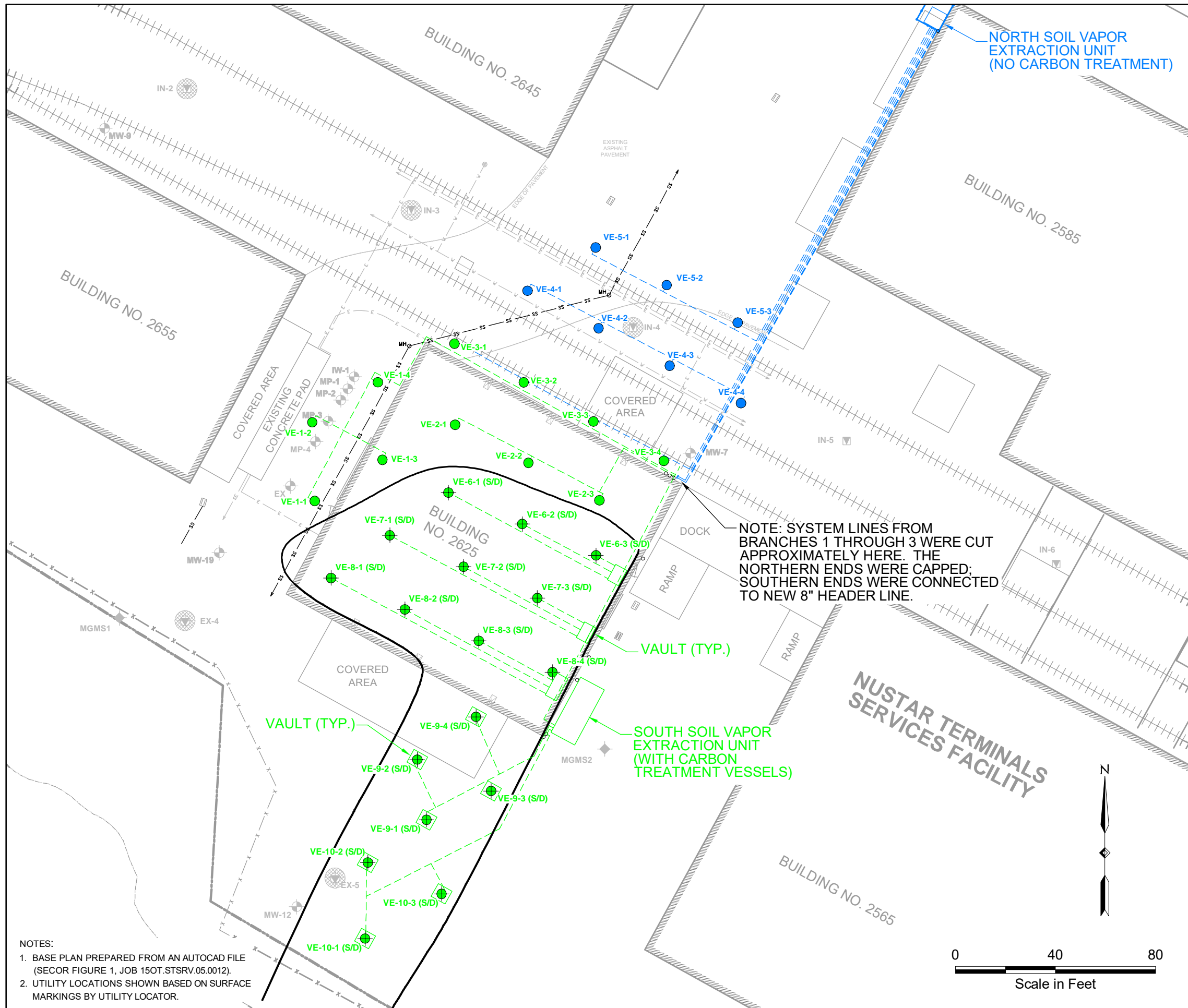
- ENHANCED BIOREMEDIATION INJECTION POINT
- EARLY 2000s INTERIM ACTION GROUNDWATER EXTRACTION WELL
- GROUNDWATER MONITORING WELL
- MULTI-LEVEL GROUNDWATER WELL
- CATCH BASIN
- BUILDING
- FENCE
- ELECTRICAL
- SYSTEM ELECTRICAL
- STORM SEWER
- WATER
- MANHOLE
- RAILROAD TRACKS

2016 Bioremediation Injection Locations
 Second Semi-Annual Groundwater Monitoring Report 2017
 NuStar Terminals Services, Inc. Vancouver Facility
 Vancouver, Washington

NOTES:

1. BASE PLAN PREPARED FROM AN AUTOCAD FILE (SECOR FIGURE 1, JOB 150T.STSRV.05.0012).
2. INJECTION LOCATIONS BASED ON FIELD MEASUREMENTS TO EXISTING SITE STRUCTURES.
3. NORTHWEST AREA INJECTION POINT LOCATIONS ARE APPROXIMATE. NUSTAR SOURCE AREA LOCATIONS ARE BASED ON GPS COORDINATES AND HAVE BEEN MODIFIED SLIGHTLY FROM THE INTERIM ACTION WORK PLAN TO AVOID ENCOUNTERING BURIED INFRASTRUCTURE.





LEGEND:

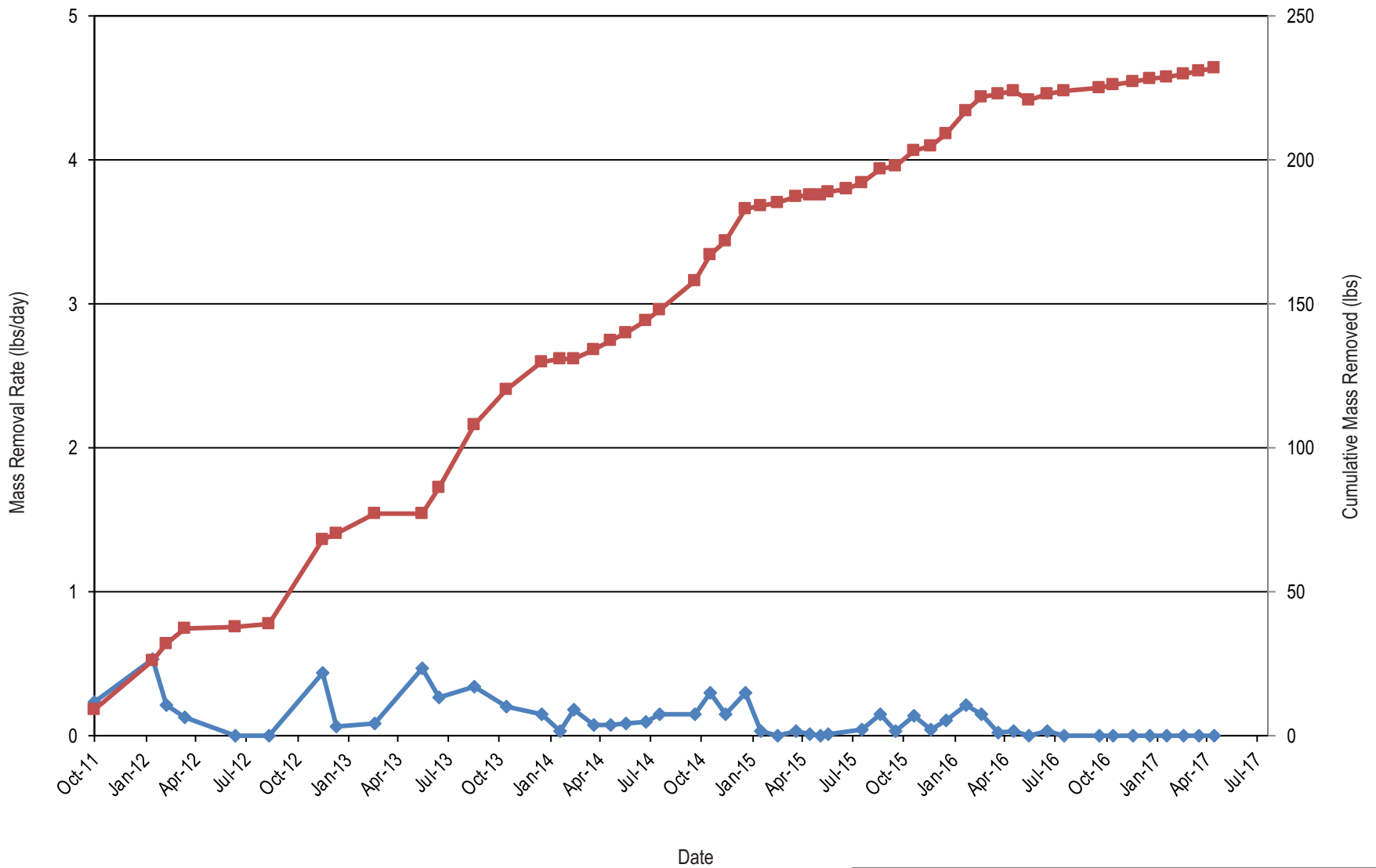
- VE-6-2 (S/D) 2011 WELL PAIR LOCATION (SHALLOW SCREENED FROM 5-15 FEET BGS) (DEEP SCREENED 15-25 FEET BGS)
- VE-1-2 2008 INTERIM ACTION VAPOR EXTRACTION WELL LOCATION
- VAPOR EXTRACTION WELL (2000-2005)
- EX-3 EARLY 2000s INTERIM ACTION GROUNDWATER EXTRACTION WELL
- IN-1 EARLY 2000s INTERIM ACTION GROUNDWATER INJECTION WELL AND VAPOR EXTRACTION WELL
- MW-1 GROUNDWATER MONITORING WELL
- MGMS3 MULTI-LEVEL GROUNDWATER WELL
- CATCH BASIN
- BUILDING
- FENCE
- ELECTRICAL
- SYSTEM ELECTRICAL
- STORM SEWER
- WATER
- MANHOLE
- RAILROAD TRACKS
- UNDERGROUND SOIL VAPOR EXTRACTION (SVE) PIPING
- BLUE NORTH VAPOR EXTRACTION UNIT
- GREEN SOUTH VAPOR EXTRACTION UNIT

2011 SVE Layout
 Second Semi-Annual Groundwater Monitoring Report 2017
 NuStar Terminals Services, Inc. Vancouver Facility
 Vancouver, Washington

Scale in Feet: 0, 40, 80

Project Number: 1126-20
 January 2018

Figure 16




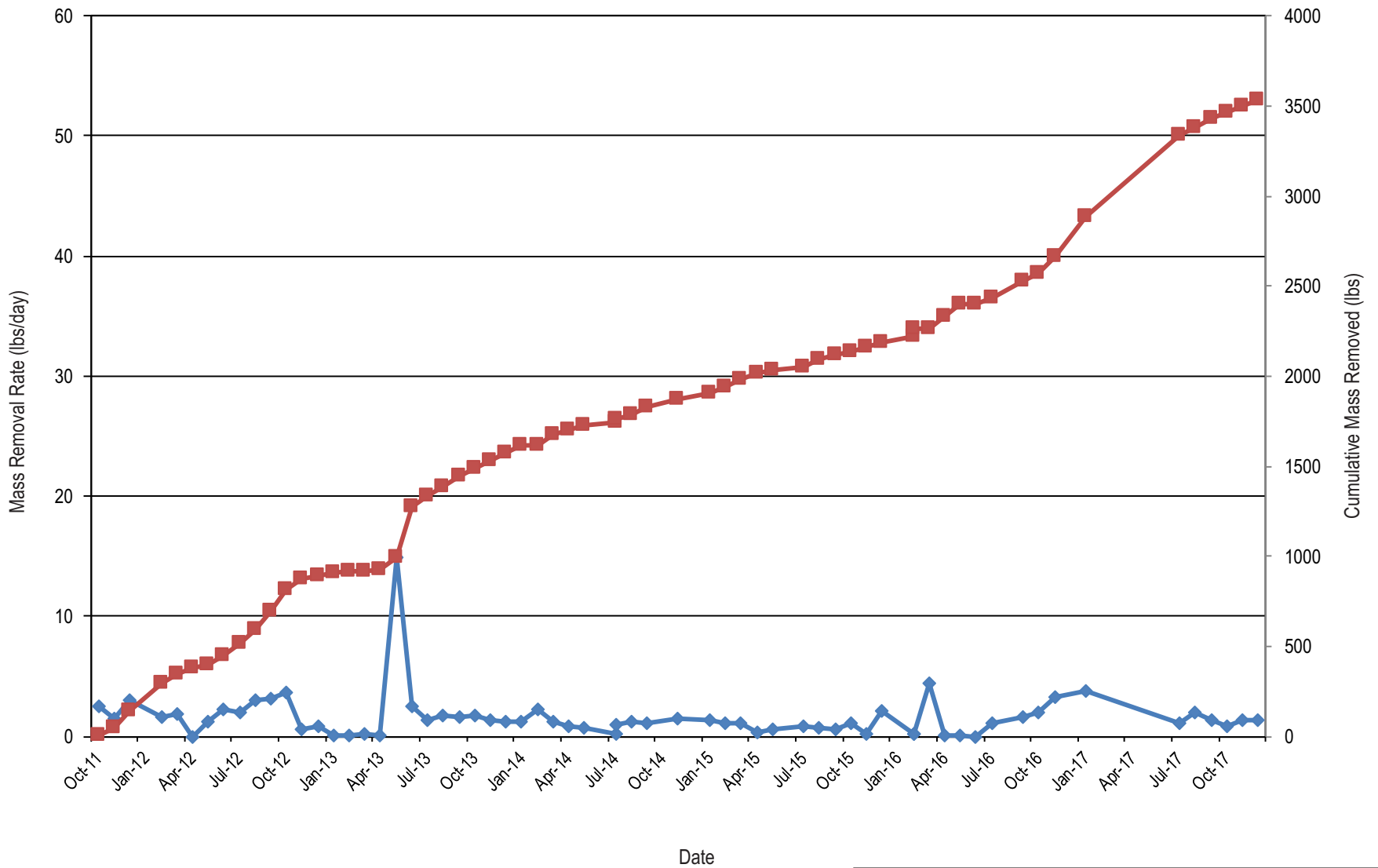
Legend:

- ◆ Volatile Organic Compound (VOC) Removal Rate (lbs/day)
- Approximate Cumulative VOCs Removed (lbs)

North SVE System - VOC Mass Removal

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 NuStar Terminals Services, Inc. Vancouver Facility
 Vancouver, Washington

 Apex Companies, LLC 3015 SW First Avenue Portland, Oregon 97201	Project Number	1126-20	Figure 17
	January 2018		



Legend:

- ◆ Volatile Organic Compound (VOC) Removal Rate (lbs/day)
- Approximate Cumulative VOCs Removed (lbs)

South SVE System - VOC Mass Removal

Second Semi-Annual Groundwater Monitoring Report 2017
 NuStar Terminals Services, Inc. Vancouver Facility
 Vancouver, Washington

 Apex Companies, LLC
 3015 SW First Avenue
 Portland, Oregon 97201

Project Number	1126-20
January 2018	

Figure
18

Appendix A

Field Sampling Data Sheets

WELL GAGING DATA SHEET



Client:	NuStar Main	Job Number:	1126
Project:	GWM	Date:	9-25-17
Weather:	FAIR	Sampler:	MM, JM
		Time In/Out:	

WATER LEVEL DATA

Well I.D.	Time	Depth to Free Product (feet)	Depth to Water (feet)	Depth to Well Bottom (feet)	Product Thickness (feet)	Water Column Height (feet)	Notes/Other Remarks
MWE	0903	-	28.72				
MW32s	0913	-	29.45				
MW16	0920	-	28.67				
MW2	0924	-	29.89				
MW6	0928	-	27.66				
EW-1	0937	-	27.05				
MW3	0935	-	29.48				
MW1	0939	-	28.36				
MW12	0943	-	26.98				
MW19	0946	-	28.63				
EX2	0948	-	28.66				
MP4	0951	-	28.67				
MP3	0953	-	28.67				
MP3	0955	-	29.80				
MP2	0958	-	28.86				
MP1	0959	-	28.75				
MW9	1005	-	28.68				
MW7	1008	-	28.66				
MW5	1010	-	28.83				
MW8	1015	-	28.01				
MW26	1021	-	28.53				
MW15	1027	-	33.42				
MWF	1033	-	29.90				
MW13	1129	-	26.52				MAY HAVE BROKEN SURFACE CASING - BENTONITE IN WELL
IS2	1134	-	29.06				
MW17	1150	-	27.91				
MW14	1154	-	28.65				
MW23i	1156	-	29.83				
MW10	1200	-	27.12				
MW22i	1249	-	30.59				
MW21i	105 1251	-	30.18				
MW24c	1445	-	30.23				

MP 3
MW24c



WELL MONITORING DATA SHEET

Well I.D.:	EW-1	Job Number:	1126
Client:	Muster VAN	Date:	9-28-17
Project:	3017 GWM	Sampler:	MM
Weather:	FAIR	Time In/Out:	

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	27.39	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters

PURGING DATA

Purge Method:	BLADDER	Pump Intake Depth:	MS
Sampling Method:	LF	Tubing Type:	SKIP BONDED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
1051				0.15	7.77	25.69	0.236	5.00	-15.1		SC
1054				0.15	7.55	20.64	0.243	3.28	-5.1		SC
1057				0.15	7.43	19.15	0.245	3.02	3.1		SC
1100				0.15	7.40	18.77	0.248	2.85	4.2		AC
1103				0.15	7.37	18.68	0.250	2.83	6.8		AC
1100											

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	EW-1	Sampling Flow Rate:	0.15	Analytical Laboratory:	PACE
Sample Time:	1100	Final Depth to Water:	27.40	Did Well Dewater?	N
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD
3x 40ml	HCl	HVOC	yes <input type="radio"/> no <input checked="" type="radio"/>		Duplicate ID
			yes <input type="radio"/> no <input type="radio"/>		
			yes <input type="radio"/> no <input type="radio"/>		
			yes <input type="radio"/> no <input type="radio"/>		
			yes <input type="radio"/> no <input type="radio"/>		

COMMENTS

COULD NOT GET GW LEVEL → WATER NEAR LEVEL TOO LOW →
METER CAN NOT GET AROUND BLADDER PUMP

WELL MONITORING DATA SHEET



Well I.D.:	EX	Job Number:	1126
Client:	NORTH VAN	Date:	9-26-17
Project:	SQA GUM	Sampler:	MMI
Weather:	FAIR	Time In/Out:	

WELL DATA

Well Depth:		Well Diameter:	4"	Water Height	
Depth to Water:	78.65	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	BLADDER	Pump Intake Depth:	MS	Comments	
Sampling Method:	LF	Tubing Type:	WIDE SKIP BUND		

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks	
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria	
0909			78.80	0.15	7.30	17.64	1.385	1.39	128.1		CL	
0912			78.97	0.15	7.15	18.63	1.430	1.70	117.5		CL	
0915			79.00	0.15	7.19	19.75	1.433	1.36	121.8		CL	
0918			79.04	0.15	7.18	18.81	1.439	1.24	133.9		CL	
0921			79.09	0.15	7.13	18.67	1.411	1.18	140.5		CL	
0924			SAMPLE									

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	EX	Sampling Flow Rate:	0.15	Analytical Laboratory:	PACE	
Sample Time:	0924	Final Depth to Water:	78.91	Did Well Dewater?	N	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
2 x 40ml	HCl	HUCCS	yes no			
3 x 40ml	HCl	BSK 135	yes no			
2 x 40ml	H ₂ SO ₄	TRIC	yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET



Well I.D.:	M6MS1-43	Job Number:	1126
Client:	Wesley & VAN	Date:	9-27-17
Project:	3Q17 GWM	Sampler:	mm
Weather:	OVERCAST	Time In/Out:	

WELL DATA

Well Depth:	Well Diameter:	Water Height
Depth to Water: 28.62	NA	
Water Column Length:	Screened Interval:	x Multiplier
Purge Volume:	Depth to Free Product:	x Casing Volumes
Water Height Multipliers (gal)	Free Product Thickness:	= Purge Volume
1-inch = 0.041	2-inch = 0.162	4-inch = 0.653
		1 gallon = 3.785 liters

PURGING DATA

Purge Method:	Pump Intake Depth:	Comments
SET BLADDER	MS	
Sampling Method:	Tubing Type:	
LF	HDPPE	

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	
1058			28.66	0.15	7.83	17.36	0.084	8.45	85.6		AC
1107			28.70	0.15	7.96	17.41	0.098	8.56	84.4		AC
1104			28.75	0.15	7.88	17.32	0.095	8.69	87.9		AC
1102			28.83	0.15	7.91	17.28	0.092	8.73	90.7		AC
1110			SAMPLE								

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	M6MS1-43	Sampling Flow Rate:	0.15	Analytical Laboratory:	PACE
Sample Time:	1110	Final Depth to Water:	28.57	Did Well Dewater?	N
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD Duplicate ID
3x 40ml	HCl	HVOC	yes no		
3x 40ml	HCl	RSK-175	yes no		
2x 40ml	H ₂ SO ₄	TOC	yes no		
			yes no		
			yes no		
			yes no		

COMMENTS

WELL MONITORING DATA SHEET



Well I.D.:	M6MS1-600	Job Number:	1126
Client:	MUSTER VIAN	Date:	9-29-17
Project:	3017 GUMU	Sampler:	mm
Weather:	OVERCAST / LT. RAIN	Time In/Out:	

WELL DATA

Well Depth:	Well Diameter:	Water Height	
Depth to Water: 29.56	NA	x Multiplier	
Water Column Length:	Screened Interval:	x Casing Volumes	
Purge Volume:	Depth to Free Product:	= Purge Volume	
Water Height Multipliers (gal)	Free Product Thickness:	1 gallon = 3.785 liters	
1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	

PURGING DATA

Purge Method:	Pump Intake Depth:	Comments	
PERRI	MS		
Sampling Method:	Tubing Type:		
LF	HDPE SKIPP HDPE		

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks	
					±0.1	±0.5 °C	±5%	±0.5 ppm	±20mV	±10%	← Stabilization Criteria	
1212				0.15	7.45	17.00	0.420	2.65	69.0		AC	
1215				0.15	7.39	16.45	0.260	1.17	51.7		AC	
1217				0.15	7.39	16.31	0.240	0.94	45.0		AC	
1220				0.15	7.39	16.13	0.241	0.77	40.0		AC	
1223				0.15	7.37	16.08	0.240	0.72	37.9		AC	
1226				SAMPLE								


Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	M6MS1-600	Sampling Flow Rate:	0.15	Analytical Laboratory:	PACE
Sample Time:	1226	Final Depth to Water:	29.55	Did Well Dewater?	NO
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD Duplicate ID
3 x 40ml	HCL	HVOC	yes <input checked="" type="checkbox"/> no		
			yes <input type="checkbox"/> no		
			yes <input type="checkbox"/> no		
			yes <input type="checkbox"/> no		
			yes <input type="checkbox"/> no		
			yes <input type="checkbox"/> no		

COMMENTS

WELL MONITORING DATA SHEET

	Well I.D.:	MGMS110	Job Number:	1176
	Client:	Muster 11M	Date:	7-20-17
	Project:	3017 Gwm	Sampler:	MM
	Weather:	RAINY	Time In/Out:	

WELL DATA

Well Depth:	Well Diameter:	NA	Water Height
Depth to Water:	Screened Interval:		x Multiplier
Water Column Length:	Depth to Free Product:		x Casing Volumes
Purge Volume:	Free Product Thickness:		= Purge Volume
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653
			1 gallon = 3.785 liters

PURGING DATA

Purge Method:				Pump Intake Depth:				Comments				
Sampling Method:				Tubing Type:								
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks	
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria	
1150			-	0.15	8.16	17.70	0.545	1.82	77.1		AC	
1153			-	0.15	7.53	16.96	0.392	0.600	77.6		AC	
1156			-	0.15	7.31	16.79	0.310	0.560	69.3		AC	
1159				0.15	7.21	16.64	0.298	0.48	55.7		AC	
1202				0.15	7.25	16.46	0.288	0.49	56.9		AC	
1205				SAMPLE								

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MGMS1-110	Sampling Flow Rate	0.15	Analytical Laboratory:	PACE
Sample Time:	7/20/17	Final Depth to Water:	29.16	Did Well Dewater?	no
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD
3x 40ml	HCl	HVOC	yes <input type="radio"/> no <input checked="" type="radio"/>		Duplicate ID
			yes <input type="radio"/> no <input type="radio"/>		
			yes <input type="radio"/> no <input type="radio"/>		
			yes <input type="radio"/> no <input type="radio"/>		
			yes <input type="radio"/> no <input type="radio"/>		

COMMENTS

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WELL MONITORING DATA SHEET



Well I.D.:	M6MS2-40	Job Number:	1126
Client:	MUSTER VAN	Date:	9-29-17
Project:	3017 GWM	Sampler:	MM
Weather:	FAIR OVERCAST	Time In/Out:	

WELL DATA LT. RAIN

Well Depth:	Well Diameter:	Water Height	
Depth to Water: 27.92	NA		
Water Column Length:	Screened Interval:	x Multiplier	
Purge Volume:	Depth to Free Product:	x Casing Volumes	
Water Height Multipliers (gal)	Free Product Thickness:	= Purge Volume	
1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters

PURGING DATA

Purge Method:	PERPI	Pump Intake Depth:	MS	Comments
Sampling Method:	LF	Tubing Type:	HOPE SKIP BOND	

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks	
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria	
0953				0.15	7.01	17.21	1.936	2.28	113.4		SC	
0956				0.15	6.99	17.01	2.023	1.86	104.4		SC	
0959				0.15	7.04	16.90	2.061	1.69	69.5		AC	
1002				0.15	7.10	16.94	2.052	1.28	-20.9		AC	
1005				0.15	7.12	16.98	2.070	1.20	-27.8		AC	
1008				0.15	7.11	16.97	2.072	1.10	-34.9		AC	
1011				0.15	7.12	16.91	2.074	1.03	-43.7		AC	
1014				SAMPLE								


Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	M6MS2-40	Sampling Flow Rate	0.15	Analytical Laboratory:	PACE
Sample Time:	1014 1014	Final Depth to Water:	27.27.93	Did Well Dewater?	N
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD Duplicate ID
3x 40ml	HCl	HVLC	yes (no)		
3x 40ml	HCl	RSK-175	yes (no)		
2x 40ml	H ₂ SO ₄	TCX	yes (no)		
			yes no		
			yes no		

COMMENTS

WELL MONITORING DATA SHEET

	Well I.D.:	M6MSZ-60	Job Number:	1126
	Client:	Nuster VAN	Date:	9-29-17
	Project:	3217 GUM	Sampler:	MMW
	Weather:	OVERCAST / RAIN	Time In/Out:	

WELL DATA

Well Depth:		Well Diameter:	NA
Depth to Water:	29.26	Screened Interval:	
Water Column Length:		Depth to Free Product:	
Purge Volume:		Free Product Thickness:	
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162
		4-inch = 0.653	1 gallon = 3.785 liters

PURGING DATA

Purge Method:				Pump Intake Depth:				Comments			
LF				MS							
Sampling Method:				Tubing Type:							
LF				HDPE							
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
0821				0.15	6.39	18.03	0.360	2.36	1093		SC
0833				0.15	6.63	16.62	0.284	0.85	101.3		SC
0834				0.15	6.64	16.33	0.230	0.81	99.6		SC
0857				0.15	6.60	16.11	0.251	0.79	99.2		SC

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:		Sampling Flow Rate	0.15	Analytical Laboratory:	PACE
Sample Time:	0840	Final Depth to Water:	29.26	Did Well Dewater?	N
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD Duplicate ID
2, 40ml	HCl	HVOC	yes <input checked="" type="checkbox"/> no		
			yes <input type="checkbox"/> no		
			yes <input type="checkbox"/> no		
			yes <input type="checkbox"/> no		
			yes <input type="checkbox"/> no		

COMMENTS

WELL MONITORING DATA SHEET



Well I.D.	MGMS2-110	Job Number:	11260
Client:	NuStar	Date:	9-29-17
Project:	3017 GUM	Sampler:	MM
Weather:	OVERCAST / LTRA	Time In/Out:	

WELL DATA

Well Depth:		Well Diameter:	NA	Water Height	
Depth to Water:	29.37	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:				PERRI		Pump Intake Depth:				MS		Comments	
Sampling Method:				LF		Tubing Type:				HDPE			
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color	Other Remarks	
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	← Stabilization Criteria		
0852				0.15	6.30	17.44	0.790	4.19	124.0		CI		
0855				0.15	6.49	16.82	0.758	1.82	97.0		CL		
0858				0.15	6.47	16.67	0.693	1.67	72.0		SC		
0901				0.15	6.47	16.61	0.380	1.55	60.5		SC		
0904				0.15	6.47	16.51	0.379	1.40	46.1		SC		
0907				0.15	6.51	16.35	0.370	1.54	48.9		SC		
0910				SAMPLE									


Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MGMS2-110	Sampling Flow Rate	0.15	Analytical Laboratory:	PACE	
Sample Time:	0910	Final Depth to Water:	29.44	Did Well Dewater?	N	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3 x 40ml	HCl	HVOC	yes <u>no</u>			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

	Well I.D.	MGMS2-132	Job Number:	1126
	Client:	Nuster VAN	Date:	9-29-17
	Project:	3Q17 GUM	Sampler:	MM
	Weather:	OVERCAST / RAIN	Time In/Out:	

WELL DATA

Well Depth:		Well Diameter:	NA
Depth to Water:	29.43	Screened Interval:	
Water Column Length:		Depth to Free Product:	
Purge Volume:		Free Product Thickness:	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653
			1 gallon = 3.785 liters

PURGING DATA

Purge Method:				Pump Intake Depth:				Comments			
PEPPI				MS							
Sampling Method:				Tubing Type:							
LF				HOPE							
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria
0919			-	0.15	5.51	17.65	0.547	2.11	32.5		CI
0922			-	0.15	5.67	16.82	0.513	1.35	44.8		CL
0925			-	0.15	5.65	16.33	0.471	1.07	58.7		CL
0928			-	0.15	5.83	15.96	0.395	0.92	62.3		CL SC
0931			-	0.15	6.46	15.68	0.307	0.79	61.2		CL SC
0934			-	0.15	6.37	15.51	0.299	0.71	59.3		AC
0937			-	0.15	6.38	15.49	0.301	0.69	58.7		AC

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear


SAMPLING DATA

Sample ID:	MGMS3-132	Sampling Flow Rate	0.15	Analytical Laboratory:	PACE	
Sample Time:	0938	Final Depth to Water:	29.44	Did Well Dewater?	N	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x 20ml	HCl	HVOC	yes <input type="checkbox"/> no <input checked="" type="checkbox"/>			
			yes <input type="checkbox"/> no <input type="checkbox"/>			
			yes <input type="checkbox"/> no <input type="checkbox"/>			
			yes <input type="checkbox"/> no <input type="checkbox"/>			
			yes <input type="checkbox"/> no <input type="checkbox"/>			

COMMENTS

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WELL MONITORING DATA SHEET

	Well I.D.:	MGMS3-40	Job Number:	1126
	Client:	Nustar	Date:	9-26-17
	Project:	3Q17 GWM	Sampler:	
	Weather:	FAIR	Time In/Out:	

WELL DATA

Well Depth:		Well Diameter:	NA	Water Height	
Depth to Water:	27.75	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters

PURGING DATA

Purge Method:				Sub Bladder				Pump Intake Depth:			MS		Comments	
Sampling Method:				LF				Tubing Type:			HDPE			
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color	Other Remarks		
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	← Stabilization Criteria			
1415			27.73	0.15	5.17	20.56	0.015	12.15	-90.2		AC			
1418			27.81	0.15	5.37	19.27	0.013	10.92	-85.3		C			
1421			27.89	0.5	5.45	19.86	0.016	10.15	-86.4		C			
1424			27.89	0.15	5.56	18.75	0.019	10.15	-87.5		C			
1427			27.89	1.15	5.58	18.65	0.015	10.02	-82.8		C			
1430			SAMPLE											

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear


SAMPLING DATA

Sample ID:	MGMS3-40	Sampling Flow Rate	0.15	Analytical Laboratory:	PACE		
Sample Time:	1436	Final Depth to Water:	27.79	Did Well Dewater?			
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID	
3 x 40ml	HCl	HVOCs	yes <input type="checkbox"/> no <input checked="" type="checkbox"/>			MGMS3-40	
3 x 40ml	HCl	BSK-175	yes <input type="checkbox"/> no <input checked="" type="checkbox"/>				
2 x 40ml	H2SO4	TCC	yes <input type="checkbox"/> no <input checked="" type="checkbox"/>				
			yes <input type="checkbox"/> no <input type="checkbox"/>				
			yes <input type="checkbox"/> no <input type="checkbox"/>				
			yes <input type="checkbox"/> no <input type="checkbox"/>				

COMMENTS

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WELL MONITORING DATA SHEET

	Well I.D.:	MGMS3-60	Job Number:	1126
	Client:	Kuster	Date:	9-26-17
	Project:	3017 GWM	Sampler:	mmw
	Weather:	FAIR	Time In/Out:	

WELL DATA

Well Depth:		Well Diameter:	NA
Depth to Water:	28.16	Screened Interval:	
Water Column Length:		Depth to Free Product:	
Purge Volume:		Free Product Thickness:	
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162
		4-inch = 0.653	1 gallon = 3.785 liters

PURGING DATA

Purge Method:	BLADDER?	Pump Intake Depth:	MS	Comments
Sampling Method:	LE	Tubing Type:	HDPE	

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks	
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria	
1456			28.25	0.1	6.27	27.17	0.110	9.76	0.1		AC	
1459			28.25	0.1	5.71	23.21	0.190	1.80	-3.0		AC	
1502			28.22	0.1	5.63	22.18	0.223	1.43	76.0		AC	
1505			28.22	0.1	5.72	21.65	0.225	1.54	4.9		C	
1508			28.27	0.1	5.76	21.25	0.225	1.73	4.5		C	
1511			28.22	0.1	5.79	21.34	0.225	1.76	5.0		C	
1514			SAMPLE									

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear


SAMPLING DATA

Sample ID:	MGMS3-60	Sampling Flow Rate:	0.1	Analytical Laboratory:	PACE
Sample Time:	1514	Final Depth to Water:	28.26	Did Well Dewater?	N
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD
3x 90ml	HCl	HUCCs	yes no		Duplicate ID
			yes no		
			yes no		
			yes no		
			yes no		
			yes no		

COMMENTS

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WELL MONITORING DATA SHEET

	Well I.D.	MGMS3-101 (70?)	Job Number:	1126
	Client:	Muster Van	Date:	9-26-17
	Project:	3Q17 GWM	Sampler:	mm
	Weather:	FAIR	Time In/Out:	

WELL DATA

Well Depth:		Well Diameter:	NA	Water Height	
Depth to Water:	28.15 28.18	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters

PURGING DATA

Purge Method:				PERRI				Pump Intake Depth:			MS		Comments	
Sampling Method:				LF				Tubing Type:			HDPE			
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color	Other Remarks		
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	← Stabilization Criteria			
1550			-	0.15	6.37	23.73	0.240	5.00	3.1		AC			
1601			-	0.15	5.91	19.84	0.254	1.00	-8.0		C			
1603			-	0.15	5.82	18.92	0.211	0.63	-24.7		C			
1606			-	0.15	5.74	18.89	0.208	0.75	-32.1		C			
1609				0.15	5.80	18.87	0.201	0.79	-39.4		C			
1612				0.15	5.81	18.72	0.199	0.89	-38.0		C			
1615				SAMPLE										

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear


SAMPLING DATA

Sample ID:	MGMS3-101	Sampling Flow Rate	0.15	Analytical Laboratory:	PACE		
Sample Time:	1615	Final Depth to Water:	28.40	Did Well Dewater?	N		
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID	
3x40ml	HCl	HVOCs	yes <input checked="" type="radio"/> no				
			yes <input type="radio"/> no				
			yes <input type="radio"/> no				
			yes <input type="radio"/> no				
			yes <input type="radio"/> no				

COMMENTS

Build in bladder pump did not work. Only blowing out air. Switched to perri pump to recover sample

WELL MONITORING DATA SHEET

	Well I.D.: <u>MGMS3-132</u>	Job Number: <u>1126</u>
	Client: <u>Nustar</u>	Date: <u>9-26-17</u>
	Project: <u>3Q17 GUM</u>	Sampler: <u>MM</u>
	Weather: <u>FAIR</u>	Time In/Out:

WELL DATA

Well Depth:	Well Diameter: <u>NA</u>	Water Height
Depth to Water: <u>28.33</u>	Screened Interval:	x Multiplier
Water Column Length:	Depth to Free Product:	x Casing Volumes
Purge Volume:	Free Product Thickness:	= Purge Volume
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162
		4-inch = 0.653
		1 gallon = 3.785 liters

PURGING DATA

Purge Method: <u>SET BLADDER</u>				Pump Intake Depth: <u>MS</u>				Comments			
Sampling Method: <u>LF</u>				Tubing Type: <u>HDPE</u>							
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria
<u>1533</u>			<u>28.33</u>	<u>0.1</u>	<u>5.95</u>	<u>22.14</u>	<u>0.206</u>	<u>3.08</u>	<u>11.6</u>		<u>AC</u>
<u>1536</u>			<u>28.33</u>	<u>0.1</u>	<u>6.01</u>	<u>21.85</u>	<u>0.205</u>	<u>0.71</u>	<u>20.9</u>		<u>AC</u>
<u>1539</u>			<u>28.38</u>	<u>0.1</u>	<u>6.01</u>	<u>21.74</u>	<u>0.204</u>	<u>0.53</u>	<u>24.5</u>		<u>AC</u>
<u>1542</u>			<u>28.42</u>	<u>0.1</u>	<u>6.07</u>	<u>21.78</u>	<u>0.205</u>	<u>0.44</u>	<u>21.6</u>		<u>C</u>
<u>1545</u>			<u>SAMPLE</u>								

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID: <u>MGMS3-132</u>	Sampling Flow Rate: <u>0.1</u>	Analytical Laboratory: <u>PACE</u>
Sample Time: <u>1545</u>	Final Depth to Water: <u>28.33</u>	Did Well Dewater? <u>N</u>
# Containers/Type: <u>3x40ml</u>	Preservative: <u>HCl</u>	Analysis/Method: <u>HVOCs</u>
		Field Filtered
		yes <input type="checkbox"/> no <input checked="" type="checkbox"/>
		yes <input type="checkbox"/> no <input type="checkbox"/>
		yes <input type="checkbox"/> no <input type="checkbox"/>
		yes <input type="checkbox"/> no <input type="checkbox"/>
		yes <input type="checkbox"/> no <input type="checkbox"/>

COMMENTS

WELL MONITORING DATA SHEET



Well I.D.	MP-1	Job Number:	1126
Client:	NuStar UAN	Date:	9-26-17
Project:	3Q17 GWM	Sampler:	MM
Weather:	FAIR	Time In/Out:	

WELL DATA

Well Depth:		Well Diameter:	24	Water Height	
Depth to Water:	28.78	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	BLADDER				Pump Intake Depth:	MS				Comments	
Sampling Method:	LF				Tubing Type:	HAPG SKIP BOND					
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria
1024			29.15	0.15	6.85	17.25	1.081	6.41	720	720	cl
1027			29.21	0.15	6.95	15.80	1.240	1.56	76.5		cl
1030			29.33	0.15	6.85	15.60	1.215	1.10	82.5		cl
1033			29.33	0.15	6.85	15.53	1.195	0.95	82.5		cl
1036			29.4	0.15	6.86	15.50	1.192	0.93	80.5		cl
1039			SAMPLE								


Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MP-1	Sampling Flow Rate:	0.15	Analytical Laboratory:	PAGE	
Sample Time:	1039	Final Depth to Water:	28.85	Did Well Dewater?	N	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x 40ml	HCl	ANOCs	yes (no)			
3x 40ml	HCl	PSK-175	yes (no)			
2x 40ml	H ₂ SO ₄	TCC	yes (no)			
			yes	no		
			yes	no		
			yes	no		

COMMENTS

WELL MONITORING DATA SHEET

	Well I.D.	MW-1	Job Number:	1126
	Client:	MuStar	Date:	9-26-17
	Project:	3017 GWM	Sampler:	mm
	Weather:	FAIR	Time In/Out:	

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	28.41	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters

PURGING DATA

Purge Method:	BLADDER	Pump Intake Depth:	MS	Comments	
Sampling Method:	LF	Tubing Type:	HDPPE SKIP BAND		

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks	
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria	
1312			28.41	0.15	5.54	27.02	0.444	7.12	-25.8		VC	
1315			28.41	0.15	5.30	19.61	0.419	2.94	-45.8		VC	
1319			28.43	0.15	5.53	18.72	0.446	3.606	-54.9		VC	
1321			28.43	0.15	5.69	18.50	0.474	1.33	-77.3		VC	
1324			28.46	0.15	5.79	18.45	0.474	1.15	-92.2		SC	
1327			28.49	0.15	5.84	18.23	0.476	1.12	-75.4		SC	
1330			SAMPLE									

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-1	Sampling Flow Rate	0.15	Analytical Laboratory:	PACE
Sample Time:	1336	Final Depth to Water:	28.50	Did Well Dewater?	N
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD Duplicate ID
3 x 40ml	HCl	HVOCs	yes no		
			yes no		
			yes no		
			yes no		
			yes no		

COMMENTS

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WELL MONITORING DATA SHEET



Well I.D.:	MW 2	Job Number:	1126
Client:	NUSTAR	Date:	9-25-17
Project:	VAN COVER	Sampler:	MM, JM
Weather:	OVERCAST	Time In/Out:	

WELL DATA

Well Depth:	-	Well Diameter:	2"	Water Height	
Depth to Water:	30.71	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	PERF BLADDER	Pump Intake Depth:	MS	Comments
Sampling Method:	LF	Tubing Type:	HOPE SKIP BAND	

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria
1624			30.74	0.1	9.10	18.46	0.330	9.33	-65.7		Cl
1627			30.89	0.1	8.20	15.17	0.398	6.10	-40.5		Cl
1631			31.00	0.1	8.21	14.86	0.400	6.83	-33.3		Cl
1633			31.15	0.1	8.30	14.82	0.480	6.66	-38.9		Cl
1636			31.40	0.1	8.35	14.75	0.498	6.23	-44.1		Cl
1639			31.48	0.1	8.38	14.81	0.502	6.19	-46.4		Cl
1642			SAMPLE								


Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-2	Sampling Flow Rate	0.1	Analytical Laboratory:	PACE
Sample Time:	1642	Final Depth to Water:	31.42	Did Well Dewater?	No
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD Duplicate ID
3x 40ml	HCl	HUOCs	yes <u>no</u>		
			yes no		
			yes no		
			yes no		
			yes no		

COMMENTS

WELL MONITORING DATA SHEET

	Well I.D.: <u>MW-3</u>	Job Number: <u>1126</u>
	Client: <u>MUSTAR</u>	Date: <u>9/25/17</u>
	Project: <u>Vancouver</u>	Sampler: <u>MAN</u>
	Weather: <u>Overcast</u>	Time In/Out: <u>1650</u>

WELL DATA

Well Depth: <u> </u>	Well Diameter: <u>2"</u>	Water Height: <u> </u>
Depth to Water: <u>29.29</u>	Screened Interval: <u> </u>	x Multiplier: <u> </u>
Water Column Length: <u> </u>	Depth to Free Product: <u> </u>	x Casing Volumes: <u> </u>
Purge Volume: <u> </u>	Free Product Thickness: <u> </u>	= Purge Volume: <u> </u>
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162
		4-inch = 0.653
		1 gallon = 3.785 liters

PURGING DATA

Purge Method: <u>Bladder</u>				Pump Intake Depth: <u>M5</u>				Comments			
Sampling Method: <u>ZF</u>				Tubing Type: <u>LAFFSKIP BOND</u>							
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria
<u>1656</u>			<u>29.29</u>	<u>0.15</u>	<u>8.94</u>	<u>18.39</u>	<u>0.615</u>	<u>5.34</u>	<u>-10.9</u>	<u> </u>	<u>SLITY</u>
<u>1659</u>			<u>29.80</u>	<u>0.15</u>	<u>8.36</u>	<u>15.62</u>	<u>0.584</u>	<u>1.50</u>	<u>-7.2</u>	<u> </u>	<u>SLITY</u>
<u>1702</u>			<u>30.15</u>	<u>0.15</u>	<u>8.02</u>	<u>15.18</u>	<u>0.580</u>	<u>2.19</u>	<u>9.5</u>	<u> </u>	<u>SLITY</u>
<u>1705</u>			<u>30.71</u>	<u>0.15</u>	<u>7.93</u>	<u>15.05</u>	<u>0.579</u>	<u>3.43</u>	<u>23.5</u>	<u> </u>	<u>SLITY</u>
<u>1708</u>			<u>31.05</u>	<u>0.15</u>	<u>7.88</u>	<u>14.99</u>	<u>0.581</u>	<u>3.13</u>	<u>29.8</u>	<u> </u>	<u>SLITY</u>
<u>1711</u>			<u>31.35</u>	<u>0.15</u>	<u>7.86</u>	<u>14.96</u>	<u>0.583</u>	<u>2.95</u>	<u>38.5</u>	<u> </u>	<u>SLITY</u>
<u>1714</u>											
<u>1717</u>			<u>SAMPLE</u>								

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear


SAMPLING DATA

Sample ID: <u>MW-3</u>	Sampling Flow Rate: <u>0.15</u>	Analytical Laboratory: <u>PACC</u>				
Sample Time: <u>1717</u>	Final Depth to Water: <u>31.50</u>	Did Well Dewater? <u>No</u>				
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
<u>3 x 40 mL</u>	<u>HCL</u>	<u>11VOC</u>	yes <u>no</u>	<u> </u>	<u> </u>	<u> </u>
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

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WELL MONITORING DATA SHEET

	Well I.D.: MW-5	Job Number: 1126
	Client: NuStar VAN	Date: 9-27-17
	Project: 3017 GUM	Sampler: MM
	Weather: FAIR	Time In/Out:

WELL DATA

Well Depth:	Well Diameter: 2"	Water Height	
Depth to Water: 28.93	Screened Interval:	x Multiplier	
Water Column Length:	Depth to Free Product:	x Casing Volumes	
Purge Volume:	Free Product Thickness:	= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653
		1 gallon = 3.785 liters	

PURGING DATA

Purge Method: BLADDER				Pump Intake Depth: MS				Comments			
Sampling Method: LF				Tubing Type: HARD SKIP BUND							
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
0937			28.95	0.15	7.20	17.73	0.657	5.78	56.2		VC
0940			28.96	0.15	7.36	16.92	0.805 0.299	2.61	20.9		VC
0943			28.97	0.15	7.41	16.72	0.750	3.49	-62.1		SC
0946			28.99	0.15	7.36	16.62	0.676	4.31	-68.5		CE
0949			29.00	0.15	7.36	16.56	0.635	4.58	-65.6		CI
0952			29.01	0.15	7.36	16.66	0.641	4.68	-63.2		CI
0955			SAMPLE								

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID: MW-5	Sampling Flow Rate: 0.15	Analytical Laboratory: ADPACE				
Sample Time: 0955	Final Depth to Water: 28.99	Did Well Dewater? N				
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x10me	HCl	HVOCs	yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

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WELL MONITORING DATA SHEET



Well I.D.:	MW-6	Job Number:	1126
Client:	Nustar Van	Date:	7-28-17
Project:	3017 GWM	Sampler:	mm
Weather:	FAIR	Time In/Out:	

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	27.90	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	BLADDER	Pump Intake Depth:	MS	Comments	
Sampling Method:	LF	Tubing Type:	HDPE SKIP BUNDLED		

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria
1014			27.99	0.15	7.46	17.99	0.639	4.12	62.9	AC	
1017			27.94	0.15	7.33	16.85	0.627	3.40	50.6	AC	
1020			28.03	0.15	7.22	16.41	0.565	3.61	40.1	AC	
1023			27.94	0.15	7.25	16.22	0.531	3.38	29.4	AC	
1026			27.94	0.15	7.26	16.12	0.501	3.20	20.3	AC	
1029			27.94	0.15	7.27	16.10	0.493	3.16	12.6	AC	
1032			27.94	0.15	7.30	16.09	0.487	3.	9.7	AC	
1035			SAMPLE								


Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-6	Sampling Flow Rate:	0.15	Analytical Laboratory:	PACE	
Sample Time:	1035	Final Depth to Water:	27.94	Did Well Dewater?	N	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x40ml	HCl	HVOC	yes <input checked="" type="radio"/> no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

	Well I.D.:	MW-7	Job Number:	1126
	Client:	Kuster Van	Date:	7-27-17
	Project:	3017 GUM	Sampler:	MM
	Weather:	FAIR	Time In/Out:	

WELL DATA

Well Depth:		Well Diameter:	4"	Water Height	
Depth to Water:	78.56	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters

PURGING DATA

Purge Method:				TRI ADDEE				Pump Intake Depth:			MS		Comments	
Sampling Method:				L2				Tubing Type:			HARD SKIP BOND			
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks			
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	← Stabilization Criteria			
0837			28.79	0.15	7.22	15.75	0.340	8.01	111.1		Cl			
0840			28.97	0.15	7.04	15.83	0.237	0.65	112.9		Cl			
0843			29.19	0.15	6.91	15.86	0.236	2.12	111.3		Cl			
0846			29.38	0.15	6.85	15.87	0.235	2.05	110.5		Cl			
0849			29.50	0.15	6.82	15.87	0.234	1.75	110.2		Cl			
0855			SAMPLE											

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear


SAMPLING DATA

Sample ID:	MW-7	Sampling Flow Rate	0.15	Analytical Laboratory:	PAGE	
Sample Time:	0855	Final Depth to Water:	29.41	Did Well Dewater?	N	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3 x 40ml	HCl	HVCS	yes	no		MW-7 DUP
3 x 40ml	HCl	PSK-175	yes	no		
7 x 40ml	H ₂ SO ₄	TCC	yes	no		
			yes	no		
			yes	no		
			yes	no		

COMMENTS

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WELL MONITORING DATA SHEET

	Well I.D.	MW-8	Job Number:	1126
	Client:	DUSTAR	Date:	9/25/17
	Project:	Vancouver	Sampler:	MM/Jon
	Weather:	Overcast	Time In/Out:	1340

WELL DATA

Well Depth:	—	Well Diameter:	4"	Water Height	—
Depth to Water:	27.99	Screened Interval:	—	x Multiplier	—
Water Column Length:	—	Depth to Free Product:	—	x Casing Volumes	—
Purge Volume:	—	Free Product Thickness:	—	= Purge Volume	—
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters

PURGING DATA

Purge Method:		BLADDER PUMP			Pump Intake Depth:			MS			Comments	
Sampling Method:		LF			Tubing Type:			HDFE SKIP BOND				
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks	
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria	
1352			28.14	0.1	7.78	17.80	1.929	5.99	95.0	—	SC	
1355			28.20	0.1	7.15	16.30	1.940	1.56	105.4	—	SC	
1358			28.21	0.1	7.17	16.25	1.940	1.62	107.5	—	SC	
1340			28.22	0.1	7.20	16.16	1.939	1.89	109.3	—	AC	
1404			SAMPLE									


Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-8	Sampling Flow Rate	0.1	Analytical Laboratory:	PACE	
Sample Time:	1404	Final Depth to Water:	28.50	Did Well Dewater?	N	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3 x 40ml	HCl	HUOC5	yes <input checked="" type="checkbox"/> no	—	—	—
			yes <input type="checkbox"/> no			
			yes <input type="checkbox"/> no			
			yes <input type="checkbox"/> no			
			yes <input type="checkbox"/> no			
			yes <input type="checkbox"/> no			

COMMENTS

WELL MONITORING DATA SHEET

	Well I.D.: MW-9	Job Number: 11260
	Client: Nuysh	Date: 9-27-13
	Project: 3017 GUM	Sampler: MM
	Weather: FAIR	Time In/Out:

WELL DATA

Well Depth:	Well Diameter: 4"	Water Height	
Depth to Water: 78.74	Screened Interval:	x Multiplier	
Water Column Length:	Depth to Free Product:	x Casing Volumes	
Purge Volume:	Free Product Thickness:	= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653
		1 gallon = 3.785 liters	

PURGING DATA

Purge Method: BLANDED				Pump Intake Depth: MS				Comments			
Sampling Method: LI				Tubing Type: HOPE SKIP BUND							
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria
0800			28.66	0.15	7.71	15.61	2.473	7.30	126.5		CL
0803			28.77	0.15	7.44	13.91	2.962	8.18	137.2		SC
0806			29.23	0.15	7.24	13.75	3.033	7.64	142.6		SC
0809			29.75	0.15	7.17	13.75	3.094	7.15	143.6		SC
0811			29.75	0.15	7.11	13.74	3.151	6.65	144.6		SC
0814			29.75	0.15	7.07	13.74	3.187	6.31	145.4		SC
0817			29.76	0.15	7.04	13.74	3.189	6.20	146.3		SC
0820			SAMPLE								

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID: MW-9	Sampling Flow Rate: 0.15	Analytical Laboratory: PACE				
Sample Time: 0820	Final Depth to Water: 28.77	Did Well Dewater? N				
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x10ml	HCl	HVOCs	yes <u>no</u>			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

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WELL MONITORING DATA SHEET



Well I.D.	MW-10	Job Number:	11210
Client:	Nuster-Jan	Date:	9-27-17
Project:	3017 GWM	Sampler:	mm
Weather:	FAIR	Time In/Out:	

WELL DATA

Well Depth:		Well Diameter:	4"	Water Height	
Depth to Water:	27.86	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:				BIADDER				Pump Intake Depth:			MS		Comments	
Sampling Method:				LF				Tubing Type:					HDPE SKIP BURD	
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color	Other Remarks		
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	← Stabilization Criteria			
1153			28.67	0.15	6.00	26.00	2.362	4.01	51.3		AC			
1150			28.12	0.15	5.58	20.05	2.715	0.96	77.5		AC			
1159			28.19	0.15	5.62	19.30	2.750	1.71	81.8		AC			
1202			28.30	0.15	5.60	19.10	2.761	1.90	84.4		AC			
1205			28.35	0.15	5.50	19.20	2.764	1.62	86.0		AC			
1208			SAMPLE											

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-10	Sampling Flow Rate	0.15	Analytical Laboratory:	PACE		
Sample Time:	1208	Final Depth to Water:	28.41	Did Well Dewater?	N		
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID	
3x40ml	HCl	HVOCs	yes <input type="radio"/> no <input checked="" type="radio"/>				
			yes <input type="radio"/> no <input type="radio"/>				
			yes <input type="radio"/> no <input type="radio"/>				
			yes <input type="radio"/> no <input type="radio"/>				
			yes <input type="radio"/> no <input type="radio"/>				

COMMENTS

WELL MONITORING DATA SHEET



Well I.D.:	MW-12	Job Number:	1126
Client:	NuStar	Date:	09-28-17
Project:	3Q17 GUM	Sampler:	RM
Weather:	FAIR	Time In/Out:	

WELL DATA

Well Depth:		Well Diameter:	4"	Water Height	
Depth to Water:	27.09	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	BLADDER			Pump Intake Depth:	MS			Comments			
Sampling Method:	LF			Tubing Type:	HDPE SIF POND						
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	← Stabilization Criteria
1309			27.25	0.15	6.12	28.35	2.111	3.39	51.3		CI
1312			27.4	0.15	6.47	22.12	2.375	3.25	-61.8		CI
1315			27.87	0.15	6.68	21.90	2.356	2.49	-86.7		CI
1318			28.12	0.15	6.72	22.28	2.355	2.02	-87.4		CI
1321			28.65	0.15	6.70	22.53	2.360	1.63	-85.4		CI
1324			28.89	0.15	6.62	22.43	2.362	1.37	-85.9		CI
1327			29.10	0.15	6.61	22.55	2.364	1.19	-87.4		CI
1330			SAMPLE								


Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-12	Sampling Flow Rate	0.15	Analytical Laboratory:	PACE	
Sample Time:	1330	Final Depth to Water:	28.	Did Well Dewater?	N	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3 x 40ml	HCl	HUC	yes <input checked="" type="checkbox"/> no			MW-12 DUP
3 x 40ml	HCl	RSK 175	yes <input checked="" type="checkbox"/> no		MS	MW-12 MS
2 x 40ml	H ₂ SO ₄	TCC	yes <input checked="" type="checkbox"/> no		MSD	MW-12 MSD
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

	Well I.D.	MW-13	Job Number:	1126
	Client:	Huster Van	Date:	9-27-17
	Project:	3Q17 GWM	Sampler:	MM
	Weather:	FAIR	Time In/Out:	

WELL DATA

Well Depth:		Well Diameter:	4"	Water Height	
Depth to Water:	—	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters

PURGING DATA

Purge Method:				BLADDER				Pump Intake Depth:			MS		Comments	
Sampling Method:				LF				Tubing Type:			HERE SKIP BUMP			
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color	Other Remarks		
					+/-0.1	+/-0.5 °C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	← Stabilization Criteria			
1221				0.15	6.27	23.60	0.988	4.72	-93.3			VC		
1224				0.15	6.22	21.00	0.993	3.95	-112.1			VC		
1227				0.15	6.25	19.70	0.986	2.55	-110.0			VC		
1230				0.15	6.27	19.52	0.982	2.18	-103.7			VC		
1233				0.15	6.24	19.58	0.972	2.16	-103.9			VC		
1236				SAMPLE										

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear


SAMPLING DATA

Sample ID:	MW-13	Sampling Flow Rate	0.15	Analytical Laboratory:	PACE	
Sample Time:	1236	Final Depth to Water:	—	Did Well Dewater?	N	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x 40ml	HCl	HVIC	yes <input type="checkbox"/> no <input checked="" type="checkbox"/>			
3x 40ml	HCl	PSK-175	yes <input type="checkbox"/> no <input checked="" type="checkbox"/>			
2x 40ml	H ₂ SO ₄	TAC	yes <input type="checkbox"/> no <input checked="" type="checkbox"/>			
			yes <input type="checkbox"/> no <input checked="" type="checkbox"/>			
			yes <input type="checkbox"/> no <input checked="" type="checkbox"/>			

COMMENTS

VC → lots of floating fragments. Odor that is similar to fertilizer
"frothy"
maybe bronite, but had manure odor → could not gauge b/c froth kept plugging up the water level meter.

WELL MONITORING DATA SHEET

	Well I.D.	MW-1A	Job Number:	1126
	Client:	Nustar	Date:	9-26-17
	Project:	3017 GWM	Sampler:	MM
	Weather:	FAIR	Time In/Out:	

WELL DATA

Well Depth:		Well Diameter:	4"	Water Height	
Depth to Water:	28.83	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters

PURGING DATA

Purge Method:				BLADDER				Pump Intake Depth:			MS		Comments	
Sampling Method:				LF				Tubing Type:					HDPE SKIP BOND	
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color	Other Remarks		
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria			
1157			28.91	0.15	6.17	25.01	2.435	7.18	52.8			VC		
1200			28.92	0.15	5.93	18.96	2.880	2.70	80.0			VC		
1203			28.91	0.15	6.06	18.53	2.845	2.01	83.2			CI		
1206			28.92	0.15	6.09	18.55	2.753	2.09	81.3			CL		
1209			28.92	0.15	6.09	18.56	2.743	1.89	80.6			CL		
1212			SAMPLE											

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-1A	Sampling Flow Rate	0.15	Analytical Laboratory:	PACE	
Sample Time:	1212	Final Depth to Water:	28.83	Did Well Dewater?	N	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x 40ml	HCl	HVOCs	yes <input type="radio"/> no <input checked="" type="radio"/>			
3x 40ml	HCl	PSK-175	yes <input type="radio"/> no <input checked="" type="radio"/>			
2x 40ml	H ₂ SO ₄	TOC	yes <input type="radio"/> no <input checked="" type="radio"/>			
			yes <input type="radio"/> no <input type="radio"/>			
			yes <input type="radio"/> no <input type="radio"/>			
			yes <input type="radio"/> no <input type="radio"/>			

COMMENTS

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WELL MONITORING DATA SHEET



Well I.D.	MW-15	Job Number:	1126
Client:	Nustar U/M	Date:	9-25-17
Project:	3017 GUM	Sampler:	MM
Weather:	281R	Time In/Out:	

WELL DATA

Well Depth:		Well Diameter:	4"	Water Height	
Depth to Water:	33.37	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	BLADDER	Pump Intake Depth:	MS	Comments
Sampling Method:	LF	Tubing Type:	HDPE SKID BOUNDED	

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	-- Stabilization Criteria
0915			33.61	0.15	7.62	17.74	0.716	3.06	49.3		AC
0921			-	0.15	7.29	16.71	0.739	1.49	44.5		AC
0924			34.17	0.15	7.24	16.55	0.740	2.35	45.8		AC
0927			-	0.15	7.22	16.52	0.739	2.35	48.9		C
0930			34.53	0.15	7.19	16.57	0.738	2.37	47.6		C
0933				SAMPLE							

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-15	Sampling Flow Rate	0.15	Analytical Laboratory:	PAGE
Sample Time:	0933	Final Depth to Water:	34.50	Did Well Dewater?	N
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD Duplicate ID
3 x 40ml	HCl	HVOC	yes no		
			yes no		
			yes no		
			yes no		
			yes no		

COMMENTS

WELL MONITORING DATA SHEET



Well I.D.	MW-150	Job Number:	1126
Client:	MUSTAR	Date:	9/25/17
Project:	VANCOUVER	Sampler:	EGM
Weather:	OVERCAST	Time In/Out:	

WELL DATA

Well Depth:	—	Well Diameter:	MW 4"	Water Height:	—
Depth to Water:	— 28.70	Screened Interval:	—	x Multiplier:	—
Water Column Length:	—	Depth to Free Product:	—	x Casing Volumes:	—
Purge Volume:	—	Free Product Thickness:	—	= Purge Volume:	—
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters

PURGING DATA

Purge Method:				Bladder pump				Pump Intake Depth:			MS		Comments	
Sampling Method:				IF				Tubing Type:					HOPE SKIP BOND	
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color	Other Remarks		
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	← Stabilization Criteria			
1322			28.92	0.1	7.01	20.25	0.823	6.70	62.8		VC			
1325			28.98	0.1	6.53	17.21	0.625	2.00	77.1		VC			
1328			29.12	0.1	6.70	16.19	0.605	2.58	74.8		VC			
1331			29.21	0.1	6.79	15.99	0.595	2.33	79.0		CI			
1333			29.23	0.1	6.86	16.01	0.589	2.68	81.3		CI			
1335			SAMPLE											

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear


SAMPLING DATA

Sample ID:	MW-16	Sampling Flow Rate:	0.1	Analytical Laboratory:	PAGE	
Sample Time:	1335	Final Depth to Water:	28.99	Did Well Dewater?	N	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x40ml	HCl	HVOCs	yes <input checked="" type="radio"/> no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

1126

	Well I.D.: <u>MW-17</u>	Job Number:
	Client: <u>Nustar UAN</u>	Date: <u>9-29-07</u>
	Project: <u>3017 GUMU</u>	Sampler: <u>AM</u>
	Weather: <u>OVERCAST/LT RAIN</u>	Time In/Out:

WELL DATA

Well Depth:	Well Diameter: <u>4"</u>	Water Height
Depth to Water: <u>28.23</u>	Screened Interval:	x Multiplier
Water Column Length:	Depth to Free Product:	x Casing Volumes
Purge Volume:	Free Product Thickness:	= Purge Volume
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162
		4-inch = 0.653
		1 gallon = 3.785 liters

PURGING DATA

Purge Method: <u>BLADDER</u>				Pump Intake Depth: <u>MS</u>				Comments			
Sampling Method: <u>LF</u>				Tubing Type: <u>Deaerated Skip line</u>							
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	← Stabilization Criteria
1246			28.34	0.15	7.09	17.54	1.089	1.59	76.2		AC
1249			28.36	0.15	7.02	16.92	1.104	1.65	76.8		AC
1252			28.7	0.15	6.99	16.83	1.107	2.02	76.6		AC
1255			28.39	0.15	6.97	16.80	1.125	1.91	75.6		AC
1258			28.39	0.15	6.97	16.80	1.128	1.81	75.3		AC
1301			28.40	0.15	6.96	16.73	1.131	1.79	74.7		AC
1305			SAMPLE								

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear


SAMPLING DATA

Sample ID: <u>MW-17</u>	Sampling Flow Rate: <u>0.15</u>	Analytical Laboratory: <u>PACE</u>
Sample Time: <u>1305</u>	Final Depth to Water: <u>28.25</u>	Did Well Dewater? <u>N</u>
# Containers/Type: <u>3x 40ml</u>	Preservative: <u>HCl</u>	Analysis/Method: <u>HVOC</u>
	Field Filtered	Filter Size
	yes <input checked="" type="checkbox"/> no	MS/MSD
	yes no	Duplicate ID
	yes no	
	yes no	
	yes no	
	yes no	

COMMENTS

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WELL MONITORING DATA SHEET

	Well I.D.	MW-18i	Job Number:	1126
	Client:	Nustar Van	Date:	9-27-17
	Project:	3Q17 OUM	Sampler:	mm
	Weather:	FAIR	Time In/Out:	

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	28.70	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters

PURGING DATA

Purge Method:		BLADDER			Pump Intake Depth:		MS			Comments	
Sampling Method:		LF			Tubing Type:		HDC SKIP BOND				
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria
1550			28.71	0.15	8.01	30.56	0.129	4.47	19.3		AC
1601			28.75	0.15	7.37	29.30	0.133	3.20	21.9		AC
1604			28.79	0.15	7.12	28.21.87	0.250	0.67	37.6		AC
1607			28.87	0.15	7.11	21.39	0.250	0.48	37.7		AC
1610			28.92	0.15	7.16	21.97	0.249	0.40	33.8		AC
1613			SAMPLE								

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear


SAMPLING DATA

Sample ID:	MW-18i	Sampling Flow Rate	0.15	Analytical Laboratory:	PACE	
Sample Time:	1613	Final Depth to Water:	28.98	Did Well Dewater?	N	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x 10ml	H+U	H+UOC	yes (no)			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

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WELL MONITORING DATA SHEET

	Well I.D.: MW-19	Job Number: 1126
	Client: [unclear]	Date: 9-26-17
	Project: 2017 GUM	Sampler: MM
	Weather: B4IR	Time In/Out:

WELL DATA

Well Depth:	Well Diameter: 2"	Water Height:	
Depth to Water: 78.61	Screened Interval:	x Multiplier:	
Water Column Length:	Depth to Free Product:	x Casing Volumes:	
Purge Volume:	Free Product Thickness:	= Purge Volume:	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653
		1 gallon = 3.785 liters	

PURGING DATA

Purge Method: Bladder				Pump Intake Depth: NIS				Comments			
Sampling Method: LF				Tubing Type: HDPE SKIP BUNN							
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria
0807			28.85	0.15	6.94	16.85	2045	6.92	168.4		CI
0810			28.92	0.15	6.94	16.30	2051	1.36	179.7		CI
0813			28.99	0.15	6.92	16.28	1.994	2.50	182.2		CI
0816			29.05	0.15	6.93	16.30	1.892	1.72	183.8		CI
1819			29.05	0.15	6.94	16.29	1.978	2.01	184.4		CI
1821			29.09	0.15	6.94	16.30	1.979	1.92	185.2		CI
0824			SAMPLE								

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID: MW-19	Sampling Flow Rate: 0.15	Analytical Laboratory: BACE				
Sample Time: 0824	Final Depth to Water: 78.78	Did Well Dewater? N				
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x 40ml	HCl	HVOCs	yes <input type="checkbox"/> no <input checked="" type="checkbox"/>			MW-19 DUB
3x 40ml	HCl	RSK-175	yes <input type="checkbox"/> no <input checked="" type="checkbox"/>			
7x 40ml	H ₂ SO ₄	TOC	yes <input type="checkbox"/> no <input checked="" type="checkbox"/>			
			yes <input type="checkbox"/> no <input type="checkbox"/>			
			yes <input type="checkbox"/> no <input type="checkbox"/>			
			yes <input type="checkbox"/> no <input type="checkbox"/>			

COMMENTS



WELL MONITORING DATA SHEET



Well I.D.:	MW-19i	Job Number:	1126
Client:	Nuske Van	Date:	9-28-17
Project:	3Q12 GUM	Sampler:	MM
Weather:	FAIR	Time In/Out:	

WELL DATA

Well Depth:		Well Diameter:	7"	Water Height	
Depth to Water:	21.50	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters

PURGING DATA

Purge Method:		BLADDER			Pump Intake Depth:		MS		Comments		
Sampling Method:		LF			Tubing Type:		HAPE SKID BONDED				
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria
0839			29.51	0.15	8.32	15.68	0.206	7.55	94.8		Cl
0847			29.21	0.15	7.62	16.15	0.251	5.99	106.4		cl
0845			30.06	0.15	7.62	15.63	0.250	0.70	93.1		cl
0848			30.33	0.15	7.64	15.53	0.249	1.25	88.9		cl
0851			30.43	0.15	7.66	15.50	0.249	1.39	82.2		cl
0854			30.89	0.15	7.67	15.33	0.249	1.10	96.8		cl
0857			SAMPLE								

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-19i	Sampling Flow Rate	0.15	Analytical Laboratory:	PACE
Sample Time:	0857	Final Depth to Water:	33.41	Did Well Dewater?	N
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD Duplicate ID
3+ 10ml	HCl	HVOCs	yes <input type="radio"/> no <input checked="" type="radio"/>		
			yes <input type="radio"/> no <input type="radio"/>		
			yes <input type="radio"/> no <input type="radio"/>		
			yes <input type="radio"/> no <input type="radio"/>		
			yes <input type="radio"/> no <input type="radio"/>		

COMMENTS

WELL MONITORING DATA SHEET



Well I.D.	MW-20i	Job Number:	1126
Client:	Nustar Van	Date:	9-27-17
Project:	3Q17 GWM	Sampler:	MMW
Weather:	FAIR	Time In/Out:	

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	29.80	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:					BLADDER					Pump Intake Depth:		MS		Comments
Sampling Method:					LF					Tubing Type:		HDPE SKIP BOND		
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color	Other Remarks		
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	← Stabilization Criteria			
1529			29.81	0.15	7.36	27.65	0.199	8.65	20.8			AC		
1532			29.82	0.15	7.23	20.98	0.195	7.29	8.0			AC		
1535			29.83	0.15	7.38	20.44	0.191	6.26	26.2			AC		
1538			29.84	0.15	7.38	20.65	0.191	6.07	22.0			AC		
1541			29.85	0.15	7.46	20.87	0.191	5.97	17.8			AC		
1545			SAMPLE											

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-20i	Sampling Flow Rate:	0.15	Analytical Laboratory:	PACE	
Sample Time:	1545	Final Depth to Water:	29.83	Did Well Dewater?	N	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x 10ml	HCl	HVOCs	yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET



Well I.D.	MW-21i-40	Job Number:	1126
Client:	Nostar VAN	Date:	9-29-17
Project:	3Q17 GUM	Sampler:	MM
Weather:	FAIR	Time In/Out:	

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	20.19	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	BLADDER	Pump Intake Depth:	MS	Comments
Sampling Method:	LF	Tubing Type:	HDP SKIP BOND	

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
1346			30.28	0.15	6.33	25.60	0.275	6.95	-12.1		cl
1349			30.22	0.15	6.24	19.32	0.289	2.63	3.5		cl
1352			30.24	0.15	6.31	19.02	0.291	1.66	9.3		SC
1355			30.24	0.15	8.17	18.87	0.291	1.89	8.1		SC
1358			30.24	0.15	8.17	18.67	0.292	1.87	9.5		SC
1401			30.28	0.15	8.27	18.54	0.293	1.91	11.2		SC
1404			SAMPLE								

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-21i-40	Sampling Flow Rate:	0.15	Analytical Laboratory:	PACE
Sample Time:	1404	Final Depth to Water:	30.30	Did Well Dewater?	N
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD Duplicate ID
3x 10ml	HCl	HVOC	yes no		
			yes no		
			yes no		
			yes no		
			yes no		

COMMENTS

WELL MONITORING DATA SHEET



Well I.D.	MW-21i-105	Job Number:	1126
Client:	Nuclear Venn	Date:	9-27-17
Project:	3Q17 GUM	Sampler:	MMV
Weather:	FAIR	Time In/Out:	

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	30.74	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters

PURGING DATA

Purge Method:	BLADDER	Pump Intake Depth:	MS	Comments
Sampling Method:	LF	Tubing Type:	HDPE SKIP BOND	

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria
1435			30.25	0.1	9.63	30.90	0.227	6.02	15.8		AC
1438			30.30	0.1	9.30	20.82	0.176	1.73	50.0		AC
1441			30.30	0.1	9.35	20.63	0.181	1.57	46.0		AC
1444			30.30	0.1	9.25	20.78	0.184	1.95	45.0		AC
1447			30.30	0.1	9.30	20.43	0.187	1.50	43.0		AC
1450											


Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-21i-105	Sampling Flow Rate	0.15	Analytical Laboratory:	PACE	
Sample Time:	1450	Final Depth to Water:	30.25	Did Well Dewater?	N	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x 40ml	HCl	HVOC	yes <input checked="" type="radio"/> no			
			yes <input type="radio"/> no			
			yes <input type="radio"/> no			
			yes <input type="radio"/> no			
			yes <input type="radio"/> no			

COMMENTS

WELL MONITORING DATA SHEET

	Well I.D.:	MW-22i	Job Number:	1126
	Client:	Nuster Van	Date:	9-27-17
	Project:	3017 GWM	Sampler:	MM
	Weather:	FAIR	Time In/Out:	

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	30.49	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters

PURGING DATA

Purge Method:	RIADOER	Pump Intake Depth:	MS	Comments
Sampling Method:	LE	Tubing Type:	HDPE SKIP BOND	

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color	
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria	
1115			30.52	0.15	6.27	26.26	0.338	4.14	-10.8		AA SC	
1118			30.51	0.15	6.00	20.00	0.480	6.40	-16.5		VC	
1121			30.51	0.15	6.12	17.90	0.486	7.73	-29.7		VC	
1124			30.51	0.15	6.18	17.49	0.479	7.27	-35.0		VC	
1127			30.51	0.15	6.21	17.28	0.471	7.00	-37.8		CI	
1130			30.51	0.15	6.28	17.10	0.469	6.96	-39.2		CI	
1133			SAMPLE									

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear


SAMPLING DATA

Sample ID:	MW-22i	Sampling Flow Rate	0.15	Analytical Laboratory:	PACE
Sample Time:	1133	Final Depth to Water:	30.50	Did Well Dewater?	N
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD Duplicate ID
3 x 40ml	HCl	HVOCs	yes <u>no</u>		
			yes no		
			yes no		
			yes no		
			yes no		
			yes no		

COMMENTS

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WELL MONITORING DATA SHEET

	Well I.D.	MW-23i	Job Number:	1126
	Client:	Nustar VAN	Date:	9-26-17
	Project:	3Q17 GWM	Sampler:	MM
	Weather:	FAIR	Time In/Out:	

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	29.76	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters

PURGING DATA

Purge Method:				BLADDER				Pump Intake Depth:			MS		Comments	
Sampling Method:				LF				Tubing Type:			HDPE SKIPPOND			
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color	Other Remarks		
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	← Stabilization Criteria			
1223			29.78	0.15	6.77	26.64	0.210	13.61	26.0		AC			
1226			29.78	0.15	5.78	18.89	0.169	10.71	32.3		AC			
1227			29.78	0.15	5.89	17.35	0.185	5.80	43.1		AC			
1232			29.78	0.15	6.00	17.16	0.185	5.86	41.2		AC			
1235			29.78	0.15	6.01	16.97	0.191	5.74	39.2		AC			
1238			29.78	0.15	6.06	16.92	0.193	5.48	36.7		AC			
1241			SAMPLE											

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-23i	Sampling Flow Rate	0.15	Analytical Laboratory:	PACE		
Sample Time:	1241	Final Depth to Water:	29.77	Did Well Dewater?	N		
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID	
3+ 40ml	HCl	HUOGS	yes <input checked="" type="radio"/> no				
			yes no				
			yes no				
			yes no				
			yes no				

COMMENTS

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WELL MONITORING DATA SHEET



Well I.D.:	MW-24i	Job Number:	1126
Client:	NuStar VAN	Date:	9-26-17
Project:	3Q17 GWM	Sampler:	MM
Weather:	FAIR	Time In/Out:	

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	29.47	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	BLADDER				Pump Intake Depth:	MS				Comments	
Sampling Method:	LE				Tubing Type:	HDPE SKIP BUND					
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
0943			29.50	0.15	8.01	16.70	0.193	6.98	-34.1		SC
0946			29.50	0.15	6.93	15.65	0.270	2.01	-12.5		SC
0949			29.50	0.15	6.81	15.15	0.298	1.30	-12.7		SC
0952			29.50	0.15	6.79	15.01	0.301	1.26	-12.2		SC
0955			29.50	0.15	6.78	15.00	0.302	1.21	-10.7		SC
0957			SAMPLE								


Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-24i	Sampling Flow Rate:	0.15	Analytical Laboratory:	PACE		
Sample Time:	0957	Final Depth to Water:	29.41	Did Well Dewater?	NO		
# Containers/Type	Preservative	Analysis/Method	Field Filtered		Filter Size	MS/MSD	Duplicate ID
3x 40 ml	HCl	HVOCs	yes	no			
3x 40 ml	HCl	PSK-175	yes	no			
2x 40 ml	H ₂ SO ₄	TOC	yes	no			
			yes	no			
			yes	no			

COMMENTS

WELL MONITORING DATA SHEET

	Well I.D.	MW-24D	Job Number:	11200
	Client:	MUSTAR	Date:	9/25/17
	Project:	VADL	Sampler:	JG
	Weather:	Overcast	Time In/Out:	1409

WELL DATA

Well Depth:	-	Well Diameter:	2"	Water Height	-
Depth to Water:	30.69	Screened Interval:	-	x Multiplier	-
Water Column Length:	-	Depth to Free Product:	-	x Casing Volumes	-
Purge Volume:	-	Free Product Thickness:	-	= Purge Volume	-
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters

PURGING DATA

Purge Method:		Bladder Pump			Pump Intake Depth:		MS			Comments		
Sampling Method:		LF			Tubing Type:		LDPE SKIP BURDED					
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks	
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria	
1419			30.95	0.1	9.23	19.60	0.396	10.55	125.3		AC	
1422			30.95	0.1	8.67	15.95	0.368	1.53	96.5		AC	
1425			30.95	0.1	8.82	15.30	0.369	1.09	38.1		AC	
1428			30.95	0.1	9.13	14.79	0.372	0.72	-10.9		AC	
1431			30.96	0.1	9.34	14.63	0.380	0.85	-10.1		AC	
1434			30.96	0.1	9.54	14.49	0.382	0.80	-57.1		AC	
1437			30.97	0.1	9.56	14.36	0.383	0.78	-63.3		AC	
1440			30.97	0.1	9.62	14.37	0.383	0.76	-71.0		AC	
1443			SAMPLE									


Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-24D	Sampling Flow Rate	0.1	Analytical Laboratory:	PACC
Sample Time:	1443	Final Depth to Water:	30.71	Did Well Dewater?	N
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD Duplicate ID
3x40ml	HCl	HVOCs	yes no		
			yes no		
			yes no		
			yes no		
			yes no		

COMMENTS

WELL MONITORING DATA SHEET

	Well I.D.: MW-25i	Job Number: 1126
	Client: NoStar	Date: 9-27-17
	Project: 3Q17 GWM	Sampler: MM
	Weather: FAIR	Time In/Out:

WELL DATA

Well Depth:	Well Diameter: 2"	Water Height	
Depth to Water: 29.87	Screened Interval:	x Multiplier	
Water Column Length:	Depth to Free Product:	x Casing Volumes	
Purge Volume:	Free Product Thickness:	= Purge Volume	
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162 4-inch = 0.653 1 gallon = 3.785 liters

PURGING DATA

Purge Method: BLADDER				Pump Intake Depth: MS				Comments			
Sampling Method: LF				Tubing Type: HOPE SKIP BOND							
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
1031			29.89	0.15	7.96	23.00	0.144	5.98 5.68	-56.8		CI
1034			29.88	0.15	7.72	17.90	0.233	6.43	-28.0		CI
1037			29.89	0.15	7.36	16.32	0.241	3.05	4.9		SC
1040			29.88	0.15	7.36	16.14	0.241	2.73	5.9		SC
1043			29.88	0.15	7.36	16.00	0.240	2.60	9.1		SC
1046			SAMPLE								

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID: MW-25i	Sampling Flow Rate: 0.15	Analytical Laboratory: PACE				
Sample Time: 1046	Final Depth to Water: 29.87	Did Well Dewater? N				
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3 = 40ml	HCl	HVOCs	yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

--

WELL MONITORING DATA SHEET



Well I.D.:	MW-26	Job Number:	1176
Client:	N-Star	Date:	9-26-17
Project:	3Q17 GWM	Sampler:	MM
Weather:	FAIR	Time In/Out:	

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	28.57	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters

PURGING DATA

Purge Method:		BLADDER			Pump Intake Depth:		MS			Comments	
Sampling Method:		LE			Tubing Type:		HDPE SKIP BUND				
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria
1117			28.60	0.15	7.02	22.56	2.365	6.41	59.8		AC
1120			28.64	0.15	6.44	19.05	2.130	3.49	73.9		AC
1123			28.69	0.15	6.51	17.49	2.839	5.43	76.8		AC
1126			28.74	0.15	6.58	17.45	2.812	5.41	77.1		AC
1129			28.77	0.15	6.59	17.33	2.813	5.56	77.3		AC
1133			SAMPLE								

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-26	Sampling Flow Rate:	0.15	Analytical Laboratory:	PACG	
Sample Time:	1133	Final Depth to Water:	28.57	Did Well Dewater?	N	
# Containers/Type	Preservative	Analysis/Method	Field Filtered		Filter Size	MS/MSD Duplicate ID
3 x 40ml	HCl	HVOCs	yes	no		
3 x 40ml	HCl	RSK-175	yes	no		
2 x 40ml	H2SO4	TOC	yes	no		
			yes	no		
			yes	no		

COMMENTS

WELL MONITORING DATA SHEET



Well I.D.:	S-1	Job Number:	1126
Client:	MUSTARUAN	Date:	9-28-17
Project:	3Q17 GWM	Sampler:	MM
Weather:	FAIR	Time In/Out:	

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	28.39	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	BLADDER	Pump Intake Depth:	MS	Comments
Sampling Method:	LE	Tubing Type:	HDPE / SKIP BOND	

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
1217			29.45	0.15	7.20	23.55	0.218	5.50	22.8		SC
1220			28.44	0.15	7.10	19.41	0.144	1.79	40.4		SC
1223			28.89	0.15	6.80	19.06	0.142	0.108	56.1		SC
1226			28.73	0.15	6.85	17.16	0.142	0.53	56.4		SC
1229			28.90	0.15	6.88	19.15	0.142	0.50	57.7		SC
1232			SAMPLE								


Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	S-1	Sampling Flow Rate	0.15	Analytical Laboratory:	PACE
Sample Time:	1232	Final Depth to Water:	28.30	Did Well Dewater?	N
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD Duplicate ID
3x 40ml	HCl	HUCC	yes <u>no</u>		
			yes no		
			yes no		
			yes no		
			yes no		
			yes no		

COMMENTS

WELL MONITORING DATA SHEET

	Well I.D.	S-2	Job Number:	1126
	Client:	NuStar VA VAN	Date:	9-28-17
	Project:	3017 Gum	Sampler:	MM
	Weather:	FAIR	Time In/Out:	

WELL DATA

Well Depth:		Well Diameter:	2"
Depth to Water:	29.46	Screened Interval:	
Water Column Length:		Depth to Free Product:	
Purge Volume:		Free Product Thickness:	
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162
		4-inch = 0.653	1 gallon = 3.785 liters

PURGING DATA

Purge Method:				BLADDER				Pump Intake Depth:			MS		Comments	
Sampling Method:				LF				Tubing Type:			SKIP BONDED			
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color	Other Remarks		
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	← Stabilization Criteria			
1152			29.77	0.15	6.08	30.0	1.811	5.88	8.3		CI	reddish color		
1155			29.64	0.15	6.20	20.26	2.051	2.10	27.4		CI			
1158			29.73	0.15	6.41	19.16	2.039	2.77	33.0		CI			
1201			29.71	0.15	6.52	18.67	2.009	1.95	34.7		CI			
1204			29.75	0.15	6.58	18.64	2.153	1.77	36.1		CI			
1207			29.76	0.15	6.63	18.70	2.187	1.80	36.4		CI			
1210			29.77	0.15	6.69	18.67	2.203	1.86	37.4		VC			
1213			SAMPLE											

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	S-2	Sampling Flow Rate	0.15	Analytical Laboratory:	PACE	
Sample Time:	1213	Final Depth to Water:	29.54	Did Well Dewater?	N	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x 40ml	HCl	HVUCs	yes <input checked="" type="checkbox"/> no			
			yes <input type="checkbox"/> no			
			yes <input type="checkbox"/> no			
			yes <input type="checkbox"/> no			
			yes <input type="checkbox"/> no			

COMMENTS

--

643
53.912
127.0

WELL MONITORING DATA SHEET



Well I.D.:	FB-092817	Job Number:	1126
Client:	Nuster Van	Date:	9-28-17
Project:	3Q17 GUM	Sampler:	MM
Weather:	FAIR	Time In/Out:	

WELL DATA

Well Depth:		Well Diameter:		Water Height	
Depth to Water:		Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters

PURGING DATA

Purge Method:				Pump Intake Depth:				Comments			
Sampling Method:				Tubing Type:							
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	FB-092817	Sampling Flow Rate:		Analytical Laboratory:	PACE	
Sample Time:	0745	Final Depth to Water:		Did Well Dewater?		
# Containers/Type	Preservative	Analysis/Method	Field Filtered		Filter Size	Duplicate ID
3x90ml	HCl	HVOC	yes	no		
			yes	no		
			yes	no		
			yes	no		
			yes	no		
			yes	no		

COMMENTS

Field blank for 9-28-17

WELL MONITORING DATA SHEET



Well I.D.	FB-092917	Job Number:	1126
Client:	Nuster UAN	Date:	9-29-17
Project:	3Q17 GUM	Sampler:	MM
Weather:	OVERCAST	Time In/Out:	

WELL DATA

Well Depth:		Well Diameter:		Water Height	
Depth to Water:		Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:				Pump Intake Depth:				Comments			
Sampling Method:				Tubing Type:							
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	FB-092917	Sampling Flow Rate		Analytical Laboratory:	PACE	
Sample Time:	0730	Final Depth to Water:		Did Well Dewater?		
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x40ml	HCl	HVOC	yes <u>no</u>			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

Field Blank for 9-29-17

WELL MONITORING DATA SHEET



Well I.D.	EB-092817	Job Number:	1126
Client:	Nustar Van	Date:	9-28-17
Project:	3Q17 GWM	Sampler:	mm
Weather:	FAIR	Time In/Out:	

WELL DATA

Well Depth:		Well Diameter:		Water Height	
Depth to Water:		Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:					Pump Intake Depth:					Comments	
Sampling Method:					Tubing Type:						
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	EB-092817	Sampling Flow Rate		Analytical Laboratory:	PACE	
Sample Time:	0740 0740	Final Depth to Water:		Did Well Dewater?		
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3 x 40ml	HCl	HUOC	yes <input checked="" type="radio"/> no			
			yes <input type="radio"/> no			
			yes <input type="radio"/> no			
			yes <input type="radio"/> no			
			yes <input type="radio"/> no			

COMMENTS

EQUIPMENT BLANK



3015 SW First Avenue
 Portland, Oregon 97201-4707
 (503) 924-4704 Phone
 (503) 943-6357 Fax

PROJECT NUMBER 1126
 FIELD REPORT NUMBER _____
 PAGE 1 OF 1
 DATE 09-25-17

PROJECT	<u>VANCOUVER GWM</u>	ARRIVAL TIME	<u>0655</u>
LOCATION	<u>VANCOUVER WA</u>	DEPARTURE TIME	<u>1730</u>
CLIENT	<u>NUSTAR</u>	WEATHER	<u>OVERCAST</u>
PURPOSE OF OBSERVATIONS	<u>GWM EVENT, SUE SYSTEM O&M</u>		
APEX REPRESENTATIVE	<u>MM, JM</u>	APEX PROJECT MANAGER	<u>H. GOSACK</u>
CONTRACTOR	<u>-</u>	PERMIT NO.	<u>✓</u>
CONTRACTOR REP.	<u>-</u>	H&S REVIEW	<u>✓</u>

Our firm's professionals are represented on site solely to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representative do not relieve any contractor from its obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods, operations, and sequence of construction. Unless signed by the Ash Creek Associates Project Manager, this report is preliminary. A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those included in a preliminary report.

0655 ARRIVED ONSITE. SIGNED IN, SAFETY MTG, ISSUED PERMIT, HASP REVIEW

0720 REMOVED WELL CAPS

0840 COULD NOT FIND MW-G + MW-30i. APPEAR TO BE GRADED OVER. CALLED PM, PM TO SEND APEX REP W/ GPS.

0903 STARTED GAUGING WELLS (SHALLOW + DEEP)

1040 FINISHED GAUGING WELLS (S + D). SOUTH SUE SYSTEM O&M, SAMPLED VAPOR.

1120 RESUMED W/ SAMPLING WELLS*

1300 APEX REP ONSITE TO FIND WELLS MW-G + MW-30i

1430 APEX REP RECOVERED WELLS, BOTH COVERED W/ 1/2' - 2' GRADING. GAUGED WELLS (INTERMEDIATE) CONT. SAMPLING

1530 TURNED IN PERMIT, SIGNED OUT, LEFT SITE

* SAMPLED. MW-2, MW-3, MW-8, MW-16, MW-24d

BY

REVIEWED BY



 APEX REPRESENTATIVE

 APEX PROJECT MANAGER



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PROJECT NUMBER 1126
 FIELD REPORT NUMBER _____
 PAGE 1 OF 1
 DATE 09-26-17

PROJECT	<u>VANCOUVER 3Q17 GWM</u>	ARRIVAL TIME	<u>0655</u>
LOCATION	<u>NUSTAR VANCOUVER</u>	DEPARTURE TIME	<u>1630</u>
CLIENT	<u>NuStar</u>	WEATHER	<u>FAIR</u>
PURPOSE OF OBSERVATIONS	<u>3Q17 GWM</u>		
APEX REPRESENTATIVE	<u>M MASTARSON</u>	APEX PROJECT MANAGER	<u>H. GOSACK</u>
CONTRACTOR	<u>~</u>	PERMIT NO.	<u>244557</u>
CONTRACTOR REP.	<u>✓</u>	H&S REVIEW	<u>✓</u>

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~~0655~~ ARRIVED ON SITE
 SIGNED IN / SAFETY MTG / ISSUED PERMIT

0725 GAUGED MW-31i → WAS UNABLE TO GAUGE YESTERDAY
 (BUILDING LOCKED) GAUGED TODAY AT SIMILAR
 TIDAL FLUX.

0740 SAMPLED WELLS *

1630 SIGNED OUT / TURNED IN PERMIT / LEFT SITE

* SAMPLED: MW-1, MW-1A, MW-19, MGMS3-40, MGMS3-60, MGMS3-101,
 MGMS3-132, MW-23i, MW-24i, MW-26, MP-1, EX,
 MW-19 DUP, MGMS3-40 DUP

BY

REVIEWED BY


 APEX REPRESENTATIVE

 APEX PROJECT MANAGER



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 (503) 943-6357 Fax

PROJECT NUMBER 1126
 FIELD REPORT NUMBER _____
 PAGE 1 OF 1
 DATE 09-27-17

PROJECT	<u>NUSTAR GWM</u>	ARRIVAL TIME	<u>0650</u>
LOCATION	<u>VANCOUVER WA</u>	DEPARTURE TIME	<u>1635</u>
CLIENT	<u>NUSTAR</u>	WEATHER	<u>FAIR</u>
PURPOSE OF OBSERVATIONS	<u>3Q17 GWM</u>		
APEX REPRESENTATIVE	<u>MM</u>	APEX PROJECT MANAGER	<u>H. GOSACK</u>
CONTRACTOR	<u>-</u>	PERMIT NO.	<input checked="" type="checkbox"/>
CONTRACTOR REP.	<u>-</u>	H&S REVIEW	<input checked="" type="checkbox"/>

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0650 ARRIVED AT SITE, SIGNED IN, SAFETY MTG, ISSUED PERMIT

0720 STARTED SAMPLING WELLS*

1230 MW-13 HAD ODOR - POSSIBLY FERTILIZER? ALSO, LOTS OF PARTICULATES - POSSIBLY BENTONITE - IN CASING. WATER LEVEL METER WOULD NOT WORK - ~~PA~~ THE BENTONITE-LOOKING MATERIAL KEPT PLUGGING THE SENSOR

1635 SIGNED OUT, TURNED IN PERMIT, LEFT SITE

* SAMPLED: MW-10, MW-22, MW-25, MW-13, MW-5, MW-7, MW-9, MW-21, -105, MW-21, -40, MW-18, MW-20, MW-7 DUP

BY

REVIEWED BY


 APEX REPRESENTATIVE

 APEX PROJECT MANAGER



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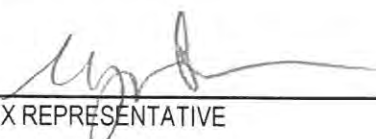
PROJECT NUMBER 1126
 FIELD REPORT NUMBER _____
 PAGE 1 OF 1
 DATE 9-28-17

PROJECT	<u>NuStar 3Q17 GUM</u>	ARRIVAL TIME	<u>0655</u>
LOCATION	<u>Vancouver</u>	DEPARTURE TIME	<u>1420</u>
CLIENT	<u>NuStar</u>	WEATHER	<u>FAIR</u>
PURPOSE OF OBSERVATIONS	<u>3Q17 GUM</u>		
APEX REPRESENTATIVE	<u>M. MASTERSON</u>	APEX PROJECT MANAGER	<u>H. GOSACK</u>
CONTRACTOR	<u>-</u>	PERMIT NO.	<u>245370</u>
CONTRACTOR REP.	<u>-</u>	H&S REVIEW	<u>✓</u>

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0655 ARRIVED ONSITE, SIGNED IN, SAFETY MTG, PERMIT
 0740 EQUIPMENT BLANK, FIELD BLANK, YSI CAL
 0830 SAMPLE WELLS*
 1420 SIGNED OUT, TURNED IN PERMIT, LEFT SITE

* SAMPLED WELLS. MW-12, S-1, S-2, EW-1, MW-6, ~~MW-5~~,
 MW-19i, MW-12 DUP,

BY 

 APEX REPRESENTATIVE

REVIEWED BY _____

 APEX PROJECT MANAGER



3015 SW First Avenue
 Portland, Oregon 97201-4707
 (503) 924-4704 Phone
 (503) 943-6357 Fax

PROJECT NUMBER 1126
 FIELD REPORT NUMBER _____
 PAGE 1 OF 1
 DATE 9-29-17

PROJECT	<u>3Q17 GUM</u>	ARRIVAL TIME	<u>0700 0700</u>
LOCATION	<u>VANCOUVER, WA</u>	DEPARTURE TIME	<u>1330</u>
CLIENT	<u>NUSTAR</u>	WEATHER	<u>OVERCAST / LT. RAIN</u>
PURPOSE OF OBSERVATIONS	<u>GW SAMPLING</u>		
APEX REPRESENTATIVE	<u>M MASTERSON</u>	APEX PROJECT MANAGER	<u>H. GOSACK</u>
CONTRACTOR	<u>-</u>	PERMIT NO.	<u>245373</u>
CONTRACTOR REP.	<u>-</u>	H&S REVIEW	<u>✓</u>

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0700 ARRIVED ONSITE, SIGNED IN, SAFETY MTG,
 ISSUED PERMIT

0730 FIELD BLANK + YSI CAL


0745 STARTED SAMPLING WELLS*

1330 SIGNED OUT, TURNED IN PERMIT, LEFT SITE

* SAMPLED MW-17, MSGS1-43, MSGS1-60, MSGS1-110,
 MSGS2-40, MSGS2-60, MSGS2-110,
 MSGS2-132

BY

REVIEWED BY


 APEX REPRESENTATIVE

 APEX PROJECT MANAGER



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PROJECT NUMBER 1126-20
 FIELD REPORT NUMBER _____
 PAGE 1 OF 1
 DATE 11/6/2017

PROJECT	<u>4Q17 GWM</u>	ARRIVAL TIME	<u>0655</u>
LOCATION	<u>Vancouver, WA</u>	DEPARTURE TIME	<u>1700</u>
CLIENT	<u>NuStar</u>	WEATHER	<u>Overcast</u>
PURPOSE OF OBSERVATIONS	<u>Gauge and sample monitoring wells</u>		
APEX REPRESENTATIVE	<u>M.Masterson & M.Whitson</u>	APEX PROJECT MANAGER	<u>S. Salisbury</u>
CONTRACTOR	<u>NA</u>	PERMIT NO.	<u>244676</u>
CONTRACTOR REP.	<u>NA</u>	H&S REVIEW	<u>Yes</u>

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- 0655 Arrived on-site / signed in / attended safety meeting / issued work permit / reviewed HASP
- 0730 Removed monitoring well caps
- 0910 Finished removing caps - Wait until approx. low tide to gauge wells
- 0930 Attempted to calibrate YSI - batteries dead. Left site to purchase batteries
- 0930 Returned on-site, calibrate YSI
- 0950 Collect field blank sample
- 1000 Started sampling wells
- 1340 Began gauging wells
- 1540 Finished gauging, continued sampling wells
- 1655 Turned in permit / signed out
- 1700 Left site

BY _____

REVIEWED BY _____

APEX REPRESENTATIVE

APEX PROJECT MANAGER



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PROJECT NUMBER 1126-20
 FIELD REPORT NUMBER _____
 PAGE 1 OF 1
 DATE 11/7/2017

PROJECT	<u>4Q17 GWM</u>	ARRIVAL TIME	<u>0657</u>
LOCATION	<u>Vancouver, WA</u>	DEPARTURE TIME	<u>1725</u>
CLIENT	<u>NuStar</u>	WEATHER	<u>Overcast</u>
PURPOSE OF OBSERVATIONS	<u>Sample monitoring wells</u>		
APEX REPRESENTATIVE	<u>M.Masterson</u>	APEX PROJECT MANAGER	<u>S. Salisbury</u>
CONTRACTOR	<u>NA</u>	PERMIT NO.	<u>244679</u>
CONTRACTOR REP.	<u>NA</u>	H&S REVIEW	<u>Yes</u>

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0657 Arrived on-site / signed in / attended safety meeting / issued work permit / reviewed HASP
 0730 Calibrate YSI, collect field blank
 0750 Started sampling wells
 1100 ALS labs courier on-site to pick up samples
 1725 Turned in permit / signed out / left site

BY

REVIEWED BY

 APEX REPRESENTATIVE

 APEX PROJECT MANAGER



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PROJECT NUMBER 1126-20
 FIELD REPORT NUMBER _____
 PAGE 1 OF 1
 DATE 11/8/2017

PROJECT	<u>4Q17 GWM</u>	ARRIVAL TIME	<u>0656</u>
LOCATION	<u>Vancouver, WA</u>	DEPARTURE TIME	<u>1715</u>
CLIENT	<u>NuStar</u>	WEATHER	<u>Overcast, rainy</u>
PURPOSE OF OBSERVATIONS	<u>Sample monitoring wells</u>		
APEX REPRESENTATIVE	<u>M.Masterson</u>	APEX PROJECT MANAGER	<u>S. Salisbury</u>
CONTRACTOR	<u>NA</u>	PERMIT NO.	<u>244681</u>
CONTRACTOR REP.	<u>NA</u>	H&S REVIEW	<u>Yes</u>

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0656	Arrive on-site / sign in / attend safety meeting / issue work permit / review HASP
0720	Calibrate YSI
0735	Collect field blank
0740	Start sampling wells
0830	Collect equipment blank
0850	ALS labs courier on-site to pick up samples
1713	Turn in permit / sign out
1715	Left site

BY _____ REVIEWED BY _____
 APEX REPRESENTATIVE _____ APEX PROJECT MANAGER _____



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PROJECT NUMBER 1126-20
 FIELD REPORT NUMBER _____
 PAGE 1 OF 1
 DATE 11/9/2017

PROJECT	<u>4Q17 GWM</u>	ARRIVAL TIME	<u>0655</u>
LOCATION	<u>Vancouver, WA</u>	DEPARTURE TIME	<u>1640</u>
CLIENT	<u>NuStar</u>	WEATHER	<u>Overcast, rainy, windy</u>
PURPOSE OF OBSERVATIONS	<u>Sample monitoring wells</u>		
APEX REPRESENTATIVE	<u>M.Masterson</u>	APEX PROJECT MANAGER	<u>S. Salisbury</u>
CONTRACTOR	<u>NA</u>	PERMIT NO.	<u>244636</u>
CONTRACTOR REP.	<u>NA</u>	H&S REVIEW	<u>Yes</u>

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0655 Arrive on-site / sign in / attend safety meeting / issue work permit / review HASP
 0730 Calibrate YSI, collect field blank, start sampling wells
 1620 ALS labs courier on-site to pick up samples
 1640 Turn in permit / sign out / left site

BY

REVIEWED BY

 APEX REPRESENTATIVE

 APEX PROJECT MANAGER



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 Portland, Oregon 97201-4707
 (503) 924-4704 Phone
 (503) 943-6357 Fax

PROJECT NUMBER 1126-20
 FIELD REPORT NUMBER _____
 PAGE 1 OF 1
 DATE 11/10/2017

PROJECT	<u>4Q17 GWM</u>	ARRIVAL TIME	<u>0655</u>
LOCATION	<u>Vancouver, WA</u>	DEPARTURE TIME	<u>1420</u>
CLIENT	<u>NuStar</u>	WEATHER	<u>Overcast, rainy</u>
PURPOSE OF OBSERVATIONS	<u>Sample monitoring wells</u>		
APEX REPRESENTATIVE	<u>M.Masterson</u>	APEX PROJECT MANAGER	<u>S. Salisbury</u>
CONTRACTOR	<u>NA</u>	PERMIT NO.	<u>244658</u>
CONTRACTOR REP.	<u>NA</u>	H&S REVIEW	<u>Yes</u>

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0655	Arrive on-site / sign in / attend safety meeting / issue work permit / review HASP
0730	Calibrate YSI
0740	Collect field blank
0800	Start sampling wells
1015	pH probe acting up - reading values <4 even when in 7 or 10 buffer solution. Re-calibrate probe. Now reads only values ~9. Calibrate probe again. Reads more accurate values in buffer solution. Continue sampling.
1345	Finish sampling wells. Purge south SVE system knock out drum. Water is bright blue - call project manager (S. Salisbury) to discuss and ask if the purge water should still be mixed with our IDW drums. Salisbury directed me to take a sample and put the purged water back in the knock out drum. She will discuss with client.
1400	ALS labs courier on-site to pick up samples
1420	Turn in permit / sign out / left site

BY _____

REVIEWED BY _____

 APEX REPRESENTATIVE

 APEX PROJECT MANAGER

WELL GAGING DATA SHEET




Client:	Nuster	Job Number:	1126-20
Project:	Van 40217 GWM	Date:	11-6-17
Weather:	OVERCAST	Sampler:	MM, MW
		Time In/Out:	

WATER LEVEL DATA

Well I.D.	Time	Depth to Free Product (feet)	Depth to Water (feet)	Depth to Well Bottom (feet)	Product Thickness (feet)	Water Column Height (feet)	Notes/Other Remarks
MW-E	08:51		26.83				
MW-22i	1337		29.21				
MW-21i-40	1344		28.93				
MW-21i-105	1346		28.81				
MW-8	1348		28.01				
MW-32s	1350		28.68				
MW-32i	1353		29.28				
MW-31i	1357		29.34				
MW-16	1409		27.76				
MW-18i	1412		28.24				
MW-20i	1411		28.04				
MW-19i	1416		28.54				
MW-15	1419		33.34				
MW-F	1427		28.93				
MW-6i	1425		27.34				
MW-2	1430		28.80				
MW-6	1433		27.08				
EW-1	1435		25.70				
MW-3	1438		29.04				
MW-1	1441		27.14				
MGMS3-132	1445		26.74				
MGMS3-110	1447		26.72				
MGMS3-60	1448		26.74				
MGMS3-40	1450		26.47				
MGMS2-132	1454		27.46				
MGMS2-110	1456		27.57				
MGMS2-60	1458		27.48				
MGMS2-40	1500		27.32				
MW-12	1503		25.76				
MGMS1-110	1507		27.82				
MGMS1-60	1509		27.80				
MGMS1-43	1511		27.56				

WELL MONITORING DATA SHEET

	Well I.D.: EW-1	Job Number: 1176-20
	Client: NuStar	Date: 11-7-17
	Project: VAN AQ17 GUM	Sampler: MM
	Weather: RAINY	Time In/Out:

WELL DATA

Well Depth: -	Well Diameter: 2"	Water Height: -
Depth to Water: 26.74	Screened Interval: -	x Multiplier: -
Water Column Length: -	Depth to Free Product: -	x Casing Volumes: -
Purge Volume: -	Free Product Thickness: -	= Purge Volume: -

Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters
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PURGING DATA

Purge Method: BLADDER				Pump Intake Depth: MS				Comments			
Sampling Method: LF				Tubing Type: DESIGNATED / SWD							
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	← Stabilization Criteria
0900	-	-	-	0.25	8.60	16.86	421	7.02	-79.7	-	AC
0903	0.75	0.75	-	0.25	7.41	12.54	393	1.910	-64.1	-	AC
0906	0.75	1.5	-	0.25	7.00	12.64	393	1.67	-65.7	-	AC
0909	0.75	2.25	-	0.25	6.92	12.25	392	1.44	-63.8	-	AC
0912	0.75	3.0	-	0.25	6.91	12.41	394	1.31	-62.4	-	AC

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear


SAMPLING DATA

Sample ID: EW-1	Sampling Flow Rate: 0.25	Analytical Laboratory: PACE/ACS				
Sample Time: 0915	Final Depth to Water: 25.79	Did Well Dewater?				
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x 40 ml	HCl	HUOC	yes <input checked="" type="checkbox"/> no			
1x 175 ml	-	NO ₂ , NO ₃	yes <input checked="" type="checkbox"/> no			
1x 125 ml	H ₂ SO ₄	NH ₃	yes <input checked="" type="checkbox"/> no			
			yes no			
			yes no			

COMMENTS

COULD NOT TAKE DTW MEASUREMENTS. WATER LEVEL TOO LOW - PROBE STOPPED BY PUMP

WELL MONITORING DATA SHEET

	Well I.D.: MGMS1-43	Job Number: 1126-20
	Client: Nustar	Date: 11-7-17
	Project: VAN 4917 GUM	Sampler: MMZ
	Weather: OVERCAST	Time In/Out:

WELL DATA

Well Depth: -	Well Diameter: -	Water Height: -
Depth to Water: 27.56	Screened Interval: -	x Multiplier: -
Water Column Length: -	Depth to Free Product: -	x Casing Volumes: -
Purge Volume: ✓	Free Product Thickness: -	= Purge Volume: -
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162
		4-inch = 0.653
		1 gallon = 3.785 liters

PURGING DATA

Purge Method: IN SET BLADDER				Pump Intake Depth: MS				Comments			
Sampling Method: LF				Tubing Type:							
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	← Stabilization Criteria
1557	-	-	27.70	0.1	8.63	14.22	4219	8.10	79.4	-	AC
1600 1600	0.3	0.3	27.78	0.1	8.88	13.62	4425	7.20	76.8	-	AC
1603 1603	0.3	0.6	27.70	0.1	8.67	13.67	4501	4.33	77.2	-	AC
1606 1606	0.3	0.9	27.70	0.1	8.65	13.68	4669	2.96	77.8	-	AC
1609 1609	0.3	1.2	27.71	0.1	8.61	13.76	4699	2.21	76.4	-	AC
1612	0.3	1.5	27.70	0.1	8.58	13.97	4702	2.09	74.9	-	AC
1615	0.3	1.8	27.71	0.1	8.57	13.99	4695	2.04	74.5	-	AC


Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID: MGMS1-43	Sampling Flow Rate: 0.1	Analytical Laboratory: PACE/ALS				
Sample Time: 1620	Final Depth to Water: 27.60	Did Well Dewater? N				
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3 x 40 ml	HCl	HVOC	yes (no)			
1 x 125 ml	-	NO ₂ , NO ₃	yes (no)			
1 x 125 ml	H ₂ SO ₄	NH ₃	yes (no)			
3 x 40 ml	HCl	RSK-175	yes (no)			
2 x 40 ml	H ₂ SO ₄	TOC	yes (no)			
			yes (no)			

COMMENTS

WELL MONITORING DATA SHEET

	Well I.D.	M6MS1-60	Job Number:	1126-20
	Client:	Nustar	Date:	11-7-17
	Project:	VAN AQ17 GUM	Sampler:	MML
	Weather:	Overcast	Time In/Out:	

WELL DATA

Well Depth:	-	Well Diameter:	-	Water Height	-
Depth to Water:	28.11	Screened Interval:	-	x Multiplier	-
Water Column Length:	-	Depth to Free Product:	-	x Casing Volumes	-
Purge Volume:	-	Free Product Thickness:	-	= Purge Volume	-
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	Fast PERRI + BIADDER	Pump Intake Depth:	MS	Comments
Sampling Method:	LF	Tubing Type:	HDPE	

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
1526	-	-	28.22	0.10	8.69	12.49	296	6.36	-10.2		SC
1529	0.30	0.30	28.22	0.16	8.77	13.24	283	3.61	-18.8		AC
1532	0.30	0.60	28.22	0.10	8.80	13.35	276	3.41	-19.8		AC
1535	0.30	0.90	28.22	0.10	8.81	13.52	271	3.37	-19.1		AC
1538	0.30	1.20	28.22	0.10	8.82	13.61	266	3.38	-17.4		AC


Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	M6MS1-60	Sampling Flow Rate:	0.10	Analytical Laboratory:	PACE / ACS	
Sample Time:	1541	Final Depth to Water:	28.14	Did Well Dewater?	N	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3 x 40 ml	HCl	HUOC	yes (no)			
4 x 125 ml	-	NO ₂ , NO ₃	yes (no)			
1 x 125 ml	H ₂ SO ₄	NH ₃	yes (no)			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

	Well I.D.: <u>MOMSI-110</u>	Job Number: <u>1126-20</u>
	Client: <u>Nustar</u>	Date: <u>11-7-17</u>
	Project: <u>VAN AQ17 BWM</u>	Sampler: <u>MM</u>
	Weather: <u>OVERCAST</u>	Time In/Out: _____

WELL DATA

Well Depth: <u>—</u>	Well Diameter: <u>—</u>	Water Height: <u>—</u>
Depth to Water: <u>27.85</u>	Screened Interval: <u>—</u>	x Multiplier: <u>—</u>
Water Column Length: <u>—</u>	Depth to Free Product: <u>—</u>	x Casing Volumes: <u>—</u>
Purge Volume: <u>—</u>	Free Product Thickness: <u>—</u>	= Purge Volume: <u>—</u>
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162
		4-inch = 0.653
		1 gallon = 3.785 liters

PURGING DATA

Purge Method: <u>PERRI</u>				Pump Intake Depth: <u>MS</u>				Comments			
Sampling Method: <u>LF</u>				Tubing Type: <u>HDPE</u>							
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
1637	—	—	27.80	0.1	9.17	12.10	439	10.70	33.9	—	AC
1640	0.3	0.3	27.80	0.1	9.04	12.85	450	4.65	15.5	—	AC
1643	0.3	0.6	27.80	0.1	9.05	12.91	340	3.01	5.5	✓	AC
1646	0.3	0.9	27.80	0.1	9.03	12.81	323	2.11	0.4	—	AC
1649	0.3	1.2	27.80	0.1	8.98	12.74	299	1.53	0.2	—	AC
1652	0.3	1.5	27.80	0.1	8.95	12.66	291	1.34	0.1	—	AC
1655	0.3	1.8	27.80	0.1	8.94	12.76	287	1.25	2.1	—	AC


Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID: <u>MOMSI-110</u>	Sampling Flow Rate: <u>0.1</u>	Analytical Laboratory: <u>PACIALS</u>				
Sample Time: <u>1650</u>	Final Depth to Water: <u>27.57</u>	Did Well Dewater? <u>N</u>				
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3 x 40 ml	HCl	HUC	yes <input type="checkbox"/> no <input checked="" type="checkbox"/>			
1 x 125 ml	—	NO ₂ , NO ₃	yes <input type="checkbox"/> no <input checked="" type="checkbox"/>			
1 x 125 ml	H ₂ SO ₄	NH ₃	yes <input type="checkbox"/> no <input checked="" type="checkbox"/>			
			yes <input type="checkbox"/> no <input type="checkbox"/>			
			yes <input type="checkbox"/> no <input type="checkbox"/>			
			yes <input type="checkbox"/> no <input type="checkbox"/>			

COMMENTS

WELL MONITORING DATA SHEET

	Well I.D.	MGM52-40	Job Number:	1126-20
	Client:	Nustar	Date:	11-9-17
	Project:	VAN AIR F GUM	Sampler:	MM
	Weather:	OVERCAST	Time In/Out:	

WELL DATA

Well Depth:	-	Well Diameter:	NA	Water Height	-
Depth to Water:	27.15	Screened Interval:	-	x Multiplier	-
Water Column Length:	-	Depth to Free Product:	-	x Casing Volumes	-
Purge Volume:	-	Free Product Thickness:	-	= Purge Volume	-
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	PERRI				Pump Intake Depth:	MS				Comments	
Sampling Method:	LF				Tubing Type:	HDPE					
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria
1550	-	-	27.24	0.2	8.06	14.85	2311	1.84	-64.1	-	AC
1553	0.6	0.6	27.32	0.2	8.07	15.36	2458	1.33	-101.5	-	AC
1556	0.6	1.2	27.33	0.2	8.07	15.42	2475	1.34	-107.4	-	AC
1559	0.6	1.8	27.35	0.2	8.05	15.48	2491	1.24	-113.3	-	AC


Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MGM52-40	Sampling Flow Rate	0.2	Analytical Laboratory:	PACE/ALS	
Sample Time:	1602	Final Depth to Water:	27.37	Did Well Dewater?	NI	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x40 ml	HCl	HVOC	yes no			
1x125	-	NO ₂ , NO ₃	yes no			
1x125	H ₂ SO ₄	NH ₃	yes no			
3x40	HCl	PSK-175	yes no			
2x40	H ₂ SO ₄	TCC	yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

	Well I.D.	MGM52-60	Job Number:	1126-20
	Client:	Nustar	Date:	11-9-17
	Project:	VAN DQ17 GWM	Sampler:	MM
	Weather:	OVERCAST	Time In/Out:	

WELL DATA

Well Depth:	—	Well Diameter:	NA
Depth to Water:	27.29	Screened Interval:	—
Water Column Length:	—	Depth to Free Product:	—
Purge Volume:	—	Free Product Thickness:	✓
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162
		4-inch = 0.653	1 gallon = 3.785 liters

PURGING DATA

Purge Method:				PERRI				Pump Intake Depth:			MC		Comments
Sampling Method:				LF				Tubing Type:			HDPE		
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks		
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria		
1521	—	—	27.33	0.25	8.19	15.88	220	2.01	-43.4	—	VC		
1524	0.75	0.75	27.33	0.25	8.22	15.68	260	0.77	-59.3	—	C		
1527	0.75	1.5	27.33	0.25	8.21	15.52	266	0.63	-64.7	—	C		
1530	0.75	2.25	27.35	0.25	8.10	15.50	265	0.52	-71.1	—	C		
1533	0.75	3.00	27.36	0.25	8.13	15.40	265	0.50	-76.2	—	C		
1536	0.75	3.75	27.37	0.25	8.10	15.42	265	0.49	-77.1	—	C		

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear


SAMPLING DATA

Sample ID:	MGM52-60	Sampling Flow Rate:	0.25	27.35	Analytical Laboratory:	PACEALS
Sample Time:	1539	Final Depth to Water:	27.35	27.35	Did Well Dewater?	N
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x 40 ml	HCl	HVOCs	yes	no		
1x 125 ml	—	NO ₂ , NO ₃	yes	no		
1x 125 ml	H ₂ SO ₄	NH ₃	yes	no		
			yes	no		
			yes	no		
			yes	no		

COMMENTS

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WELL MONITORING DATA SHEET

	Well I.D.	MGMS2-110	Job Number:	1126-20
	Client:	NuStar	Date:	11-9-17
	Project:	VAN AQ17 GUM	Sampler:	MMW
	Weather:	Overcast / LT RAIN	Time In/Out:	-

WELL DATA

Well Depth:	-	Well Diameter:	NA	Water Height	-
Depth to Water:	27.19	Screened Interval:	-	x Multiplier	-
Water Column Length:	-	Depth to Free Product:	-	x Casing Volumes	-
Purge Volume:	-	Free Product Thickness:	-	= Purge Volume	-
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	PFPR				Pump Intake Depth:	MS				Comments	
Sampling Method:	LE				Tubing Type:	HDPE					
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria
1449	-	-	27.25	0.2	7.80	15.01	253	1.97	-60.7	-	AC
1452	0.6	0.6	27.26	0.2	7.76	15.60	250	1.99	-62.4	-	AC
1455	0.6	1.2	27.27	0.2	8.27	15.50	243	2.58	-82.9	-	AC
1458	0.6	1.8	27.29	0.2	8.33	15.52	243	2.59	-85.5	-	AC
1501	0.6	2.4	27.30	0.2	8.36	15.56	243	2.61	-87.1	-	AC


Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MGMS2-110	Sampling Flow Rate	0.2	Analytical Laboratory:	PAGE / ACS	
Sample Time:	1504	Final Depth to Water:	27.27	Did Well Dewater?	N	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x 40 ml	HCl	HUC	yes <input checked="" type="checkbox"/>			
1x 125 ml	-	NO ₂ , NO ₃	yes <input checked="" type="checkbox"/>			
1x 125 ml	H ₂ SO ₄	NH ₃	yes <input checked="" type="checkbox"/>			
			yes	no		
			yes	no		
			yes	no		

COMMENTS

WELL MONITORING DATA SHEET

	Well I.D.	MGMS2-132	Job Number:	1176-20
	Client:	Nustar	Date:	11-9-17
	Project:	VAN ARD 6WM	Sampler:	mmw
	Weather:	OVERCAST	Time In/Out:	

WELL DATA

Well Depth:	—	Well Diameter:	NA	Water Height	—
Depth to Water:	27.09	Screened Interval:	—	x Multiplier	—
Water Column Length:	—	Depth to Free Product:	—	x Casing Volumes	—
Purge Volume:	—	Free Product Thickness:	—	= Purge Volume	—
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	PERRI	Pump Intake Depth:	MS	Comments
Sampling Method:	LF	Tubing Type:	HDPE	

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<< Stabilization Criteria
1400	—	—	27.18	0.1	10.25	14.30	402	8.37	21.2	—	AC
1401	0.30	0.30	27.15	0.1	9.07	14.89	353	2.34	-15.5	—	AC
1414	0.30	0.60	27.15	0.1	8.80	15.28	332	1.53	-42.9	—	AC
1417	0.30	0.90	27.16	0.1	8.76	15.11	323	1.13	-73.1	—	AC
1420	0.30	1.20	27.17	0.1	8.79	14.75	318	0.90	-87.8	—	AC
1423	0.30	1.50	27.18	0.1	8.78	14.67	314	0.84	-74.3	—	AC


Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MGMS2-132	Sampling Flow Rate	0.1	Analytical Laboratory:	PACE/ALS	
Sample Time:	1426	Final Depth to Water:	27.16	Did Well Dewater?	N	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x 40 ml	HCl	HVOC	yes (no)			
1x 125 ml	—	NO ₂ , NO ₃	yes (no)			
1x 125 ml	H ₂ SO ₄	NH ₃	yes (no)			
			yes	no		
			yes	no		
			yes	no		

COMMENTS

WELL MONITORING DATA SHEET

	Well I.D.	MGMS3-40	Job Number:	1126-20
	Client:	NuStar	Date:	11-10-17
	Project:	VAN 4017 GUM	Sampler:	mm
	Weather:	OVERCAST / RAIN	Time In/Out:	

WELL DATA

Well Depth:	-	Well Diameter:	NA	Water Height	-
Depth to Water:	75.54	Screened Interval:	-	x Multiplier	-
Water Column Length:	-	Depth to Free Product:	-	x Casing Volumes	-
Purge Volume:	-	Free Product Thickness:	✓	= Purge Volume	-
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:				DPRD1				Pump Intake Depth:			1MS		Comments	
Sampling Method:				LE				Tubing Type:			HOPE			
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color	Other Remarks		
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	← Stabilization Criteria			
1208	-	-	75.62	0.2	6.46	12.93	668	4.20	-21.8	-	C			
1211	0.6	0.6	75.69	0.2	6.75	13.98	778	0.91	-62.0	-	C			
1214	0.6	1.2	75.65	0.2	6.94	14.20	824	0.60	-96.6	-	C			
1217	0.6	1.8	75.66	0.2	7.02	14.25	835	0.76	-104.2	-	C			
1220	0.6	2.4	75.65	0.2	6.99	14.48	838	0.93	-111.6	-	C			

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MGMS3-40	Sampling Flow Rate	0.2	Analytical Laboratory:	DACEALS	
Sample Time:	1225	Final Depth to Water:	75.61	Did Well Dewater?	N	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x 40 ml	HCl	HVOC	yes (no)			MGMS3-40 dup
1x 125	-	NO ₂ , NO ₃	yes (no)			
1x 125	H ₂ SO ₄	NH ₃	yes (no)			
3x 40	HCl	PSK-175	yes (no)			
2x 40	H ₂ SO ₄	TOC	yes (no)			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

	Well I.D.	MGMS3-60	Job Number:	1126-2E
	Client:	NuStar	Date:	11-10-17
	Project:	VAN 4Q17 GWH	Sampler:	MM
	Weather:	OVERCAST/RAIN	Time In/Out:	

WELL DATA

Well Depth:	-	Well Diameter:	NA	Water Height	-
Depth to Water:	25.28	Screened Interval:	-	x Multiplier	-
Water Column Length:	-	Depth to Free Product:	-	x Casing Volumes	-
Purge Volume:	-	Free Product Thickness:	-	= Purge Volume	-
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters

PURGING DATA

Purge Method:				Pump Intake Depth:				Comments			
Sampling Method:				Tubing Type:							
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria
1137	-	-	25.35	0.25	7.28	13.63	272	6.07	-14.9	-	C
1140	0.75	0.75	25.31	0.25	7.17	13.73	227	0.64	-24.9	-	C
1143	0.75	1.5	25.33	0.25	7.11	13.97	220	0.51	-24.0	-	C
1146	0.75	2.25	25.36	0.25	7.10	14.03	218	0.44	-34.0	-	C
1149	0.75	3.0	25.37	0.25	7.02	14.08	217	0.46	-28.3	-	C

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear


SAMPLING DATA

Sample ID:	MGMS3-60	Sampling Flow Rate	0.25	Analytical Laboratory:	PACE/ACS	
Sample Time:	1157	Final Depth to Water:	25.35	Did Well Dewater?	N	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x 40 ml	HCl	HVOC	yes <input checked="" type="checkbox"/>			
1x 125 ml	-	NO ₂ , NO ₃	yes <input checked="" type="checkbox"/>			
1x 125 ml	H ₂ SO ₄	NH ₃	yes <input checked="" type="checkbox"/>			
			yes <input type="checkbox"/>			
			yes <input type="checkbox"/>			
			yes <input type="checkbox"/>			

COMMENTS

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WELL MONITORING DATA SHEET

	Well I.D.:	MGMS3-110	Job Number:	1126-20
	Client:	N. Star	Date:	11-10-17
	Project:	UAN 4Q17 OWN	Sampler:	MM
	Weather:	OVERCAST / RAINY	Time In/Out:	

WELL DATA

Well Depth:	-	Well Diameter:	NA	Water Height	-
Depth to Water:	25.37	Screened Interval:	-	x Multiplier	-
Water Column Length:	-	Depth to Free Product:	-	x Casing Volumes	-
Purge Volume:	-	Free Product Thickness:	-	= Purge Volume	-
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters

PURGING DATA

Purge Method:		Pump Intake Depth:			Comments						
Sampling Method:		Tubing Type:									
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria
1108	-	-	25.30	0.20	5.42	14.37	570	4.00	48.9	-	C
1111	0.6	0.6	25.28	0.2	7.04	14.61	397	2.37	-6.9	-	C
1114	0.6	1.2	25.32	0.2	7.10	14.60	336	2.82	-4.7	-	C
1117	0.6	1.8	25.33	0.2	7.18	14.60	271	2.92	-8.7	-	C
1120	0.6	2.4	25.33	0.2	7.55	14.50	263	3.02	-15.4	-	C
1123	0.6	3.0	25.33	0.2	7.57	14.38	2102	3.06	-20.1	-	C


Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MGMS3-110	Sampling Flow Rate:	0.20	Analytical Laboratory:	PACE/ALS	
Sample Time:	1126	Final Depth to Water:	25.29	Did Well Dewater?	N	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3 x 40 ml	HCl	HNO3	yes (no)			
1 x 125 ml	-	NO2, NO3	yes (no)			
1 x 125 ml	H2SO4	NH3	yes (no)			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

	Well I.D.: M6MS3-132	Job Number: 1126-20
	Client: Nustar	Date: 11-10-17
	Project: VAN 4Q17 GUM	Sampler: MM
	Weather: OVERCAST	Time In/Out:

WELL DATA

Well Depth: —	Well Diameter: NA	Water Height: —
Depth to Water: 25.83	Screened Interval: —	x Multiplier: —
Water Column Length: —	Depth to Free Product: —	x Casing Volumes: —
Purge Volume: —	Free Product Thickness: —	= Purge Volume: —
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162
		4-inch = 0.653
		1 gallon = 3.785 liters

PURGING DATA

Purge Method: PERRI / 粵				Pump Intake Depth: MS				Comments			
Sampling Method: LF				Tubing Type: HDPE							
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	← Stabilization Criteria
1016	—	—	25.62	0.20	3.14	15.34	252	3.25	174.6	—	C
1013	0.6	0.6	—	0.20	3.82	15.30	266	1.62	120.7	—	C
* STOPPED TO RE-CAL YSI PH											
1021	0.6	1.2	25.53	0.20	8.55	15.30	309	1.01	95.6	—	C
1024	0.6	1.8	25.53	0.2	8.65	15.27	287	0.82	76.1	—	C
1027	0.6	2.4	25.53	0.2	8.99	15.20	271	0.68	68.2	—	C
1030	0.6	3.0	25.53	0.2	8.97	15.13	272	0.57	59.2	—	C
1033	0.6	3.6	25.51	0.2	9.07	15.04	271	0.54	51.4	—	C

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear


SAMPLING DATA

Sample ID: M6MS3-132	Sampling Flow Rate: 0.2	Analytical Laboratory: DACE / ALS				
Sample Time: 1036	Final Depth to Water: 25.40	Did Well Dewater? N				
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x 40 ml	HCl	HVOC	yes <input checked="" type="checkbox"/>			
1x 125 ml	—	NO ₂ , NO ₃	yes <input checked="" type="checkbox"/>			
1x 125 ml	H ₂ SO ₄	NH ₃	yes <input checked="" type="checkbox"/>			
			yes <input type="checkbox"/>			
			yes <input type="checkbox"/>			
			yes <input type="checkbox"/>			

COMMENTS

PH WAS ACTING ODD. AT FIRST DISPLAYING VALUES < 4 (EVEN IN CAL SOLUTION + DI H₂O). RECAL PROBE + NOW ALL VALUES ARE ~9 AFTER SAMPLING. PUT PROBE BACK IN 7.0 BUFFER SOLUTION + YSI READ 8.96 RE-CAL ONCE AGAIN.

WELL MONITORING DATA SHEET

	Well I.D.: <u>MW-1</u>	Job Number: <u>1126-20</u>
	Client: <u>Mustar</u>	Date: <u>11-9-17</u>
	Project: <u>VAN 4Q17 GUM</u>	Sampler: <u>MMW</u>
	Weather: <u>LT. RAIN</u>	Time In/Out: <u>...</u>

WELL DATA

Well Depth: <u>-</u>	Well Diameter: <u>2"</u>	Water Height: <u>-</u>
Depth to Water: <u>27.09</u>	Screened Interval: <u>-</u>	x Multiplier: <u>-</u>
Water Column Length: <u>-</u>	Depth to Free Product: <u>-</u>	x Casing Volumes: <u>-</u>
Purge Volume: <u>-</u>	Free Product Thickness: <u>-</u>	= Purge Volume: <u>-</u>
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162
		4-inch = 0.653
		1 gallon = 3.785 liters

PURGING DATA

Purge Method: <u>BLADDER</u>				Pump Intake Depth: <u>MS</u>				Comments			
Sampling Method: <u>LF</u>				Tubing Type: <u>disconnected / skip</u>							
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<<- Stabilization Criteria
0952	-	-	27.13	0.2	8.25	10.91	816	10.09	20.9	-	Cl reddish color
0955	0.6	0.6	27.13	0.2	7.30	12.40	931	2.41	7.0	-	Cl ""
0958	0.6	1.2	27.13	0.2	7.07	11.20	942	1.84	-17.7	-	Cl ""
1001	0.6	1.8	27.13	0.2	6.96	11.16	932	1.59	-33.8	-	VC SC ""
1003	0.6	2.4	27.14	0.2	6.94	11.01	931	1.52	-35.0	-	SC ""
1006	0.6	3.0	27.13	0.2	6.93	10.76	931	1.48	-40.2	-	SC ""

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear


SAMPLING DATA

Sample ID: <u>MW-1</u>	Sampling Flow Rate: <u>0.20</u>	Analytical Laboratory: <u>PAGE/ALS</u>				
Sample Time: <u>1009</u>	Final Depth to Water: <u>27.11</u>	Did Well Dewater? <u>N</u>				
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x 40 ml	HCl	HVCC	yes (no)			
1x 125 ml	-	NO ₂ , NO ₃	yes (no)			
1x 125 ml	H ₂ SO ₄	NH ₃	yes (no)			
			yes no			
			yes no			
			yes no			

COMMENTS

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WELL MONITORING DATA SHEET

	Well I.D.:	MW-2	Job Number:	1126-20
	Client:	No Star	Date:	11-6-17
	Project:	4Q17 Gwm	Sampler:	MM
	Weather:	OVERCAST	Time In/Out:	

WELL DATA

Well Depth:	-	Well Diameter:	2"	Water Height:	-
Depth to Water:	28.49	Screened Interval:	-	x Multiplier:	-
Water Column Length:	-	Depth to Free Product:	-	x Casing Volumes:	-
Purge Volume:	-	Free Product Thickness:	-	= Purge Volume:	-
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters

PURGING DATA

Purge Method:				LF				Pump Intake Depth:			MS		Comments	
Sampling Method:				BLADDER				Tubing Type:			designated skip zone			
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color	Other Remarks		
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	← Stabilization Criteria			
1212	-	-	28.80	0.15	8.42	12.85	648	6.00	30.0	-	SC			
1215	0.45		28.81	0.15	8.51	12.95	665	2.60	-4.4	-	AC			
1218	0.45		28.81	0.15	8.52	12.73	676	2.21	-19.7	✓	AC			
1221	0.45		28.84	0.15	8.51	12.99	692	1.92	-33.8	✓	AC			
1224	0.45		28.87	0.15	8.52	13.17	713	1.75	-47.5	-	AC			
1227	0.45		28.93	0.15	8.54	13.20	722	1.65	-60.8	-	AC			
1230	0.45		28.97	0.15	8.55	13.19	723	1.58	-65.8	-	AC			

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear


SAMPLING DATA

Sample ID:	MW-2	Sampling Flow Rate:	0.15	Analytical Laboratory:	PAC/ALS	
Sample Time:	1238	Final Depth to Water:	29.11	Did Well Dewater?:		
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3 x 40 mL	HCl	HVOCs	yes <input type="radio"/> no <input checked="" type="radio"/>			
1 x 125 mL poly	-	NO ₂ , NO ₃	yes <input type="radio"/> no <input checked="" type="radio"/>			
1 x 125 mL poly	H ₂ SO ₄	NH ₃	yes <input type="radio"/> no <input checked="" type="radio"/>			
			yes <input type="radio"/> no <input type="radio"/>			
			yes <input type="radio"/> no <input type="radio"/>			

COMMENTS

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WELL MONITORING DATA SHEET

	Well I.D.	MW-3	Job Number:	1126-20
	Client:	Nustar	Date:	11-8-17
	Project:	VAN 4Q17 OUM	Sampler:	MM
	Weather:	OVERCAST	Time In/Out:	

WELL DATA

Well Depth:	—	Well Diameter:	2"	Water Height	—
Depth to Water:	29.81	Screened Interval:	—	x Multiplier	✓
Water Column Length:	—	Depth to Free Product:	—	x Casing Volumes	—
Purge Volume:	✓	Free Product Thickness:	✓	= Purge Volume	—
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	BLADDER				Pump Intake Depth:	MS				Comments	
Sampling Method:	LE				Tubing Type:	Designated / Skip					
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	← Stabilization Criteria
1624	✓	✓	29.04	0.25	9.30	10.26	763	9.37	52.1	—	SC
1627	0.75	0.75	29.40	0.25	8.75	12.15	778	7.12	26.0	—	SC
1630	0.75	1.50	29.89	0.25	8.91	13.05	840	3.88	28.1	—	SC
1633	0.75	2.25	30.18	0.25	8.76	13.13	884	5.48	28.0	—	SC
1636	0.75	3.00	30.48	0.25	8.82	13.03	854	6.10	28.7	—	SC
1639	0.75	3.75	30.91	0.25	8.87	13.03	843	6.43	30.7	—	SC
1642	0.75	4.50	31.17	0.25	8.88	12.98	844	6.39	31.7	—	SC

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear


SAMPLING DATA

Sample ID:	MW-3	Sampling Flow Rate	0.25	Analytical Laboratory:	PACE ALS	
Sample Time:	1645	Final Depth to Water:	31.51	Did Well Dewater?	N	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x 40 ml	HCl	HVOC	yes <input type="checkbox"/> no <input checked="" type="checkbox"/>			
1x 125 ml	—	NO ₂ , NO ₃	yes <input type="checkbox"/> no <input checked="" type="checkbox"/>			
1x 125 ml	H ₂ SO ₄	NH ₃	yes <input type="checkbox"/> no <input checked="" type="checkbox"/>			
			yes <input type="checkbox"/> no <input type="checkbox"/>			
			yes <input type="checkbox"/> no <input type="checkbox"/>			
			yes <input type="checkbox"/> no <input type="checkbox"/>			

COMMENTS

* DA KEPT RISING + FALLING, SWINGING BY AT LEAST 2 ppm per 3-MINUTE CYCLE

WELL MONITORING DATA SHEET

	Well I.D.:	MW-5	Job Number:	1126-20
	Client:	NuStar	Date:	11-7-17
	Project:	VAN 4Q17 GMM	Sampler:	MMW
	Weather:	OVERCAST	Time In/Out:	

WELL DATA

Well Depth:	-	Well Diameter:	2"	Water Height	-
Depth to Water:	28.56	Screened Interval:	-	x Multiplier	-
Water Column Length:	-	Depth to Free Product:	-	x Casing Volumes	-
Purge Volume:	-	Free Product Thickness:	-	= Purge Volume	-
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters

PURGING DATA

Purge Method:				BIADDER				Pump Intake Depth:			MS		Comments	
Sampling Method:				LF				Tubing Type:			DESIGNATED / SKIP			
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color	Other Remarks		
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria			
0956	-	-	28.52	0.20	7.32	13.43	521	3.84	57.1		AC			
0959	0.60	0.60	28.52	0.20	7.58	14.55	518	3.24	0.1		AC			
1002	0.60	1.20	28.58	0.20	7.69	12.45	520	3.79	-23.6		AC			
1005	0.60	1.80	28.55	0.20	7.71	13.27	518	4.24	-34.3		AC			
1008	0.60	2.40	28.57	0.20	7.74	13.26	518	4.62	-41.8		AC			
1011	0.60	3.00	28.60	0.20	7.76	13.31	516	4.81	-45.1		AC			


Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-5	Sampling Flow Rate	0.20	Analytical Laboratory:	PACE / ALS	
Sample Time:	1015	Final Depth to Water:	28.58	Did Well Dewater?		
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3 x 40 ml	HCl	HUOC	yes <input checked="" type="checkbox"/>			
1 x 125 ml	-	NO ₂ , NO ₃	yes <input checked="" type="checkbox"/>			
1 x 125 ml	H ₂ SO ₄	NH ₃	yes <input checked="" type="checkbox"/>			
			yes <input type="checkbox"/>			
			yes <input type="checkbox"/>			
			yes <input type="checkbox"/>			

COMMENTS

WELL MONITORING DATA SHEET

	Well I.D.	MW-6	Job Number:	1126-20
	Client:	Husker	Date:	11-7-17
	Project:	VAN 4Q17 GUM	Sampler:	MM
	Weather:	OVERCAST	Time In/Out:	

WELL DATA

Well Depth:	-	Well Diameter:	2"	Water Height:	-
Depth to Water:	27.04	Screened Interval:	-	x Multiplier:	-
Water Column Length:	-	Depth to Free Product:	-	x Casing Volumes:	-
Purge Volume:	-	Free Product Thickness:	✓	= Purge Volume:	-
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:				Bladder				Pump Intake Depth:			MS		Comments	
Sampling Method:				LF				Tubing Type:			DESIGNATED / SKIP			
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks			
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria			
1328	-	-	27.13	0.30	8.56	12.75	401	7.81	31.2	-	AC			
1331	0.90	0.90	27.30	0.30	8.22	13.40	406	3.00	5.8	-	AC			
133A	0.90	1.80	27.31	0.30	8.25	13.60	402	4.66	0.6	-	AC			
1337	0.90	2.70	27.36	0.30	8.25	13.54	398	4.68	-2.6	-	AC			
1340	0.90	3.60	27.31	0.30	8.22	13.62	398	4.92	-3.3	-	AC			

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-6	Sampling Flow Rate:	0.30	Analytical Laboratory:	PACE/ALS	
Sample Time:	1343	Final Depth to Water:	27.12	Did Well Dewater?	N	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x 40ml	HCl	HUOC	yes <u>no</u>			
1x 125ml	-	NO ₂ , NO ₃	yes <u>no</u>			
1x 125ml	H ₂ SO ₄	NH ₃	yes <u>no</u>			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET



Well I.D.:	MW-7	Job Number:	1126-20
Client:	NuStar	Date:	11-7-17
Project:	VAN 4217 GWM	Sampler:	MMW
Weather:	OVERCAST	Time In/Out:	

WELL DATA

Well Depth:	—	Well Diameter:	4"	Water Height	—
Depth to Water:	28.54	Screened Interval:	—	x Multiplier	—
Water Column Length:	—	Depth to Free Product:	—	x Casing Volumes	—
Purge Volume:	—	Free Product Thickness:	—	= Purge Volume	—
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	—

PURGING DATA

Purge Method:	BLADDER				Pump Intake Depth:	MS				Comments	
Sampling Method:	LF				Tubing Type:	DESIGNATED/SKIP					
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria
0848					7.05	7.73	117	12.27	149		
0851	0.90	0.90	28.70	0.30	7.09	13.30	152	2.55	36.6	—	SC
0854	0.90	1.80	28.70	0.30	7.60	13.01	163	2.68	48.5	—	AC
0857	0.90	2.70	28.70	0.30	7.47	12.60	167	2.61	49.9	—	AC
0900	0.90	3.50	28.70	0.30	7.39	12.18	167	2.54	59.3	—	AC
0903	0.90	4.40	28.70	0.30	7.34	11.84	167	2.60	63.2	—	AC
0906	0.90	5.30	28.70	0.30	7.30	11.81	168	2.65	68.6	—	AC

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear


SAMPLING DATA

Sample ID:	MW-7	Sampling Flow Rate	0.30	Analytical Laboratory:	PACE, ALS	
Sample Time:	0710	Final Depth to Water:	28.98	Did Well Dewater?	N	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3 x 40 ml	HCl	HUOC	yes <input type="checkbox"/> no <input checked="" type="checkbox"/>			MW-7 DUP
1 x 125 ml	—	NO ₂ , NO ₃	yes <input type="checkbox"/> no <input checked="" type="checkbox"/>			
1 x 125 ml	H ₂ SO ₄	NH ₃	yes <input type="checkbox"/> no <input checked="" type="checkbox"/>			
1 x 40 ml			yes <input type="checkbox"/> no <input checked="" type="checkbox"/>			
3 x 40 ml	HCl	RSK-175	yes <input type="checkbox"/> no <input checked="" type="checkbox"/>			
2 x 40 ml	H ₂ SO ₄	TUC	yes <input type="checkbox"/> no <input checked="" type="checkbox"/>			

COMMENTS

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WELL MONITORING DATA SHEET

	Well I.D.	MW-8	Job Number:	1126-20
	Client:	NUStar	Date:	11-6-17
	Project:	4Q17 GUM	Sampler:	MW
	Weather:	OVERCAST	Time In/Out:	

WELL DATA

Well Depth:	-	Well Diameter:	4"	Water Height	-
Depth to Water:	27.98	Screened Interval:	-	x Multiplier	-
Water Column Length:	-	Depth to Free Product:	-	x Casing Volumes	-
Purge Volume:	-	Free Product Thickness:	-	= Purge Volume	-
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	-

PURGING DATA

Purge Method:		LF			Pump Intake Depth:		MS			Comments	
Sampling Method:		BLADDER			Tubing Type:		DESGINATED / SLIP				
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria
1057	-	-	28.06	-	8.55	13.72	2394	9.10	30.1		AC
1100	1.5	1.5	28.11	0.18	8.31	14.89	2538	2.81	5.8		AC
1103	0.55		28.24	0.18	8.17	14.35	2549	2.74	10.2		AC
1106	0.55		28.19	0.18	8.09	14.38	2557	2.93	15.3		AC
1109	0.55		28.21	0.18	8.05	14.00	2559	2.69	21.3		AC


Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-8	Sampling Flow Rate	0.18	Analytical Laboratory:	PACE / ALS	
Sample Time:	1112	Final Depth to Water:	28.06	Did Well Dewater?	N	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3 x 10ml	HCl	HVOC	yes <input checked="" type="radio"/> no			
1 x 125ml poly	-	NO ₂ , NO ₃	yes <input checked="" type="radio"/> no			
1 x 125ml poly	H ₂ SO ₄	NH ₃	yes <input checked="" type="radio"/> no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

	Well I.D.	MW-9	Job Number:	1126-20
	Client:	Nustaw	Date:	11-7-17
	Project:	VAN 1017 GWM	Sampler:	MMW
	Weather:	OVERCAST	Time In/Out:	

WELL DATA

Well Depth:	-	Well Diameter:	4"	Water Height	-
Depth to Water:	28.70	Screened Interval:	-	x Multiplier	-
Water Column Length:	-	Depth to Free Product:	-	x Casing Volumes	-
Purge Volume:	-	Free Product Thickness:	-	= Purge Volume	-
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	-

PURGING DATA

Purge Method:				BIADDER				Pump Intake Depth:			MS		Comments	
Sampling Method:				LF				Tubing Type:			DESIGNATED / SKIP			
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color	Other Remarks		
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	← Stabilization Criteria			
0800	-	-	28.67	0.25	8.08	10.52	2760	9.89	138.3		AC			
0803	0.75	0.75	28.67	0.25	7.74	11.93	4657	1.73	143.3		AC			
0806	0.75	1.50	28.67	0.25	7.60	12.01	4900	1.10	141.9		AC			
0809	0.75	2.25	28.67	0.25	7.50	12.10	5145	0.92	140.8		AC			
0812	0.75	3.00	28.67	0.25	7.45	12.15	5206	0.89	141.9		AC			
0815	0.75	3.75	28.67	0.25	7.42	12.32	5300	0.90	142.8		AC			

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear


SAMPLING DATA

Sample ID:	MW-9	Sampling Flow Rate	0.25	Analytical Laboratory:	PACE / ALS	
Sample Time:	0818	Final Depth to Water:	28.70	Did Well Dewater?	N	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x 40 ml	HCl	HVOCs	yes <input checked="" type="checkbox"/> no			
1x 125 ml	-	NO ₂ , NO ₃	yes <input checked="" type="checkbox"/> no			
1x 125 ml	H ₂ SO ₄	NH ₃	yes <input checked="" type="checkbox"/> no			
			yes no			
			yes no			
			yes no			

COMMENTS

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WELL MONITORING DATA SHEET

	Well I.D.: MW-10	Job Number: 1126-20
	Client: NuStar	Date: 11-6-17
	Project: Van 4Q17 Gum	Sampler: mm
	Weather: OVERCAST	Time In/Out:

WELL DATA

Well Depth: -	Well Diameter: 4"	Water Height: -
Depth to Water: 28.38	Screened Interval: -	x Multiplier: -
Water Column Length: -	Depth to Free Product: -	x Casing Volumes: -
Purge Volume: -	Free Product Thickness: -	= Purge Volume: -
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162
		4-inch = 0.653
		1 gallon = 3.785 liters

PURGING DATA

Purge Method: BLADDER				Pump Intake Depth: MS				Comments			
Sampling Method: LF				Tubing Type: DESIGNATED / SKIP							
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<<- Stabilization Criteria
1312	-	-	28.31	0.25	8.57	12.35	3309	10.88	52.8	-	AC
1315	0.75	0.75	28.38	0.25	8.15	14.33	3467	2.97	56.5	-	AC
1318	0.75	1.5	28.58	0.25	8.08	14.63	3504	2.71	58.6	-	AC
1321	0.75	2.25	28.82	0.25	8.06	14.65	3515	5.99	61.2	-	AC
1324	0.75	3.0	28.93	0.25	8.10	14.72	3527	7.60	62.5	-	AC
1327	0.75	3.75	29.13	0.25	8.12	14.67	3539	8.30*	63.3	-	AC

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID: MW-10	Sampling Flow Rate: 0.25	Analytical Laboratory: DACE / ALS				
Sample Time: 1330	Final Depth to Water: 29.67	Did Well Dewater?				
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3 x 40 ml	HCl	HUOC	yes <input type="radio"/> no <input checked="" type="radio"/>			
1 x 125 ml	-	NO ₂ , NO ₃	yes <input type="radio"/> no <input checked="" type="radio"/>			
1 x 125 ml	H ₂ SO ₄	NH ₃	yes <input type="radio"/> no <input checked="" type="radio"/>			
			yes <input type="radio"/> no <input type="radio"/>			
			yes <input type="radio"/> no <input type="radio"/>			
			yes <input type="radio"/> no <input type="radio"/>			

COMMENTS

* DO DID NOT STABILIZE - DID NOT SHOW SIGNS EITHER - KEPT INCREASING STEADILY

WELL MONITORING DATA SHEET

Well I.D.:	MW-12	Job Number:	1126-20
Client:	Nustar VAN	Date:	11-9-17
Project:	4Q17 GUM	Sampler:	MM
Weather:	RAINY / WINDY	Time In/Out:	

WELL DATA			
Depth to Water:	25.80	Well Diameter:	4"
Water Column Length:		Screened Interval:	
Purge Volume:		Depth to Free Product:	
Water Height Multipliers (gal)	1-inch = 0.041	Free Product Thickness:	
		2-inch = 0.162	
		4-inch = 0.653	
		= Purge Volume	
		1 gallon = 3.785 liters	

PURGING DATA			
Purge Method:	BLADDER	Pump Intake Depth:	MS
Sampling Method:	LF	Tubing Type:	Designated / Skip

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
0745	-	-	26.08	0.15	4.35	14.07	2223	4.61	-44.4	-	VC
0748	0.45	0.45	26.15	0.15	6.23	14.40	2420	2.91	-88.8	-	VC
0751	0.45		26.23	0.15	6.19	13.73	2432	2.54	-105.7	-	VC
0754	0.45		26.29	0.15	6.15	14.18	2422	2.24	-114.6	-	VC
0757	0.45		26.31	0.15	6.14	14.11	2381	1.89	-116.0	-	VC
0800	0.45		26.46	0.15	6.12	14.03	2328	1.72	-118.3	-	VC
0803	0.45		26.54	0.15	6.13	13.87	2303	1.61	-119.0	-	VC


Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-12	Sampling Flow Rate:	0.15	Analytical Laboratory:	PACIFIALS
Sample Time:	0800	Final Depth to Water:	28.33	Did Well Dewater?	N
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD
3x 40 ml	HCl	HVOC	yes <input type="checkbox"/> no <input checked="" type="checkbox"/>		
1x 125		NO ₂ , NO ₃	yes <input type="checkbox"/> no <input checked="" type="checkbox"/>		
1x 125	H ₂ SO ₄	NH ₃	yes <input type="checkbox"/> no <input checked="" type="checkbox"/>		
3x 40	HCl	BSL-175	yes <input type="checkbox"/> no <input checked="" type="checkbox"/>		
2x 40	H ₂ SO ₄	TU	yes <input type="checkbox"/> no <input checked="" type="checkbox"/>		

COMMENTS

WELL MONITORING DATA SHEET

	Well I.D.	MW-13	Job Number:	1126-20
	Client:	KuStar	Date:	11-7-17
	Project:	VAN 4017 GUM	Sampler:	mm
	Weather:	OVERCAST	Time In/Out:	

WELL DATA

Well Depth:	—	Well Diameter:	4"	Water Height:	—
Depth to Water:	27.63	Screened Interval:	—	x Multiplier:	—
Water Column Length:	—	Depth to Free Product:	—	x Casing Volumes:	—
Purge Volume:	—	Free Product Thickness:	—	= Purge Volume:	—
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters

PURGING DATA

Purge Method:		BLADDER			Pump Intake Depth:		MS			Comments	
Sampling Method:		LF			Tubing Type:		DESIGNATED/SKIP				
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
1406	—	—	27.76	0.20	8.00	13.25	803	7.00	32.1		CI
1409	0.60	0.60	27.96	0.20	8.07	13.92	912	2.78	-30.9		CI
1412	0.60	1.20	28.14	0.20	8.12	14.15	921	2.38	-57.5		CI
1415	0.60	1.80	28.20	0.20	8.13	14.10	926	2.11	-80.6		CI
1418	0.60	2.40	28.55	0.20	8.12	14.10	926	2.14	-86.2		CI
1421	0.60	3.00	28.61	0.20	8.07	14.01	927	2.19	-89.2		CI


Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-13	Sampling Flow Rate	0.20	Analytical Laboratory:	PACE LABS	
Sample Time:	1425	Final Depth to Water:	28.97	Did Well Dewater?	N	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3 x 40 ml	HCl	HCC	yes <input checked="" type="radio"/> no			
1 x 125 ml	—	NO ₂ , NO ₃	yes <input checked="" type="radio"/> no			
1 x 125 ml	H ₂ SO ₄	NH ₃	yes <input checked="" type="radio"/> no			
3 x 40 ml	HCl	BSK-175	yes <input checked="" type="radio"/> no			
2 x 40 ml	H ₂ SO ₄	TOC	yes <input checked="" type="radio"/> no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

	Well I.D.: MW-14	Job Number: 1126-20
	Client: Nustar	Date: 11-8-17
	Project: VAN AQ17 GWM	Sampler: mm
	Weather:	Time In/Out:

WELL DATA

Well Depth: -	Well Diameter: 4"	Water Height: -
Depth to Water: 28.60	Screened Interval: -	x Multiplier: -
Water Column Length: -	Depth to Free Product: -	x Casing Volumes: -
Purge Volume: -	Free Product Thickness: ✓	= Purge Volume: -
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162
		4-inch = 0.653
		1 gallon = 3.785 liters

PURGING DATA

Purge Method: BLADDER				Pump Intake Depth: MS				Comments			
Sampling Method: LF				Tubing Type: DESIGNATED / SKIP							
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria
0932	-	-	28.65	0.15	8.06	12.14	2325	9.11	96.4	-	CI
0935	0.45	0.45	28.65	0.15	8.15	14.98	2631	2.37	91.0	-	SC
0938	0.45	0.90	28.65	0.15	8.05	14.40	2657	2.08	94.5	-	AC
0941	0.45	1.35	28.65	0.15	8.08	11.67 11.67	2669	2.08	97.5	-	AC
0944	0.45		28.65	0.15	8.07	11.34	2641	1.96	103.6	-	AC
0947	0.45		28.65	0.15	8.09	11.21	2616	1.85	106.9	-	AC


Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID: MW-14	Sampling Flow Rate: 0.15	Analytical Laboratory: PAEE / ALS				
Sample Time: 0950	Final Depth to Water: 28.60	Did Well Dewater? N				
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3 x 40 ml	HCl	HVOC	yes (no)			
1 x 125 ml	-	NO ₂ , NO ₃	yes (no)			
1 x 125 ml	H ₂ SO ₄	NH ₃	yes (no)			
3 x 40 ml	HCl	PSK-175	yes (no)			
2 x 40 ml	H ₂ SO ₄	TOC	yes (no)			
			yes (no)			

COMMENTS

WELL MONITORING DATA SHEET

	Well I.D.	MW-15	Job Number:	1126-20
	Client:	Nuster	Date:	11-6-17
	Project:	VAN 4Q17 GWM	Sampler:	MM, MW
	Weather:	OVERCAST	Time In/Out:	

WELL DATA

Well Depth:	-	Well Diameter:	4"	Water Height	-
Depth to Water:	33.03	Screened Interval:	-	x Multiplier	-
Water Column Length:	-	Depth to Free Product:	-	x Casing Volumes	-
Purge Volume:	-	Free Product Thickness:	-	= Purge Volume	-
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	-

PURGING DATA

Purge Method:				BIADDER				Pump Intake Depth:			MS		Comments	
Sampling Method:				LF				Tubing Type:			Designated / SKIP			
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color	Other Remarks		
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria			
11.16	-	-		0.25	9.04	12.14	802	5.77	8.7	-	C			
1619	0.75	0.75		0.25	8.89	12.75	779	4.38	-1.5	-	C			
1622	0.75	1.50		0.25	8.85	12.82	775	3.80	-4.3	-	C			
1625	0.75	2.25		0.25	8.85	12.67	779	3.60	-4.8	-	C			
1628	0.75	3.00		0.25	8.84	12.71	775	3.43	-3.8	-	C			


Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-15	Sampling Flow Rate	0.25	Analytical Laboratory:	PACE/ALS	
Sample Time:	1631	Final Depth to Water:		Did Well Dewater?		
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3 x 10 ml	HCl	HVOCs	yes <input checked="" type="radio"/> no			
1 x 125 ml	-	NO ₂ , NO ₃	yes <input checked="" type="radio"/> no			
1 x 125 ml	H ₂ SO ₄	NH ₃	yes <input checked="" type="radio"/> no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

	Well I.D.: MW-16	Job Number: 1126-26
	Client: NuStar	Date: 11-06-2017
	Project: 4Q17 GWM	Sampler: mm
	Weather: OVERCAST	Time In/Out:

WELL DATA

Well Depth: -	Well Diameter: 4"	Water Height: -
Depth to Water: 27.31	Screened Interval: -	x Multiplier: -
Water Column Length: -	Depth to Free Product: -	x Casing Volumes: -
Purge Volume: -	Free Product Thickness: -	= Purge Volume: -
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162
		4-inch = 0.653
		1 gallon = 3.785 liters

PURGING DATA

Purge Method: LF				Pump Intake Depth: 6MS				Comments			
Sampling Method: BLADDER				Tubing Type: DESIGNATED / SKIPBOND							
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria
1135	-	-	27.34	0.22	8.85	10.33	779	13.00	35.0	-	SC
1138	0.66	0.66	27.52	0.22	8.36	11.97	886	3.19	34.7	-	AC
1141	0.66		27.62	0.22	8.31	12.73	860	2.83	29.3	-	AC
1144	0.66		27.60	0.22	8.32	12.85	832	2.51	29.4	-	AC
1147	0.66		27.70	0.22	8.31	12.91	817	2.23	31.2	-	AC
1150	0.66		27.74	0.22	8.31	13.02	805	2.07	33.0	-	AC

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear


SAMPLING DATA

Sample ID: MW-16	Sampling Flow Rate: 0.22	Analytical Laboratory: PAGE, AWS				
Sample Time: 1153	Final Depth to Water: 27.76	Did Well Dewater? N				
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3 x 40ml	HCl	H VOCs	yes (no)			
1 x 125ml poly	-	NO ₂ , NO ₃	yes (no)			
1 x 125ml poly	H ₂ SO ₄	NH ₃	yes (no)			
			yes no			
			yes no			
			yes no			

COMMENTS

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WELL MONITORING DATA SHEET

	Well I.D.: MW-17	Job Number: 1126-26
	Client: Nustar	Date: 11-8-17
	Project: VAN ARDUR GUM	Sampler: mm
	Weather: OVERCAST	Time In/Out:

WELL DATA

Well Depth: -	Well Diameter: 4"	Water Height: -
Depth to Water: 27.20	Screened Interval: -	x Multiplier: -
Water Column Length: -	Depth to Free Product: -	x Casing Volumes: -
Purge Volume: -	Free Product Thickness: -	= Purge Volume: -
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162
		4-inch = 0.653
		1 gallon = 3.785 liters

PURGING DATA

Purge Method: BLADDER				Pump Intake Depth: MS				Comments			
Sampling Method: LF				Tubing Type: DESIGNATED/SKIP							
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria
0747	-	-	27.37	0.25	9.76	12.88	1040	8.36	37.8	-	AC
0750	0.75	0.75	27.41	0.25	8.19	14.52	923	1.92	44.6	-	AC
0753	0.75	1.50	27.41	0.25	7.73	14.58	936	1.28	39.1	-	AC
0756	0.75	2.25	27.39	0.25	7.40	14.59	960	1.54	42.1	-	AC
0759	0.75	3.00	27.54	0.25	7.25	14.55	976	1.40	44.2	-	AC
0802	0.75	3.75	27.48	0.25	7.22	14.55	988	1.34	45.3	-	AC
0805	0.75	4.50	27.55	0.25	7.19	14.53	997	1.32	46.0	-	AC

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear


SAMPLING DATA

Sample ID: MW-17	Sampling Flow Rate: 0.25	Analytical Laboratory: PAGE / ALS				
Sample Time: 0808	Final Depth to Water: 27.45	Did Well Dewater? N				
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3 x 40ml	HCl	HVOCs	yes <input checked="" type="checkbox"/> no			
1 x 125 ml	-	NO ₂ , NO ₃	yes <input checked="" type="checkbox"/> no			
1 x 125 ml	H ₂ SO ₄	NH ₃	yes <input checked="" type="checkbox"/> no			
			yes no			
			yes no			

COMMENTS

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WELL MONITORING DATA SHEET

	Well I.D.	MW-19	Job Number:	1126-20
	Client:	NuStar	Date:	11-9-17
	Project:	VAN 1017 GUM	Sampler:	mmw
	Weather:	RAINY / HIGH WIND	Time In/Out:	

WELL DATA

Well Depth:	-	Well Diameter:	2"	Water Height	-
Depth to Water:	28.16	Screened Interval:	-	x Multiplier	-
Water Column Length:	<	Depth to Free Product:	-	x Casing Volumes	-
Purge Volume:	✓	Free Product Thickness:	-	= Purge Volume	✓
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:		BLADDER			Pump Intake Depth:		MS			Comments		
Sampling Method:		LF			Tubing Type:		DESIGNATED					
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks	
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria	
1221	-	-	28.16	0.15	8.03	14.20	2731	6.18	-61.7	-	SC	
1224	0.45	0.45	28.38	0.15	7.95	14.29	3016	3.00	-58.1	-	SC	
1227	0.45		28.36	0.15	7.91	13.55	3035	2.37	-67.0	-	SC	
1230	0.45		28.34	0.15	7.90	13.63	3028	2.35	-71.6	-	SC	
1233	0.45		28.34	0.15	7.88	13.85	3027	2.26	-75.2	-	SC	


Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-19	Sampling Flow Rate:	0.15	Analytical Laboratory:	PACEALS	
Sample Time:	1236	Final Depth to Water:	28.34	Did Well Dewater?	N	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x 40 ml	HCl	HVOC	yes no			MW-19 DUP
1x 125	-	NO ₂ , NO ₃	yes no			
1x 125	H ₂ SO ₄	NH ₃	yes no			
3x 40	HCl	PSK-175	yes no			
2x 40	H ₂ SO ₄	TOC	yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

	Well I.D.:	MW-20i	Job Number:	1126-20
	Client:	Nustar	Date:	11-7-17
	Project:	UAN AQ17 GUM	Sampler:	MMW
	Weather:	OVERCAST/WINDY	Time In/Out:	

WELL DATA

Well Depth:	—	Well Diameter:	2"	Water Height:	—
Depth to Water:	28.00	Screened Interval:	—	x Multiplier:	—
Water Column Length:	—	Depth to Free Product:	—	x Casing Volumes:	—
Purge Volume:	—	Free Product Thickness:	—	= Purge Volume:	—
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:		BLADDER			Pump Intake Depth:		MS			Comments	
Sampling Method:		LF			Tubing Type:		DESIGNATED/SLOW				
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<<- Stabilization Criteria
1238	—	—	28.11	0.25	8.69	14.17	280	4.37	13.8	—	AC
1241	0.75	0.75	28.18	0.25	8.71	14.35	300	0.74	6.5	—	AC
1245	0.75	1.50	28.45	0.25	8.100	14.32	302	0.58	6.2	—	AC
1248	0.75	2.25	28.70	0.25	8.63	14.24	301	0.53	6.4	—	AC


Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-20i	Sampling Flow Rate:	0.25	Analytical Laboratory:	RACE/ALS	
Sample Time:	1251	Final Depth to Water:	28.18	Did Well Dewater?		
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x 40ml	HCl	HVOC	yes <input checked="" type="checkbox"/>			
1x 125 ml	—	NO ₂ , NO ₃	yes <input checked="" type="checkbox"/>			
1x 125 ml	H ₂ SO ₄	NH ₃	yes <input checked="" type="checkbox"/>			
			yes	no		
			yes	no		
			yes	no		

COMMENTS

WELL MONITORING DATA SHEET

	Well I.D.	MW-21i-40	Job Number:	1126-20
	Client:	NuStar	Date:	11-8-17
	Project:	VAN 4Q17 Gum	Sampler:	MM
	Weather:	RAINY	Time In/Out:	

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	-
Depth to Water:	28.96	Screened Interval:	-	x Multiplier	-
Water Column Length:	-	Depth to Free Product:	-	x Casing Volumes	-
Purge Volume:	-	Free Product Thickness:	-	= Purge Volume	-
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters

PURGING DATA

Purge Method:	BLADDER	Pump Intake Depth:	MS	Comments
Sampling Method:	LF	Tubing Type:	DESIGNATED/SKIP	

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria
1451	-	-	28.98	0.2	9.61	12.11	339	1.91	43.8	-	SC
1454	0.60	0.6	28.98	0.2	9.58	13.52	377	2.20	25.1	-	AC
1457	0.60	1.2	28.98	0.2	9.27	14.10	386	0.85	23.0	-	AC
1500	0.60	1.8	28.98	0.2	9.08	14.11	387	0.71	22.3	-	AC
1503	0.60	2.40	28.98	0.2	9.05	14.08	386	0.72	22.0	-	AC
1506	0.60	3.00	28.98	0.2	8.99	14.25	385	0.78	22.3	-	AC

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-21i-40	Sampling Flow Rate:	0.2	Analytical Laboratory:	PACE/ALS	
Sample Time:	1510	Final Depth to Water:	28.98	Did Well Dewater?	N	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3 x 40 ml	HCl	HVOC	yes <input type="checkbox"/> no <input checked="" type="checkbox"/>			
1 x 125 ml	-	NO ₂ , NO ₃	yes <input type="checkbox"/> no <input checked="" type="checkbox"/>			
1 x 125 ml	H ₂ SO ₄	NH ₃	yes <input type="checkbox"/> no <input checked="" type="checkbox"/>			
			yes <input type="checkbox"/> no <input type="checkbox"/>			
			yes <input type="checkbox"/> no <input type="checkbox"/>			
			yes <input type="checkbox"/> no <input type="checkbox"/>			

COMMENTS

WELL MONITORING DATA SHEET



Well I.D.	MW-21i-105	Job Number:	1126-20
Client:	MuStar	Date:	11-8-17
Project:	VAN 1017 gum	Sampler:	MM
Weather:	VERY RAINY	Time In/Out:	

WELL DATA

Well Depth:	-	Well Diameter:	2"	Water Height	
Depth to Water:	28.79	Screened Interval:	-	x Multiplier	
Water Column Length:		Depth to Free Product:	-	x Casing Volumes	
Purge Volume:	-	Free Product Thickness:	-	= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	BLADDER	Pump Intake Depth:	MS	Comments	
Sampling Method:	LF	Tubing Type:	DESIGNATED / SKIP		

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria
1411	-	-	28.83	0.25	11.33	11.87	345	8.02	23.6	-	AC
1414	0.75	0.75	28.83	0.25	10.77	10.85	300	4.01	26.7	-	AC
1417	0.75	1.50	28.83	0.25	10.48	11.47	216	2.49	27.3	-	AC
1420	0.75	2.25	28.83	0.25	9.82	12.02	328	1.60	28.7	-	AC
1423	0.75	3.00	28.83	0.25	9.78	11.40	337	1.41	29.0	-	AC
1426	0.75	3.75	28.83	0.25	9.77	11.43	342	1.36	29.6	-	AC


Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-21i-105	Sampling Flow Rate	0.25	Analytical Laboratory:	PACE/ACS	
Sample Time:	1430	Final Depth to Water:	28.79	Did Well Dewater?		
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3 x 40 ml	HCl	HUIC	yes no			
1 x 125 ml	-	NH ₄ , NO ₃	yes no			
1 x 125 ml	H ₂ SO ₄	NH ₃	yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

	Well I.D.	MW-22i	Job Number:	1126-20
	Client:	Nustar	Date:	11-7-17
	Project:	VAN 4917 GUM	Sampler:	MM
	Weather:	OVERCAST	Time In/Out:	

WELL DATA

Well Depth:	-	Well Diameter:	2"	Water Height:	-
Depth to Water:	29.01	Screened Interval:	-	x Multiplier:	-
Water Column Length:	-	Depth to Free Product:	-	x Casing Volumes:	-
Purge Volume:	-	Free Product Thickness:	-	= Purge Volume:	-
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:		BLADDER			Pump Intake Depth:		MS			Comments	
Sampling Method:		LF			Tubing Type:		DESIGNATED / SICH				
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria
1050	-	-	28.84	0.25	7.72	12.62	558	4.15	-12.7		SC
1053	0.75	0.75	28.93	0.25	7.89	13.30	639	1.25	-31.9		SC
1056	0.75	1.50	28.98	0.25	7.92	13.14	446	1.02	-39.2		SC
1059	0.75	2.25	29.02	0.25	7.94	13.38	642	0.95	-45.7		SC


Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-22i	Sampling Flow Rate:	0.25	Analytical Laboratory:	PACE / ALS	
Sample Time:	1102	Final Depth to Water:	29.09	Did Well Dewater?	N	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3 x 40 ml	HCl	HVOCs	yes (no)			
1 x 125 ml	-	NO ₂ , NO ₃	yes (no)			
1 x 125 ml	H ₂ SO ₄	NH ₃	yes (no)			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

	Well I.D.:	MW-23i	Job Number:	1126-20
	Client:	Nustar	Date:	11-8-17
	Project:	UAN 9Q170um	Sampler:	mm
	Weather:	OVERCAST	Time In/Out:	

WELL DATA

Well Depth:	-	Well Diameter:	2"	Water Height	-
Depth to Water:	27.90	Screened Interval:	-	x Multiplier	-
Water Column Length:	-	Depth to Free Product:	-	x Casing Volumes	-
Purge Volume:	-	Free Product Thickness:	-	= Purge Volume	-
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters

PURGING DATA

Purge Method:				BLADDER				Pump Intake Depth:			MS		Comments	
Sampling Method:				LF				Tubing Type:			DESIGNATED / SKIP			
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color	Other Remarks		
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	← Stabilization Criteria			
0852	-	-	27.91	0.20	8.82	14.87	253	8.65	38.7	-	AC			
0855	0.60	0.60	27.91	0.20	8.73	14.73	257	7.66	18.6	-	AC			
0858	0.60		27.91	0.20	8.53	14.96	265	4.23	18.8	-	AC			
0901	0.60		27.91	0.20	8.45	14.69	265	4.11	19.6	-	AC			
0904	0.60		27.91	0.20	8.43	14.68	265	4.06	20.2	-	AC			

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear


SAMPLING DATA

Sample ID:	MW-23i	Sampling Flow Rate	0.20	Analytical Laboratory:	PACE/ALS
Sample Time:	0907	Final Depth to Water:	27.90	Did Well Dewater?	N
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD Duplicate ID
3 x 40 ml	HCl	HVOC	yes <input checked="" type="checkbox"/> no		
1 x 125 ml	-	NO ₂ , NO ₃	yes <input checked="" type="checkbox"/> no		
1 x 125 ml	H ₂ SO ₄	NH ₃	yes <input checked="" type="checkbox"/> no		
			yes no		
			yes no		
			yes no		

COMMENTS

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WELL MONITORING DATA SHEET

	Well I.D.: <u>MW-24i</u>	Job Number: <u>1126-20</u>
	Client: <u>Nustar</u>	Date: <u>11-9-17</u>
	Project: <u>VAN 4017 Gwm</u>	Sampler: <u>MM</u>
	Weather: <u>OVERCAST</u>	Time In/Out:

WELL DATA

Well Depth: <u>-</u>	Well Diameter: <u>2"</u>	Water Height: <u>-</u>
Depth to Water: <u>27.50</u>	Screened Interval: <u>-</u>	x Multiplier: <u>-</u>
Water Column Length: <u>-</u>	Depth to Free Product: <u>-</u>	x Casing Volumes: <u>-</u>
Purge Volume: <u>-</u>	Free Product Thickness: <u>-</u>	= Purge Volume: <u>-</u>
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162
		4-inch = 0.653
		1 gallon = 3.785 liters

PURGING DATA

Purge Method: <u>BLADDER</u>				Pump Intake Depth: <u>MC</u>				Comments			
Sampling Method: <u>LE</u>				Tubing Type: <u>DESIGNATED</u>							
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria
1128	-	-	27.14	0.25	9.72	14.88	257	6.00	-65.9	-	AC
1131	0.75	0.75	27.02	0.25	9.05	14.75	278	5.25	-85.3	-	AC
1134	0.75	1.5	26.98	0.25	8.78	14.56	285	3.53	-92.0	-	AC
1137	0.75	2.25	26.98	0.75	8.58	14.25	286	3.27	-95.0	-	AC
1140	0.75	3.0	26.98	0.25	8.42	14.10	286	3.18	-98.5	-	AC
1143	0.75	3.75	27.07	0.25	8.38	14.07	285	3.12	-99.3	-	AC
1146	0.75	4.50 4.50	27.00	0.25	8.34	14.06	285	3.11	-100.1	-	AC

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear


SAMPLING DATA

Sample ID: <u>MW-24i</u>	Sampling Flow Rate: <u>0.25</u>	Analytical Laboratory: <u>PACE SALS</u>				
Sample Time: <u>1149</u>	Final Depth to Water: <u>27.00</u>	Did Well Dewater? <u>N</u>				
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x 40 ml	HCl	HVOC	yes <u>no</u>			
1x 125	-	NO ₂ , NO ₃	yes <u>no</u>			
1x 125	H ₂ SO ₄	NH ₃	yes <u>no</u>			
3x 40	HCl	BVK175	yes <u>no</u>			
2x 40	H ₂ SO ₄	TOL	yes <u>no</u>			
			yes			
			no			

COMMENTS

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WELL MONITORING DATA SHEET

	Well I.D.:	MW-24d	Job Number:	1126-20
	Client:	Nustar Van 421700M	Date:	11-6-17
	Project:	Nustar Van 421700M	Sampler:	MMW
	Weather:	OVERCAST	Time In/Out:	

WELL DATA

Well Depth:	-	Well Diameter:	2"	Water Height	-
Depth to Water:	27.87	Screened Interval:	-	x Multiplier	-
Water Column Length:	-	Depth to Free Product:	-	x Casing Volumes	-
Purge Volume:	-	Free Product Thickness:	-	= Purge Volume	-
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters

PURGING DATA

Purge Method:				DIAPHRAGM				Pump Intake Depth:			MS		Comments	
Sampling Method:				LF				Tubing Type:			DESIGNATED SKIP POINT			
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color	Other Remarks		
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	← Stabilization Criteria			
1007	1.38	1.38	27.85	0.46	8.52	12.55	463	7.38	142.7			AC		
1010	1.38	1.38	27.93	0.46	8.63	13.63	476	2.11	67.1			AC		
1013	1.38	2.76	27.71	0.46	8.67	13.32	472	1.68	44.1			AC		
1016	1.38	4.14	27.79	0.46	8.82	13.21	475	1.50	29.6			AC		
1019	1.38	5.52	27.83	0.46	8.83	13.19	479	1.44	18.7			AC		
1021	1.38	6.9	27.85	0.46	8.90	13.14	481	1.24	6.9			AC		
1024	1.38	8.28	27.96	0.46	8.95	13.11	481	1.16	0.2			AC		

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear


SAMPLING DATA

Sample ID:	MW-24d	Sampling Flow Rate	0.46	Analytical Laboratory:	PACE / ALS	
Sample Time:	1030	Final Depth to Water:	28.06	Did Well Dewater?	N	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3 x 40 ml	HCl	HUOCs	yes <input checked="" type="radio"/> no			
1 x 125 ml	-	NO ₂ , NO ₃	yes <input checked="" type="radio"/> no			
1 x 125 ml	H ₂ SO ₄	NO ₃ /NO ₂ NH ₃	yes <input checked="" type="radio"/> no			
			yes	no		
			yes	no		
			yes	no		

COMMENTS

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WELL MONITORING DATA SHEET

	Well I.D.	MW-251	Job Number:	1126- 17 20
	Client:	M. Star	Date:	11-8-17
	Project:	VAN AQ17 GWM	Sampler:	MMW
	Weather:	RAINY	Time In/Out:	

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	28.08	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	BLADDER	Pump Intake Depth:	MS	Comments	
Sampling Method:	LF	Tubing Type:	DESIGNATED / SKIP		

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria
1210	-	-	28.11	0.25	10.45	11.79	294	7.84	46.1	-	SC
1213	0.75	0.75	28.11	0.25	9.89	11.14	313	6.01	35.9	-	SC
1216	0.75	1.50	28.11	0.25	9.65	10.91	314	2.30	36.2	-	SC
1219	0.75	2.25	28.11	0.25	9.27	11.45	313	1.80	36.8	-	SC
1222	0.75	3.00	28.11	0.25	9.28	11.46	312	1.64	35.6	-	SC
1225	0.75	3.75	28.11	0.25	9.24	11.46	312	1.63	35.6	-	SC

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-251	Sampling Flow Rate	0.25	Analytical Laboratory:	PAE/ALS	
Sample Time:	1228	Final Depth to Water:	28.10	Did Well Dewater?	N	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3 x 40 ml	HCl	HVOC	yes (no)			
1 x 125 ml	-	NO2, NO3	yes (no)			
1 x 125 ml	H2SO4	NH3	yes (no)			
			yes (no)			
			yes (no)			
			yes (no)			

COMMENTS

WELL MONITORING DATA SHEET



Well I.D.	MW-26	Job Number:	1126-20
Client:	Nuster	Date:	11-8-17
Project:	JAN 4Q17 GWM	Sampler:	MM
Weather:	OVERCAST / RAIN	Time In/Out:	

WELL DATA

Well Depth:	-	Well Diameter:	2"	Water Height	-
Depth to Water:	78.50	Screened Interval:	-	x Multiplier	-
Water Column Length:	-	Depth to Free Product:	-	x Casing Volumes	-
Purge Volume:	-	Free Product Thickness:	-	= Purge Volume	-
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters

PURGING DATA

Purge Method:				BLADDER				Pump Intake Depth:			MS		Comments
Sampling Method:				LF				Tubing Type:					
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks		
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	← Stabilization Criteria		
1252	-	-	78.59	0.20	8.70	14.14	3666	3.21	96.5	-	AC		
1255	0.60	0.60	78.61	0.20	8.68	13.28	3747	2.29	96.9	-	AC		
1258	0.60	1.20	78.62	0.20	8.61	14.11	3712	2.05	98.1	-	AC		
1301	0.60	1.80	78.62	0.20	8.55	14.05	3644	1.89	99.8	-	AC		
1304	0.60	2.40	78.62	0.20	8.43	14.04	3555	1.75	99.8	-	AC		


Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-26	Sampling Flow Rate	0.20	Analytical Laboratory:	PACE / ALS	
Sample Time:	1307	Final Depth to Water:	78.58	Did Well Dewater?	N	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3 x 40 ml	HCl	HVOC	yes <input type="checkbox"/> no <input checked="" type="checkbox"/>			
1 x 125 ml	-	NO ₂ , NO ₃	yes <input type="checkbox"/> no <input checked="" type="checkbox"/>			
1 x 125 ml	H ₂ SO ₄	NH ₃	yes <input type="checkbox"/> no <input checked="" type="checkbox"/>			
3 x 40 ml	HCl	PSK-175	yes <input type="checkbox"/> no <input checked="" type="checkbox"/>			
2 x 40 ml	H ₂ SO ₄	TOL	yes <input type="checkbox"/> no <input checked="" type="checkbox"/>			

COMMENTS

WELL MONITORING DATA SHEET

	Well I.D.	MW-32s	Job Number:	1126-20
	Client:	NuStar	Date:	11-10-17
	Project:	VAN ARCTIC OIL	Sampler:	MM
	Weather:	OVERCAST / LIGHT RAIN	Time In/Out:	

WELL DATA

Well Depth:	-	Well Diameter:	- NA	Water Height	-
Depth to Water:	28.98	Screened Interval:	-	x Multiplier	-
Water Column Length:	-	Depth to Free Product:	-	x Casing Volumes	-
Purge Volume:	-	Free Product Thickness:	-	= Purge Volume	-
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	BLADDER	Pump Intake Depth:	MS	Comments
Sampling Method:	LF	Tubing Type:	HDPE	

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria
0847	-	-	29.51	0.20	6.79	14.70	617	4.19	-84.3	-	C
0850	0.6	0.6	29.87	0.20	6.60	14.42	490	3.30	-78.8	-	C
0853	0.6	1.2	29.95	0.2	6.46	14.47	444	3.60	-74.1	-	C
0856	0.6	1.8	29.85	0.2	6.68	14.49	240	4.17	-51.4	-	C
0859	0.6	2.4	29.80	0.2	5.70	14.54	142	4.18	-27.1	-	C
0902	0.6	3.0	29.80	0.2	5.38	14.71	115	4.08	-11.5	-	C
0905	0.6	3.6	29.80	0.2	5.37	14.72	114	4.03	-8.6	-	C
0908	0.6	4.2	29.81	0.2	5.34	14.67	114	4.01	-6.9	-	C


Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-32s	Sampling Flow Rate	0.2	Analytical Laboratory:	PACE/ALS	
Sample Time:	0911	Final Depth to Water:	28.83	Did Well Dewater?	N	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x 40 ml	HCl	HVOC	yes (no)			
1x 125 ml	-	NO ₂ , NO ₃	yes (no)			
1x 125 ml	H ₂ SO ₄	NH ₃	yes (no)			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

	Well I.D.	MW-32i	Job Number:	1126-20
	Client:	NVStar	Date:	11-10-17
	Project:	VAN 4017 GUM	Sampler:	mm
	Weather:	OVERCAST / L RAIN	Time In/Out:	

WELL DATA

Well Depth:	—	Well Diameter:	NA	Water Height	—
Depth to Water:	79.26	Screened Interval:	—	x Multiplier	—
Water Column Length:	—	Depth to Free Product:	—	x Casing Volumes	—
Purge Volume:	—	Free Product Thickness:	—	= Purge Volume	—
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:				BLADDER				Pump Intake Depth:			MS		Comments	
Sampling Method:				LF				Tubing Type:			HDPE?			
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks			
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<< Stabilization Criteria			
0811			29.26	0.15	8.92	14.75	415	9.16	-144.2	—	C			
0814	0.45	0.45	29.22	0.15	8.00	14.21	384	7.26	-85.6	—	C			
0817	0.45		29.21	0.15	7.93	14.04	365	5.21	-87.6	—	C			
0820	0.45		29.19	0.15	7.62	13.70	345	4.51	-84.4	—	C			
0823	0.45		29.18	0.15	7.33	13.93	328	4.00	-78.9	—	C			
0826	0.45		29.15	0.15	7.19	13.88	324	3.84	-80.0	—	C			
0829	0.45		29.13	0.15	7.16	13.81	324	3.78	-80.6	—	C			

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear


SAMPLING DATA

Sample ID:	MW-32i	Sampling Flow Rate	0.15	Analytical Laboratory:	PACE / ALS	
Sample Time:	0832	Final Depth to Water:	29.11	Did Well Dewater?	N	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x 40	HCl	HUOC	yes <input type="checkbox"/> no <input checked="" type="checkbox"/>			
1x 125	—	NO ₂ , NO ₃	yes <input type="checkbox"/> no <input checked="" type="checkbox"/>			
1x 125	H ₂ SO ₄	NH ₃	yes <input type="checkbox"/> no <input checked="" type="checkbox"/>			
			yes <input type="checkbox"/> no <input type="checkbox"/>			
			yes <input type="checkbox"/> no <input type="checkbox"/>			

COMMENTS

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WELL MONITORING DATA SHEET

	Well I.D.:	S-1	Job Number:	1126-20
	Client:	NuStar	Date:	11-8-17
	Project:	VAN 4Q17 GWM	Sampler:	MM
	Weather:	LT RAW	Time In/Out:	

WELL DATA

Well Depth:	-	Well Diameter:	2"	Water Height	-
Depth to Water:	27.47	Screened Interval:	-	x Multiplier	-
Water Column Length:	-	Depth to Free Product:	-	x Casing Volumes	-
Purge Volume:	-	Free Product Thickness:	-	= Purge Volume	-
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters

PURGING DATA

Purge Method:	BLADDER	Pump Intake Depth:	MS	Comments
Sampling Method:	LF	Tubing Type:	DESIGNATED/SKIP	

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
1035	-	-	27.54	0.20	10.09	13.30	239	3.13	37.1	-	AC SC
1038	0.60	1.20	27.54	0.20	9.26	12.92	177	2.12	46.5	-	AC SC
1041	0.60	1.80	27.54	0.20	9.04	13.66	181	1.57	47.9	-	AC SC
1044	0.60	1.80	27.59	0.20	8.83	13.42	184	1.28	52.9	-	AC SC
1047	0.60	2.40	27.60	0.20	8.65	13.59	190	0.91	58.6	-	AC SC
1050	0.60	3.00	27.61	0.20	8.61	13.70	191	0.83	60.4	-	AC SC
1053	0.60	3.60	27.63	0.20	8.59	13.56	194	0.80	61.5	-	AC SC

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear


SAMPLING DATA

Sample ID:	S-1	Sampling Flow Rate	0.20	Analytical Laboratory:	PACE/ALS	
Sample Time:	1053	Final Depth to Water:	27.60	Did Well Dewater?	N	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3 x 40 ml	HCl	HVOC	yes <input type="radio"/> no <input checked="" type="radio"/>			
1 x 125 ml	-	NO ₂ , NO ₃	yes <input type="radio"/> no <input checked="" type="radio"/>			
1 x 125 ml	H ₂ SO ₄	NH ₃	yes <input type="radio"/> no <input checked="" type="radio"/>			
			yes <input type="radio"/> no <input type="radio"/>			
			yes <input type="radio"/> no <input type="radio"/>			
			yes <input type="radio"/> no <input type="radio"/>			

COMMENTS

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WELL MONITORING DATA SHEET

	Well I.D.	S-2	Job Number:	1126-20
	Client:	Nuster	Date:	11-8-17
	Project:	VAN AQ17 GUM	Sampler:	MM
	Weather:	LT RAIN	Time In/Out:	

WELL DATA

Well Depth:	✓	Well Diameter:	2"	Water Height:	—
Depth to Water:	27.08	Screened Interval:	—	x Multiplier:	—
Water Column Length:	—	Depth to Free Product:	—	x Casing Volumes:	—
Purge Volume:	✓	Free Product Thickness:	✓	= Purge Volume:	—
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	BLADDER	Pump Intake Depth:	MS	Comments	
Sampling Method:	LF	Tubing Type:	DESIGNATED / SKIP		

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	← Stabilization Criteria
1110	—	—	27.22	0.25	8.39	11.95	1702	5.03	88.4	—	VC reddish color
1113	0.75	0.75	27.30	0.25	8.32	12.89	2384	2.16	88.0	—	VC
1116	0.75	1.50	27.31	0.25	8.29	12.90	2438	2.15	84.5	—	VC
1119	0.75	2.25	27.31	0.25	8.28	12.75	2556	2.06	83.9	—	VC
1121	0.75	3.00	27.35	0.25	8.26	12.86	2610	1.71	83.1	—	VC
1124	0.75	3.75	27.39	0.25	8.25	12.85	2615	1.65	82.8	—	VC

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear


SAMPLING DATA

Sample ID:	S-2	Sampling Flow Rate:	0.25	Analytical Laboratory:	PACE/ALS
Sample Time:	1127	Final Depth to Water:	27.36	Did Well Dewater?	N
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD Duplicate ID
3x 40	HCl	HNO ₃	yes (no)		
1x 125	—	NO ₂ , NO ₃	yes (no)		
1x 125	H ₂ SO ₄	NH ₃	yes (no)		
			yes no		
			yes no		
			yes no		

COMMENTS

REDDISH-ORANGE COLOR

WELL MONITORING DATA SHEET

	Well I.D.	FB-110617	Job Number:	11260-20
	Client:	Nustar	Date:	11-6-17
	Project:	ARCOM	Sampler:	MM
	Weather:	OVERCAST	Time In/Out:	-

WELL DATA

Well Depth:	-	Well Diameter:	-	Water Height:	-
Depth to Water:	-	Screened Interval:	-	x Multiplier:	-
Water Column Length:	-	Depth to Free Product:	-	x Casing Volumes:	-
Purge Volume:	-	Free Product Thickness:	-	= Purge Volume:	-
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters

PURGING DATA

Purge Method:				Pump Intake Depth:				Comments				
Sampling Method:				Tubing Type:								
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks	
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria	
NA	-											

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	FB-110617	Sampling Flow Rate:	-	Analytical Laboratory:	PACE
Sample Time:	0750	Final Depth to Water:	-	Did Well Dewater?	-
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD Duplicate ID
3 x 40ml	HCl	VOC	yes <u>no</u>		
			yes no		
			yes no		
			yes no		
			yes no		
			yes no		

COMMENTS

WELL MONITORING DATA SHEET

	Well I.D.	FB-11072017	Job Number:	1126-20
	Client:	NoStar	Date:	11-7-17
	Project:	VAN AQUICUM	Sampler:	mm
	Weather:	OVERCAST	Time In/Out:	

WELL DATA

Well Depth:	—	Well Diameter:	—	Water Height:	—
Depth to Water:	—	Screened Interval:	—	x Multiplier:	—
Water Column Length:	—	Depth to Free Product:	—	x Casing Volumes:	—
Purge Volume:	—	Free Product Thickness:	—	= Purge Volume:	—
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters

PURGING DATA

Purge Method:					—	Pump Intake Depth:					—	Comments	
Sampling Method:					—	Tubing Type:					—		
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color	Other Remarks	
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	← Stabilization Criteria		
NA													


Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	FB-11072017	Sampling Flow Rate:	—	Analytical Laboratory:	PACE		
Sample Time:	0745	Final Depth to Water:	—	Did Well Dewater?:	NA		
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID	
3 x 40ml	HCl	HVOCs	yes no				
			yes	no			
			yes	no			
			yes	no			
			yes	no			
			yes	no			

COMMENTS

WELL MONITORING DATA SHEET

	Well I.D.	FB-11082017	Job Number:	1126-20
	Client:	Nustar	Date:	11-8-17
	Project:	VAN 4Q17 GUM	Sampler:	MM
	Weather:	OVERCAST	Time In/Out:	

WELL DATA

Well Depth:		Well Diameter:		Water Height	
Depth to Water:		Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:				Pump Intake Depth:				Comments			
Sampling Method:				Tubing Type:							
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	-- Stabilization Criteria


Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	FB-11082017	Sampling Flow Rate	—	Analytical Laboratory:	PAGE	
Sample Time:	0735	Final Depth to Water:	—	Did Well Dewater?	—	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x 40ml	HCl	HVOC	yes (no)			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

	Well I.D.	FB-11092017	Job Number:	1126-20
	Client:	NuStar	Date:	11-9-2017
	Project:	VAN 4Q17 GLOM	Sampler:	MMW
	Weather:	OVERCAST/LT RAIN/ LT WIND	Time In/Out:	

WELL DATA

Well Depth:		Well Diameter:		Water Height	
Depth to Water:		Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:				Pump Intake Depth:				Comments			
Sampling Method:				Tubing Type:							
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria


Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	FB-11092017	Sampling Flow Rate		Analytical Laboratory:	PACE	
Sample Time:	0730	Final Depth to Water:		Did Well Dewater?		
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x 40ml	HCl	HVOC	yes (no)			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

	Well I.D.:	FB-11102017	Job Number:	1126-20
	Client:	NWStar	Date:	11-10-17
	Project:	VANALQUIA GUMM	Sampler:	MM
	Weather:	OVERCAST	Time In/Out:	

WELL DATA

Well Depth:	Well Diameter:	Water Height:		
Depth to Water:	Screened Interval:	x Multiplier:		
Water Column Length:	Depth to Free Product:	x Casing Volumes:		
Purge Volume:	Free Product Thickness:	= Purge Volume		
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters

PURGING DATA

Purge Method:	Pump Intake Depth:	Comments
Sampling Method:	Tubing Type:	

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					±0.1	±0.5° C	±5%	± 0.5 ppm	±20mV	±10%	← Stabilization Criteria

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	FB-11102017	Sampling Flow Rate:		Analytical Laboratory:	PACE	
Sample Time:	0740	Final Depth to Water:		Did Well Dewater?		
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x 40ml	HCl	HUOC	yes <input checked="" type="radio"/>			
			yes <input type="radio"/>			
			yes <input type="radio"/>			
			yes <input type="radio"/>			
			yes <input type="radio"/>			
			yes <input type="radio"/>			

COMMENTS

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WELL MONITORING DATA SHEET



Well I.D.	EB-11082017	Job Number:	1126-20
Client:	Nustar	Date:	11-8-17
Project:	VAN ACQ 17 GUM	Sampler:	mm
Weather:	OVERCAST	Time In/Out:	

WELL DATA

Well Depth:	Well Diameter:	Water Height		
Depth to Water:	Screened Interval:	x Multiplier		
Water Column Length:	Depth to Free Product:	x Casing Volumes		
Purge Volume:	Free Product Thickness:	= Purge Volume		
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters

PURGING DATA

Purge Method:	Pump Intake Depth:	Comments
Sampling Method:	Tubing Type:	

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	EB-11082017	Sampling Flow Rate	—	Analytical Laboratory:	PACC	
Sample Time:	0825	Final Depth to Water:	—	Did Well Dewater?	—	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3 x 40ml	HCl	HUOCs	yes no			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

Appendix B

Historical Groundwater Analytical Data

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MW-1	11/17/93	--	500	--	--	<250	<250	--	14,000	--	--	750	<250	--	1,400	<500
	09/01/95	<250	<500	<250	<250	<250	<250	<250	13,000	<250	<250	620	<250	--	890	610
	09/24/96	<5	<20	<2	<2	54	<2	8.4	11,000	83	17	2,600	68	--	1,800	420
	12/02/96	0.8	<0.50	<0.50	<0.20	6.7	<0.50	0.3	1,500	4.4	<0.20	1,200	7.3	--	310	1.6
	11/12/97	<125	<250	<125	<125	<125	<125	<125	11,600	<125	<125	6,330	<125	--	2,880	<250
	08/11/99	<50	<250	<25	<250	43.1	<25	<25	8,590	86	<25	2,520	52.5	--	1,210	408
	11/16/99	<50	<125	<25	<50	38	<25	<25	6,250	47.5	<25	2,400	28	--	829	148
	02/29/00	<100	<500	<50	<50	<50	<50	<50	6,720	60.9	<50	1,370	<100	--	590	438
	06/27/00	<100	<500	<50	<50	<50	<50	<50	6,480	65.1	<50	1,780	<100	--	795	284
	08/31/00	<100	<500	<50	<50	<50	<50	<50	5,160	<50	<50	1,960	<100	--	720	<50
	11/30/00	<20	<100	<10	<10	15	<10	<10	1,550	12.7	<10	660	<20	--	234	<10
	02/27/01	<100	<100	<50	<50	<50	<50	<50	4,990	<50	<50	1,140	<100	--	440	190
	05/29/01	<50	<250	<25	<25	<25	<25	<25	4,050	<25	<25	1,040	<50	--	407	91
	09/25/01	<50	<50	<50	<50	<50	<50	<50	5,000	<50	<50	890	<50	--	440	240
	12/17/01	<2	<10	<1	<1	<1	<1	<1	109	1.26	<1	164	<2	--	42.9	<1
	03/19/02	<50	<25	<25	<50	35	<25	<25	4,120	35	<25	710	<25	--	349	170
	05/30/02	<10	<5	<5	<10	10.8	<5	<5	1,140	6.6	<5	307	<5	--	101	22.3
	11/08/02	<20	<10	<10	<20	22.8	<10	<10	1,980	20.2	<10	367	<10	--	174	14.4
	05/30/03	<20	<10	<10	<20	21.2	<10	<10	2,180	<10	<10	1,200	14.2	--	340	22.6
	11/02/04	<20	<10	<10	<20	22.4	<10	<10	2,130	23.6	<10	335	<10	--	169	22.8
	11/16/04	<12	<12	<12	<12	15	<12	<12	1,300	<12	<12	310	<12	--	130	<12
	05/18/05	<5	<2.5	<2.5	<5	12	<2.5	<2.5	773	14.1	<2.5	193	<2.5	--	87.6	3.8
	05/23/07	<10	<10	<10	<10	15.5	<10	<10	1,110	<10	<10	58.5	<10	--	45.4	11.7
	09/11/07	<50	<25	<25	<50	<25	<25	<25	916	<25	<25	34	<25	--	34	62.5
	12/13/07	<10	<5	<5	<10	9.7	<5	<5	526	5	<5	81.9	<5	--	45.4	8.8
	03/05/08	<1	<0.500	<0.500	<1	16.1	<0.500	1.66	826	9.18	2.3	49.7	0.88	<0.500	45.6	58.8
	09/19/08	<20	<10	<10	<20	20.4	<10	<10	633	<10	<10	108	<10	<10	74.8	<10
	12/10/08	<2.5	<2.5	<2.5	<2.5	15	<2.5	<2.5	570	6.2	<2.5	28	<2.5	<2.5	25	48
	03/27/09	<2.5	<2.5	<2.5	<2.5	17	<0.50	<2.5	580	5.7	<2.5	39	<2.5	<2.5	42	4.4
	06/17/09	<0.90	<0.90	<0.90	<0.90	6.3	<0.90	<0.90	310	3.6	0.99	21	<0.90	<0.90	14	9.7
	09/18/09	<0.80	<0.80	<0.80	<0.80	19	<0.80	<0.80	590	4.2	1.9	29	<0.80		27	8.1
	12/17/09	<0.50	<0.50	<0.50	<0.50	4.8	<0.50	<0.50	170	0.72	0.67	53	0.53	<0.50	26	<0.50

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MW-1 (continued)	03/19/10	<0.50	<0.50	<0.50	<0.50	9.3	<0.50	0.61	300	3.6	1.4	22	<0.50	<0.50	21	26
	06/15/10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	9.6	<0.50	<0.50	22	<0.50	<0.50	6.6	<0.50
	09/23/10	<0.90	<0.90	<0.90	<0.90	12	<0.90	<0.90	380	3.4	1.6	25	<0.90	<0.90	27	7.1
	12/09/10	<1.5	<1.5	<1.5	<1.5	7.1	1.5	<1.5	250	2.2	<1.5	25	<1.5	<1.5	17	8
	03/10/11	<1.5	<1.5	<1.5	<1.5	7.5	<1.5	<1.5	250	3	<1.5	16	<1.5	<1.5	16	18
	06/09/11	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	4.4	<0.5	<0.5	11	<0.5	<0.5	3.4	<0.5
	09/19/11	<1.5	<1.5	<1.5	<1.5	12	<1.5	<1.5	300	3.2	<1.5	5.2	<1.5	<1.5	13	30
	12/09/11	<1.5	<1.5	<1.5	<1.5	11	<1.5	<1.5	260	2.9	<1.5	6.2	<1.5	<1.5	8.4	40
	03/09/12	<0.50	<0.50	<0.50	<0.50	7.8	<0.50	<0.50	200	2.4	1	3.1	<0.50	<0.50	9.5	19
	06/22/12	<0.5	<0.5	<0.5	<0.5	4.8	<0.5	<0.5	140	1.7	0.53	17	<0.5	<0.5	13	14
	09/13/12	<1.5	<1.5	<1.5	<1.5	10	<1.5	<1.5	260	2.4	<1.5	<1.5	<1.5	<1.5	7	25
	12/13/12	<0.50	<0.50	<0.50	<0.50	1.4	<0.50	<0.50	47	0.64	<0.50	26	<0.50	<0.50	14	<0.50
	03/15/13	<0.50	<0.50	<0.50	<0.50	5.8	<0.50	<0.50	140	1.6	0.8	0.83	<0.50	<0.50	6	0.98
	06/13/13	<0.50	<0.50	<0.50	<0.50	7.2	<0.50	<0.50	130	1.9	0.63	1.1	<0.50	<0.50	2.4	28
	09/19/13	<0.50	<0.50	<0.50	<0.50	11	<0.50	<0.50	180	1.6	1	3.2	<0.50	<0.50	5.6	0.92
	12/16/13	<0.50	<0.50	<0.50	<0.50	7.8	<0.50	<0.50	110	1.8	<0.50	8.5	<0.50	<0.50	5.9	13
	3/21/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	9.1	<0.50	<0.50	10	<0.50	<0.50	4.3	<0.50
	6/25/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	5.6	45	1	<0.50	<0.50	<0.50	<0.50	0.65	5.9
	9/30/2014	<0.50	<0.50	<0.50	<0.50	11	<0.50	<0.50	170	1.3	0.83	12	<0.50	<0.50	9.7	3.3
	12/11/2014	<0.50	<0.50	<0.50	<0.50	1.5	<0.50	<0.50	30	<0.50	<0.50	17	<0.50	<0.50	9.4	<0.50
	3/19/2015	<0.50	<0.50	<0.50	<0.50	6.2	<0.50	<0.50	47.4	0.67	<0.50	1.1	<0.50	<0.50	1.9	<5
	6/17/2015	<0.50	<0.50	<0.50	<0.50	9.5	<0.50	<0.50	75	0.8	<0.50	4.3	<0.50	<0.50	4.6	4.9
	9/24/2015	<0.50	<0.50	<0.50	<0.50	8.4	<0.50	<0.50	39.1	0.65	<0.50	2.8	<0.50	<0.50	2.4	32.7
	12/8/2015	<0.50	<0.50	<0.50	<0.50	1.4	<0.50	<0.50	25.2	<0.50	<0.50	18	<0.50	<0.50	8.9	<0.50
	3/7/2016	<0.50	<2	<5	<0.50	4.4	<0.50	<0.50	51.9	<0.50	<0.50	18	<0.50	<0.50	10.3	0.57
	6/15/2016	<0.50	<2	<0.50	<0.50	3.7	<0.50	<0.50	13.1	<0.50	<0.50	0.67	<0.50	<0.50	1.2	5.3
9/27/2016	<0.50	<2	<0.50	<0.50	8.6	<0.50	<0.50	25.2	<0.50	<0.50	2.3	<0.50	<0.50	3.1	23.9	
12/16/2016	<0.50	<2	<0.50	<0.50	3.4	<0.50	<0.50	22.5	<0.50	<0.50	8	<0.50	<0.50	5.8	0.86	
3/30/2017	<0.50	<2	<0.50	<0.50	<0.5	<0.5	<0.50	1.6	<0.50	<0.50	4.6	<0.50	<0.50	1.6	<0.50	
6/12/2017	<2.0	<2.0	<0.50	<0.50	2.1	<1.0	<0.50	9.9	<0.50	<0.50	4.4	<0.50	<0.50	3.1	<0.50	
9/26/2017	<2.0	<2.0	<0.50	<0.50	6.8	<1.0	<0.50	6.7	<0.50	<0.50	1.5	<0.50	<0.50	1.6	22.60	
11/9/2017	<2.0	<2.0	<0.50	<0.50	5.0	<0.50	<0.50	22.8	<0.50	<0.50	9.5	<0.50	<0.50	6.5	1.10	

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MW-2	11/17/93	--	51	--	--	12	<0.50	--	10	--	--	<0.50	<0.50	--	<0.50	<0.10
	09/01/95	<0.50	16	<0.50	<0.20	8.2	<0.50	<0.50	2.5	<0.50	<0.50	<0.50	<0.50	--	<0.50	2.2
	09/24/96	<0.50	19	<0.20	<0.20	9.6	0.5	<0.20	9.4	<0.20	<0.20	<0.20	<0.50	--	0.3	5.1
	12/02/96	<0.50	8.8	<0.50	<0.20	6.9	0.6	<0.20	11	<1	<0.20	<0.50	<1	--	<0.30	7.2
	11/13/97	<0.50	<1	<0.50	<0.50	5.32	0.571	<0.50	7.9	<0.50	<0.50	<0.50	<0.50	--	<0.50	<1
	08/11/99	<1	18.3	<0.50	<0.50	6.38	<0.50	<0.50	20	<0.50	<0.50	<0.50	<1	--	10.4	1.64
	02/29/00	<1	16	<0.50	<0.50	5.68	<0.50	<0.50	23.5	<0.50	<0.50	<0.50	<1	--	4.52	1.21
	06/27/00	<1	18.3	<0.50	<0.50	5.34	<0.50	1.27	23.4	<0.50	<0.50	12.8	<1	--	16.6	<0.50
	05/30/01	<1	<5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1	--	<0.50	<0.50
	05/30/02	<1	1.68	<0.50	<1	2.65	<0.50	<0.50	0.51	<0.50	<0.50	0.61	<0.50	--	<0.50	<0.50
	11/08/02	<1	10.4	<0.50	<1	3.13	<0.50	<0.50	1.84	<0.50	<0.50	1.05	<0.50	--	0.98	<0.50
	05/30/03	<1	3.64	<0.50	<1	1.95	<0.50	<0.50	0.59	<0.50	<0.50	6.6	<0.50	--	1.13	<0.50
	09/12/07	<1	5.9	<0.50	<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	--	<0.50	<0.50
	03/07/08	<1	7.86	<0.50	<1	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	0.5	<0.500	<0.500	<0.500	<0.500
	09/18/08	<1	5.93	<0.500	<1	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
	03/24/09	<0.50	4.8	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	09/16/09	<0.50	5.1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1	<0.50	<0.50	0.85	<0.50
	03/19/10	<0.50	5.7	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	09/23/10	<0.5	3.8	<0.50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	03/09/11	<0.50	4.8	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	09/16/11	<0.50	4.3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/09/12	<0.50	4.3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	09/13/12	<0.50	3.4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/14/13	<0.50	3.1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	09/19/13	<0.50	2.9	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	3/21/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	9/30/2014	<0.50	2.3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	3/19/2015	<0.50	0.96	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	9/23/2015	<0.50	2.7	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	3/7/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	9/29/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	3/28/2017	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	3/28/2017	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	9/25/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/6/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MW-3	11/17/93	--	210	--	--	27	4	--	240	--	--	190	20	--	97	130
	09/01/95	<50	<100	<50	<50	<50	<50	<50	2,700	<50	<50	1,300	<50	--	140	730
	09/24/96	<5	<20	7.9	<2	12	<2	<2	1,100	9.5	4	1,800	21	--	330	82
	12/02/96	<50	<50	<50	<20	<30	<50	<20	650	<100	<20	2,100	<100	--	470	<50
	11/12/97	<25	<50	<25	<25	<25	<25	<25	464	<25	<25	2,000	<25	--	241	<50
	08/11/99	<20	<100	<10	<10	<10	<10	<10	500	<10	<10	1,760	25.4	--	247	<10
	11/16/99	<20	<50	<10	<20	14	<10	<10	628	15.2	<10	700	<10	--	132	<10
	02/29/00	<20	<100	<10	<10	<10	<10	<10	473	<10	<10	1,890	25.4	--	356	<10
	06/27/00	<20	<100	<10	<10	<10	<10	<10	410	<10	10.2	1,460	<20	--	241	<10
	08/31/00	<20	<100	<10	<10	52.2	<10	<10	2,580	25.5	<10	399	<20	--	100	171
	11/30/00	<5	<25	<2.5	<2.5	13.3	<2.5	<2.5	374	3.73	<2.5	366	<5	--	80.3	3.1
	02/27/01	<5	<25	3.64	<2.5	5.78	<2.5	<2.5	153	<2.5	2.5	358	<5	--	76.1	<2.5
	05/29/01	<5	<25	2.8	<2.5	<2.5	<2.5	<2.5	112	<2.5	<2.5	647	5.12	--	93.3	<2.5
	09/25/01	<1.3	3.1	2.4	<1.3	10	2	<1.3	210	3	1.7	550	7.2	--	90	4.9
	12/17/01	<10	<50	<5	<5	<5	<5	<5	164	<5	<5	826	16.9	--	155	<5
	03/19/02	<5	<2.5	2.75	<5	<2.5	<2.5	<2.5	138	4.1	<2.5	758	9.6	--	107	<2.5
	05/30/02	<10	7.8	<5	<10	27.8	<5	<5	1,380	42.6	6	302	11.5	--	55.1	96.7
	11/08/02	<5	15	<2.5	<5	29.4	3.55	<2.5	399	9.05	5.7	359	5.8	--	67.1	19.4
	05/30/03	<5	<2.5	6.45	<5	<2.5	<2.5	<2.5	50.1	3.65	<2.5	706	4.95	--	72.6	<2.5
	11/16/04	<10	<5	<5	<10	15	<5	<5	440	5.9	<5	270	<5	--	72	<5
	03/23/05	<2	2.26	4.16 B	<2	8.92	<1	<1	246	8.4	2.86	329	5.04	--	71.9	3.84
	05/18/05	<2	<1	3.86	<2	5.74	<1	<1	188	4.72	3.02	304	5.06	--	88.5	<1
	05/23/07	<2	<2	<2	<2	<2	<2	<2	110	6.3	<2	349	4.54	--	70.6	<2
	09/11/07	<5	9.95	14.4	<5	43	6.1	<2.50	950	28.2	12	601	31	--	223	6.1
	12/12/07	<10	<5	<5	<10	<5	<5	<5	95.7	<5	<5	254	<5	--	63.2	<5
	03/06/08	<1	<0.500	2.10 J	<1	1.32	<0.500	<0.500	127	8.49	2.37	144	5.66	<0.500	94.7	<0.500
	09/19/08	<5	3.7	2.65 J	<5	10.6	<2.50	<2.50	187	5.85	2.95	283	6.6	<2.50	75	<2.50
	12/10/08	<0.90	1.5	1.9	<0.90	5.3	1.2	<0.90	120	4.3	1.5	200	3.8	<0.90	54	<0.90
	03/26/09	<0.50	<0.50	1.4	<0.50	1.6	<0.50	<0.50	83	4.3	1.2	180	3.6	<0.50	46	<0.50
	06/17/09	<0.50	<0.50	1.1	<0.50	0.89	<0.50	<0.50	76	4.7	0.71	190	3.4	<0.50	49	<0.50
	09/18/09	<0.50	<0.50	3.3	<0.50	10	<0.50	<0.50	180	6.2	2.2	270	7.3	<0.50	62	1.2
	12/17/09	<0.90	<0.90	0.96	<0.90	<0.90	<0.90	<0.90	50	3.2	<0.90	180	3.2	<0.90	47	<0.90
	03/19/10	<0.90	<0.90	1 BE	<0.90	<0.90	<0.90	<0.90	77	5.4	<0.90	280	4.1	<0.90	49	<0.90
	06/16/10	<0.50	<0.50	2.3	<0.50	1.6	0.9	<0.50	42	1.7	<0.50	180	1.9	<0.50	30	<0.50
	09/23/10	<0.5	<0.5	2.8 BE	<0.5	0.56	<0.5	<0.5	75	4.4	0.51	220	3	<0.5	39	<0.5
	12/09/10	<0.5	<0.5	2.7	<0.5	<0.5	<0.5	<0.5	39	3.4	<0.5	210	3	<0.5	35	<0.5

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MW-3 (continued)	03/10/11	<0.50	<0.50	5.4	<0.50	<0.50	<0.50	<0.50	8.9	1.1	<0.50	110	1.6	<0.50	15	<0.50
	06/10/11	<0.5	<0.5	1.6	<0.5	2.2	0.76	<0.5	36	1.1	0.54	99	1.6	<0.5	30	<0.5
	09/16/11	<0.50	<0.50	2	<0.50	3	0.59	<0.50	70	1.7	0.91	130	2.4	<0.50	31	<0.50
	12/09/11	<0.50	<0.50	2.2	<0.50	2.9	0.54	<0.50	62	1.6	0.83	190	2.6	<0.50	45	<0.50
	03/12/12	<0.50	<0.50	2.4	<0.50	0.83	<0.50	<0.50	52	2.8	1	140	3.1	<0.50	45	<0.50
	06/21/12	<0.5	<0.5	2.3	<0.5	0.9	<0.5	<0.5	45	2.7	0.56	170	2.7	<0.5	37	<0.5
	09/13/12	<0.50	<0.50	1.7	<0.50	4.1	<0.50	<0.50	100	2.1	1.4	140	3.3	<0.50	45	<0.50
	12/13/12	<0.50	<0.50	1.3	<0.50	0.78	<0.50	<0.50	27	1.6	<0.50	170	2	<0.50	36	<0.50
	03/14/13	<0.50	<0.50	1.8	<0.50	1	<0.50	<0.50	64	2.5	1.4	160	3.2	<0.50	53	<0.50
	06/14/13	<0.90	<0.90	1.4	<0.90	1.1	<0.90	<0.90	68	3.1	1.3	210	3.3	<0.90	48	<0.90
	09/19/13	<0.50	<0.50	1.1	<0.50	1.1	<0.50	<0.50	99	1.5	1.4	86	1.7	<0.50	30	<0.50
	12/16/13	<0.50	<0.50	1.4	<0.50	1.3	<0.50	<0.50	47	2.1	0.81	170	2.4	<0.50	38	<0.50
	3/21/2014	<0.50	<0.50	1.3	<0.50	0.64	<0.50	<0.50	27	1.6	<0.50	150	2	<0.50	30	<0.50
	6/24/2014	<0.50	0.86	0.86	<0.50	1.4	<0.50	<0.50	65	3.2	1.3	180	3.2	<0.50	44	<0.50
	9/30/2014	<0.50	<0.50	1	<0.50	6.7	0.7	<0.50	110	2.1	1.3	180	2.8	<0.50	47	<0.50
	12/11/2014	<0.50	<0.50	1.2	<0.50	0.8	<0.50	<0.50	28	1.7	<0.50	150	2.2	<0.50	37	<0.50
	3/19/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	6/15/2015	<0.50	<0.50	0.86	<0.50	1.1	<0.50	<0.50	49	2	0.88	160	2.8	<0.50	44	<0.50
	12/9/2015	<0.50	<0.50	0.66	<0.50	4.9	<0.50	<0.50	72	1.8	1.1	145	1.8	<0.50	33.6	<0.50
	3/7/2016	<0.50	<2	0.76	<0.50	2.2	<0.50	<0.50	61.8	2.5	1.3	199	3.6	<0.50	45.1	<0.50
	6/16/2016	<0.50	<2	<0.50	<0.50	1.1	<0.50	<0.50	50.2	0.82	<0.50	49.5	0.77	<0.50	17.4	<0.50
	9/30/2016	<0.50	<2	0.67	<0.50	8.2	0.73	<0.50	95.3	1.5	1.6	145	2	<0.50	40.1	<0.50
	12/16/2016	<0.50	<2	0.52	<0.50	1.1	<0.50	<0.50	26.8	0.9	0.57	86.2	1.2	<0.50	23.9	<0.50
3/29/2017	<0.50	<2	<0.50	<0.50	7.1	1.3	<0.50	77.9	1.2	<0.50	67.6	0.64	<0.50	20.2	2.5	
6/14/2017	<2.0	<2.0	1.0	<0.50	2.1	<1.0	<0.50	39.0	1.5	<0.50	163	1.7	<0.50	30.4	<0.50	
9/25/2017	<2.0	<2.0	<0.50	<0.50	5.6	<1.0	<0.50	73.3	1.3	<0.50	127	1.5	<0.50	29.5	<0.50	
11/8/2017	<2.0	<2.0	<0.50	<0.50	5.0	<0.50	<0.50	59.5	0.6	<0.50	67	0.6	<0.50	16.1	0.7	
MW-4	11/17/93	--	850	--	--	12	<50	--	20	--	--	40	<50	--	5.4	<10
	09/01/95	<5	340	<5	<5	5.2	<50	<5	14	<5	<5	<50	<50	--	<50	30
	09/24/96	<0.50	300	<0.20	<0.20	7.1	1.4	<0.20	3.2	<0.20	1	0.5	<0.50	--	0.8	4.7
	12/02/96	<0.50	310	<0.50	0.3	3.8	1	<0.20	19	<1	0.3	<0.50	<1	--	<0.30	39
	11/13/97	<0.50	252	<0.50	<0.50	4.22	1.23	<0.50	6.91	<0.50	0.688	<0.50	<0.50	--	<0.50	<1

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MW-4 (continued)	08/11/99	<2	144	<1	<1	1.21	<1	<1	<1	<1	<1	3.6	<2	--	<1	<1
	11/16/99	<1	26.3	<0.50	<1	2.3	<0.50	<0.50	4.18	<0.50	<0.50	1.2	<0.50	--	0.88	2.07
	02/29/00	<2	119	<1	<1	2.84	<1	<1	4.1	<1	<1	<1	<2	--	<1	5.72
	06/28/00	<5	59.4	<2.5	<2.5	3.89	<2.5	<2.5	2.5	<2.5	<2.5	<2.5	<5	--	<2.5	<2.5
	07/05/00	Well Abandoned														
MW-5	11/17/93	--	1,900	--	--	<25	<25	--	100	--	1,200	<25	--	52	<50	
	09/01/95	<1	<2	<1	<2	<1	<1	<1	1,300	<1	<1	60,000	<1	--	<1	<2
	09/24/96	<5	140	<2	<2	35	<2	7.5	2,600	80	5.3	16,000	64	--	670	370
	12/02/96	71	<50	<50	27	<30	<50	<20	5,600	<100	<20	27,000	110	--	1,700	340
	11/12/97	<500	<1	<500	<500	<500	<500	<500	<500	<500	<500	28,000	<500	--	1,250	<1
	08/11/99	<200	<1	<100	<100	<100	<100	<100	1,750	<100	<100	25,100	<200	--	862	238
	02/29/00	<100	<500	<50	<50	<50	<50	<50	126	<50	<50	5,250	<100	--	135	<50
	08/31/00	<50	<250	<25	<25	41.4	<25	<25	1,860	<25	<25	5,660	<50	--	347	280
	11/30/00	<50	<250	<25	<25	27.3	<25	<25	3,850	26.8	<25	6,150	<50	--	511	189
	02/27/01	<50	<250	<25	<25	<25	<25	<25	1,370	<25	<25	7,350	<50	--	445	127
	05/30/01	<50	<250	<25	<25	<25	<25	<25	2,410	<25	<25	5,560	<50	--	439	129
	09/25/01	<25	200	<25	<25	34	<25	<25	1,800	<25	<25	2,200	<25	--	180	180
	12/17/01	<100	<500	<50	<50	<50	<50	<50	1,480	<50	<50	10,100	<100	--	646	<50
	03/19/02	<50	<25	<25	<50	<25	<25	<25	360	<25	<25	4,640	<25	--	221	114
	05/29/02	<50	46	<25	<50	<25	<25	<25	916	<25	<25	4,330	<25	--	238	39.5
	08/29/02	<50	<25	<25	<50	<25	<25	<25	1,160	<25	<25	4,090	<25	--	288	310
	11/08/02	<5	178	<2.5	<5	8.3	<2.5	<2.5	385	3.25	<2.5	603	<2.5	--	63.4	66
	01/23/03	<50	<25	<25	<50	<25	<25	<25	582	<25	<25	4,090	<25	--	349	<25
	05/30/03	<10	14.1	<5	<10	<5	<5	<5	382	<5	<5	1,450	7.9	--	140	67
	11/10/03	<1	84.2	<1	<1	1.06	<1	<1	90.7	<1	<1	161	<1	--	30.8	9.42
	01/26/04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	05/04/04	<20	<20	<20	<20	<20	<20	<20	432	<20	<20	2,440	<20	--	178	188
	08/17/04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/02/04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
11/16/04	<50	<50	<50	<50	<50	<50	<50	6,300	<50	<50	1,800	<50	--	370	990	
03/23/05	<20	<10	<10	<20	26.2	<10	<10	2,350	27.6	<10	511	<10	--	147	604	
05/18/05	<5	<2.5	<2.5	<5	9.25	<2.5	6.45	817	10.2	<2.5	611	<2.5	--	156	329	

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MW-5	08/18/05	<5	5.15	<2.50	<5	14.4	<2.50	<2.50	397	4.7	<2.50	169 B	<2.50	--	81.8	278
(continued)	11/15/05	<20	<10	<10	<20	36.2	<10	<10	2,790	14	<10	408	<10	--	177	615
	02/21/06	<1	<0.500	<0.500	<1	<0.500	<0.500	<0.500	72.7	1.06	<0.500	184	0.78	--	31.5	5.05
	06/05/06	<20	<20	<20	<20	<20	<20	<20	2,800	<20	<20	157	<20	--	75	199
	09/06/06	<2	10.6	<1	<2	8.3	<1	<1	377	3.66	<1	104	<1	--	45	29.9
	12/06/06	<2	<1	<1	<2	1.32	<1	1.34	113	1.28	1.52	240	1.6	--	58	43.3
	02/07/07	<10	<5	<5	<10	<5	<5	<5	1,220	18	<5	124	<5	--	26.9	600
	05/22/07	<5	<5	<5	<5	<5	<5	<5	634	8.45	<5	102	<5	--	40.8	59.4
	09/12/07	<1	67.5	<0.50	<1	<0.50	<0.50	<0.50	16.2	<0.50	<0.50	0.89	<0.50	--	1.38	1.86
	12/13/07	<1	<0.50	<0.50	<1	7.1	<0.50	4.67	2,420	9.22	1.14	180	<0.50	--	179	416
	03/07/08	<1	<0.500	<0.500	<1	2.18	<0.500	1.33	411	3.21	<0.500	86.4	<0.500	<0.500	26.1	105
	09/18/08	<1	101	<0.500	<1	0.79	<0.500	<0.500	11.2	<0.500	<0.500	1.14	<0.500	<0.500	1.27	1.74
	12/10/08	<2	<2	<2	<2	3.7	<2	<2	360	2.3	<2	49	<2	<2	53	150
	03/27/09	<0.50	4.2	<0.50	<0.50	4	<0.50	<0.50	170	1	<0.50	0.59	<0.50	<0.50	<0.50	64
	06/17/09	<0.50	<0.50	<0.50	<0.50	4.1	<0.50	0.6	160	2.5	<0.50	11	<0.50	<0.50	12	11
	09/18/09	<0.50	65 BE	<0.50	<0.50	<0.50	<0.50	<0.50	3.6	<0.50	<0.50	<0.50	<0.50	<0.50	0.5	1.2
	12/17/09	<0.50	<0.80	<0.50	<0.50	2.1	<0.50	1.4	340	2	<0.50	19	<0.50	<0.50	37	93
	03/19/10	<0.50	1.4	<0.50	<0.50	4.4	<0.50	<0.50	72	<0.50	<0.50	24	<0.50	<0.50	14	21
	06/16/10	<0.50	<0.50	<0.50	<0.50	3.6	<0.50	0.83	94	0.65	0.54	4.1	<0.50	<0.50	10	23
	09/23/10	<0.5	59	<0.5	<0.5	0.84	<0.5	<0.5	9.7	<0.5	<0.5	<0.5	<0.5	<0.5	0.97	1.3
	12/09/10	<0.5	<0.5	<0.5	<0.5	0.84	<0.5	<0.5	140	0.73	<0.5	5.6	<0.5	<0.5	8.8	15
	03/11/11	<0.50	<0.50	<0.50	<0.50	0.96	<0.50	<0.50	34	<0.50	<0.50	8.4	<0.50	<0.50	7.6	4.7
	06/10/11	<0.5	<0.5	<0.5	<0.5	5	<0.5	<0.5	40	<0.5	0.63	2.2	<0.5	<0.5	3.8	26
	09/19/11	<0.50	2.3	<0.50	<0.50	2.8	<0.50	<0.50	97	<0.50	<0.50	1.3	<0.50	<0.50	11	6.3
	12/09/11	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	47	<0.50	<0.50	2.7	<0.50	<0.50	7.7	2.8
	03/12/12	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	4.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	3.4
	06/22/12	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	13	<0.5	<0.5	0.54	<0.5	<0.5	2.9	3
	09/14/12	<0.50	20	<0.50	<0.50	0.75	<0.50	<0.50	26	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	3.4
	12/13/12	<0.50	<0.50	<0.50	<0.50	0.72	<0.50	<0.50	67	0.65	<0.50	<0.50	<0.50	<0.50	1.7	6.6
	03/15/13	<0.50	7.4	<0.50	<0.50	1.5	<0.50	<0.50	48	<0.50	<0.50	<0.50	<0.50	<0.50	1.1	6.6

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MW-5 (continued)	06/13/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	8.5	<0.50	<0.50	7.2	<0.50	<0.50	7.2	1.7
	09/19/13	<0.50	23	<0.50	<0.50	<0.50	<0.50	<0.50	4.6	<0.50	<0.50	<0.50	<0.50	<0.50	1.2	0.61
	12/16/13	<0.50	<0.50	<0.50	<0.50	0.88	<0.50	<0.50	180	<0.50	<0.50	<0.50	<0.50	<0.50	0.8	71
	3/21/2014	<0.50	<0.50	<0.50	<0.50	1.3	<0.50	<0.50	39	<0.50	<0.50	<0.50	<0.50	<0.50	3.4	10
	6/25/2014	<0.50	<0.50	<0.50	<0.50	<5	<0.50	<0.50	14	<0.50	<0.50	1.3	<0.50	<0.50	8	2.3
	9/30/2014	<0.50	28	<0.50	<0.50	<5	<0.50	<0.50	20	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	3.6
	12/16/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	33	<0.50	<0.50	<0.50	<0.50	<0.50	2.2	1.9
	3/19/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	26.5	<0.50	<0.50	8.4	<0.50	<0.50	5.8	5.6
	6/17/2015	<0.50	2.2	<0.50	<0.50	<0.50	<0.50	<0.50	3.2	<0.50	<0.50	0.63	<0.50	<0.50	0.64	<0.50
	9/24/2015	<0.50	24.6	<0.50	<0.50	<0.50	<0.50	<0.50	4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.3
	12/8/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.73	199	<0.50	<0.50	29.5	<0.50	<0.50	43.2	32.3
	12/8/2015 DUP	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.68	175	<0.50	<0.50	27.1	<0.50	<0.50	38.5	28.4
	3/8/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	4	<0.50	<0.50	9.9	<0.50	<0.50	3.1	<0.50
	6/17/2016	<0.50	7.5	<0.50	<0.50	<0.50	<0.50	<0.50	23.3	<0.50	<0.50	7.3	<0.50	<0.50	3.2	<0.50
	9/29/2016	<5	<20	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	12/14/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	4.3	<0.50	<0.50	11.5	<0.50	<0.50	2.5	1.1
	3/28/2017	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<0.5	8.4	<0.5	<0.5	6.5	<0.5	<0.5	5.8	<0.5
	6/14/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	4.2	<0.50	<0.50	16.3	<0.50	<0.50	6.8	<0.50
	9/27/2017	<2.0	<2.0	<0.50	<0.50	1.60	<1.0	<0.50	15.6	<0.50	<0.50	26.7	<0.50	<0.50	15.6	0.64
	11/7/2017	<2.0	<2.0	<0.50	<0.50	0.99	<0.50	<0.50	35.6	<0.50	<0.50	3.5	<0.50	<0.50	9.7	5.30
MW-6	11/17/93	--	<1	--	--	<0.50	<0.50	--	1.2	--	--	2.1	<0.50	--	0.54	<1
	09/01/95	<0.50	<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	--	<0.50	<1
	09/24/96	<0.50	<2	<0.20	<0.20	<0.20	<0.20	<0.20	0.3	<0.20	<0.20	<0.20	<0.50	--	<0.20	<1
	12/02/96	<0.50	<0.50	<0.50	<0.20	<0.20	<0.50	<0.20	<0.20	<1	<0.20	<0.50	<1	--	<0.20	<0.20
	11/12/97	<0.50	<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.03	<0.50	--	<0.50	<1
	08/11/99	<1	<5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1	--	1.37	<0.50
	11/16/99	<1	<2.5	<0.50	<1	<0.50	<0.50	<0.50	0.51	<0.50	<0.50	<0.50	<0.50	--	<0.50	<0.50
	02/29/00	<1	<5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.654	<1	--	<0.50	<0.50
	06/27/00	<1	<5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1	--	<0.50	<0.50
	05/29/01	<1	<5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1	--	<0.50	<0.50
	05/30/02	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	1.51	<0.50	<0.50	1.31	<0.50	--	<0.50	<0.50

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MW-6 (continued)	08/28/02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/08/02	<1	<0.50	<0.50	<1	0.51	<0.50	<0.50	2.55	<0.50	<0.50	0.97	<0.50	--	0.55	0.52
	01/23/03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	05/30/03	<0.50	<0.50	<0.50	<1	<0.50	<0.50	<0.50	1.5	<0.50	<0.50	3.73	<0.50	--	0.99	<0.50
	11/17/04	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	0.88	<0.50	<0.50	<0.50	<0.50	--	<0.50	<0.50
	05/17/05	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	--	<0.50	<0.50
	09/12/07	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	--	<0.50	<0.50
	03/06/08	<1	<0.500	<0.500	<1	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	1.16	<0.500	<0.500	<0.500	<0.500
	09/19/08	<1	<0.500	<0.500	<1	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
	03/24/09	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	09/16/09	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/19/10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	09/23/10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	03/09/11	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	09/15/11	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/05/12	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	09/13/12	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/14/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	09/19/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	3/21/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
10/2/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
3/19/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
9/18/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
3/7/2016	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
9/28/2016	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
3/30/2017	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
9/28/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
11/7/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
MW-7	12/02/96	81	<50	<50	39	<30	<50	110	110	<100	<20	73,000	1,900	--	7,600	<50
	11/12/97	<500	<1	<500	<500	<500	<500	<500	<500	<500	<500	36,400	<500	--	7,670	<1
	08/11/99	<1	<5	<500	<500	<500	<500	<500	<500	<500	<500	49,000	1,210	--	4,650	<500
	11/16/99	<100	<250	<50	<100	<50	<50	92	353	<50	<50	54,800	914	--	5,320	<50
	02/28/00	<1	<5	<500	<500	<500	<500	<500	<500	<500	<500	52,400	<1	--	4,060	<500
	06/28/00	<1	<5	<500	<500	<500	<500	<500	<500	<500	<500	54,300	<1	--	3,390	<500

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MW-7 (continued)	08/31/00	<500	<2	<250	<250	<250	<250	<250	<250	<250	<250	50,900	824	--	3,960	<250
	11/30/00	<500	<2	<250	<250	<250	<250	<250	<250	<250	<250	33,500	520	--	3,560	<250
	02/27/01	<500	<2	<250	<250	<250	<250	<250	386	<250	<250	26,700	<500	--	3,290	<250
	05/30/01	<200	<1,000	<100	<100	<100	<100	<100	374	<100	<100	20,400	214	--	2,820	<100
	09/25/01	<25	<25	<25	<25	28	<25	35	350	<25	<25	19,000	260	--	2,500	<25
	12/17/01	<100	<50	<50	<50	84.6	<50	<50	506	<50	<50	10,100	200	--	1,960	<50
	03/18/02	<50	<25	<25	<50	<25	<25	<25	206	<25	<25	7,250	71	--	1,020	<25
	05/31/02	<50	<25	<25	<50	<25	<25	<25	42.5	<25	<25	5,500	<25	--	311	<25
	08/29/02	<50	<25	<25	<50	<25	<25	50.5	93	<25	<25	4,940	44.5	--	634	<25
	11/07/02	<50	<25	<25	<50	<25	<25	<25	123	<25	<25	5,810	43	--	758	<25
	01/23/03	<20	<10	<10	<20	<10	<10	<10	59.8	<10	<10	2,010	14	--	282	<10
	05/28/03	<10	<5	<5	<5	6.3	<5	<5	<5	<5	<5	1,080	10.9	--	67.9	<5
	11/11/03	<20	<20	<20	<20	40.2	<20	<20	246	<20	<20	2,460	62	--	599	<20
	01/27/04	<20	<10	<10	<20	17	<10	<10	105	<10	<10	3,510	33	--	380	<10
	05/04/04	<20	<20	<20	<20	<20	<20	<20	72.4	<20	<20	3,940	22	--	323	<20
	11/16/04	<50	<50	<50	<50	<50	<50	<50	99	<50	<50	8,000	<50	--	520	<50
	03/24/05	<50	<25	<25	<50	<25	<25	<25	98.5	<25	<25	3,930	26	--	404	<25
	05/18/05	<10	<5	<5	<10	<5	<5	<5	72.7	<5	<5	1,310	12.4	--	180	<5
	05/18/05 DUP	<10	<5	<5	<10	<5	<5	<5	69.4	<5	<5	1,250	12.4	--	179	<5
	08/18/05	<20	<10	<10	<20	<10	<10	<10	54.8	<10	<10	1,800	<10	--	237	<10
	11/15/05	<20	<10	<10	<20	15.2	<10	<10	107	<10	<10	1,960	29.6	--	333	<10
	02/21/06	<20	<10	<10	<20	<10	<10	<10	<10	<10	<10	2,640	<10	--	139	<10
	06/05/06	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	26,100	<200	--	568	<200
	09/06/06	<100	<50	<50	<100	<50	<50	<50	56	<50	<50	12,800	<50	--	422	<50
	12/06/06	<200	<100	<100	<200	<100	<100	<100	<100	<100	<100	24,600	<100	--	408	<100
	02/07/07	<200	<100	<100	<200	<100	<100	<100	<100	<100	<100	31,500	<100	--	352	<100
05/22/07	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	29,100	<200	--	450	<200	
09/12/07	<200	<100	<100	<200	<100	<100	<100	<100	<100	<100	21,300	<100	--	366	<100	
12/13/07	<500	<250	<250	<500	<250	<250	<250	345	<250	<250	18,700	<250	--	1,040	280	
03/06/08 ⁷	<1	<0.500	<0.500	<1	5.06	2.57	3.99	42.3	2.9	<0.500	26,300	38.7	<0.500	430	<0.500	
06/10/08	<500	<500	<500	<500	<500	<500	<500	<500	<500	<500	27,000	<500	<500	575	<500	
09/18/08	<500	<500	<500	<500	<500	<500	<500	<500	<500	<500	23,200	<500	<500	530	<500	
12/11/08	<50	<50	<50	<50	<50	<50	<50	130	<50	<50	15,000	<50	<50	450	<50	
12/11/08 DUP	<50	<50	<50	<50	<50	<50	<50	120	<50	<50	14,000	<50	<50	430	<50	

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MW-7 (continued)	03/23/09	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	420	<0.50	<0.50	3,330	<0.50	<0.50	270	<0.50
	06/18/09	<3	<3	<3	<3	3.7	<3	<3	520	<3	<3	890	5.2	<3	350	<3
	06/18/09 DUP	<2.5	<2.5	<2.5	<2.5	3.8	<2.5	<2.5	520	<2.5	<2.5	910	5.6	<2.5	360	<2.5
	09/18/09	<3	<3	<3	<3	9.8	<3	5.5	930	<3	<3	2,600	10	<3	250	<3
	09/18/09 DUP	<3	<3	<3	<3	8.7	<3	4.8	850	<3	<3	2,600	9.3	<3	240	<3
	12/18/09	<5	<5	<5	<5	6.7	<5	<5	330	<5	<5	1,600	6.7	<5	160	<5
	12/18/09 DUP	<5	<5	<5	<5	6.6	<5	<5	320	<5	<5	1,500	6.6	<5	160	<5
	03/16/10	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	180	<2.5	<2.5	510	<2.5	<2.5	52	<2.5
	03/16/10 DUP	<2	<2	<2	<2	<2	<2	<2	180	<2	<2	560	<2	<2	55	<2
	06/17/10	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	360	<1.5	<1.5	200	2.7	<1.5	72	<1.5
	06/17/10 DUP	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	360	<1.5	<1.5	200	2.8	<1.5	72	<1.5
	09/23/10	<3	<3	<3	<3	3.3	<3	<3	690	<3	<3	750	3.5	<3	110	4.8
	09/23/10 DUP	<3	<3	<3	<3	3.1	<3	<3	700	<3	<3	740	3.8	<3	100	4.1
	12/10/10	<0.9	<0.9	<0.9	<0.9	1.8	<0.9	<0.9	94	<0.9	<0.9	220	1.6	<0.9	36	1.7
	12/10/10 DUP	<0.9	<0.9	<0.9	<0.9	1.7	<0.9	<0.9	98	<0.9	<0.9	230	1.7	<0.9	36	1.8
	03/11/11	<0.90	<0.90	<0.90	<0.90	6.6	<0.90	1.6	150	0.91	<0.90	420	5.1	<0.90	82	9.3
	03/11/11 DUP	<0.90	<0.90	<0.90	<0.90	6.5	<0.90	1.9	150	1.1	<0.90	400	5.2	<0.90	80	9.7
	06/07/11	<2.5	<2.5	<2.5	<2.5	4.8	<2.5	3.4	1,400	3.3	<2.5	430	4	<2.5	110	7.9
	06/07/11 DUP	<6	<6	<6	<6	<6	<6	<6	1,400	<6	<6	400	<6	<6	110	7.8
	09/19/11	<5	<5	<5	<5	<5	<5	<5	1,300	<5	<5	410	<5	<5	84	78
	09/19/11 DUP	<7	<7	<7	<7	<7	<7	<7	1,300	<7	<7	420	<7	<7	87	81
	12/07/11	<5	<5	<5	<5	8	<5	6.9	3,400	6.8	<5	200	<5	<5	32	110
	12/07/11 DUP	<6	<6	<6	<6	7.6	<6	7.8	3,400	6.8	<6	210	<6	<6	32	110
	03/12/12	<5	<5	<5	<5	9.2	<5	<5	1,600	<5	<5	41	<5	<5	8.6	600
	03/12/12 DUP	<7	<7	<7	<7	9.5	<7	<7	1,600	<7	<7	42	<7	<7	8.9	660
	06/22/2012	<2	9.2	<2	<2	9.8	<2	<2	540	<2	<2	24	<2	<2	5.1	300
	06/22/12 DUP	<2	8.1	<2	<2	9	<2	<2	500	<2	<2	25	<2	<2	5.2	290
	09/14/12	<0.50	6.3	<0.50	<0.50	3.8	<0.50	0.54	180	0.7	<0.50	28	<0.50	0.52	5.2	80
	09/14/12 DUP	<0.50	5.7	<0.50	<0.50	3.8	<0.50	<0.50	180	0.78	<0.50	28	<0.50	<0.50	5.3	79
	12/14/12	<0.50	6.3	<0.50	<0.50	1.9	<0.50	<0.50	130	<0.50	<0.50	8.2	<0.50	<0.50	5.3	16
	12/14/12 DUP	<0.50	5.6	<0.50	<0.50	1.8	<0.50	<0.50	130	<0.50	<0.50	11	<0.50	<0.50	6.8	18
	03/15/13	<0.50	5.2	<0.50	<0.50	0.68	<0.50	<0.50	110	<0.50	<0.50	1.5	<0.50	<0.50	0.75	11
	03/15/13 DUP	<0.50	5.4	<0.50	<0.50	0.69	<0.50	<0.50	110	<0.50	<0.50	1.6	<0.50	<0.50	0.78	11

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MW-7	06/14/13	<0.50	2	<0.50	<0.50	<0.50	<0.50	<0.50	57	<0.50	<0.50	1.6	<0.50	<0.50	<0.50	15
(continued)	06/14/13 DUP	<0.50	2	<0.50	<0.50	0.51	<0.50	<0.50	58	<0.50	<0.50	1.5	<0.50	<0.50	<0.50	16
	09/20/13	<0.50	3	<0.50	<0.50	1.5	<0.50	<0.50	56	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	10
	09/20/13 DUP	<0.50	3	<0.50	<0.50	1.5	<0.50	<0.50	56	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	10
	12/16/13	<0.50	2.4	<0.50	<0.50	2.9	<0.50	<0.50	6.9	<0.50	<0.50	0.51	<0.50	<0.50	<0.50	9.1
	12/16/13 DUP	<0.50	2.4	<0.50	<0.50	2.4	<0.50	<0.50	6.3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	8.9
	3/24/2014	<0.50	0.97	<0.50	<0.50	1.6	<0.50	<0.50	13	<0.50	<0.50	9.8	<0.50	<0.50	2.6	7.6
	3/24/2014 DUP	<0.50	1	<0.50	<0.50	1.6	<0.50	<0.50	13	<0.50	<0.50	9.4	<0.50	<0.50	2.5	7.7
	6/25/2014	<0.50	1.3	<0.50	<0.50	0.17	<0.50	<0.50	0.59	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.3
	6/25/14 DUP	<0.50	0.15	<0.50	<0.50	0.19	<0.50	<0.50	0.62	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.4
	9/30/2014	<0.50	1.9	<0.50	<0.50	2.7	<0.50	<0.50	4.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	9.8
	9/30/2014 DUP	<0.50	1.7	<0.50	<0.50	2.6	<0.50	<0.50	4.3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	8.8
	12/15/2014	<0.50	1.2	<0.50	<0.50	3.4	<0.50	<0.50	12	<0.50	<0.50	<0.50	<0.50	<0.50	1	15
	12/15/2014 DUP	<0.50	1.6	<0.50	<0.50	4.5	<0.50	<0.50	16	<0.50	<0.50	0.61	<0.50	<0.50	1.5	21
	3/20/2015	<0.50	<0.50	<0.50	<0.50	1	<0.50	<0.50	8.4	<0.50	<0.50	<0.50	<0.50	<0.50	1.1	1
	3/20/15 DUP	<0.50	<0.50	<0.50	<0.50	1	<0.50	<0.50	7.7	<0.50	<0.50	0.53	<0.50	<0.50	1	10.4
	6/17/2015	<0.50	0.72	<0.50	<0.50	2.6	<0.50	<0.50	12	<0.50	<0.50	1.2	<0.50	<0.50	1	12.6
	6/17/2015 DUP	<0.50	0.71	<0.50	<0.50	2.6	<0.50	<0.50	12.2	<0.50	<0.50	0.96	<0.50	<0.50	1	12.3
	9/24/2015	<0.50	<0.50	<0.50	<0.50	1.7	<0.50	<0.50	12.4	<0.50	<0.50	4.5	<0.50	<0.50	4.2	4.6
	9/24/2015 DUP	<0.50	<0.50	<0.50	<0.50	1.8	<0.50	<0.50	12.7	<0.50	<0.50	4.5	<0.50	<0.50	4.2	4.8
	12/8/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	4.1	<0.50	<0.50	9.4	<0.50	<0.50	1.7	1.9
	6/17/2016	<0.50	<2	<0.50	<0.50	0.6	<0.50	<0.50	10.9	<0.50	<0.50	0.69	<0.50	<0.50	2.1	5.4
	6/17/16 DUP	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	11	<0.50	<0.50	0.62	<0.50	<0.50	2	5.4
	9/29/2016	<0.50	<2	<0.50	<0.50	1.1	<0.50	<0.50	10.9	<0.50	<0.50	<0.50	<0.50	<0.50	5.5	5.5
	9/29/2016 DUP	<0.50	<2	<0.50	<0.50	1.1	<0.50	<0.50	10.9	<0.50	<0.50	<0.50	<0.50	<0.50	6	5.5
	12/14/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	9.2	<0.50	<0.50	0.65	<0.50	<0.50	<0.50	0.98
	12/14/2016 DUP	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	9.4	<0.50	<0.50	0.78	<0.50	<0.50	<0.50	1
	3/28/2017	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.1	<0.5	<0.5	0.73	<0.5
	3/28/2017 DUP	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	<0.5	<0.5	0.69	<0.5
	6/14/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	2.5	<0.50	<0.50	<0.50	<0.50	<0.50	0.55	2.5
	6/14/2017 DUP	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	2.4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	2.5
	9/27/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	1.7	<0.50	<0.50	2.60	<0.50	<0.50	1.60	1.6
	9/27/2017 DUP	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	1.7	<0.50	<0.50	2.60	<0.50	<0.50	1.60	1.7
	11/7/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	2.6	<0.50	<0.50	6.30	<0.50	<0.50	7.80	1.4
	11/7/2017 DUP	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	2.5	<0.50	<0.50	3.80	<0.50	<0.50	6.40	1.5

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MW-8	12/02/96	<0.50	<0.50	<0.50	<0.20	1	<0.50	0.2	6.5	<1	<0.20	2.3	<1	--	12	<0.50
	11/13/97	<1	<2	<1	<1	1.72	<1	2.44	9.32	<1	<1	52.4	4	--	38.6	<2
	08/11/99	<1	<5	<0.50	<0.50	0.75	<0.50	<0.50	1.82	<0.50	<0.50	46.2	4.79	--	24.3	<0.50
	11/16/99	<1	<2.5	<0.50	<1	1.22	<0.50	<0.50	2.11	<0.50	<0.50	39.8	1.55	--	15.5	<0.50
	02/28/00	<1	<5	<0.50	<0.50	0.929	<0.50	<0.50	2.38	<0.50	<0.50	41.8	3.7	--	20.5	<0.50
	06/27/00	<1	<5	<0.50	<0.50	<0.50	<0.50	<0.50	1.46	<0.50	<0.50	33.7	2.88	--	17.5	<0.50
	05/30/01	<100	<5	<0.50	<0.50	0.611	<0.50	<0.50	0.601	<0.50	<0.50	11.8	<1	--	5.46	<0.50
	05/30/02	<1	<0.50	<0.50	<1	1.09	<0.50	<0.50	2.02	<0.50	<0.50	12.1	<0.50	--	4.47	<0.50
	05/28/03	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	0.84	<0.50	<0.50	40.4	1.55	--	11.2	<0.50
	11/02/04	<1	<0.50	<0.50	<1	1.02	<0.50	<0.50	1.99	<0.50	<0.50	8.88	<0.50	--	2.4	<0.50
	11/16/04	<0.50	<0.50	<0.50	<0.50	0.9	<0.50	<0.50	1.6	<0.50	<0.50	0.6	<0.50	--	3.1	<0.50
	03/23/05	<1	<0.50	<0.50	<1	0.78	<0.50	<0.50	1.82	<0.50	<0.50	13.5	0.53	--	2.41	<0.50
	05/17/05	<1	<0.50	<0.50	<1	1.1	<0.50	<0.50	6.45	<0.50	<0.50	13.2	<0.50	--	6.92	<0.50
	05/17/05 DUP	<1	<0.50	<0.50	<1	1.19	<0.50	<0.50	6.97	<0.50	<0.50	11.4	<0.50	--	6.39	<0.50
	11/16/05	<1	<0.500	<0.500	<1	0.78	<0.500	<0.500	4.19	<0.500	<0.500	14.8	0.65	--	2.99	<0.500
	06/05/06	<1	<1	<1	<1	1.26	<1	<1	19.8	<1	<1	20.7	<1	--	11.4	<1
	12/06/06	<1	<0.50	<0.50	<1	1.11	<0.50	<0.50	14.2	<0.50	<0.50	18.3	<0.50	--	5.08	<0.50
	05/23/07	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	22.8	<1	--	2.32	<1
	09/12/07	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	0.52	<0.50	<0.50	12.4	0.6	--	0.65	<0.50
	12/12/07	<1	<0.50	<0.50	<1	1.03	<0.50	<0.50	13.7	<0.50	<0.50	8.27	<0.50	--	2.71	<0.50
	03/06/08	<1	<0.500	<0.500	<1	<0.500	<0.500	<0.500	1.64	<0.500	<0.500	19.1 J	<0.500	<0.500	1.4	<0.500
	6/10/08 ⁷	<1	<1	<1	<1	1.07	<1	<1	10.5	<1	<1	10.8	<1	<1	3.87	<1
	09/18/08	<1	<0.500	<0.500	<1	<0.500	<0.500	<0.500	1.58	<0.500	<0.500	13.2	0.5	<0.500	1.21	<0.500
	12/09/08	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.6	<0.50	<0.50	9.1	<0.50	<0.50	0.57	<0.50
	12/09/08 DUP	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.5	<0.50	<0.50	9.7	<0.50	<0.50	0.59	<0.50
	03/26/09	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	2	<0.50	<0.50	8	<0.50	<0.50	0.56	<0.50
	06/17/09	<0.50	<0.50	<0.50	<0.50	0.77	<0.50	<0.50	12	<0.50	<0.50	4.8	<0.50	<0.50	1.4	<0.50
	09/16/09	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.1	<0.50	<0.50	11	<0.50	<0.50	<0.50	<0.50
	12/16/09	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	3.2	<0.50	<0.50	8.4	<0.50	<0.50	0.51	<0.50
	03/18/10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	2	<0.50	<0.50	11	<0.50	<0.50	<0.50	<0.50
06/14/10	<0.50	<0.50	<0.50	<0.50	1.1	<0.50	<0.50	20	0.52	<0.50	4.2	<0.50	<0.50	1.1	<0.50	
09/22/10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.7	<0.5	<0.5	8.1	<0.5	<0.5	<0.5	<0.5	
12/08/10	<0.5	<0.5	<0.5	<0.5	1.4	<0.5	<0.5	20	1.1	<0.5	2.5	<0.5	<0.5	0.6	<0.5	
03/11/11	<0.50	<0.50	<0.50	<0.50	0.93	<0.50	<0.50	20	0.58	<0.50	7.9	<0.50	<0.50	0.95	<0.50	
06/08/11	<0.5	<0.5	<0.5	<0.5	1.5	<0.5	<0.5	40	0.82	<0.5	4	<0.5	<0.5	1.1	<0.5	
09/15/11	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.3	<0.50	<0.50	10	<0.50	<0.50	0.54	<0.50	
12/08/11	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.54	<0.50	<0.50	10	<0.50	<0.50	<0.50	<0.50	

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MW-8 (continued)	03/06/12	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	7.5	<0.50	<0.50	6.8	<0.50	<0.50	0.56	<0.50
	06/20/12	<0.5	<0.5	<0.5	<0.5	0.89	<0.5	<0.5	22	<0.5	<0.5	6.1	<0.5	<0.5	1.4	<0.5
	09/12/12	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.4	<0.50	<0.50	7	<0.50	<0.50	<0.50	<0.50
	12/12/12	<0.50	<0.50	<0.50	<0.50	1.3	<0.50	<0.50	36	1	<0.50	4.8	<0.50	<0.50	1	<0.80
	03/13/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.94	<0.50	<0.50	7.2	<0.50	<0.50	<0.50	<0.50
	06/13/13	<0.50	<0.50	<0.50	<0.50	0.84	<0.50	<0.50	18	0.64	<0.50	6.2	<0.50	<0.50	0.76	<0.50
	09/19/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	6.6	<0.50	<0.50	4.8	<0.50	<0.50	<0.50	<0.50
	12/12/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	5.5	0.54	<0.50	4	<0.50	<0.50	<0.50	<0.50
	3/19/2014	<0.50	<0.50	<0.50	<0.50	1.1	<0.50	<0.50	21	1.1	<0.50	2.3	<0.50	<0.50	0.85	<0.50
	6/24/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	3.1	<0.50	<0.50	5.6	<0.50	<0.50	<0.50	<0.50
	9/26/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	3.8	<0.50	<0.50	6.1	<0.50	<0.50	<0.50	<0.50
	12/10/2014	<0.50	<0.50	<0.50	<0.50	1.1	<0.50	<0.50	13	0.86	<0.50	2.3	<0.50	<0.50	0.62	<0.50
	3/18/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.3	<0.50	<0.50	7.6	<0.50	<0.50	<0.50	<0.50
	6/17/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	5.9	<0.50	<0.50	<0.50	<0.50
	9/18/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	2	<0.50	<0.50	6.3	<0.50	<0.50	<0.50	<0.50
	12/7/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	2	<0.50	<0.50	1.1	<0.50	<0.50	<0.50	<0.50
	3/8/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	1.3	<0.50	<0.50	6.4	<0.50	<0.50	<0.50	<0.50
	6/15/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	4.1	<0.50	<0.50	<0.50	<0.50
	9/27/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	5.3	<0.50	<0.50	<0.50	<0.50
	12/14/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	3.1	<0.50	<0.50	3.8	<0.50	<0.50	<0.50	<0.50
3/30/2017	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<0.5	35.7	0.96	<0.5	2.3	<0.5	<0.5	0.57	<0.5	
6/13/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	14.3	<0.50	<0.50	4.3	<0.50	<0.50	0.56	<0.50	
9/25/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	4.3	<0.50	<0.50	<0.50	<0.50	
11/6/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	1.2	<0.50	<0.50	4.4	<0.50	<0.50	<0.50	<0.50	
MW-9	12/02/96	<50	<50	<50	<20	<30	<50	<20	<20	<100	<20	5,000	200	--	1,600	<50
	11/13/97	<50	<100	<50	<50	<50	<50	<50	487	<50	<50	2,890	<50	--	1,840	<100
	08/11/99	<20	<100	<10	<10	<10	<10	<10	54	<10	<10	1,490	43.2	--	517	<10
	11/16/99	<20	<50	<10	<20	<10	<10	<10	103	<10	<10	1,730	32	--	305	<10
	02/28/00	<20	<100	<10	<10	<10	<10	<10	<10	<10	<10	2,040	36.4	--	315	<10
	06/27/00	<50	<250	<25	<25	<25	<25	<25	<25	<25	<25	1,300	<50	--	298	<25
	08/31/00	<10	<50	<5	<5	<5	<5	<5	<5	<5	<5	1,560	31.3	--	229	<5
	11/30/00	<10	<50	<5	<5	21.7	<5	10.5	1,330	11.7	<5	823	26.6	--	528	8.15
	09/25/01	<2.5	<2.5	<2.5	<2.5	3.8	<2.5	<2.5	9.1	<2.5	<2.5	680	16	--	140	<2.5
	12/17/01	<5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	306	<5	--	74.2	<2.5

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MW-9	03/18/02	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	113	<0.50	--	19.1	<0.50
(continued)	05/31/02	<2	<1	<1	<2	<1	<1	<1	1.22	<1	<1	296	1.44	--	44	<1
	08/29/02	<2	<1	<1	<2	<1	<1	<1	1.88	<1	<1	294	2.12	--	67.4	<1
	11/07/02	<5	<2.5	<2.5	<5	<2.5	<2.5	<2.5	17.2	<2.5	<2.5	453	4	--	145	<2.5
	01/23/03	<2	<1	<1	<2	<1	<1	<1	1.66	<1	<1	205	2.74	--	59.5	<1
	05/28/03	<1	<0.50	<0.50	<1	1.81	<0.50	<0.50	0.97	<0.50	<0.50	141	2.85	--	27.4	<0.50
	11/11/03	<5	<5	<5	<5	<5	<5	<5	23.7	<5	<5	401	6.25	--	91.4	<5
	01/27/04	<2	<1	<1	<2	<1	<1	<1	2.58	<1	<1	179	2.54	--	58.1	<1
	05/04/04	<1	<1	<1	<1	<1	<1	<1	1.09	<1	<1	178	2.56	--	51.9	<1
	11/15/04	<25	<25	<25	<25	28	<25	<25	1,200	27	<25	1,800	<25	--	1,000	<25
	03/24/05	<5	<2.5	<2.5	<5	3.3	<2.5	<2.5	54.2	<2.5	<2.5	675	8	--	239	<2.5
	05/18/05	<2	<1	<1	<2	<1	<1	<1	2.68	<1	<1	2.41	2.08	--	62.4	<1
	08/18/05	<5	<2.50	<2.50	<5	<2.50	<2.50	<2.50	20.5 B	<2.50	<2.50	551	7.6	--	209	<2.50
	11/15/05	<10	<5	<5	<10	27.1	<5	6.8	1,020	18.6	<5	1,040	14.1	--	633	21.2
	02/21/06	<10	<5	<5	<10	<5	<5	<5	16.7	<5	<5	534	<5	--	165	<5
	06/05/06	<1	<1	<1	<1	<1	<1	<1	1.47	<1	<1	151	2.6	--	57.3	<1
	09/05/06	<5	<2.50	<2.50	<5	5.5	<2.50	<2.50	117	3.15	<2.50	698	6.8	--	314	<2.50
	12/06/06	<5	<2.50	<2.50	<5	2.95	<2.50	<2.50	59	<2.50	<2.50	578	5.55	--	237	<2.50
	02/07/07	<5	<2.50	<2.50	<5	3.15	<2.50	<2.50	72.6	<2.50	<2.50	591	6.1	--	239	2.65
	05/23/07	<2	<2	<2	<2	<2	<2	<2	6.32	<2	<2	210	3	--	90.4	<2
	09/12/07	<2	<1	<1	<2	2.34	<1	<1	47.1	1.44	<1	282	5.12	--	184	<1
	12/13/07	<5	<2.50	<2.50	<5	<2.50	<2.50	<2.50	<2.50	<2.50	<2.50	253	4.45	--	78.4	<2.50
	03/06/08	<1	<0.500	<0.500	<1	<0.500	<0.500	<0.500	1.92	<0.500	<0.500	138	3.77	<0.500	61.5	<0.500
	06/10/08	<1	<1	<1	<1	<1	<1	<1	2.73	<1	<1	297	5.16	<1	87.7	<1
	09/18/08	<5	<2.50	<2.50	<5	7.05	<2.50	<2.50	172	3.8	<0.5000	524	5.35	<0.500	315	4.15
	12/09/08	<0.90	<0.90	<0.90	<0.90	3.8	<0.90	1.3	130	2.5	<0.90	270	5.1	<0.90	140	2.3
	03/26/09	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	5.4	<0.50	<0.50	170	4	<0.50	56	<0.50
	06/17/09	<0.50	<0.50	<0.50	<0.50	2.7	<0.50	1.1	72	2.8	<0.50	420	4.9	<0.50	180	1.8
	09/17/09	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	3.1	<0.50	<0.50	170	4.4	<0.50	60	<0.50
	12/17/09	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.57	<0.50	<0.50	120	2.5	<0.50	43	<0.50
	03/19/10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.8	<0.50	<0.50	160	3	<0.50	48	<0.50
	06/16/10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	100	1.4	<0.50	36	<0.50
	09/21/10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.7	<0.5	<0.5	140	2.9	<0.5	50	<0.5
	12/10/10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	100	1.3	<0.5	330	<0.5
	03/11/11	<0.50	<0.50	<0.50	<0.50	0.66	<0.50	<0.50	17	0.82	<0.50	190	2.7	<0.50	81	0.52
	03/11/11 DUP	<0.50	<0.50	<0.50	<0.50	0.67	<0.50	<0.50	17	0.85	<0.50	200	2.8	<0.50	84	0.51

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MW-9 (continued)	06/10/11	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.3	<0.5	<0.5	53	1.9	<0.5	31	<0.5
	09/19/11	<0.50	<0.50	<0.50	<0.50	2.1	<0.50	<0.50	72	2.3	<0.50	230	3.1	<0.50	120	0.78
	12/09/11	<0.90	<0.90	<0.90	<0.90	53	<0.90	11	1,800	40	<0.90	600	10	<0.90	590	26
	03/12/12	<0.50	<0.50	<0.50	<0.50	0.66	<0.50	<0.50	20	0.57	<0.50	140	2	<0.50	56	<0.50
	06/22/12	<0.5	<0.5	<0.5	<0.5	3.3	<0.5	1.1	140	4.3	<0.5	220	3.3	<0.5	180	2.3
	09/14/12	<0.90	<0.90	<0.90	<0.90	<0.90	<0.90	<0.90	17	<0.90	<0.90	210	2.4	<0.90	78	<0.90
	12/13/12	<0.50	<0.50	<0.50	<0.50	0.7	<0.50	<0.50	29	0.96	<0.50	110	1.1	<0.50	49	<0.50
	03/15/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	5	<0.50	<0.50	86	1.8	<0.50	34	<0.50
	06/13/13	<0.50	<0.50	<0.50	<0.50	2.4	<0.50	1	100	3.7	<0.50	240	3.1	<0.50	150	2.2
	09/20/13	<0.50	<0.50	<0.50	<0.50	2	<0.50	0.51	74	2.2	<0.50	160	2	<0.50	87	0.82
	12/16/13	<0.50	<0.50	<0.50	<0.50	6.5	<0.50	1.4	230	6.4	<0.50	210	3.5	<0.50	180	2.8
	3/21/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	39	0.57	<0.50	19	<0.50
	6/25/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.68	41	1.6	<0.50	190	2.3	<0.50	91	1.1
	9/30/2014	<0.90	<0.90	<0.90	<0.90	2.3	<0.90	<0.90	77	2.3	<0.90	230	2.9	<0.90	110	1.3
	12/15/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	35	0.64	<0.50	18	<0.50
	3/19/2015	<0.50	<0.50	<0.50	<0.50	0.77	<0.50	<0.50	18.9	0.6	<0.50	155	2	<0.50	59.5	<0.50
	6/17/2015	<0.50	<0.50	<0.50	<0.50	0.93	<0.50	0.54	12.5	0.78	<0.50	160	1.9	<0.50	61.8	1.6
	9/17/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	2.4	<0.50	<0.50	74.3	2.2	<0.50	31.6	<0.50
	12/8/2015	<0.50	<0.50	<0.50	<0.50	3.5	<0.50	0.85	145	4.2	<0.50	199	2.4	<0.50	113	2
	12/8/2015 DUP	<0.50	<0.50	<0.50	<0.50	3.7	<0.50	0.93	153	4.4	<0.50	198	2.5	<0.50	118	2.1
	3/8/2016	<1	<4	<1	<1	4.1	<1	<1	117	3.8	<1	164	2.3	<1	94.6	3.4
	6/17/2016	<0.50	<2	<0.50	<0.50	1.8	<0.50	0.58	60.7	2.4	<0.50	116	1.7	<0.50	68.3	0.89
	9/29/2016	<0.50	<2	<0.50	<0.50	1.2	<0.50	<0.50	39.3	1.8	<0.50	192	2.5	<0.50	91.9	0.76
	12/14/2016	<0.50	<2	<0.50	<0.50	1.3	<0.50	<0.50	59.7	1.6	<0.50	75.8	1.1	<0.50	44.9	0.52
	3/28/2017	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<0.5	0.77	<0.5	<0.5	27.9	0.89	<0.5	12.5	<0.5
	6/14/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	17.5	0.60	<0.50	104	1.3	<0.50	47.2	<0.50
	9/27/2017	<2.0	<2.0	<0.50	<0.50	2.80	<1.0	<0.50	83.1	2.50	<0.50	102	2.4	<0.50	66.7	0.99
11/7/2017	<2.0	<2.0	<0.50	<0.50	20.30	<0.50	3.30	569.0	15.20	<0.50	205	4.5	<0.50	167.0	7.80	
MW-10	12/02/96	<0.50	<0.50	<0.50	<0.20	<0.30	<0.50	<0.20	<0.20	<1	<0.20	2.7	<1	--	0.4	<0.50
	11/13/97	<0.50	<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.53	<0.50	--	3.65	<1
	08/11/99	<1	<5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	2.02	<1	--	1.24	<0.50
	11/16/99	<1	<2.5	<0.50	<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	69.6	1.89	--	10.3	<0.50
	02/28/00	<1	<5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.63	<1	--	1.16	<0.50
	06/27/00	<1	<5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.72	<1	--	3.74	<0.50
05/30/01	<1	<5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.25	<1	--	2.52	<0.50	

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MW-10	05/30/02	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	4.05	<0.50	--	1.43	<0.50
	05/28/03	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	0.86	<0.50	<0.50	2.21	<0.50	--	1.28	<0.50
	11/02/04	<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.93	<0.50	--	0.98	<0.50
	11/16/04	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	4.1	<0.50	--	3.4	<0.50
	03/23/05	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.02	<0.50	--	1.21	<0.50
	05/17/05	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.26	<0.50	--	1.19	<0.50
	09/12/07	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.59 J	<0.50	--	0.83	<0.50
	03/05/08	<1	<0.500	<0.500	<1	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	1.66	<0.500	<0.500	1.67	<0.500
	09/18/08	<1	<0.500	<0.500	<1	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	1.13	<0.500	<0.500	1.4	<0.500
	03/25/09	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.5	<0.50	<0.50	1.6	<0.50
	09/16/09	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.4	<0.50	<0.50	2	<0.50
	03/18/10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.3	<0.50	<0.50	1.6	<0.50
	09/22/10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	<0.5	<0.5	1.4	<0.5
	03/09/11	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.4	<0.50	<0.50	0.8	<0.50
	09/14/11	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1	<0.50	<0.50	2.1	<0.50
	03/06/12	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.2	<0.50	<0.50	2	<0.50
	09/12/12	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.98	<0.50	<0.50	1.4	<0.50
	03/13/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	2.6	<0.50	<0.50	3.1	<0.50
	09/18/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.3	<0.50	<0.50	1.4	<0.50
	3/19/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.2	<0.50	<0.50	8.8	<0.50	<0.50	16	<0.50
	9/26/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	2	<0.50	<0.50	2	<0.50
	3/18/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.7	<0.50	<0.50	1.8	<0.50
	9/21/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	2.4	<0.50	<0.50	1.6	<0.50
	3/7/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.98	<0.50
	9/27/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.6	<0.50	<0.50	1.4	<0.50
	3/30/2017	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.4	<0.5	<0.5	1.5	<0.5
9/27/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	3.7	<0.50	<0.50	2.4	<0.50	
11/6/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	2.5	<0.50	<0.50	1.1	<0.50	
MW-11	12/02/96	<50	<50	<50	<20	<30	<50	52	140	<100	<20	2,200	550	--	5,900	<50
	11/13/97	<50	<100	<50	<50	<50	<50	<50	<50	<50	<50	686	90.3	--	2,720	<100
	08/10/99	<5	<25	<2.5	<2.5	13.7	<2.5	22.8	14.4	<2.5	<2.5	259	112	--	1,300	<2.5
	11/16/99	<20	<50	<10	<20	12	<10	16.8	18.8	<10	<10	478	94.8	--	1,500	<10
	02/28/00	<5	<25	<2.5	<2.5	2.71	<2.5	7.9	5.05	<2.5	<2.5	247	30.2	--	473	<2.5
	06/27/00	<10	<50	<5	<5	12.1	<5	28.9	14.8	<5	<5	337	108	--	1,390	<5
	08/31/00	<20	<100	<10	<10	15.4	<10	28	24.8	<10	<10	646	159	--	1,690	<10
	11/30/00	<20	<100	<10	<10	12.2	<10	26.4	19.3	<10	<10	342	125	--	1,550	<10
	02/27/01	<5	<25	<2.5	<2.5	3.65	<2.5	7.82	7.1	<2.5	<2.5	198	35.1	--	468	<2.5
	05/30/01	<10	<50	<5	<5	5.2	<5	13.6	9.09	<5	<5	256	48.8	--	858	<5
	09/25/01	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	260	57	--	820	<13
	12/17/01	<10	<50	<5	<5	<5	<5	15.4	25.9	<5	<5	983	40.9	--	1,390	<5

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MW-11 (continued)	03/18/02	<10	<5	<5	<10	11.9	<5	19.4	17.1	<5	<5	433	79.8	--	1,370	<5
	05/30/02	<10	<5	<5	<10	5.9	<5	10.9	15.6	<5	<5	571	45.6	--	965	<5
	11/07/02	<10	<5	<5	<10	15	<5	19.3	18.9	<5	<5	347	112	--	1,640	<5
	01/23/03	<5	<2.5	<2.5	<5	3.35	<2.5	4.3	5.35	<2.5	<2.5	265	24.1	--	534	<2.5
	05/28/03	<10	<5	<5	<10	13.3	<5	17.9	17.6	<5	<5	305	105	--	1,580	<5
	11/11/03	<5	<5	<5	<5	5	<5	5.15	9.15	<5	<5	191	38.8	--	504	<5
	01/26/04	<10	<5	<5	<10	9.6	<5	11.5	13.5	<5	<5	369	73.3	--	1,070	<5
	03/22/04	Well Abandoned														
MW-12	12/02/96	<50	<50	<50	<20	<30	<50	<20	29	<100	<20	2,500	<100	--	950	<50
	11/12/97	<250	<500	<250	<250	<250	<250	<250	2,710	<250	<250	12,900	645	--	5,400	<500
	08/11/99	<200	<1	<100	<100	120	<100	<100	2,680	<100	<100	11,300	758	--	3,520	<100
	11/16/99	<200	<500	<100	<200	<100	<100	<100	160	<100	<100	18,200	922	--	4,630	<100
	02/28/00	<200	<1	<100	<100	<100	<100	<100	908	<100	<100	3,780	<200	--	1,210	<100
	06/27/00	<100	<500	<50	<50	161	<50	<50	2,880	<50	<50	12,000	712	--	3,180	<50
	05/30/01	<50	<250	<25	<25	64.8	<25	54	1,650	<25	<25	4,990	298	--	1,810	<25
	05/30/02	<5	<2.5	<2.5	<5	4.25	<2.5	<2.5	101	<2.5	<2.5	344	6.6	--	81.6	<2.5
	05/29/03	<5	<2.5	<2.5	<5	28.4	<2.5	8	601	5.7	<2.5	362	18.2	--	199	<2.5
	11/16/04	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	59	<2.5	<2.5	410	3.5	--	96	<2.5
	03/23/05	<20	<10	<10	<20	247	<10	53	3,640	40.2	<10	1,080	49.8	--	639	14.2
	05/18/05	<1	<0.50	<0.50	<1	0.96	<0.50	0.98	30.1	0.57	<0.50	51.1	0.92	--	21.4	<0.50
	05/22/07	<5	<5	<5	<5	35.6	<5	7.45	785	11.1	<5	233	7.8	--	139	<5
	09/11/07	<100	<50	<50	<100	316	<50	57	6,700	53	<50	431	<50	--	516	<50
	12/12/07	<2	<1	<1	<2	1.1	<1	<1	43.8	<1	<1	106	3.16	--	39.6	<1
	03/05/08	<1	4.97	<0.500	<1	156	2.01	46.2	3,170	41.8	<0.500	440	21.2	<0.500	329	18.5
	09/19/08	<50	<25	<25	<50	394	<25	66	7,650	69	<25	968	45	<25	924	58
	12/10/08	<4	<4	<4	<4	33	<4	6.6	670	8.7	<4	99	5	<4	80	<4
	03/27/09	<4	4.8	<4	<4	230	<4	39	4,800	46	<4	540	28	<4	440	31
	03/27/09 DUP	<4	5	<4	<4	250	<4	44	4,700	51	<4	600	32	<4	490	35
06/18/09	<15	<15	<15	<15	170	<15	32	3,500	36	<15	270	<15	<15	230	26	
06/18/09 DUP	<15	<15	<15	<15	170	<15	32	3,600	37	<15	310	<15	<15	250	25	
09/18/09	<15	<15	<15	<15	240	<15	46	4,200	50	<15	540	26	<15	440	51	
09/18/09 DUP	<15	<15	<15	<15	260	<15	49	4,600	52	<15	590	28	<15	470	56	
12/18/09	<0.50	<0.50	<0.50	<0.50	2.4	<0.50	<0.50	100	1.1	1.3	170	2.2	<0.50	65	<0.50	
12/18/09 DUP	<0.50	<0.50	<0.50	<0.50	2.2	<0.50	<0.50	96	1.1	1.3	160	2.1	<0.50	62	<0.50	

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MW-12 (continued)	03/19/10	<0.50	4.1	<0.50	<0.50	220	2.6	48	4,400	53	<0.50	480	28	0.7	380	37
	03/19/10 DUP	<15	<15	<15	<15	270	<15	44	4,900	54	<15	600	29	<15	460	39
	06/16/10	<0.50	<0.50	<0.50	<0.50	0.56	<0.50	<0.50	19	<0.50	<0.50	38	<0.50	<0.50	17	<0.50
	06/16/10 DUP	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	18	0.54	<0.50	37	<0.50	<0.50	16	<0.50
	09/23/10	<15	<15	<15	<15	260	<15	47	4,800	56	<15	780	38	<15	560	68
	9/23/10 DUP	<15	<15	<15	<15	260	<15	49	4,800	57	<15	800	41	<15	580	65
	12/09/10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	3.5	<0.5	<0.5	5.1	<0.5	<0.5	2.1	<0.5
	12/09/10 DUP	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	4.4	<0.5	<0.5	5.8	<0.5	<0.5	2	<0.5
	03/10/11	<0.50	0.67	<0.50	<0.50	94	0.96	17	1,900	19	0.55	340	12	<0.50	220	11
	03/10/11 DUP	<0.50	0.87	<0.50	<0.50	93	1	17	1,600	19	0.55	260	13	<0.50	180	11
	06/07/11	<0.5	<0.5	<0.5	<0.5	1.8	<0.5	<0.5	59	1	<0.5	53	0.7	<0.5	25	<0.5
	06/07/11 DUP	<0.5	<0.5	<0.5	<0.5	1.8	<0.5	<0.5	60	1	<0.5	58	0.69	<0.5	27	<0.5
	09/19/11	<0.50	3	<0.50	<0.50	240	2.5	45	4,700	55	<0.50	860	65	0.94	690	63
	09/19/11 DUP	<20	<20	<20	<20	240	<20	53	4,700	60	<20	860	60	<20	680	68
	12/07/11	<0.50	<0.50	<0.50	<0.50	130	1.3	28	2,900	33	<0.50	520	34	0.54	380	40
	12/07/11 DUP	<0.50	<15	<0.50	<0.50	140	1.3	29	2,900	33	<0.50	580	34	0.55	400	41
	03/12/12	<15	<15	<15	<15	210	<15	44	3,800	45	<15	770	48	<15	540	46
	03/12/12 DUP	<20	<20	<20	<20	220	<20	44	4,000	47	<20	740	50	<20	540	45
	06/22/2012	<5	<5	<5	<5	100	<5	16	1,700	39	<5	270	13	<5	200	22
	06/22/12 DUP	<5	<5	<5	<5	100	<5	16	1,700	39	<5	270	13	<5	190	22
	09/14/12	<5	<5	<5	<5	220	<5	45	4,700	56	<5	890	61	<5	590	58
	09/14/12 DUP	<15	<15	<15	<15	270	<15	58	5,400	73	<15	1,100	76	<15	730	84
	12/13/12	<0.50	<0.50	<0.50	<0.50	1	<0.50	<0.50	62	0.97	<0.50	38	0.52	<0.50	22	<0.50
	12/13/12 DUP	<0.50	<0.50	<0.50	<0.50	1	<0.50	<0.50	62	0.92	<0.50	38	0.53	<0.50	23	<0.50
	03/15/13	<0.50	1	<0.50	<0.50	200	1.7	40	4,300	55	<0.50	760	53	0.71	540	53
	03/15/13 DUP	<0.50	1	<0.50	<0.50	200	1.8	40	4,200	56	<0.50	750	52	0.66	520	54
	06/13/13	<15	<15	<15	<15	230	<15	38	4,700	53	<15	590	44	<15	480	55
	06/13/13 DUP	<15	<15	<15	<15	240	<15	39	4,800	53	<15	610	46	<15	500	59
	09/20/13	<0.50	<0.50	<0.50	<0.50	170	1.6	37	3,400	49	<0.50	510	37	0.66	400	50
	09/20/13 DUP	<0.50	<0.50	<0.50	<0.50	180	1.7	36	3,400	48	<0.50	520	37	0.63	400	49
12/16/13	<2.5	<2.5	<2.5	<2.5	36	<2.5	7.5	800	10	<2.5	150	5.7	<2.5	110	9.6	
12/16/13 DUP	<2.5	<2.5	<2.5	<2.5	35	<2.5	7.6	770	9.6	<2.5	140	5.8	<2.5	110	9.8	
3/24/2014	<0.50	<0.50	<0.50	<0.50	110	0.77	18	1,900	25	<0.50	180	8.6	<0.50	170	47	
3/24/2014 DUP	<7	<7	<7	<7	97	<7	16	1,900	22	<7	170	7.5	<7	140	35	

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MW-12 (continued)	6/24/2014	<1.5	<1.5	<1.5	<1.5	14	<1.5	1.7	300	2.1	<1.5	42	<1.5	<1.5	32	<1.5
	6/24/2014 DUP	<1.5	<1.5	<1.5	<1.5	14	<1.5	1.9	310	2.3	<1.5	42	1.6	<1.5	34	<1.5
	9/30/2014	<15	<15	<15	<15	190	<15	39	3,500	45	<15	670	36	<15	480	42
	9/30/2014 DUP	<15	<15	<15	<15	180	<15	39	3,500	45	<15	680	35	<15	460	42
	12/11/2014	<0.50	<0.50	<0.50	<0.50	0.72	<0.50	<0.50	34	0.64	<0.50	25	<0.50	<0.50	15	<0.50
	12/11/2014 DUP	<0.50	<0.50	<0.50	<0.50	0.73	<0.50	<0.50	32	0.6	<0.50	24	<0.50	<0.50	14	<0.50
	3/20/2015	<5	<5	<5	<5	102	<5	25.4	2,110	29.4	<5	584	17.8	<5	344	36.8
	3/20/15 DUP	<12.5	<12.5	<12.5	<12.5	143	<12.5	25.8	2,490	28.8	<12.5	495	21.7	<12.5	340	29
	6/19/2015	<10	<10	<10	<10	151	<10	28.2	2,570	25	<10	514	23.6	<10	356	31.1
	6/19/2015 DUP	<10	<10	<10	<10	157	<10	31	2,680	30	<10	516	23.4	<10	362	33.2
	9/22/2015	<8.3	<8.3	<8.3	<8.3	120	<8.3	16.9	2,250	23.4	<8.3	343	15.7	<8.3	239	22.5
	9/22/2015 DUP	<8.3	<8.3	<8.3	<8.3	134	<8.3	21.4	2,490	25.7	<8.3	425	20.1	<8.3	282	26.5
	12/8/2015	<5	<5	<5	<5	8	<5	<5	40	0.7	<5	45	0.5	<5	22	<5
	3/8/2016	<3.6	<14.3	<3.6	<3.6	79.9	<3.6	15.4	1,380	16.2	<3.6	325	7.7	<3.6	209	21.3
	3/8/16 DUP	<3.6	<14.3	<3.6	<3.6	82	<3.6	16.6	1,390	15.6	<3.6	336	7.7	<3.6	210	21.2
	6/16/2016	<8.4	<33.4	<8.4	<8.4	174	<8.4	29.9	3,310	31.6	<8.4	314	12.8	<8.4	288	52.3
	6/16/16 DUP	<8.4	<33.4	<8.4	<8.4	192	<8.4	31.9	3,420	37.4	<8.4	367	15.4	<8.4	311	67
	9/27/2016	<10	<40	<10	<10	26	<10	<10	525	<10	<10	67.6	<10	<10	45.4	14.8
	9/27/2016 DUP	<2.5	<10	<2.5	<2.5	44.4	<2.5	11.5	867	11.4	<2.5	387	3.9	<2.5	163	22.6
	12/14/2016	<1	<4	<1	<1	<1	<1	<1	6.9	2.3	<1	<1	<1	<1	<1	20.5
	12/14/2016 DUP	<2.5	29.1	<2.5	<2.5	16.5	<2.5	4.7	744	<2.5	<2.5	62.3	<2.5	<2.5	42.2	21.2
	3/30/2017	<10	<40	<10	<10	<10	<10	<10	1,120	<10	<10	55.9	<10	<10	29.6	37.8
	3/30/2017 DUP	<2.5	<10	<2.5	<2.5	11.4	<2.5	3.8	853	6.1	<2.5	49	<2.5	<2.5	26	28.3
	6/12/2017	<125	<12.5	<3.1	<3.1	14.0	<3.1	4.7	893	7.6	<3.1	42.4	<3.1	<3.1	18.1	48.4
	6/12/2017 DUP	<3.1	<12.5	<3.1	<3.1	12.8	<3.1	<3.1	860	7.1	<3.1	40.0	<3.1	<3.1	16.5	47.4
	9/28/2017	<3.1	17	<3.1	<3.1	19.5	<3.1	<3.1	457	5.4	<3.1	<3.1	<3.1	<3.1	<3.1	47.7
	9/28/2017 DUP	<1.7	16	<1.7	<1.7	17.3	<1.7	<1.7	428	5.2	<1.7	<1.7	<1.7	<1.7	<1.7	45.1
11/9/2017	<2.0	15	<0.50	<0.50	4.5	<0.50	<0.50	22	1.4	<0.50	<0.50	<0.50	<0.50	<0.50	49.1	
11/9/2017 DUP	<2.0	13	<0.50	<0.50	4.5	<0.50	<0.50	21	1.6	<0.50	<0.50	<0.50	<0.50	<0.50	36.4	
MW-13	12/02/96	0.7	<0.50	<0.50	<0.20	<0.30	<0.50	0.3	9.1	<1	<0.20	750	6.6	--	82	<0.50
	11/12/97	<250	<500	<250	<250	291	<250	<250	5,050	<250	<250	18,100	<250	--	9,050	<500
	08/11/99	<200	<1	<100	<100	<100	<100	<100	2,280	<100	<100	9,590	<200	--	3,920	<100
	11/16/99	<50	<125	<25	<50	108	<25	51	2,620	<25	<25	7,210	67.5	--	3,050	--
	02/28/00	<200	<1	<100	<100	<100	<100	<100	562	<100	<100	1,340	<200	--	602	<100
	06/28/00	<100	<500	<50	<50	132	<50	142	4,210	<50	<50	14,700	155	--	6,360	<50
	05/30/01	<200	<1,000	<100	<100	<100	<100	<100	2,460	<100	<100	10,300	<200	--	4,620	<100
	05/30/02	<2	<1	<1	<2	1.44	<1	1.28	60.4	<1	<1	241	1.68	--	86.4	<1
	05/28/03	<1	<0.50	<0.50	<1	1.71	<0.50	1.75	79.6	1.26	<0.50	121	1.58	--	130	<0.50
	11/16/04	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	1,200	<12	--	230	<12
	05/18/05	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	3.14	<0.50	<0.50	71.2	<0.50	--	10.3	<0.50

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MW-13 (continued)	09/12/07	<50	<25	<25	<50	55	<25	28	1,290	<25	<25	2,730	29.5	--	2,020	<25
	12/12/07	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	3.36	<0.50	<0.50	51.3	0.64	--	19.5	<0.50
	03/05/08	<1	<0.500	<0.500	<1	8.32	<0.500	4.46	174	4.52	<0.500	383	4.21	<0.500	337	0.96
	06/25/08	<5	<5	<5	<5	15.2	<5	<5	320	10.4	<5	132	<5	--	160	<5
	09/19/08	<5	<2.50	<2.50	<5	5.6	<2.50	<2.50	116	2.65	<2.50	266	<2.50	<2.50	187	<2.50
	12/10/08	<0.50	<0.50	<0.50	<0.50	1.5	<0.50	0.62	32	0.69	<0.50	25	0.6	<0.50	39	<0.50
	03/27/09	<0.50	<0.50	<0.50	<0.50	0.7	<0.50	<0.50	15	<0.50	<0.50	25	<0.50	<0.50	17	<0.50
	03/27/09 DUP	<0.50	<0.50	<0.50	<0.50	0.79	<0.50	<0.50	15	<0.50	<0.50	25	<0.50	<0.50	17	<0.50
	06/18/09	<0.50	<0.50	<0.50	<0.50	2.4	<0.50	0.8	58	1.8	<0.50	16	<0.50	<0.50	42	<0.50
	09/17/09	<0.50	<0.50	<0.50	<0.50	5.8	<0.50	3.3	130	2.9	<0.50	430	4	<0.50	270	1
	12/18/09	<0.50	<0.50	<0.50	<0.50	0.62	<0.50	<0.50	16	<0.50	<0.50	66	0.61	<0.50	45	<0.50
	03/19/10	<0.50	<0.50	<0.50	<0.50	2.7	<0.50	1.4	64	1.2	<0.50	130	1.3	<0.50	110	<0.50
	06/16/10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	2.1	<0.50	<0.50	14	<0.50	<0.50	7.6	<0.50
	09/23/10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.7	<0.5	<0.5	45	<0.5	<0.5	12	<0.5
	12/21/10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	03/11/11	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.5	<0.50	<0.50	0.65	<0.50
	06/09/11	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.8	<0.5	<0.5	6.1	<0.5	<0.5	4.2	<0.5
	09/19/11	<0.50	0.54	<0.50	<0.50	35	<0.50	17	700	20	<0.50	2,200	17	0.63	1,300	3.6
	12/09/11	<9	<9	<9	<9	23	<9	11	530	18	<9	2,800	12	<9	1,400	<9
	03/12/12	<9	<9	<9	<9	24	<9	14	600	14	<9	1,800	11	<9	1,200	<9
	06/22/12	<4	<4	<4	<4	40	<4	13	940	30	<4	1,300	8.6	<4	1,000	4.5
	09/14/12	<4	<4	<4	<4	38	<4	21	900	22	<4	3,100	16	<4	1,800	<4
	12/13/12	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	13	0.62	<0.50	88	<0.50	<0.50	51	<0.50
	03/15/13	<0.50	<0.50	<0.50	<0.50	34	<0.50	21	890	20	<0.50	2,400	14	0.68	1,700	3.2
	06/14/13	<4	<4	<4	<4	19	<4	9.4	520	15	<4	1,100	6	<4	920	<4
	09/20/13	<0.50	<0.50	<0.50	<0.50	40	<0.50	20	770	19	<0.50	2,600	13	0.74	1,700	3.4
	12/13/13	<4	<4	<4	<4	11	<4	6.6	280	5.8	<4	1,300	4.9	<4	720	<4
	3/21/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	14	<0.50	<0.50	100	<0.50	<0.50	54	<0.50
6/24/2014	<0.50	<0.50	<0.50	<0.50	12	<0.50	<0.50	880	33	<0.50	1,500	12	0.67	1,300	3.2	
09/30/14	<4	<4	<4	<4	38	<4	20	890	19	<4	3,100	13	<4	2,000	<4	
12/11/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	18	0.66	<0.50	91	<0.50	<0.50	65	<0.50	

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MW-13 (continued)	3/18/2015	<1.6	<1.6	<1.6	<1.6	19	<1.6	3.1	515	7.4	<1.6	551	2.4	<1.6	609	<1.6
	6/18/2015	<0.50	<0.50	<0.50	<0.50	33.9	<0.50	15.9	615	15.3	<0.50	1,960	10.4	<0.50	1,390	2
	9/22/2015	<0.50	<0.50	<0.50	<0.50	33.9	<0.50	21	754	15.6	<0.50	2,370	10.4	<0.50	1,740	2.4
	12/8/2015	<0.50	<0.50	<0.50	<0.50	0.89	<0.50	0.64	30.5	0.88	<0.50	185	0.7	<0.50	121	<0.50
	3/8/2016	<2.5	<10	<2.5	<2.5	14.3	<2.5	6.4	336	4.6	<2.5	839	3.7	<2.5	736	<2.5
	6/16/2016	<8.4	<33.4	<8.4	<8.4	41.3	<8.4	17.8	841	19.2	<8.4	2,470	10.1	<8.4	1,820	<8.4
	9/28/2016	<2.5	<10	<2.5	<2.5	<2.5	<2.5	<2.5	148	<2.5	<2.5	4,840	<2.5	<2.5	895	<2.5
	9/28/16 DUP	<2.5	<10	<2.5	<2.5	<2.5	<2.5	<2.5	145	<2.5	<2.5	5,090	<2.5	<2.5	951	<2.5
	12/16/2016	<5	<20	<5	<5	<5	<5	<5	509	<5	<5	1,020	<5	<5	394	<5
	3/30/2017	<5	<20	<5	<5	<5	<5	<5	101	<5	<5	176	<5	<5	57.6	<5
	6/15/2017	<1.0	<4.0	<1.0	<1.0	<1.0	<1.0	1.2	272	1.6	<1.0	97.7	<1.0	<1.0	56.3	4.1
	9/27/2017	<1.0	<4.0	<1.0	<1.0	<1.0	<1.0	5.0	3,220	7.3	<1.0	3.3	<1.0	<1.0	1.3	25.0
	11/7/2017	<16.7	<16.7	<4.2	<4.2	<4.2	<4.2	<4.2	1,360	5.4	<4.2	<4.2	<4.2	<4.2	<4.2	25.0
	MW-14	11/12/97	<5	<10	<5	<5	5.01	<5	<5	<5	<5	<5	42.6	<5	--	394
08/10/99		<20	<100	<10	<10	<10	<10	<10	15.1	<10	<10	121	35.6	--	853	<10
11/16/99		<2	<5	<1	<2	2.48	<1	2.48	4.2	<1	<1	186	10.8	--	313	<1
02/28/00		<100	<500	<50	<50	<50	<50	83.2	85.1	<50	<50	711	190	--	5,300	<50
06/27/00		<10	<50	<5	<5	10.1	<5	18.9	219	<5	<5	207	46.2	--	1,150	<5
11/30/00		<2	<10	<1	<1	1.08	<1	1.88	2.27	<1	<1	21.3	5.54	--	157	<1
05/30/01		<1	<50	<5	<5	6.16	<5	13.8	30.4	<5	<5	268	28.2	--	1,280	<5
05/30/02		<10	<5	<5	<10	<5	<5	<5	8.4	<5	<5	78.3	11.9	--	303	<5
05/28/03		<1	<0.50	<0.50	<1	0.9	<0.50	1.47	4.15	<0.50	<0.50	80.6	4.99	--	188	<0.50
11/15/04		<25	<25	<25	<25	<25	<25	<25	96	<25	<25	480	<25	--	1,200	<25
05/17/05		<2	<1	<1	<2	4.64	<1	2.3	41.1	<1	<1	127	9.28	--	367	<1
09/12/07		<20	<10	<10	<20	21.6	<10	<10	162	<10	<10	180	22.2	--	963	<10
03/05/08		<1	<0.500	0.850 J	<1	24.3	<0.500	13.9	217	3.86	<0.500	549	27.2	<0.500	1,770	<0.500
06/25/08		<5	<5	<5	<5	15.2	<5	10.2	113	<5	<5	360	18.2	--	1,290	<5
09/19/08		<5	<2.50	<2.50	<5	19.1	<2.50	8.6	173	<2.50	<2.50	425	16.6	<2.50	1,320	<2.50
12/10/08		<5	<5	<5	<5	17	<5	9.6	160	<5	<5	330	17	<5	1,200	<5
03/27/09		<2.5	<2.5	<2.5	<2.5	16	<2.5	6.7	160	2.5	<2.5	320	14	<2.5	980	<2.5
06/17/09		<2.5	<2.5	<2.5	<2.5	21	<2.5	12	150	<2.5	<2.5	400	21	<2.5	1,400	<2.5
09/18/09		<0.50	<0.50	0.74	<0.50	19	<0.50	8.8	150	2	<0.50	440	17	<0.50	1,300	<0.50
12/15/09		<2.5	<2.5	<2.5	<2.5	11	<2.5	4.7	120	<2.5	<2.5	410	7.6	<2.5	820	<2.5
03/17/10	<2.5	<2.5	<2.5	<2.5	22	<2.5	9.5	140	<2.5	<2.5	320	15	<2.5	1,300	<2.5	
07/02/10	<2.5	<2.5	<2.5	<2.5	7	<2.5	4.8	52	<2.5	<2.5	220	5.9	<2.5	610	<2.5	
09/22/10	<3	<3	<3	<3	16	<3	6.5	140	<3	<3	230	10	<3	800	<3	
12/08/10	<0.5	<0.5	<0.5	<0.5	1.2	<0.5	0.7	11	<0.5	<0.5	82	1.5	<0.5	150	<0.5	

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MW-14 (continued)	03/09/11	<3	<3	<3	<3	6.8	<3	3.8	55	<3	<3	200	5	<3	540	<3
	06/08/11	<0.5	<0.5	<0.5	<0.5	0.64	<0.5	<0.5	1.8	<0.5	<0.5	27	1.1	<0.5	66	<0.5
	09/14/11	<2.5	<2.5	<2.5	<2.5	12	<2.5	5.7	120	<2.5	<2.5	300	8	<2.5	850	<2.5
	12/06/11	<2.5	<2.5	<2.5	<2.5	8.4	<2.5	3.9	88	<2.5	<2.5	320	5.7	<2.5	740	<2.5
	03/07/12	<2.5	<2.5	<2.5	<2.5	9.3	<2.5	4.6	87	<2.5	<2.5	270	6.1	<2.5	760	<2.5
	06/19/12	<2.5	<2.5	<2.5	<2.5	11	<2.5	5.6	70	<2.5	<2.5	200	7.4	<2.5	730	<2.5
	09/11/12	<2.5	<2.5	<2.5	<2.5	11	<2.5	5.1	110	<2.5	<2.5	280	6.6	<2.5	730	<2.5
	12/12/12	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.51	<0.50	<0.50	16	<0.50	<0.50	27	<0.50
	03/12/13	<0.50	<0.50	0.56	<0.50	12	<0.50	4.4	100	1.7	<0.50	230	7.2	<0.50	670	<0.50
	06/12/13	<3	<3	<3	<3	11	<3	5	84	<3	<3	260	6.6	<3	770	<3
	09/18/13	<0.50	<0.50	<0.50	<0.50	13	<0.50	4.6	130	2	<0.50	240	5.9	<0.50	640	<0.50
	12/11/13	<1.5	<1.5	<1.5	<1.5	8.4	<1.5	2.8	83	<1.5	<1.5	180	3.7	<1.5	460	<1.5
	3/18/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	11	<0.50	<0.50	20	<0.50
	6/24/2014	<0.50	<0.50	<0.50	<0.50	17	<0.50	7	120	1.8	<0.50	210	0.87	<0.50	670	<0.50
	9/24/2014	<2.5	<2.5	<2.5	<2.5	10	<2.5	4	120	<2.5	<2.5	240	4	<2.5	640	<2.5
	12/9/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	4.7	<0.50	<0.50	29	0.61	<0.50	63	<0.50
	3/18/2015	<0.50	<0.50	<0.50	<0.50	15.4	<0.50	5.9	128	2.2	<0.50	312	5.9	<0.50	912	<0.50
	6/16/2015	<3.1	<3.1	<3.1	<3.1	14.7	<3.1	4.9	117	<3.1	<3.1	248	4.4	<3.1	792	<3.1
	9/21/2015	<0.50	<0.50	<0.50	<0.50	15.2	<0.50	5.6	116	2.1	<0.50	201	4.7	<0.50	654	<0.50
	12/8/2015	Not sampled; well monument under water.														
	3/8/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	4.2	<0.50	<0.50	12.5	<0.50	<0.50	29.2	<0.50
	9/27/2016	<0.50	<2	<0.50	<0.50	7.2	<0.50	2.1	61.8	0.94	<0.50	100	1.7	<0.50	218	<0.50
	12/13/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	1.3	<0.50	<0.50	0.56	<0.50	<0.50	0.97	<0.50
3/27/2017	<0.5	<2	<0.5	<0.5	<0.5	<0.5	0.57	69.2	<0.5	<0.5	14.7	<0.5	<0.5	33.4	0.62	
6/13/2017	<2.0	<2.0	<0.50	<0.50	10	<1.0	5.3	432	2.7	<0.50	58.3	2.1	<0.50	204	2.5	
9/26/2017	<0.84	<3.3	<0.84	<0.84	6	<0.84	2.6	279	2.8	<0.84	62.4	<0.84	<0.84	265	<0.84	
11/8/2017	<3.3	<3.3	<0.84	<0.84	5	<0.84	2.1	306	2.2	<0.84	39.3	<0.84	<0.84	160	0.9	
MW-15	11/13/97	<0.50	<1	<0.50	<0.50	<0.50	1.1	<0.50	6.78	<0.50	<0.50	2.38	1.68	--	1.81	<1
	11/16/99	<1	<2.5	<0.50	<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	967	13.7	--	63.4	<0.50
	02/28/00	<1	<5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	17.9	1.55	--	1.01	<0.50
	06/27/00	<1	<5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	5.44	1.03	--	0.565	<0.50
	05/30/01	<1	<5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	2.32	<1	--	<0.50	<0.50
	05/31/02	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	2.59	0.63	--	<0.50	<0.50
	05/29/03	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	0.53	<0.50	<0.50	4.42	<0.50	--	1.3	<0.50
	11/02/04	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.9	<0.50	--	<0.50	<0.50

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MW-15 (continued)	11/16/04	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.73	<0.50	<0.50	12	<0.50	--	3.1	<0.50
	03/24/05	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.74	<0.50	--	1.49	<0.50
	05/17/05	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.54	<0.50	--	0.58	<0.50
	09/13/07	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.54 J	<0.50	--	<0.50	<0.50
	03/07/08	<1	<0.500	<0.500	<1	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	2.63 J	<0.500	<0.500	<0.500	<0.500
	09/18/08	<1	<0.500	<0.500	<1	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	0.86	<0.500	<0.500	<0.500	<0.500
	03/25/09	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1	<0.50	<0.50	<0.50	<0.50
	09/17/09	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.81	<0.50	<0.50	<0.50	<0.50
	03/18/10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.7	<0.50	<0.50	<0.50	<0.50
	09/23/10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.76	<0.5	<0.5	<0.5	<0.5
	03/09/11	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	09/16/11	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.64	<0.50	<0.50	<0.50	<0.50
	03/09/12	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.7	<0.50	<0.50	<0.50	<0.50
	09/10/12	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.5	<0.50	<0.50	<0.50	<0.50
	03/14/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.58	<0.50	<0.50	<0.50	<0.50
	09/19/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.56	<0.50	<0.50	<0.50	<0.50
	3/21/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	9/30/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.87	<0.50	<0.50	<0.50	<0.50
	3/18/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.5	<0.50	<0.50	<0.50	<0.50
	9/23/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.62	<0.50	<0.50	<0.50	<0.50
3/8/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.59	<0.50	<0.50	<0.50	<0.50	
9/30/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.51	<0.50	<0.50	<0.50	<0.50	
3/28/2017	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
9/28/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
11/6/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.6	<0.50	<0.50	<0.50	<0.50	
MW-16	11/12/97	<5	<10	<5	<5	19.8	<5	27.8	23.6	<5	<5	328	57.5	--	142	<10
	08/11/99	<5	<25	<2.5	<2.5	15.2	<2.5	<2.5	7.2	<2.5	<2.5	205	55.6	--	85.6	<2.5
	02/28/00	<2	<10	<1	<1	10.4	<1	12	7.4	<1	<1	523	54.5	--	112	<1
	06/27/00	<10	<50	<5	<5	12.4	<5	13.9	8.39	<5	<5	236	45	--	93.8	<5
	05/30/01	<10	<50	<5	<5	9.28	<5	12	8.95	<5	<5	302	30.1	--	110	<5
	05/30/02	<5	<2.5	<2.5	<5	13.5	<2.5	10.6	8.65	<2.5	<2.5	467	24	--	119	<2.5
	05/29/03	<5	<2.5	<2.5	<5	3.6	<2.5	3.35	2.85	<2.5	<2.5	412	13.4	--	76	<2.5
	11/02/04	<2	<10	<1	<1	<1	<1	<1	1.66	<1	<1	260	6.9	--	25.4	<1
	11/16/04	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	300	7.8	--	26	<2.5
	03/24/05	<2	<1	<1	<2	1.8	<1	1.34	1.96	<1	<1	373	11.8	--	49.4	<1
05/17/05	<1	<0.50	<0.50	<1	4.39	<0.50	3.14	9.25	<0.50	<0.50	120	9.09	--	41.5	<0.50	

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MW-16	11/15/05	<1	<0.500	<0.500	<1	2.75	<0.500	1.86	2.5	<0.500	<0.500	152	8.94	--	33.4	<0.500
(continued)	02/21/06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	06/06/06	<2	<2	<2	<2	12.2	<2	3.38	210	<2	<2	84.6	2.56	--	25.2	5.64
	12/06/06	<2	<1	<1	<2	4.2	<1	2.12	16.7	<1	<1	176	5.88	--	45.6	<1
	05/23/07	<1	<1	<1	<1	2.57	<1	<1	14	<1	<1	98.8	3.35	--	23.8	<1
	09/13/07	<1	<0.50	<0.50	<1	3.15	<0.50	1.08	6.6	<0.50	<0.50	163	5.87	--	49.2	<0.50
	12/12/07	<2	<1	<1	<1	2.32	<1	1.44	5.9	<1	<1	110	5.92	--	28.2	<1
	03/07/08	<1	<0.500	<0.500	<1	3	<0.500	1.86	5.93	<0.500	<0.500	280	6.12	<0.500	73.3	<0.500
	09/18/08	<5	<2.50	<2.50	<5	2.7	<2.50	<2.50	5.15	<2.50	<2.50	300	6.2	<2.50	65.2	<2.50
	12/09/08	<1	<1	<1	<1	2.6	<1	1.8	5.5	<1	<1	300	5.7	<1	67	<1
	03/26/09	<0.50	<0.50	<0.50	<0.50	1.4	<0.50	0.82	3.2	<0.50	<0.50	150	5.2	<0.50	28	<0.50
	06/17/09	<0.50	<0.50	<0.50	<0.50	5	<0.50	0.95	29	<0.50	<0.50	54	1.8	<0.50	16	0.68
	09/17/09	<0.50	<0.50	<0.50	<0.50	1.5	<0.50	1.1	2	<0.50	<0.50	220	4.8	<0.50	33	<0.50
	12/17/09	<0.50	<0.50	<0.50	<0.50	0.87	<0.50	0.6	1.4	<0.50	<0.50	100	3.2	<0.50	19	<0.50
	03/19/10	<0.50	<0.50	<0.50	<0.50	1.2	<0.50	1	2	<0.50	<0.50	110	4.5	<0.50	36	<0.50
	06/16/10	<0.50	<0.50	<0.50	<0.50	4.9	<0.50	0.91	37	<0.50	<0.50	39	0.94	<0.50	9.9	1.6
	09/23/10	<0.5	<0.5	<0.5	<0.5	1.4	<0.5	0.94	2.8	<0.5	<0.5	240	4.2	<0.5	43	<0.5
	12/10/10	<0.5	<0.5	<0.5	<0.5	0.85	<0.5	0.54	1.6	<0.5	<0.5	94	2.4	<0.5	18	<0.5
	03/10/11	<0.50	<0.50	<0.50	<0.50	1.8	<0.50	0.5	6.2	<0.50	<0.50	110	1.9	<0.50	21	<0.50
	06/09/11	<0.5	<0.5	<0.5	<0.5	4.9	<0.5	1.2	63	<0.5	<0.5	28	<0.5	<0.5	7.1	2.2
	09/19/11	<0.50	<0.50	<0.50	<0.50	1.2	<0.50	<0.50	5.1	<0.50	<0.50	160	2.7	<0.50	13	<0.50
	12/08/11	<0.50	<0.50	<0.50	<0.50	0.92	<0.50	0.61	2.2	<0.50	<0.50	210	2.9	<0.50	38	<0.50
	06/20/12	<0.5	<0.5	<0.5	<0.5	3.6	<0.5	0.56	24	<0.5	<0.5	60	0.98	<0.5	14	0.62
	09/13/12	<0.50	<0.50	<0.50	<0.50	1.7	<0.50	0.61	6.5	<0.50	<0.50	190	2.4	<0.50	35	<0.50
	12/13/12	<0.50	<0.50	<0.50	<0.50	1.5	<0.50	0.68	5.7	<0.50	<0.50	110	1.1	<0.50	24	<0.50
	03/14/13	<0.50	<0.50	<0.50	<0.50	0.98	<0.50	0.7	4.7	<0.50	<0.50	200	2	<0.50	50	<0.50
	06/14/13	<0.50	<0.50	<0.50	<0.50	1.3	<0.50	<0.50	6	<0.50	<0.50	84	0.96	<0.50	18	<0.50
	09/19/13	<0.50	<0.50	<0.50	<0.50	0.92	<0.50	0.75	7.1	<0.50	<0.50	180	1.4	<0.50	57	<0.50
	12/13/13	<0.50	<0.50	<0.50	<0.50	0.8	<0.50	0.68	5.9	<0.50	<0.50	160	1.4	<0.50	52	<0.50
	3/20/2014	<0.50	<0.50	<0.50	<0.50	2.7	<0.50	0.89	19	<0.50	<0.50	52	<0.50	<0.50	13	0.55
	6/24/2014	<0.50	<0.50	<0.50	<0.50	2	<0.50	<0.50	10	<0.50	<0.50	70	0.7	<0.50	12	<0.50
	9/27/2014	<0.50	<0.50	<0.50	<0.50	0.77	<0.50	0.66	8.8	<0.50	<0.50	200	1.4	<0.50	47	<0.50

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)															
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride	
MW-16 (continued)	12/11/2014	<0.50	<0.50	<0.50	<0.50	0.64	<0.50	<0.50	4	<0.50	<0.50	76	0.96	<0.50	17	<0.50	
	3/18/2015	<0.50	<0.50	<0.50	<0.50	0.7	<0.50	<0.50	6	<0.50	<0.50	157	0.94	<0.50	31	<0.50	
	6/17/2015	<0.50	<0.50	<0.50	<0.50	0.61	<0.50	<0.50	10.5	<0.50	<0.50	179	1	<0.50	41.6	<0.50	
	9/23/2015	<0.50	<0.50	<0.50	<0.50	0.56	<0.50	0.65	10.4	<0.50	<0.50	173	1.2	<0.50	43.5	<0.50	
	12/7/2015	Not sampled; well monument under water.															
	9/28/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	9.5	<0.50	<0.50	144	0.66	<0.50	35.6	<0.50	
	12/14/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	3.1	<0.50	<0.50	51.5	<0.50	<0.50	11.6	<0.50	
	3/29/2017	<0.5	<2	<0.5	<0.5	1.6	<0.5	<0.5	19	<0.5	<0.5	27	<0.5	<0.5	6.4	<0.5	
	6/14/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	6.4	<0.50	<0.50	53.7	0.66	<0.50	5.4	<0.50	
	9/25/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	1.3	<0.50	<0.50	148.0	1.00	<0.50	11.1	<0.50	
	11/6/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	3.8	<0.50	<0.50	150.0	0.96	<0.50	17.4	<0.50	
	MW-17	11/13/97	<0.50	<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.9	<0.50	--	<0.50	<1
		11/16/99	<1	<2.5	<0.50	<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	127	1.5	--	9.54	<0.50
02/28/00		<1	<5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.85	<1	--	2.51	<0.50	
06/27/00		<1	<5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	2.27	<1	--	<0.50	<0.50	
05/30/01		<1	<5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1	--	<0.50	<0.50	
05/30/02		<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.82	<0.50	--	<0.50	<0.50	
05/28/03		<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.75	<0.50	--	0.92	<0.50	
11/15/04		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	2.5	<0.50	--	<0.50	<0.50	
05/17/05		<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	8.06	<0.50	--	6.68	<0.50	
05/23/07		<1	<1	<1	<1	<1	<1	<1	8.82	<1	<1	37.8	<1	--	28.2	<1	
09/11/07		<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50 J	<0.50	--	<0.50	<0.50	
03/05/08		<1	<0.500	<0.500	<1	0.9	<0.500	<0.500	0.96	<0.500	<0.500	1.05	<0.500	<0.500	3.62	<0.500	
09/19/08		<1	<0.500	<0.500	<1	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	0.8	<0.500	
03/25/09		<0.50	<0.50	<0.50	<0.50	0.57	<0.50	<0.50	1	<0.50	<0.50	0.69	<0.50	<0.50	3	<0.50	
09/16/09		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.8	<0.50	<0.50	0.72	<0.50	<0.50	3.2	<0.50	
03/23/10		<0.50	<0.50	<0.50	<0.50	1.2	<0.50	<0.50	3.9	<0.50	<0.50	3.2	0.58	<0.50	18	<0.50	
09/20/10		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.69	<0.5	<0.5	0.71	<0.5	<0.5	3	<0.5	
03/09/11		<0.50	<0.50	<0.50	<0.50	0.65	<0.50	<0.50	<0.50	<0.50	<0.50	2.5	<0.50	<0.50	8.2	<0.50	
09/13/11		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.96	<0.50	<0.50	0.71	<0.50	<0.50	3.1	<0.50	
03/07/12		<0.50	<0.50	<0.50	<0.50	1.6	<0.50	<0.50	5.4	<0.50	<0.50	6.8	0.56	<0.50	25	<0.50	
09/11/12	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.73	<0.50	<0.50	0.66	<0.50	<0.50	2.5	<0.50		
03/12/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.9	<0.50	<0.50	4.1	<0.50	<0.50	11	<0.50		
09/17/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.6	<0.50	<0.50	4.2	<0.50	<0.50	8.9	<0.50		

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MW-17 (continued)	3/18/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	9/24/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.5	<0.50	<0.50	3.2	<0.50	<0.50	6.8	<0.50
	3/18/2015	<0.50	<0.50	<0.50	<0.50	0.71	<0.50	<0.50	2.4	<0.50	<0.50	3.9	<0.50	<0.50	12.6	<0.50
	9/17/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.53	<0.50	<0.50	2.5	<0.50	<0.50	4.2	<0.50
	3/8/2016	<0.50	<2	<0.50	<0.50	0.83	<0.50	<0.50	3.3	<0.50	<0.50	9.4	<0.50	<0.50	22.7	<0.50
	9/27/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	1.5	<0.50	<0.50	4.2	<0.50	<0.50	10.4	<0.50
	3/29/2017	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	9/29/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	2.7	<0.50	<0.50	4.6	<0.50	<0.50	11.4	<0.50
	11/8/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	9.3	<0.50	<0.50	9.9	<0.50	<0.50	21.9	<0.50
	MW-18i	09/29/00	ND	ND	0.694	ND	0.843	ND	ND	16.5	ND	ND	11.7	ND	--	8.32
11/30/00		<1	<5	<0.50	<0.50	0.907	<0.50	<0.50	11.6	<0.50	<0.50	12.4	<1	--	17.6	<0.50
02/27/01		<5	<25	<2.5	<2.5	<2.5	<2.5	<2.5	10.2	<2.5	<2.5	15.2	<5	--	10	<2.5
05/30/01		<5	<25	<2.5	<2.5	<2.5	<2.5	<2.5	6.47	<2.5	<2.5	29.5	<5	--	8.06	<2.5
09/25/01		<1	<1	<1	<1	1.8	<1	<1	23	<1	<1	62	2.3	--	39	<1
03/29/02		<1	<0.50	<0.50	<1	1.2	<0.50	<0.50	17.3	<0.50	<0.50	71.1	1.22	--	31	<0.50
05/30/02		<1	<0.50	<0.50	<1	1.18	<0.50	<0.50	18.6	<0.50	<0.50	53.2	1.14	--	19.3	<0.50
08/29/02		<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	6.91	<0.50	<0.50	18.2	<0.50	--	7.34	<0.50
11/07/02		<1	<0.50	<0.50	<1	0.56	<0.50	<0.50	10.1	<0.50	<0.50	23.3	<0.50	--	9.7	<0.50
01/23/03		<1	<0.50	<0.50	<1	0.68	<0.50	<0.50	12.3	<0.50	<0.50	27.6	0.5	--	12.5	<0.50
05/29/03		<1	<0.50	<0.50	<1	0.59	<0.50	<0.50	10.4	<0.50	<0.50	23.9	0.5	--	10.8	<0.50
11/11/03		<1	<1	<1	<1	<1	<1	<1	16.1	<1	<1	31.5	<1	--	16.3	<1
01/27/04		<1	<0.50	<0.50	<1	0.67	<0.50	<0.50	14.2	<0.50	<0.50	69.7	0.53	--	12	<0.50
05/04/04		<1	<1	<1	<1	<1	<1	<1	15.6	<1	<1	112	<1	--	12.1	<1
08/17/04		<1	<0.50	3.76	<0.50	0.81	1.86	<0.50	22.6	0.78	<0.50	43.8	0.96	--	24	<1
11/02/04		<0.50	<0.50	<0.50	<0.50	1.09	<0.50	<0.50	21.8	<0.50	<0.50	32.2	0.6	--	17.8	<0.50
11/16/04		<0.50	<0.50	<0.50	<0.50	1	<0.50	<0.50	24	<0.50	<0.50	42	0.69	--	21	<0.50
02/01/05		<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	8.92	<0.50	<0.50	13	<0.50	--	6.01	<0.50
05/18/05		<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	11	<0.50	<0.50	9.69	<0.50	--	7.3	<0.50
08/18/05		<1	<0.500	<0.500	<1	1.17	<0.500	<0.500	18 B	<0.500	<0.500	21.4 B	0.58	--	16.3 B	<0.500
08/18/05 DUP	<1	<0.500	<0.500	<1	1.17	<0.500	<0.500	18.5 B	<0.500	<0.500	21.8 B	0.57	--	16.2 B	<0.500	
11/15/05	<1	<0.500	<0.500	<1	<0.500	<0.500	<0.500	7.31	<0.500	<0.500	11.4	<0.500	--	6.31	<0.500	
02/21/06	<1	<0.500	<0.500	<1	0.93	<0.500	<0.500	14.8	<0.500	<0.500	24.3	0.52	--	15.2	<0.500	
06/06/06	<1	<1	<1	<1	<1	<1	<1	5.88	<1	<1	8.46	<1	--	4.47	<1	

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MW-18i (continued)	09/06/06	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	5.79	<0.50	<0.50	7.89	<0.50	--	4.23	<0.50
	12/06/06	<1	<0.50	<0.50	<1	0.56	<0.50	<0.50	11.6	<0.50	<0.50	11.2	<0.50	--	6.91	<0.50
	02/07/07	<1	<0.50	<0.50	<1	0.68	<0.50	<0.50	12	<0.50	<0.50	15	<0.50	--	9.32	<0.50
	05/23/07	<1	<1	<1	<1	<1	<1	<1	14.6	<1	<1	17.2	<1	--	11.3	<1
	09/11/07	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	4.87	<0.50	<0.50	1.13	<0.50	--	1.46	<0.50
	12/13/07	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	2.99	<0.50	<0.50	5.57	<0.50	--	3.32	<0.50
	03/06/08	<1	<0.500	<0.500	<1	0.82	<0.500	<0.500	13.2	<0.500	<0.500	13.2	<0.500	<0.500	9.78	<0.500
	06/10/08	<1	1	1	<1	<1	<1	<1	4.17	<1	<1	4.31	<1	--	2.18	<1
	09/17/08	<1	<0.500	<0.500	<1	<0.500	<0.500	<0.500	3.95	<0.500	<0.500	3.1	<0.500	<0.500	2.55	<0.500
	12/09/08	<0.50	<0.50	<0.50	<0.50	0.7	<0.50	<0.50	12	<0.50	<0.50	8.5	<0.50	<0.50	7.4	<0.50
	03/26/09	<0.50	<0.50	<0.50	<0.50	0.51	<0.50	<0.50	8	<0.50	<0.50	4.8	<0.50	<0.50	4.7	<0.50
	06/16/09	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	3.3	<0.50	<0.50	2.5	<0.50	<0.50	1.7	<0.50
	09/16/09	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	8.2	<0.50	<0.50	5.9	<0.50	<0.50	4.5	<0.50
	12/15/09	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.6	<0.50	<0.50	2.5	<0.50	<0.50	1.6	<0.50
	03/18/10	<0.50	<0.50	<0.50	<0.50	0.52	<0.50	<0.50	11	<0.50	<0.50	9.7	<0.50	<0.50	6	<0.50
	06/15/10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	3	<0.50	<0.50	3.6	<0.50	<0.50	1.8	<0.50
	09/22/10	<0.5	<0.5	<0.5	<0.5	0.71	<0.5	0.5	15	<0.5	<0.5	9.8	<0.5	<0.5	7.4	<0.5
	12/09/10	<0.5	<0.5	<0.5	<0.5	0.66	<0.5	0.5	15	<0.5	<0.5	12	<0.5	<0.5	8	<0.5
	03/10/11	<0.50	<0.50	<0.50	<0.50	0.5	<0.50	<0.50	12	<0.50	<0.50	9.4	<0.50	<0.50	5.2	<0.50
	06/09/11	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2	<0.5	<0.5	2.1	<0.5	<0.5	1	<0.5
	09/15/11	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	3.3	<0.50	<0.50	2.9	<0.50	<0.50	1.9	<0.50
	12/08/11	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	9.8	<0.50	<0.50	8.5	<0.50	<0.50	4.8	<0.50
	03/07/12	<0.50	<0.50	<0.50	<0.50	0.62	<0.50	<0.50	15	<0.50	<0.50	12	<0.50	<0.50	6.4	<0.50
	06/21/12	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.7	<0.5	<0.5	1.5	<0.5	<0.5	0.97	<0.5
	09/13/12	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	2.2	<0.50	<0.50	1.7	<0.50	<0.50	1	<0.50
	12/13/12	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	6.3	<0.50	<0.50	3.9	<0.50	<0.50	2.1	<0.50
	03/13/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	5.2	<0.50	<0.50	3.8	<0.50	<0.50	2.1	<0.50
	06/13/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	3.9	<0.50	<0.50	2.4	<0.50	<0.50	1.3	<0.50
	09/19/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	3.1	<0.50	<0.50	2.2	<0.50	<0.50	1.3	<0.50
	12/13/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	11	<0.50	<0.50	5.3	<0.50	<0.50	3.6	<0.50
3/20/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.8	<0.50	<0.50	1	<0.50	<0.50	0.7	<0.50	
6/26/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.63	<0.50	<0.50	0.19	<0.50	<0.50	1	<0.50	
9/26/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.51	<0.50	<0.50	1.5	<0.50	<0.50	0.93	<0.50	
12/10/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	2.9	<0.50	<0.50	2	<0.50	<0.50	1.3	<0.50	

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)															
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride	
MW-18i (continued)	3/18/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	2.3	<0.50	<0.50	2	<0.50	<0.50	1.1	<0.50	
	6/17/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.3	<0.50	<0.50	2	<0.50	<0.50	1.1	<0.50	
	9/23/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	3.5	<0.50	<0.50	3.4	<0.50	<0.50	1.8	<0.50	
	12/7/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	6.5	<0.50	<0.50	4	<0.50	<0.50	2.6	<0.50	
	3/9/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.6	<0.50	<0.50	1	<0.50	
	6/16/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.98	<0.50	<0.50	0.73	<0.50	
	9/28/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.4	<0.50	<0.50	0.85	<0.50	
	12/14/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	2.8	<0.50	<0.50	1.5	<0.50	<0.50	1.2	<0.50	
	3/29/2017	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<0.5	1.5	<0.5	<0.5	1.4	<0.5	<0.5	1.2	<0.5	
	6/13/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	1.1	<0.50	<0.50	0.66	<0.50	
	9/27/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	6.40	<0.50	<0.50	1.9	<0.50	<0.50	1.30	<0.50	
	11/7/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.9	<0.50	<0.50	0.50	<0.50	
	MW-19	11/07/02	<20	<10	<10	<20	252	<10	66.2	2,450	23	<10	3,100	139	--	1,810	79.2
		05/30/03	<50	<25	<25	<50	109	<25	36	1,300	<25	<25	7,160	104	--	2,070	35.5
11/16/04		<50	<50	<50	<50	<50	65	<50	490	<50	<50	7,300	130	--	1,400	<50	
05/18/05		<10	<5	<5	<10	19.3	<5	<5	161	<5	<5	1,500	33.8	--	205	24.6	
11/15/05		<20	<10	<10	<20	27	<10	18.8	230	<10	<10	3,080	67.2	--	785	14.6	
11/15/05 DUP		<20	<10	<10	<20	25	<10	20.2	221	<10	<10	2,860	64.4	--	762	15.2	
06/05/06		<10	<10	<10	<10	<10	<10	<10	80.9	<10	<10	1,280	13.1	--	237	<10	
12/06/06		<20	<10	<10	<20	<10	<10	<10	76.2	<10	<10	2,060	17.2	--	304	<10	
05/22/07		<20	<20	<20	<20	<20	<20	<20	114	<20	<20	2,720	51.4	--	504	<20	
09/11/07		<50	<25	<25	<50	<25	<25	<25	85.5	<25	<25	3,370	62.5	--	608	<25	
12/12/07		<50	<25	<25	<50	<25	<25	<25	80	<25	<25	2,070	38.5	--	326	<25	
03/05/08 ²		<1	<0.500	<0.500	<1	12.5	<0.500	20.5	149	4.53	<0.500	4,060	66	<0.500	1,030	6.41	
06/25/08		<20	<20	<20	<20	45.8	<20	29.6	435	<20	<20	2,790	46.6	--	1,410	<20	
09/19/08		<50	<25	<25	<50	62	<25	37.5	715	<25	<25	4,990	56.5	<25	2,870	39.5	
12/10/08		<25	<25	<25	<25	51	<25	<25	500	<25	<25	6,600	110	<25	1,100	<25	
03/27/09		<15	<15	<15	<15	53	<15	39	650	<15	<15	4,500	120	<15	1,900	25	
03/27/09 DUP		<15	<15	<15	<15	56	<15	39	670	<15	<15	4,800	130	<15	1,900	25	
06/18/09		<2.5	<2.5	<2.5	<2.5	5.4	<2.5	5.3	82	<2.5	<2.5	680	8.6	<2.5	240	<2.5	
06/18/09 DUP		<2.5	<2.5	<2.5	<2.5	5.1	<2.5	5.4	80	<2.5	<2.5	660	8.4	<2.5	240	<2.5	
09/18/09		<2.5	<2.5	<2.5	<2.5	12	<2.5	36	170	4.6	<2.5	9,400	140	<2.5	2,000	11	
09/18/09 DUP		<2.5	<2.5	<2.5	<2.5	12	<2.5	36	170	4.4	<2.5	9,700	140	<2.5	2,000	12	
12/18/09		<10	<10	<10	<10	87	<10	29	780	13	<10	3,200	57	<10	1,200	35	
12/18/09 DUP		<10	<10	<10	<10	84	<10	27	740	12	<10	3,100	53	<10	1,200	32	
03/19/10	<5	<5	<5	<5	<5	<5	8.3	45	<5	<5	1,900	19	<5	380	<5		
03/19/10 DUP	<7	<7	<7	<7	<7	<7	8.3	44	<7	<7	1,800	18	<7	360	<7		

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MW-19	06/17/10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	6.7	<0.50	<0.50	67	<0.50	<0.50	25	<0.50
(continued)	06/17/10 DUP	<0.50	<0.50	<0.50	<0.50	0.53	<0.50	<0.50	6.9	<0.50	<0.50	65	0.52	<0.50	24	<0.50
	09/23/10	<2.5	<2.5	<2.5	<2.5	8.7	<2.5	21	110	3.6	<2.5	3,400	50	<2.5	920	12
	09/23/10 DUP	<2.5	<2.5	<2.5	<2.5	8.5	<2.5	21	110	3.4	<2.5	3,700	49	<0.25	890	13
	12/09/10	<15	<15	<15	<15	59	<15	38	590	<15	<15	6,200	68	<15	1,500	48
	12/09/10 DUP	<1.5	<1.5	<1.5	<1.5	58	<1.5	37	590	<1.5	<1.5	6,000	67	<1.5	1,500	48
	03/08/11	<5	<5	<5	<5	23	<5	12	280	<5	<5	1,500	18	<5	590	13
	06/10/11	<0.9	<0.9	<0.9	<0.9	22	<0.9	2.7	160	1.4	<0.9	240	3.6	<0.9	130	5.6
	06/10/11 DUP	<0.9	<0.9	<0.9	<0.9	19	<0.9	2.3	140	1.3	<0.9	220	3.3	<0.9	120	5
	09/19/11	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	53	<1.5	<1.5	400	3	<1.5	78	<1.5
	09/19/11 DUP	<2	<2	<2	<2	<2	<2	<2	53	<2	<2	410	3.2	<2	80	<2
	12/09/11	<1.5	<1.5	<1.5	<1.5	5	<1.5	4.3	110	<1.5	<1.5	730	10	<1.5	220	3.9
	12/09/2011 DUP	<2	<2	<2	<2	5.4	<2	4.7	120	<2	<2	770	10	<2	230	3.9
	03/09/12	<2.5	<2.5	<2.5	<2.5	46	<2.5	26	820	1	<2.5	2,400	50	<2.5	1,200	67
	03/09/12 DUP	<4	<4	<4	<4	43	<4	24	770	8.8	<4	2,400	46	<4	1,200	62
	06/22/2012	<5	<5	<5	<5	74	<5	17	1,000	14	<5	1,300	21	<5	1,000	57
	06/22/12 DUP	<5	<5	<5	<5	74	<5	18	1,000	13	<5	1,300	22	<5	1,000	57
	09/14/12	<5	<5	<5	<5	<5	<5	5.7	300	<5	<5	2,200	31	<5	340	8
	09/14/12 DUP	<5	<5	<5	<5	<5	<5	5.9	300	<5	<5	2,300	31	<5	340	<5
	12/14/12	<1.5	9.8	<1.5	<1.5	21	<1.5	1.8	330	3.6	<1.5	290	3.2	<1.5	140	3.1
	12/14/12 DUP	<1	9.3	<1	<1	21	<1	1.7	340	3.7	<1	300	3.1	<1	140	3
	03/15/13	<1.5	4.7	<1.5	<1.5	29	<1.5	21	870	5.5	<1.5	3,200	67	<1.5	1,600	9
	03/15/13 DUP	<1.5	4.7	<1.5	<1.5	30	<1.5	20	820	6.1	<1.5	3,200	68	<1.5	1,500	9.2
	06/14/13	<9	<9	<9	<9	25	<9	13	730	<9	<9	2,500	29	<9	1,000	<9
	06/14/13 DUP	<9	<9	<9	<9	25	<9	11	720	<9	<9	2,400	26	<9	1,000	<9
	09/20/13	<0.50	1.2	<0.50	<0.50	14	<0.50	25	520	4.5	<0.50	3,000	61	<0.50	1,100	10
	09/20/13 DUP	<1	1.1	<1	<1	12	<1	21	490	3.8	<1	3,200	52	<1	1,200	9
	12/16/13	<15	<15	<15	<15	37	<15	22	680	<15	<15	3,000	36	<15	1,100	<15
	12/16/13 DUP	<15	<15	<15	<15	36	<15	22	660	<15	<15	2,900	37	<15	1,100	<15
	3/21/2014	<0.50	1.4	<0.50	<0.50	4.8	<0.50	2.4	130	1.2	<0.50	180	1.6	<0.50	51	4.3
	3/21/2014 DUP	<0.50	1.4	<0.50	<0.50	4.8	<0.50	2.2	130	1.1	<0.50	180	1.6	<0.50	51	4.3

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MW-19 (continued)	6/26/2014	<5	0.89	<0.50	<0.50	0.54	110	38	2,000	21	<0.50	1,900	36	0.8	1,500	6.2
	6/26/14 DUP	<5	1.1	<0.50	<0.50	110	<0.50	38	1,900	21	<0.50	1,900	36	0.74	1,600	6.1
	9/30/2014	<15	<15	<15	<15	18	<15	38	520	<15	<15	4,400	61	<15	1,700	32
	9/30/2014 DUP	<15	<15	<15	<15	18	<15	37	510	<15	<15	4,400	60	<15	1,700	30
	12/12/2014	<5	<5	<5	<5	96	<5	20	1,500	12	<5	1,400	19	<5	790	60
	12/12/2014 DUP	<5	<5	<5	<5	110	<5	21	1,500	14	<5	1,500	21	<5	890	68
	3/18/2015	<4.2	<4.2	<4.2	<4.2	72.5	<4.2	48	1,460	17.5	<4.2	5,920	56.5	<4.2	3,970	53.7
	3/18/2015 DUP	<4.2	<4.2	<4.2	<4.2	82.9	<4.2	47.9	1,410	17.8	<4.2	4,930	56.2	<4.2	3,500	46.6
	6/18/2015	<0.50	<0.50	<0.50	<0.50	21.5	<0.5	48.5	628	6.6	<0.50	8,080	94.3	<0.50	2,200	28
	6/18/2015 DUP	<0.50	<0.50	<0.50	<0.50	22.7	<0.50	48.8	614	7.5	<0.50	7,990	98.5	<0.50	2,090	30.7
	9/22/2015	<0.50	<0.50	<0.50	<0.50	4.9	<0.5	31.7	185	2	<0.50	7,200	74.8	<0.50	791	6.8
	12/8/2015	<0.50	<0.50	<0.50	<0.50	150	<0.5	33.5	1,640	16.4	<0.50	2,900	36	<0.50	1,550	87.3
	12/8/15 DUP	<0.50	<0.50	<0.50	<0.50	155	<0.50	35.1	1,680	17.2	<0.50	3,020	37.1	<0.50	1,600	89.8
	3/8/2016	<10	<40	<10	<10	96.6	<10	42	1,520	20.2	<10	4,080	40.8	<10	2,610	64.8
	3/8/16 DUP	<10	<40	<10	<10	93	<10	42.8	1,460	18.2	<10	3,760	40.4	<10	2,560	72.4
	6/16/2016	<10	<40	<10	<10	<10	<10	22.2	507	<10	<10	3,250	29.2	<10	1,030	18.3
	6/16/2016 DUP	<12.5	<50	<12.5	<12.5	19.5	<12.5	23.8	505	<12.5	<12.5	3,460	28.1	<12.5	1,020	17.6
	9/26/2016	<5	<20	<5	<5	10.4	<5	11	235	<5	<5	1,520	14.5	<5	592	10.1
	12/12/2016	<5	<20	<5	<5	72.8	<5	11.2	1,030	10.7	<5	1,730	10.9	<5	812	28.2
	12/12/2016 DUP	<2.5	<10	<2.5	<2.5	78.7	<2.5	14.2	1,010	11.6	<2.5	1,530	15.5	<2.5	975	31.9
	3/28/2017	<5	<20	<5	<5	197	<5	25.5	1,930	19.7	<5	664	17	<5	826	58.5
	3/28/2017 DUP	<5	<20	<5	<5	214	<5	26.7	1,990	21.5	<5	755	19.9	<5	896	63.2
	6/14/2017	<2.5	<10	<2.5	<2.5	40.6	<2.5	15.4	481	6.1	<2.5	531	8.1	<2.5	481	16.5
6/14/2017 DUP	<2.5	<10	<2.5	<2.5	41.8	<2.5	15.8	486	6.2	<2.5	566	8.2	<2.5	506	17.2	
9/26/2017	<2.5	<10	<2.5	<2.5	<2.5	<2.5	26.5	1,160	5.4	<2.5	3,620	38.9	<2.5	1,450	111.0	
9/26/2017 DUP	<2.5	<10	<2.5	<2.5	11.1	<2.5	28.9	1,150	5.4	<2.5	3,710	40.4	<2.5	1,480	111.0	
11/9/2017	<20	<20	<5.0	<5.0	104.0	<5.0	24.9	1,660	24.0	<5.0	1,530	20.2	<5.0	1,020	109.0	
11/9/2017 DUP	<2.0	<2.0	<0.50	<0.50	56.5	<0.50	14.7	1,040	14.7	<0.50	970	13.0	0.75	790	115.0	
MW-19i	06/10/08	<1	<1	<1	<1	<1	<1	<1	8.46	<1	<1	<1	<1	<1	1.28	<1
	09/17/08	<1	<0.500	<0.500	<1	1.93	0.53	<0.500	27.1	<0.500	<0.500	1.72	<0.500	<0.500	5.77	<0.500
	12/10/08	<0.50	<0.50	<0.50	<0.50	1.8	<0.50	<0.50	28	<0.50	<0.50	<0.50	<0.50	<0.50	5.6	<0.50
	03/26/09	<0.50	<0.50	<0.50	<0.50	1.7	<0.50	<0.50	25	<0.50	<0.50	<0.50	<0.50	<0.50	3.3	<0.50
	06/17/09	<0.50	<0.50	<0.50	<0.50	0.9	<0.50	<0.50	10	<0.50	<0.50	0.67	<0.50	<0.50	1.5	<0.50
	09/16/09	<0.50	<0.50	<0.50	<0.50	1.7	0.64	<0.50	28	<0.50	<0.50	<0.50	<0.50	<0.50	1.8	0.79
	12/15/09	<0.50	<0.50	<0.50	<0.50	0.87	<0.50	<0.50	10	<0.50	<0.50	<0.50	<0.50	<0.50	0.7	<0.50
	03/18/10	<0.50	<0.50	<0.50	<0.50	1.1	0.53	<0.50	15	<0.50	<0.50	<0.50	<0.50	<0.50	1.9	<0.50
	06/15/10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	4.7	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MW-19i (continued)	09/22/10	<0.5	<0.5	<0.5	<0.5	1.2	0.58	<0.5	20	<0.5	<0.5	<0.5	<0.5	<0.5	2.4	<0.5
	12/09/10	<0.5	<0.5	<0.5	<0.5	1	<0.5	<0.5	14	<0.5	<0.5	<0.5	<0.5	<0.5	1	<0.5
	03/09/11	<0.50	<0.50	<0.50	<0.50	0.94	<0.50	<0.50	14	<0.50	<0.50	<0.50	<0.50	<0.50	1.4	<0.50
	06/09/11	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.88	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	09/15/11	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	4.1	<0.50	<0.50	<0.50	<0.50	<0.50	0.73	<0.50
	12/09/11	<0.50	<0.50	<0.50	<0.50	0.72	<0.50	<0.50	8.8	<0.50	<0.50	<0.50	<0.50	<0.50	1	<0.50
	03/12/12	<0.50	<0.50	<0.50	<0.50	0.86	<0.50	<0.50	13	<0.50	<0.50	<0.50	<0.50	<0.50	1.4	<0.50
	06/21/12	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	09/13/12	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	4.2	<0.50	<0.50	<0.50	<0.50	<0.50	0.65	<0.50
	12/12/12	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	2.3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/14/13	<0.50	<0.50	<0.50	<0.50	0.65	<0.50	<0.50	9.5	<0.50	<0.50	<0.50	<0.50	<0.50	1.1	<0.50
	06/12/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	2.2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	09/19/13	<0.50	<0.50	<0.50	<0.50	0.56	<0.50	<0.50	6.8	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	12/13/13	<0.50	<0.50	<0.50	<0.50	0.6	<0.50	<0.50	6.6	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	3/20/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	6/24/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	5.1	<0.50	<0.50	0.83	<0.50	<0.50	1.6	<0.50
	9/27/2014	<0.50	<0.50	<0.50	<0.50	0.56	<0.50	<0.50	6.4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	12/10/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	2.7	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	3/18/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	6/16/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	6.3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	9/23/2015	<0.50	<0.50	<0.50	<0.50	0.75	<0.50	<0.50	11	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	12/7/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	3/8/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	5.4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	6/16/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	3.2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	9/28/2016	<5	<2	<0.50	<0.50	<0.50	<0.50	<0.50	5.9	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	12/14/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	2.4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	3/29/2017	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	6/14/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
9/28/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	0.83	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
11/8/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	0.57	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MW-20i	06/10/08	<1	<1	<1	<1	<1	<1	<1	18	<1	<1	5.77	<1	<1	3.2	<1
	09/17/08	<1	<0.500	<0.500	<1	2.12	<0.500	<0.500	42.3	<0.500	<0.500	12.8	<0.500	<0.500	11	<0.500
	12/11/08	<0.50	<0.50	<0.50	<0.50	2.1	<0.50	<0.50	47	<0.50	<0.50	11	<0.50	<0.50	9.3	<0.50
	03/25/09	<0.50	<0.50	<0.50	<0.50	1.8	<0.50	<0.50	36	<0.50	<0.50	8.4	<0.50	<0.50	6.4	<0.50
	06/16/09	<0.50	<0.50	<0.50	<0.50	1.6	<0.50	<0.50	30	<0.50	<0.50	6.3	<0.50	<0.50	5.1	<0.50
	09/17/09	<0.50	<0.50	<0.50	<0.50	1.6	<0.50	<0.50	34	<0.50	<0.50	7.4	<0.50	<0.50	5	<0.50
	12/16/09	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	9.3	<0.50	<0.50	1.1	<0.50	<0.50	0.69	<0.50
	03/18/10	<0.50	<0.50	<0.50	<0.50	2.1	<0.50	<0.50	47	<0.50	<0.50	11	<0.50	<0.50	6.9	<0.50
	06/15/10	<0.50	<0.50	<0.50	<0.50	0.51	<0.50	<0.50	13	<0.50	<0.50	4.3	<0.50	<0.50	2.3	<0.50
	09/22/10	<0.5	<0.5	<0.5	<0.5	1.8	<0.5	<0.5	43	<0.5	<0.5	17	<0.5	<0.5	10	<0.5
	12/09/10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	13	<0.5	<0.5	3.7	<0.5	<0.5	2	<0.5
	03/11/11	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	9.6	<0.50	<0.50	2.4	<0.50	<0.50	2.3	<0.50
	06/08/11	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.9	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	09/15/11	<0.50	<0.50	<0.50	<0.50	0.96	<0.50	<0.50	21	<0.50	<0.50	7.6	<0.50	<0.50	4.5	<0.50
	12/08/11	<0.50	<0.50	<0.50	<0.50	1.2	<0.50	<0.50	26	<0.50	<0.50	6.4	<0.50	<0.50	4.2	<0.50
	03/07/12	<0.50	<0.50	<0.50	<0.50	1.2	<0.50	<0.50	32	<0.50	<0.50	11	<0.50	<0.50	5.9	<0.50
	06/21/12	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8.3	<0.5	<0.5	2.6	<0.5	<0.5	1.5	<0.5
	09/13/12	<0.50	<0.50	<0.50	<0.50	0.83	<0.50	<0.50	18	<0.50	<0.50	6.1	<0.50	<0.50	3.8	<0.50
	12/13/12	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	6.9	<0.50	<0.50	1.4	<0.50	<0.50	0.84	<0.50
	03/14/13	<0.50	<0.50	<0.50	<0.50	1.1	<0.50	<0.50	28	<0.50	<0.50	9.2	<0.50	<0.50	6	<0.50
	06/13/13	<0.50	<0.50	<0.50	<0.50	0.72	<0.50	<0.50	14	<0.50	<0.50	7.3	<0.50	<0.50	3.7	<0.50
	09/19/13	<0.50	<0.50	<0.50	<0.50	0.64	<0.50	<0.50	11	<0.50	<0.50	3.9	<0.50	<0.50	2.4	<0.50
	12/13/13	<0.50	<0.50	<0.50	<0.50	0.9	<0.50	<0.50	16	<0.50	<0.50	2.4	<0.50	<0.50	1.9	<0.50
	3/20/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	3.4	<0.50	<0.50	0.56	<0.50	<0.50	<0.50	<0.50
	6/30/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	4	<0.50	<0.50	1.1	<0.50	<0.50	0.58	<0.50
	9/27/2014	<0.50	<0.50	<0.50	<0.50	0.68	<0.50	<0.50	12	<0.50	<0.50	4.3	<0.50	<0.50	2.6	<0.50
	12/12/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	5.1	<0.50	<0.50	0.68	<0.50	<0.50	<0.50	<0.50
	3/18/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	10.3	<0.50	<0.50	3	<0.50	<0.50	1.7	<0.50
	6/17/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	10.8	<0.50	<0.50	3.7	<0.50	<0.50	2.2	<0.50
	9/23/2015	<0.50	<0.50	<0.50	<0.50	0.69	<0.50	<0.50	13.8	<0.50	<0.50	4.1	<0.50	<0.50	2.1	<0.50
	12/7/2015	Not sampled; well monument under water.														

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MW-20i (continued)	3/8/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	6.8	<0.50	<0.50	3.4	<0.50	<5	1.8	<0.50
	6/16/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	7.4	<0.50	<0.50	2.1	<0.50	<0.50	1.5	<0.50
	9/28/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	8.7	<0.50	<0.50	4	<0.50	<0.50	2.2	<0.50
	12/14/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	2.5	<0.50	<0.50	0.54	<0.50	<0.50	<0.50	<0.50
	3/30/2017	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<0.5	1.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	6/14/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	5.6	<0.50	<0.50	1.5	<0.50	<0.50	0.84	<0.50
	9/27/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	0.7	<0.50	<0.50	<0.50	<0.50
	11/7/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	7.7	<0.50	<0.50	2.8	<0.50	<0.50	1.50	<0.50
MW-21i-105	06/10/08	<2	<2	<2	<2	2	<2	<2	15.8	<2	<2	53.2	<2	<0.50	25.1	<2
	09/18/08	<1	<0.500	<0.500	<1	0.78	<0.500	<0.500	5.42	<0.500	<0.500	2.97	<0.500	<0.50	1.77	<0.500
	12/11/08	<0.50	<0.50	<0.50	<0.50	2.2	<0.50	0.88	61	<0.50	<0.50	33	0.87	<0.50	17	<0.50
	03/26/09	<0.50	<0.50	<0.50	<0.50	1.4	<0.50	<0.50	61	<0.50	<0.50	0.76	<0.50	<0.50	0.7	<0.50
	06/17/09	<0.50	<0.50	<0.50	<0.50	1.8	<0.50	<0.50	76	<0.50	<0.50	4.3	0.6	<0.50	3.4	<0.50
	09/17/09	<0.50	<0.50	<0.50	<0.50	1.6	<0.50	<0.50	73	<0.50	<0.50	11	0.59	<0.50	6.7	<0.50
	12/16/09	<0.50	<0.50	<0.50	<0.50	1.5	<0.50	<0.50	60	<0.50	<0.50	14	0.65	<0.50	9.3	<0.50
	03/18/10	<0.50	<0.50	<0.50	<0.50	1.7	<0.50	<0.50	64	<0.50	<0.50	6.2	0.58	<0.50	7.6	<0.50
	06/15/10	<0.50	<0.50	<0.50	<0.50	1.7	<0.50	0.63	60	<0.50	<0.80	29	0.84	<0.50	22	<0.50
	09/22/10	<0.5	<0.5	<0.5	<0.5	1.7	<0.5	<0.5	75	<0.5	<0.5	5.2	0.55	<0.50	5.1	<0.5
	12/08/10	<0.5	<0.5	<0.5	<0.5	2	<0.5	0.52	72	<0.5	<0.5	27	0.91	<0.50	14	<0.50
	03/09/11	<0.50	<0.50	<0.50	<0.50	1.9	<0.50	0.69	61	<0.50	<0.50	32	1.1	<0.50	17	<0.50
	06/09/11	<0.5	<0.5	<0.5	<0.5	1.6	<0.5	0.61	63	<0.5	<0.5	29	0.7	<0.5	17	<0.5
	09/15/11	<0.50	<0.50	<0.50	<0.50	1.9	<0.50	<0.50	88	<0.50	<0.50	12	0.59	<0.50	12	<0.50
	12/08/11	<0.50	<0.50	<0.50	<0.50	1.6	<0.50	<0.50	73	<0.50	<0.50	15	0.58	<0.50	9.3	<0.50
	03/07/12	<0.50	<0.50	<0.50	<0.50	1	<0.50	<0.50	38	<0.50	<0.50	5.6	<0.50	<0.50	5.7	<0.50
	06/20/12	<0.5	<0.5	<0.5	<0.5	1.1	<0.5	<0.5	52	<0.5	<0.5	1.4	<0.5	<0.5	3	<0.5
	09/12/12	<0.50	<0.50	<0.50	<0.50	0.82	<0.50	<0.50	34	<0.50	<0.50	5	<0.50	<0.50	6.3	<0.50
	12/12/12	<0.50	<0.50	<0.50	<0.50	1.4	<0.50	<0.50	60	1	<0.50	13	<0.50	<0.50	15	<0.50
	03/13/13	<0.50	<0.50	<0.50	<0.50	0.9	<0.50	<0.50	42	<0.50	<0.50	2.4	<0.50	<0.50	3.7	<0.50
06/13/13	<0.50	<0.50	<0.50	<0.50	1.2	<0.50	<0.50	48	<0.50	<0.50	1.2	<0.50	<0.50	9.9	<0.50	
09/18/13	<0.50	<0.50	<0.50	<0.50	1.1	<0.50	<0.50	51	<0.50	<0.50	2.8	<0.50	<0.50	4.2	<0.50	
12/12/13	<0.50	<0.50	<0.50	<0.50	1.4	<0.50	<0.50	61	1.6	<0.50	4	<0.50	<0.50	5.4	<0.50	
3/20/2014	<0.50	<0.50	<0.50	<0.50	1.2	<0.50	<0.50	52	<0.50	<0.50	4.4	<0.50	<0.50	6.8	<0.50	
6/25/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)															
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride	
MW-21i-105 (continued)	9/26/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	5.8	<0.50	<0.50	5.4	<0.50	<0.50	3.3	<0.50	
	12/10/2014	<0.50	<0.50	<0.50	<0.50	0.94	<0.50	<0.50	37	<0.50	<0.50	5.4	<0.50	<0.50	9.6	<0.50	
	3/17/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	13.3	<0.50	<0.50	6.6	<0.50	<0.50	5.4	<0.50	
	6/17/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	20.8	<0.50	<0.50	3.5	<0.50	<0.50	4	<0.50	
	9/23/2015	<0.50	<0.50	<0.50	<0.50	0.91	<0.50	<0.50	41.4	<0.50	<0.50	3.4	<0.50	<0.50	5.4	<0.50	
	12/7/2015	<0.50	<0.50	<0.50	<0.50	0.79	<0.50	<0.50	28.5	<0.50	<0.50	4.9	<0.50	<0.50	8.1	<0.50	
	3/8/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	6/16/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	9/26/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	11.7	<0.50	<0.50	5.8	<0.50	<0.50	5.1	<0.50	
	12/13/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	3/29/2017	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<0.5	4.8	<0.5	<0.5	5.7	<0.5	<0.5	2.9	<0.5	
	6/13/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	4.7	<0.50	<0.50	7.6	<0.50	<0.50	4.1	<0.50	
	9/27/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	4.3	<0.50	<0.50	5.7	<0.50	<0.50	3.9	<0.50	
	11/8/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	13.0	<0.50	<0.50	7.4	<0.50	<0.50	6.4	<0.50	
MW-21i-40	09/18/08	<1	<0.500	<0.500	<1	7.48	<0.500	4.38	124	0.77	<0.500	107	2.01	<0.500	133	<0.500	
	12/11/08	<0.50	<0.50	<0.50	<0.50	6.6	<0.50	3.6	130	0.84	<0.50	100	1.6	<0.50	110	<0.50	
	03/26/09	<0.50	<0.50	<0.50	<0.50	6.2	<0.50	3.6	130	0.63	<0.50	77	1.3	<0.50	88	<0.50	
	06/17/09	<0.50	<0.50	<0.50	<0.50	6.6	<0.50	3.1	120	0.79	<0.50	71	1.5	<0.50	88	<0.50	
	09/18/09	<0.50	<0.50	<0.50	<0.50	5.9	<0.50	3.2	120	1	<0.50	75	1.3	<0.50	92	0.55	
	12/16/09	<0.50	<0.50	<0.50	<0.50	5.7	<0.50	2.6	120	1	<0.50	90	1.2	<0.50	89	<0.50	
	03/18/10	<0.50	<0.50	<0.50	<0.50	5.5	<0.50	2.8	120	0.74	<0.50	84	1.1	<0.50	91	<0.50	
	06/15/10	<0.50	<0.50	<0.50	<0.50	5.4	<0.50	2.4	120	0.89	<0.50	62	1.2	<0.50	64	<0.50	
	09/22/10	<0.5	<0.5	<0.5	<0.5	4.9	<0.5	2.2	110	0.73	<0.5	68	0.93	<0.5	75	<0.5	
	12/08/10	<0.5	<0.5	<0.5	<0.5	5.1	<0.5	2.3	110	0.77	<0.5	72	1	<0.5	69	<0.5	
	03/10/11	<0.50	<0.50	<0.50	<0.50	4.6	<0.50	1.9	100	0.64	<0.50	53	1	<0.50	57	<0.50	
	06/09/11	<0.5	<0.5	<0.5	<0.5	4.7	<0.5	2.1	110	0.7	<0.5	50	0.96	<0.5	55	<0.5	
	09/15/11	<0.50	<0.50	<0.50	<0.50	5	<0.50	1.9	110	0.65	<0.50	54	1.1	<0.50	57	<0.50	
	12/08/11	<0.50	<0.50	<0.50	<0.50	4.8	<0.50	2.1	110	0.66	<0.50	61	0.96	<0.50	60	<0.50	
	03/07/12	<0.50	<0.50	<0.50	<0.50	5.3	<0.50	2.1	110	0.76	<0.50	74	1.5	<0.50	58	<0.50	
	06/20/12	<0.5	<0.5	<0.5	<0.5	5	<0.5	2	160	0.84	<0.5	19	0.81	<0.5	23	<0.5	
	09/12/12	<0.50	<0.50	<0.50	<0.50	5	<0.50	1.8	110	0.63	<0.50	50	1.1	<0.50	48	<0.50	
12/12/12	<0.50	<0.50	<0.50	<0.50	5.3	<0.50	2	120	0.69	<0.50	74	1.1	<0.50	53	<0.50		

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MW-21i-40 (continued)	03/13/13	<0.50	<0.50	<0.50	<0.50	4.6	<0.50	1.8	120	0.6	<0.50	43	0.83	<0.50	42	<0.50
	06/13/13	<0.50	<0.50	<0.50	<0.50	1.2	<0.50	<0.50	48	<0.50	<0.50	12	<0.50	<0.50	9.9	<0.50
	09/18/13	<0.50	<0.50	<0.50	<0.50	4.7	<0.50	1.4	100	0.53	<0.50	38	0.68	<0.50	33	<0.50
	12/12/13	<0.50	<0.50	<0.50	<0.50	4.6	<0.50	1.3	100	1	<0.50	41	0.73	<0.50	37	<0.50
	3/20/2014	<0.50	<0.50	<0.50	<0.50	4.5	<0.50	1.5	100	0.61	<0.50	40	0.76	<0.50	34	<0.50
	6/25/2014	<0.50	<0.50	<0.50	<0.50	4.3	<0.50	1.3	100	0.51	<0.50	33	0.65	<0.50	29	<0.50
	9/26/2014	<0.50	<0.50	<0.50	<0.50	4	<0.50	1.4	100	86	<0.50	31	0.51	<0.50	32	<0.50
	12/10/2014	<0.50	<0.50	<0.50	<0.50	4.2	<0.50	1.4	100	0.6	<0.50	30	0.51	<0.50	32	<0.50
	3/17/2015	<0.50	<0.50	<0.50	<0.50	3.8	<0.50	1.5	102	0.51	<0.50	43.6	<0.50	<0.50	37.2	<0.50
	6/19/2015	<0.50	<0.50	<0.50	<0.50	2.7	<0.50	0.76	61.6	<0.50	<0.50	24.7	<0.50	<0.50	21.8	<0.50
	9/23/2015	<0.50	<0.50	<0.50	<0.50	3.3	<0.50	0.95	84.2	<0.50	<0.50	26.3	<0.50	<0.50	26.6	<0.50
	12/7/2015	<0.50	<0.50	<0.50	<0.50	2.8	<0.50	0.7	63.6	<0.50	<0.50	24.7	<0.50	<0.50	21.1	<0.50
	3/9/2016	<0.50	<2	<0.50	<0.50	2.1	<0.50	<0.50	58.6	<0.50	<0.50	14.2	<0.50	<0.50	15.1	<0.50
	6/16/2016	<0.50	<2	<0.50	<0.50	2.3	<0.50	0.8	67.8	<0.50	<0.50	18.1	<0.50	<0.50	17.1	<0.50
	9/26/2016	<0.50	<2	<0.50	<0.50	2.6	<0.50	0.87	77.2	<0.50	<0.50	20.1	<0.50	<0.50	19.8	<0.50
	12/13/2016	<0.50	<2	<0.50	<0.50	2.4	<0.50	0.83	74.2	<0.50	<0.50	21.4	<0.50	<0.50	19.4	<0.50
	3/29/2017	<0.5	<2	<0.5	<0.5	2.6	<0.5	0.91	87.6	0.58	<0.5	21.8	<0.5	<0.5	16.2	<0.5
	6/13/2017	<2.0	<2.0	<0.50	<0.50	2.3	<1.0	0.63	63.6	0.56	<0.50	24.1	<0.50	<0.50	15.1	<0.50
	9/27/2017	<2.0	<2.0	<0.50	<0.50	2.3	<1.0	0.70	60.0	<0.50	<0.50	18.1	<0.50	<0.50	15.0	<0.50
	11/8/2017	<2.0	<2.0	<0.50	<0.50	2.6	<0.50	0.84	65.4	0.63	<0.50	17.4	<0.50	<0.50	14.6	<0.50
MW-22i	06/10/08	<1	<1	<1	<1	1.02	<1	<1	30	<1	<1	10.3	<1	<1	30	<1
	09/17/08	<1	<0.500	<0.500	<1	7.48	<0.500	4.38	124	0.77	<0.500	107	2.01	<0.500	133	<0.500
	12/11/08	<0.50	<0.50	<0.50	<0.50	1.2	<0.50	0.73	63	<0.50	<0.50	1.1	<0.50	<0.50	6.8	<0.50
	03/25/09	<0.50	<0.50	<0.50	<0.50	1.1	<0.50	0.64	50	<0.50	<0.50	2.5	<0.50	<0.50	14	<0.50
	06/16/09	<0.50	<0.50	<0.50	<0.50	1.2	<0.50	0.52	39	<0.50	<0.50	8.5	<0.50	<0.50	24	<0.50
	09/17/09	<0.50	<0.50	<0.50	<0.50	1	<0.50	0.57	40	<0.50	<0.50	3.3	<0.50	<0.50	21	<0.50
	12/15/09	<0.50	<0.50	<0.50	<0.50	0.8	<0.50	<0.50	28	<0.50	<0.50	3.8	<0.50	<0.50	20	<0.50
	03/18/10	<0.50	<0.50	<0.50	<0.50	0.86	<0.50	<0.50	34	<0.50	<0.50	2.6	<0.50	<0.50	16	<0.50
	06/14/10	<0.50	<0.50	<0.50	<0.50	0.6	<0.50	<0.50	17	<0.50	<0.50	4	<0.50	<0.50	18	<0.50
	09/22/10	<0.5	<0.5	<0.5	<0.5	0.75	<0.5	<0.5	24	<0.5	<0.5	3.6	<0.5	<0.5	18	<0.5
	12/08/10	<0.5	<0.5	<0.5	<0.5	0.73	<0.5	<0.5	21	<0.5	<0.5	3.5	<0.5	<0.5	18	<0.5
	03/11/11	<0.50	<0.50	<0.50	<0.50	0.67	<0.50	<0.50	17	<0.50	<0.50	3.6	<0.50	<0.50	17	<0.50
	06/08/11	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	<0.5	18	<0.5	<0.5	1.8	<0.5	<0.5	12	<0.5

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MW-22i (continued)	09/14/11	<0.50	<0.50	<0.50	<0.50	0.55	<0.50	<0.50	18	<0.50	<0.50	1.3	<0.50	<0.50	11	<0.50
	12/08/11	<0.50	<0.50	<0.50	<0.50	0.58	<0.50	<0.50	17	<0.50	<0.50	2.5	<0.50	<0.50	14	<0.50
	03/06/12	<0.50	<0.50	<0.50	<0.50	0.51	<0.50	<0.50	13	<0.50	<0.50	2.4	<0.50	<0.50	13	<0.50
	06/20/12	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	<0.5	12	<0.5	<0.5	1.9	<0.5	<0.5	11	<0.5
	09/12/12	<0.50	<0.50	<0.50	<0.50	0.52	<0.50	<0.50	16	<0.50	<0.50	1.5	<0.50	<0.50	10	<0.50
	12/13/12	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	13	<0.50	<0.50	1.8	<0.50	<0.50	11	<0.50
	03/13/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	12	<0.50	<0.50	2.2	<0.50	<0.50	11	<0.50
	06/12/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	14	<0.50	<0.50	1.1	<0.50	<0.50	9.6	<0.50
	09/18/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	10	<0.50	<0.50	2.1	<0.50	<0.50	11	<0.50
	12/12/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	9.3	<0.50	<0.50	1.4	<0.50	<0.50	8.2	<0.50
	3/19/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	10	<0.50	<0.50	1.3	<0.50	<0.50	9.6	<0.50
	6/25/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	9	<0.50	<0.50	1.1	<0.50	<0.50	5.7	<0.50
	9/26/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	8.8	<0.50	<0.50	1.7	<0.50	<0.50	9.8	<0.50
	12/10/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	9.2	<0.50	<0.50	2.1	<0.50	<0.50	11	<0.50
	3/17/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	8.2	<0.50	<0.50	1.8	<0.50	<0.50	8.7	<0.50
	6/16/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	8.6	<0.50	<0.50	1.6	<0.50	<0.50	9	<0.50
	9/23/2015	<0.50	<0.50	<0.50	<0.50	0.5	<0.50	<0.50	10	<0.50	<0.50	2.1	<0.50	<0.50	1.15	<0.50
	12/7/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	8	<0.50	<0.50	2.1	<0.50	<0.50	11	<0.50
	3/9/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	8	<0.50	<0.50	2.2	<0.50	<0.50	12	<0.50
	6/16/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	6.5	<0.50	<0.50	1	<0.50	<0.50	7.9	<0.50
9/28/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	8.1	<0.50	<0.50	1.3	<0.50	<0.50	9	<0.50	
12/13/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	8.6	<0.50	<0.50	2	<0.50	<0.50	10.2	<0.50	
3/29/2017	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<0.5	10	<0.5	<0.5	1.1	<0.5	<0.5	9.7	<0.5	
6/13/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	9.6	<0.50	<0.50	0.63	<0.50	<0.50	6.2	<0.50
9/27/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	8.8	<0.50	<0.50	0.88	<0.50	<0.50	6.3	<0.50
11/7/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	9.7	<0.50	<0.50	1.20	<0.50	<0.50	6.4	<0.50
MW-23i	06/10/08	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	06/10/08 DUP	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	09/17/08	<1	<0.500	<0.500	<1	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
	12/09/08	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/25/09	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	06/16/09	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.54	<0.50	<0.50	<0.50	<0.50
	09/16/09	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
12/15/09	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MW-23i (continued)	03/17/10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	07/02/10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	09/22/10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	12/08/10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	03/09/11	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	06/08/11	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	09/13/11	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	12/06/11	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/07/12	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	06/19/12	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	09/11/12	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.67	<0.50	<0.50	<0.50	<0.50
	12/12/12	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/12/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	06/12/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	09/18/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	12/11/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	3/19/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	6/25/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	9/24/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	12/9/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	3/18/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.78	<0.50
	6/16/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	9/17/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	12/7/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	3/8/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	6/16/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	9/27/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	12/13/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
3/27/2017	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
6/13/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
9/26/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
11/8/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MW-24i	10/01/10	<0.50	<0.50	<0.50	<0.50	3.3	<0.50	0.94	52	<0.50	<0.50	52	1.9	<0.50	29	<0.50
	12/10/10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	3.5	<0.5	<0.5	6.3	<0.5	<0.5	2	<0.5
	03/14/11	<0.50	<0.50	<0.50	<0.50	0.88	<0.50	<0.50	15	<0.50	<0.50	23	1	<0.50	7.4	<0.50
	06/07/11	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2	<0.5	<0.5	6.6	<0.5	<0.5	1.4	<0.5
	09/16/11	<0.50	<0.50	<0.50	<0.50	13	<0.50	2.5	270	1.7	<0.50	27	5.6	<0.50	24	19
	12/07/11	<0.50	<0.50	<0.50	<0.50	5	<0.50	0.84	100	<0.50	<0.50	19	2.9	<0.50	14	7.5
	03/12/12	<0.50	<0.50	<0.50	<0.50	5.9	<0.50	<0.50	79	<0.50	<0.50	30	2.3	<0.50	11	4.5
	06/22/12	<0.5	<0.5	<0.5	<0.5	1.8	<0.5	<0.5	14	<0.5	<0.5	0.85	<0.5	<0.5	<0.5	2.6
	09/14/12	<0.50	<0.50	<0.50	<0.50	4.4	<0.50	0.87	58	<0.50	<0.50	31	0.79	<0.50	20	<0.50
	12/14/12	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	5.1	<0.50	<0.50	2.1	<0.50	<0.50	0.65	<0.50
	03/15/13	<0.50	<0.50	<0.50	<0.50	2.8	<0.50	<0.50	48	<0.50	<0.50	23	0.57	<0.50	15	<0.50
	06/14/13	<0.50	<0.50	<0.50	<0.50	2.7	<0.50	<0.50	28	<0.50	<0.50	6.2	<0.50	<0.50	3.6	<0.80
	09/20/13	<0.50	<0.50	<0.50	<0.50	1	<0.50	<0.50	15	<0.50	<0.50	15	<0.50	<0.50	5.9	<0.80
	12/16/13	<0.50	<0.50	<0.50	<0.50	1.3	<0.50	<0.50	8.4	<0.50	<0.50	6.7	<0.50	<0.50	3.4	<0.50
	3/24/2014	<0.50	<0.50	<0.50	<0.50	1.3	<0.50	<0.50	16	<0.50	<0.50	10	<0.50	<0.50	5.5	<0.80
	6/23/2014	<0.50	<0.50	<0.50	<0.50	1.2	<0.50	<0.50	13	<0.50	<0.50	1.3	<0.50	<0.50	5.2	2.1
	9/30/2014	<0.50	<0.50	<0.50	<0.50	1.8	<0.50	<0.50	21	<0.50	<0.50	20	<0.50	<0.50	10	<0.50
	12/15/2014	<0.50	<0.50	<0.50	<0.50	0.6	<0.50	<0.50	12	<0.50	<0.50	2.4	<0.50	<0.50	1.1	<0.50
	3/20/2015	<0.50	<0.50	<0.50	<0.50	0.58	<0.50	<0.50	5.9	<0.50	<0.50	6.1	<0.50	<0.50	3.1	<0.50
	6/18/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	3.4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	9/22/2015	<0.50	<0.50	<0.50	<0.50	1.9	<0.50	<0.50	4.7	<0.50	<0.50	2.2	<0.50	<0.50	0.8	<0.50
	12/8/2015	<0.50	<0.50	<0.50	<0.50	0.7	<0.50	<0.50	18	<0.50	<0.50	189	<0.50	<0.50	36.4	<0.50
	3/8/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	3.5	<0.50	<0.50	4.1	<0.50	<0.50	1.6	<0.50
	6/17/2016	<0.50	<2	<0.50	<0.50	0.99	<0.50	<0.50	7.8	<0.50	<0.50	11.5	<0.50	<0.50	6.3	<0.50
	9/28/2016	<0.50	<2	<0.50	<0.50	0.53	<0.50	<0.50	5.4	<0.50	<0.50	5.8	<0.50	<0.50	3.1	<0.50
	12/12/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.1	<0.50	<0.50	<0.50	<0.50
	3/30/2017	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	<0.5	<0.5	1	<0.5	<0.5	<0.5	<0.5
6/15/2017	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	3.2	<0.50	<0.50	6.6	<0.50	<0.50	2.8	<0.50
9/26/2017	<2.0	<2.0	<0.50	<0.50	2.10	<1.0	<0.50	24.5	<0.50	<0.50	30.1	<0.50	<0.50	16.6	<0.50	
11/9/2017	<2.0	<2.0	<0.50	<0.50	1.10	<0.50	<0.50	9.6	<0.50	<0.50	12.7	<0.50	<0.50	5.9	<0.50	
MW-24d	09/14/11	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	12/09/11	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/08/12	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	06/21/12	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MW-24d (continued)	09/14/12	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	12/14/12	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/15/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	06/14/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	09/20/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	2.2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	12/16/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	7	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	3/24/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	12	<0.50	<0.50	4	<0.50	<0.50	1.6	<0.50
	6/23/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	3.9	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/2/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	4.2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	12/15/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	3/18/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	3.8	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	6/18/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	3.8	<0.50	<0.50	3.8	<0.50	<0.50	1.7	<0.50
	9/18/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	2.1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	12/9/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	3/9/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	1.4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	6/17/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	0.87	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	9/30/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	0.62	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	12/12/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	3/28/2017	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	6/15/2017	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
9/25/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
11/6/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
MW-25i	09/16/11	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	12/08/11	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/06/12	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	06/20/12	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	09/11/12	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	12/12/12	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/13/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	06/13/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	09/18/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	12/11/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	3/19/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	6/25/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)															
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride	
MW-25i (continued)	9/24/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
	12/9/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
	3/17/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
	6/16/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
	9/21/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.75	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
	12/7/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
	3/9/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
	3/9/2016 DUP	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
	6/15/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
	9/29/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	0.81	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
	12/13/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	0.77	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
	3/29/2017	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
	6/15/2017	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
	9/27/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
	11/8/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
	MW-26	09/16/11	<2	<2	<2	<2	7	<2	2.2	120	2.6	<2	250	5.7	<2	490	<2
		12/08/11	<2	<2	<2	<2	7.1	<2	2.5	110	2.2	<2	300	5.8	<2	500	<2
03/06/12		<2	<2	<2	<2	8.2	<2	2.2	99	<2	<2	210	4.6	<2	450	<2	
06/19/12		<2	<2	<2	<2	14	<2	3	90	<2	<2	160	5.2	<2	460	<2	
09/11/12		<2	<2	<2	<2	6.3	<2	2.3	110	3	<2	280	4.3	<2	460	<2	
12/12/12		<2	<2	<2	<2	5.6	<2	<2	120	3.7	<2	300	3.8	<2	470	<2	
03/13/13		<2	<2	<2	<2	4.9	<2	<2	83	<2	<2	210	2.9	<2	390	<2	
06/12/13		<2	<2	<2	<2	8.2	<2	<2	80	<2	<2	170	4.5	<2	360	<2	
09/18/13		<2	<2	<2	<2	5.7	<2	<2	96	2.4	<2	210	3.2	<2	410	<2	
12/11/13		<2	<2	<2	<2	7.8	<2	<2	75	<2	<2	150	3.9	<2	370	<2	
3/19/2014		<2	<2	<2	<2	4.9	<2	<2	95	2.1	<2	220	2.9	<2	350	<2	
6/24/2014		<0.50	<0.50	<0.50	<0.50	2.7	<0.50	6.4	49	0.86	<0.50	150	2.1	<0.50	200	<0.50	
9/24/2014		<2	<2	<2	<2	3.9	<2	<2	68	<2	<2	220	3.1	<2	340	<2	
12/9/2014		<0.90	<0.90	<0.90	<0.90	3.8	<0.90	0.96	55	1.3	<0.90	160	2.8	<0.90	280	<0.90	
3/17/2015		<1	<1	<1	<1	5.8	<1	1.7	75.7	1.8	<1	265	3.7	<1	458	<1	
6/16/2015		<1.7	<1.7	<1.7	<1.7	5	<1.7	<1.7	77.9	<1.7	<1.7	205	2.8	<1.7	385	<1.7	
9/21/2015		<1.7	<1.7	<1.7	<1.7	4.3	<1.7	<1.7	72.4	1.7	<1.7	176	2.7	<1.7	326	<1.7	
12/7/2015	<1.2	<1.2	<1.2	<1.2	8.5	<1.2	1.7	75	1.6	<1.2	179	3.5	<1.2	393	<1.2		
3/8/2016	<1.2	<5	<1.2	<1.2	8	<1.2	1.5	76.1	1.8	<1.2	171	3.7	<1.2	370	<1.2		

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MW-26 (continued)	6/15/2016	<1	<4	<1	<1	4.6	<1	1.4	83.1	2.2	<1	192	2.2	<1	343	<1
	9/27/2016	<0.50	<2	<0.50	<0.50	3.9	<0.50	1.1	61.1	1.6	<0.50	160	2.4	<0.50	288	<0.50
	12/13/2016	<0.50	<2	<0.50	<0.50	8.9	<0.50	2.4	85.9	2	<0.50	167	3.3	<0.50	410	<0.50
	3/29/2017	<5	<20	<5	<5	<5	<5	<5	170	<5	<5	214	<5	<5	452	<5
	6/13/2017	<2.0	<2.0	<0.50	<0.50	6.7	<1.0	1.9	113	2.0	<0.50	160	2.1	<0.50	311 E, J	0.65
	9/26/2017	<2.0	<2.0	<0.50	<0.50	5.1	<1.0	1.0	192	2.1	<0.50	68	0.8	<0.50	192	0.98
	11/8/2017	<2.0	2	<0.50	<0.50	4.8	<0.50	1.5	204	2.3	<0.50	88	1.0	<0.50	170	1.80
	MW-32s	03/24/05	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	5.79	<0.50	--	<0.50
08/18/05		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/14/05		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
03/06/08		<1	<0.500	<0.500	<1	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
09/17/08		<1	<0.500	<0.500	<1	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
12/09/08		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
06/16/09		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
12/15/09		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
07/02/10		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
09/22/10		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
12/07/10		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
06/09/11		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.4	<0.5	<0.5	0.94	<0.5	<0.5	1.1	<0.5
09/15/11		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
12/08/11		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
06/21/12		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
09/13/12		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
12/11/12		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
03/14/13		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
06/11/13		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
09/20/13		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
12/16/13		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
3/24/2014		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
6/25/2014		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
6/25/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
12/11/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MW-32s (continued)	3/19/2015	<0.50	<0.50	0.77	<0.50	1.5	<0.50	<0.50	73.5	2.5	<0.50	<0.50	3.5	<0.50	52	<0.50
	6/17/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	12/7/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	6/16/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	6/16/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	12/14/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	6/14/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/10/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	MW-32i	11/10/17	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	7	<0.50	<0.50	8.2	<0.50	<0.50	3.4
MW-F	06/14/95	--	<10	<5	<5	<5	5	<5	15	<5	--	<5	<5	--	<5	<10
	02/27/01	<1	<5	<0.50	<0.50	0.754	<0.50	<0.50	5.99	<0.50	<0.50	0.506	<1	--	1.18	<0.50
	05/29/01	<1	<5	<0.50	<0.50	0.58	<0.50	<0.50	6.47	<0.50	<0.50	<0.50	<1	--	0.585	<0.50
	09/24/01	<0.50	<0.50	<0.50	<0.50	1.2	<0.50	<0.50	6.5	<0.50	<0.50	<0.50	<0.50	--	<0.50	<0.50
	12/18/01	<1	<5	<0.50	<0.50	1.44	<0.50	<0.50	17.9	<0.50	<0.50	<0.50	<1	--	0.709	<0.50
	03/18/02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	05/31/02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	08/28/02	<1	<0.50	<0.50	<1	1.12	0.65	<0.50	9.54	<0.50	<0.50	<0.50	<0.50	--	0.69	<0.50
	11/08/02	<1	<0.50	<0.50	<1	1.15	0.81	<0.50	9.86	<0.50	<0.50	<0.50	<0.50	--	0.65	<0.50
	01/23/03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	05/29/03	<1	<0.50	<0.50	<1	1.11	0.83	<0.50	10.6	<0.50	<0.50	<0.50	<0.50	--	0.62	<0.50
	11/10/03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	01/26/04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	05/04/04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	08/17/04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/02/04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/15/04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	03/24/05	<1	<0.50	<0.50	<1	0.87	0.64	<0.50	8.31	<0.50	<0.50	0.52	<0.50	--	0.74	<0.50
	05/17/05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	08/18/05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/14/05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
12/13/07	<1	<0.50	<0.50	<1	0.5	0.52	<0.50	5.93	<0.50	<0.50	<0.50	<0.50	--	<0.50	<0.50	
09/18/08	<1	<0.500	<0.500	<1	0.85	0.72	<0.500	8.57	<0.500	<0.500	<0.500	<0.500	<0.500	0.57	<0.500	

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
EW-1	04/25/91	--	<2	--	--	35	20	--	750	--	--	9,100	280	--	440	9.3
	11/17/93	--	<200	---	--	<100	<100	--	1,700	--	--	8,600	<100	--	480	<200
	09/01/95	<25	<50	<25	<25	<25	<25	<25	140	<25	<25	2,400	74	--	340	<50
	09/24/96	<1	<4	3	<0.4	8.5	2.1	<0.40	260	6.2	<0.40	49	34	--	29	89
	12/02/96	0.7	<0.50	1.9	<0.20	5.7	5	1	530	3.3	<0.20	310	86	--	98	10
	11/12/97	<2.5	<5	<2.5	<2.5	5.05	3.38	<2.5	68.5	4.91	<2.5	111	5.1	--	47.4	9.2
	08/11/99	<10	<50	<5	<5	<5	<5	<5	14.5	<5	<5	369	<10	--	39.9	<5
	11/16/99	<5	<12.5	<2.5	<5	<2.5	3.15	<2.5	41.7	3	<2.5	314	6.9	--	35.5	5.1
	02/29/00	<2	<10	<1	<1	<1	6.42	<1	13.7	<1	<1	97.3	3.48	--	20.8	<1
	06/27/00	<2	<10	2.12	<1	<1	6.42	<1	17.5	<1	<1	293	5.37	--	35.1	<1
	08/31/00	<5	<25	<2.5	<2.5	<2.5	<2.5	<2.5	31.9	<2.5	<2.5	325	<5	--	38.4	<2.5
	01/30/00	<5	<25	<2.5	<2.5	<2.5	<2.5	<2.5	45.6	<2.5	<2.5	380	5.86	--	53.9	<2.5
	02/27/01	<2	<10	1.42	<1	2.51	2.83	<1	35	<1	<1	240	7.98	--	47.5	2.43
	05/29/01	<10	<50	<5	<5	<5	<5	<5	22.4	<5	<5	338	<10	--	61.1	<5
	09/25/01	<5	<5	<5	<5	<5	<5	<5	14	<5	<5	320	9.5	--	61	<5
	12/17/01	<2	<10	<1	<1	1.19	<1	<1	25.8	<1	<1	217	12.8	--	47.1	<1
	03/19/02	<2	<1	<1	<2	1.04	<1	<1	17.5	<1	<1	323	5.66	--	46.1	<1
	05/30/02	<2	<1	1.38	<2	1	1.68	<1	23.5	<1	<1	319	6.46	--	39.9	<1
	08/29/02	<2	<1	1.36	<2	2.44	1.24	<1	20.4	<1	<1	307	3.38	--	37.8	<1
	11/08/02	<2	<1	1.46	<2	3.02	3.96	<1	28.4	<1	<1	274	5.54	--	50.2	<1
	01/23/03	<2	<1	1.36	<2	2.34	<1	<1	17	<1	<1	252	5.06	--	51.9	<1
	05/30/03	<2	<1	5.22	<2	<1	<1	<1	6.12	<1	<1	255	5.06	--	41.1	<1
	11/10/03	<5	<5	<5	<5	<5	<5	<5	9	<5	<5	85.8	<5	--	16.2	<5
	01/27/04	<1	<0.50	2.07	<1	0.87	0.78	<0.50	5.2	<0.50	<0.50	151	4.26	--	37.6	<0.50
	05/04/04	<1	<1	4.73	<1	<1	1.25	<1	4.36	<1	<1	168	3.09	--	30.8	<1
	08/17/04	<1	<0.50	3.76	<0.50	0.81	1.86	<0.50	6.83	<0.50	<0.50	144	1.73	--	23.2	<0.50
	11/17/04	<2.5	<2.5	4	<2.5	<2.5	<2.5	<2.5	9.6	<2.5	<2.5	180	3.6	--	33	<2.5
	05/18/05	<2	<1	<1	<2	<1	<1	<1	8.28	<1	<1	207	<1	--	23.2	2.3
	11/14/05	<2	<1	1.06	<2	1.36	2.7	<1	11.1	<1	<1	187	<1	--	26.1	<1
	06/05/06	<1	<1	2.4	<1	<1	<1	<1	6.18	<1	<1	102	3.55	--	19.1	<1
	12/06/06	<1	<0.50	2.07	<1	1.13	<0.50	<0.50	8.98	<0.50	<0.50	133	2.1	--	28.3	<0.50

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
EW-1 (continued)	09/12/07	<1	<0.50	2.66	<1	0.51	1.14	<0.50	6.28	<0.50	<0.50	76.9	1.47	--	18.3	<0.50
	03/06/08	<1	<0.500	1.71 J	<1	0.64	1.04	<0.500	5.75	<0.500	<0.500	80.9	1.45	<0.500	19.9	<0.500
	09/19/08	<5	<2.50	<2.50	<5	<2.50	<2.50	<2.50	14.6	<2.50	<2.50	86.1	<2.50	<2.50	20.8	<2.50
	03/26/09	<0.50	<0.50	3.6	<0.50	<0.50	0.76	<0.50	3.8	<0.50	<0.50	81	1	<0.50	14	<0.50
	09/17/09	<0.50	<0.50	3.4	<0.50	0.63	<0.50	<0.50	8.3	<0.50	<0.50	100	0.74	<0.50	17	<0.50
	03/19/10	<0.50	<0.50	3.5 BE	<0.50	<0.50	<0.50	0.52	4.1	<0.50	<0.50	89	1.5	<0.50	22	<0.50
	09/23/10	<0.50	<0.50	1.7 BE	<0.50	0.86	0.94	<0.50	10	<0.50	<0.50	87	0.64	<0.50	17	<0.50
	03/10/11	<0.50	<0.50	5.2	<0.50	<0.50	<0.50	<0.50	2.9	<0.50	<0.50	67	0.89	<0.50	13	<0.50
	09/16/11	<0.50	<0.50	2.7	<0.50	<0.50	<0.50	<0.50	2.1	<0.50	<0.50	75	0.69	<0.50	9.9	<0.50
	03/12/12	<0.50	<0.50	4.4	<0.50	<0.50	<0.50	<0.50	3	<0.50	<0.50	52	0.68	<0.50	13	<0.50
	09/13/12	<0.50	<0.50	1.7	<0.50	<0.50	<0.50	<0.50	2.1	<0.50	<0.50	60	0.58	<0.50	8.6	<0.50
	03/15/12	<0.50	<0.50	2.4	<0.50	<0.50	<0.50	<0.50	3.1	<0.50	<0.50	78	0.63	<0.50	12	<0.50
	09/19/13	<0.50	<0.50	2.2	<0.50	<0.50	<0.50	<0.50	5.3	<0.50	<0.50	63	0.57	<0.50	14	<0.50
	3/20/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.3	<0.50	<0.50	32	1.6	<0.50	12	<0.50
	9/27/2014	Insufficient water for sampling during monitoring event.														
	9/21/2015	<0.50	<0.50	2	<0.50	<0.50	<0.50	<0.50	3.9	<0.50	<0.50	45.3	0.56	<0.50	12.5	<0.50
	3/8/2016	<0.50	<2	2	<0.50	<0.50	<0.50	<0.50	2.9	<0.50	<0.50	62.6	0.83	<0.50	14.3	<0.50
	9/29/2016	<0.50	<2	1.1	<0.50	<0.50	1.5	<0.50	5.4	<0.50	<0.50	38.6	<0.50	<0.50	10.5	<0.50
	3/30/2017	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	10.7	<0.50	<0.50	2.4	<0.50
	9/28/2017	<2.0	<2.0	2.4	<0.50	<0.50	<1.0	<0.50	1.8	<0.50	<0.50	32.4	<0.50	<0.50	7.2	<0.50
11/9/2017	<2.0	<2.0	0.91	<0.50	<0.50	<0.50	<0.50	3.30	<0.50	<0.50	33.0	0.66	<0.50	7.3	<0.50	
S-1	08/10/99	<1	<5	<0.50	<1	<0.50	<0.50	<0.50	2.63	<0.50	<0.50	7.81	1.3	--	20.6	<0.50
	02/29/00	<1	<5	<0.50	<0.50	0.761	<0.50	<0.50	2.21	<0.50	<0.50	60.6	2.98	--	24.4	<0.50
	06/28/00	<5	<25	<2.5	<2.5	<2.5	<2.5	2.7	58.2	<2.5	<2.5	749	14.5	--	232	<2.5
	08/31/00	<5	<25	<2.5	<2.5	<2.5	<2.5	4.98	<2.5	<2.5	313	5.14	--	60.4	<2.5	
	11/30/00	<1	<5	<0.50	<0.50	<0.50	<0.50	1.61	<0.50	<0.50	9.78	1.95	--	29.8	<0.50	
	02/27/01	<1	<5	<0.50	<0.50	<0.50	<0.50	0.551	1.66	<0.50	<0.50	13.5	2.26	--	45.2	<0.50
	05/30/01	<1	<5	<0.50	<0.50	<0.50	<0.50	0.974	<0.50	<0.50	7.38	<1	--	12.6	<0.50	
	09/25/01	<2.5	<2.5	<2.5	<2.5	2.6	<2.5	4	2.7	<2.5	<2.5	39	18	--	210	<2.5
	03/19/02	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	4.21	<0.50	--	3.73	<0.50
	05/30/02	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	8.45	<0.50	--	10.4	<0.50
	11/07/02	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	2.34	<0.50	<0.50	8.71	1.02	--	19.7	<0.50
	01/23/03	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	0.78	<0.50	<0.50	6.15	0.56	--	13	<0.50
	05/28/03	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	2.2	<0.500	--	8.67	<0.50

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
S-1	11/11/03	<1	<1	<1	<1	<1	<1	<1	1.85	<1	<1	4.22	<1	--	13.2	<1
(continued)	01/26/04	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	6.57	0.67	--	15.5	<0.50
	05/04/04	<1	<1	<1	<1	<1	<1	<1	1.17	<1	<1	4.07	<1	--	10.6	<1
	11/15/04	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	2.8	<0.50	<0.50	8.4	0.82	--	18	<0.50
	02/01/05	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	0.75	<0.50	<0.50	1.89	<0.50	--	2.87	<0.50
	05/18/05	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	2.24	<0.50	<0.50	3.73	<0.50	--	8.39	<0.50
	05/23/07	<1	<1	<1	<1	<1	<1	<1	3.63	<1	<1	4.02	<1	--	6.85	<1
	12/13/07	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	4.61	<0.50	<0.50	4.87	<0.50	--	8.44	<0.50
	03/05/08	<1	<0.500	<0.500	<1	<0.500	<0.500	<0.500	5.15	<0.500	<0.500	<0.500	4.14	<0.500	<0.500	<0.500
	06/25/08	<1	<1	<1	<1	<1	<1	<1	1.67	<1	<1	<1	1.37	<1	<1	<1
	09/17/08	<1	<0.500	<0.500	<1	<0.500	<0.500	<0.500	5.55	<0.500	<0.500	2.81	<0.500	<0.500	6.07	<0.500
	12/09/08	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1	<0.50	<0.50	0.62	<0.50	<0.50	1.4	<0.50
	03/25/09	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	2.3	<0.50	<0.50	1.4	<0.50	<0.50	2.7	<0.50
	06/16/09	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.91	<0.50	<0.50	0.81	<0.50	<0.50	1.8	<0.50
	09/16/09	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	2.4	<0.50	<0.50	1.7	<0.50	<0.50	5	<0.50
	12/16/09	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	2.4	<0.50	<0.50	1.7	<0.50	<0.50	6.1	<0.50
	03/17/10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.2	<0.50	<0.50	1	<0.50
	07/02/10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	09/22/10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.66	<0.5	<0.5	<0.5	<0.5	<0.5	1.5	<0.5
	12/08/10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	<0.5	<0.5	0.77	<0.5	<0.5	3	<0.5
	03/09/11	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.2	<0.50
	06/08/11	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.66	<0.5
	09/14/11	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.8	<0.50	<0.50	1.4	<0.50	<0.50	4	<0.50
	12/06/11	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.1	<0.50	<0.50	1.3	<0.50	<0.50	3.1	<0.50
	03/12/12	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.59	<0.50	<0.50	0.74	<0.50	<0.50	1.8	<0.50
	06/21/12	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.98	<0.5	<0.5	0.94	<0.5	<0.5	3.5	<0.5
	09/14/12	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.88	<0.50	<0.50	0.88	<0.50	<0.50	2.6	<0.50
	12/12/12	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.8	<0.50	<0.50	0.96	<0.50	<0.50	3.8	<0.50
	03/13/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.78	<0.50	<0.50	1.5	<0.50
	06/12/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.74	<0.50	<0.50	2.2	<0.50
	09/20/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.8	<0.50	<0.50	1.8	<0.50	<0.50	5.4	<0.50
	12/12/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1	<0.50	<0.50	1.2	<0.50	<0.50	5.1	<0.50
	3/20/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1	<0.50
	6/24/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.82	<0.50	<0.50	2.1	<0.50

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
S-1 (continued)	9/27/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.2	<0.50	<0.50	1.3	<0.50	<0.50	4.3	<0.50
	12/9/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.4	<0.50	<0.50	1.3	<0.50	<0.50	4.9	<0.50
	3/18/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.73	<0.50	<0.50	1.4	<0.50
	6/16/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.8	<0.50
	9/21/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.2	<0.50	<0.50	1.6	<0.50	<0.50	5.1	<0.50
	12/8/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.6	<0.50
	3/9/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	6/16/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	9/27/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	1.1	<0.50	<0.50	0.73	<0.50	<0.50	3	<0.50
	12/13/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	0.57	<0.50	<0.50	0.54	<0.50	<0.50	1.6	<0.50
	3/27/2017	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	6/13/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	9/28/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/8/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	S-2	08/11/99	<1	<5	<0.50	<0.50	2.37	<0.50	<0.50	<0.50	<0.50	<0.50	1.7	<1	--	0.843
11/15/04		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.52	<0.50	<0.50	4.4	<0.50	--	1.6	<0.50
12/12/12		<0.50	<0.50	<0.50	<0.50	2.7	<0.50	<0.50	1.7	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
03/13/13		<0.50	<0.50	<0.50	<0.50	3.4	<0.50	<0.50	2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
06/12/13		<0.50	<0.50	<0.50	<0.50	2.3	<0.50	<0.50	1.4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
09/20/13		<0.50	<0.50	<0.50	<0.50	3.7	<0.50	<0.50	3.3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
12/12/13		<0.50	<0.50	<0.50	<0.50	3	<0.50	<0.50	2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
3/20/2014		<0.50	<0.50	<0.50	<0.50	1.9	<0.50	<0.50	2.2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
6/24/2014		<0.50	<0.50	<0.50	<0.50	3.1	<0.50	<0.50	3.4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
9/27/2014		<0.50	<0.50	<0.50	<0.50	4.5	<0.50	<0.50	4.7	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
12/9/2014		<0.50	<0.50	<0.50	<0.50	3.9	<0.50	<0.50	4.6	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
3/18/2015		<0.50	<0.50	<0.50	<0.50	4.5	<0.50	<0.50	5.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
6/16/2015		<0.50	<0.50	<0.50	<0.50	4.1	<0.50	<0.50	3.8	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
12/8/2015		<0.50	<0.50	<0.50	<0.50	3	<0.50	<0.50	3.2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
6/16/2016		<0.50	<2	<0.50	<0.50	4.3	<0.50	<0.50	6	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
9/26/2016		<0.50	<2	<0.50	<0.50	6.2	<0.50	<0.50	11	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
12/13/2016		<0.50	<2	<0.50	<0.50	3.5	<0.50	<0.50	4.9	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
3/27/2017		<0.5	<2	<0.5	<0.5	2.6	<0.5	<0.5	4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
6/13/2017	<2.0	<2.0	<0.50	<0.50	3.3	<1.0	<0.50	4.3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
9/28/2017	<2.0	<2.0	<0.50	<0.50	8.0	<1.0	<0.50	13.2	<0.50	<0.50	<0.50	0.86	<0.50	0.51	<0.50	
11/8/2017	<2.0	<2.0	<0.50	<0.50	7.1	<0.50	<0.50	12.1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	

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Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MGMS1-3(43)	06/28/00	<50	<250	<25	<25	278	<25	55.9	4,270	<25	<25	734	<50	--	1,840	<25
	08/30/00	<200	<1	<100	<100	420	<100	116	8,850	<100	<100	5,940	<200	--	3,040	<100
	11/29/00	<100	<500	<50	<50	249	<50	76.2	4,560	<50	<50	1,210	<100	--	1,140	<50
	02/27/01	<100	<500	<50	<50	697	<50	164	14,000	<50	<50	148	<100	--	1,390	133
	05/31/01	<100	<500	<50	<50	<50	<50	<50	5,870	<50	<50	130	<100	--	599	<50
	09/24/01	<13	<13	<13	<13	150	<13	32	4,700	<13	<13	310	<13	--	450	25
	12/18/01	<50	<250	<25	<25	153	<25	33.3	3,600	<25	<25	276	<50	--	568	<25
	03/19/02	<100	<50	<50	<100	310	<50	103	6,700	<50	<50	2,090	<50	--	1,720	86
	05/29/02	<50	<25	<25	<50	188	<25	39	4,700	<25	<25	470	<25	--	624	37.5
	08/29/02	<1	<0.50	<0.50	<1	3.72	<0.50	0.84	94.7	0.54	<0.50	34.9	0.75	--	35.7	1.46
	11/11/02	<100	<50	<50	<100	183	<50	<50	4,810	<50	<50	757	<50	--	831	51
	01/23/03	<100	<50	<50	<100	378	<50	76	10,500	<50	<50	782	<50	--	1,290	109
	05/28/03	<100	<50	<50	<100	402	<50	72	9,510	<50	<50	270	<50	--	841	114
	11/11/03	<50	<50	<50	<50	252	<50	<50	9,710	<50	<50	516	<50	--	1,020	58
	01/27/04	<50	<25	<25	<50	290	<25	54.5	8,160	53.5	<25	393	<25	--	808	95
	05/03/04	<100	<100	<100	<100	370	<100	<100	12,300	<100	<100	830	<100	--	1,520	111
	08/17/04	<100	<50	<50	<100	401	<50	114	12,700	109	<50	1,540	<50	--	2,340	151
	11/15/04	<120	<120	<120	<120	270	<120	<120	9,600	<120	<120	1,400	<120	--	1,600	<120
	03/24/05	<100	<50	<50	<100	481	<50	148	15,600	135	<50	1,390	<50	--	2,090	266
	05/16/05	<50	<25	<25	<50	327	<25	89	9,670	83	<25	802	<25	--	1,410	157
	05/17/05	<100	<50	<50	<100	353	<50	86	10,600	94	<50	920	<50	--	1,660	173
	11/17/05	<100	<50	<50	<100	392	<50	121	13,400	133	<50	1,310	<50	--	2,280	186
	06/06/06	<100	<100	<100	<100	385	<100	<100	11,800	115	<100	628	<100	--	1,370	192
	12/06/06	<100	<50	<50	<100	256	<50	72	9,960	92	<50	843	<50	--	1,260	155
	05/22/07	<100	<100	<100	<100	439	<100	119	14,200	152	<100	910	<100	--	1,920	245
	09/11/07	<100	<50	<50	<100	303	<50	109	11,700	128	<50	1,100	<50	--	2,060	189
	12/12/07	<100	<50	<50	<100	270	<50	75	8,740	93	<50	1,010	<50	--	1,540	167
	03/05/08	<50	<25	<25	<50	370	<25	128	6,740	220	<25	1,480	36	<25	2,350	234
	09/16/08	<100	<50	<50	<100	302	<50	112	10,400	139	<50	2,700	<50	<50	2,500	171
	12/08/08	<4	<4	<4	<4	190	<4	63	6,000	78	<4	1,300	19	<4	1,200	100
03/25/09	<15	<15	<15	<15	110	<15	66	3,500	34	<15	3,600	49	<15	2,100	49	
09/15/09	<15	<15	<15	<15	140	<15	74	4,200	45	<15	4,300	44	<15	2,300	84	
12/14/09	<15	<15	<15	<15	140	<15	46	4,000	55	<15	1,500	15	<15	1,100	67	
03/17/10	<15	<15	<15	<15	160	<15	63	4,600	44	<15	2,800	32	<15	1,900	78	

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MGMS1-3(43) (continued)	06/14/10	<25	<25	<25	<25	220	<25	46	5,400	69	<25	790	<25	<25	900	85
	09/21/10	<15	<15	<15	<15	130	<15	55	3,800	43	<15	2,900	37	<15	1,900	68
	12/07/10	<15	<15	<15	<15	190	<15	63	5,500	69	<15	2,500	23	<15	1,800	96
	03/08/11	<20	<20	<20	<20	170	<20	52	4,600	56	<20	1,400	<20	<20	1,300	86
	06/06/11	<15	<15	<15	<15	190	<15	36	4,700	71	<15	610	<15	<15	790	97
	09/13/11	<20	<20	<20	<20	290	<20	78	8,000	160	<20	900	<20	<20	1,800	160
	03/08/12	<4	<40	<40	<40	340	<40	62	9,500	150	<40	240	<40	<40	690	890
	06/21/12	<20	<20	<20	<20	220	<20	25	4,400	76	<20	74	<20	<20	260	1,100
	09/12/12	<20	<20	<20	<20	280	<20	72	8,800	180	<20	360	<20	<20	970	890
	12/11/12	<20	<20	<20	<20	220	<20	40	6,100	110	<20	160	<20	<20	430	680
	03/12/13	<20	<20	<20	<20	220	<20	21	4,700	74	<20	110	<20	<20	340	1,600
	06/11/13	<20	<20	<20	<20	190	<20	<20	3,900	56	<20	78	<20	<20	260	1,100
	09/17/13	<15	<15	<15	<15	190	<15	21	4,600	66	<15	100	<15	<15	350	1,100
	12/10/13	<15	<15	<15	<15	210	<15	18	3,600	54	<15	95	<15	<15	270	1,800
	3/18/2014	<20	<20	<20	<20	150	<20	<20	3,600	40	<20	93	<20	<20	260	440
	6/26/2014	<7	<7	<7	<7	120	<7	14	2,000	14	<7	21	<7	<7	57	480
	9/23/2014	<15	<15	<15	<15	190	<15	35	4,700	69	<15	120	<15	<15	420	550
	12/12/2014	<7	<7	<7	<7	200	<7	23	4,000	52	<7	100	<7	<7	350	810
	3/19/2015	<12.5	<12.5	<12.5	<12.5	131	<12.5	<12.5	2,450	16.6	<12.5	31.7	<12.5	<12.5	129	249
	6/18/2015	<0.50	<0.50	<0.50	<0.50	2.7	<0.50	<0.50	59.1	<0.50	<0.50	0.84	<0.50	<0.50	2.8	3.1
	9/21/2015	<10	<10	<10	<10	124	<10	14.1	2,810	24.8	<10	53.5	<10	<10	171	129
	12/8/2015	<0.50	<0.50	<0.50	<0.50	92	<0.50	<0.50	1,580	11.5	<0.50	26.2	<0.50	<0.50	88	230
	3/9/2016	<10	<40	<10	<10	93.9	<10	<10	1,700	12.4	<10	24.1	<10	<10	81.9	209
	6/17/2016	<8.3	<33.3	<8.3	<8.3	163	<8.3	26.6	3,130	36.1	<8.3	64.6	<8.3	<8.3	248	288
	9/30/2016	<8.3	<33.3	<8.3	<8.3	81.9	<8.3	13.5	1,980	24.2	<8.3	230	<8.3	<8.3	366	52
	12/16/2016	<8.4	<33.4	<8.4	<8.4	92.6	<8.4	9.5	1,810	20.1	<8.4	64.1	<8.4	<8.4	171	239
	3/31/2017	<8.4	<33.4	<8.4	<8.4	90.8	<8.4	12.5	1,430	15.2	<8.4	45.8	<8.4	<8.4	119	348
6/12/2017	<8.3	<33.3	<8.3	<8.3	173	<8.3	16.7	2,620	18.7	<8.3	24.4	<8.3	<8.3	116	681	
9/29/2017	<2.5	<10.0	<2.5	<2.5	60	<2.5	6.9	901	12.9	<2.5	70.7	<2.5	<2.5	126	117	
11/7/2017	<10.0	<10.0	<2.5	<2.5	153	<2.5	13.7	2,350 J-	26.6	<2.5	108	<2.5	<2.5	211	181	
MGMS1-2(60)	06/28/00	<10	<50	<5	<5	53.6	<5	<5	369	<5	<5	658	19.7	--	240	<5
	08/30/00	<20	<100	<10	<10	21.7	<10	13.1	267	<10	<10	2,590	108	--	586	<10
	11/29/00	<2	<10	<1	<1	1.58	<1	1.09	57.7	<1	<1	121	4.58	--	40.3	<1

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MGMS1-2(60) (continued)	02/27/01	<1	<5	<0.5	<0.5	0.838	<0.5	0.686	32.9	<0.5	<0.5	54.6	2.06	--	24.7	<0.5
	05/31/01	<1	<5	<0.50	<0.50	0.662	<0.50	0.581	39	<0.50	<0.50	69.4	<1	--	27.8	0.52
	09/24/01	<13	<13	<13	<13	<13	<13	<13	89	<13	<13	830	14	--	150	<13
	12/18/01	<1	<5	<0.50	<0.50	<0.50	<0.50	<0.50	20.4	<0.50	<0.50	12.8	<1	--	15.7	<0.50
	03/19/02	<1	<0.50	<0.50	<1	2.52	<0.50	0.99	68	<0.50	<0.50	62.9	1.2	--	34	3.48
	05/29/02	<1	<0.50	<0.50	<1	0.78	<0.50	<0.50	22.8	<0.50	<0.50	23.4	<0.50	--	14.2	0.6
	08/29/02	<10	<5	<5	<10	30.6	<5	5.1	661	<5	<5	138	<5	--	116	<5
	11/11/02	<1	<0.50	<0.50	<1	2.99	<0.50	0.83	86	<0.50	<0.50	38.2	1.16	--	38.9	<0.50
	01/23/03	<1	<0.50	<0.50	<1	1.53	<0.50	0.74	42.6	<0.50	<0.50	42.8	0.78	--	34.2	1.04
	05/28/03	<1	<0.50	<0.50	<1	2.87	<0.50	1.21	72	<0.50	<0.50	51.1	1.18	--	47.6	0.63
	11/11/03	<1	<1	<1	<1	1.84	<1	<1	48.8	<1	<1	45.9	<1	--	36	<1
	01/27/04	<1	<0.50	<0.50	<1	2.06	<0.50	1.06	72.3	0.69	<0.50	40.9	0.66	--	43.1	0.63
	05/03/04	<1	<1	<1	<1	4.07	<1	1.22	70.7	<1	<1	54.8	1.36	--	43.5	2.53
	08/17/04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/02/04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/15/04	<0.50	<0.50	<0.50	<0.50	1.2	<0.50	0.68	39	<0.50	<0.50	31	<0.50	--	28	0.67
	02/01/05	<1	<0.50	<0.50	<1	1.31	<0.50	<0.50	37.5	0.56	<0.50	33.2	<0.50	--	21.7	1.3
	05/16/05	<1	<0.50	<0.50	<1	0.95	<0.50	<0.50	40.6	<0.50	<0.50	21.7	<0.50	--	19.8	<0.50
	05/16/05 DUP	<1	<0.50	<0.50	<1	1.02	<0.50	<0.50	42.1	<0.50	<0.50	21.4	<0.50	--	20.5	<0.50
	08/18/05	<1	<0.500	<0.500	<1	7.28	<0.500	2.41	145	1.2	<0.500	76.5 B	1.46	--	65.6	5.16 B
	11/17/05	<1	<0.500	<0.500	<1	2.53	<0.500	0.99	87	0.59	<0.500	34.8	<0.500	--	26.4	0.93
	02/20/06	<1	<0.500	<0.500	<1	6.17	<0.500	1.93	136	1.1	<0.500	61.9	0.93	--	45.5	4.17
	06/06/06	<1	<1	<1	<1	1.02	<1	<1	33.7	<1	<1	23.4	<1	--	18.7	<1
	09/05/06	<1	<0.50	<0.50	<1	5.37	<0.50	1.75	115	0.84	<0.50	55.9	0.8	--	37.5	4.79
	12/06/06	<1	<0.50	<0.50	<1	3.39	<0.50	1.12	90.9	0.62	<0.50	39.5	<0.50	--	28.3	2.15
	02/07/07	<1	<0.50	<0.50	<1	4.37	<0.50	1.37	116	0.93	<0.50	55.9	0.58	--	40.7	3
	05/22/07	<1	<1	<1	<1	1.18	<1	<1	38.5	<1	<1	31.6	<1	--	25.2	<1
	09/11/07	<5	<2.50	<2.50	<5	26.6	<2.50	8.75	711	7.2	<2.50	81.4	2.95	--	216	11.9
	12/12/07	<1	<0.50	<0.50	<1	1.83	<0.50	0.79	64.9	0.65	<0.50	28.1	<0.50	--	24.9	0.67
	03/04/08	<1	<0.500	<0.500	<1	6.65	<0.500	2.22	166	2.92	<0.500	75.4	0.81	<0.500	60.5	2.79
	09/16/08	<5	<2.50	<2.50	<2.50	5.5	<2.50	<2.50	160	<2.50	<2.50	38.8	<2.50	<2.50	65.5	<2.50
	12/08/08	<0.50	<0.50	<0.50	<0.50	4.1	<0.50	1.2	88	1.1	<0.50	40	0.51	<0.50	38	1.3
	12/08/08 DUP	<0.50	<0.50	<0.50	<0.50	3.9	<0.50	1.2	84	1.1	<0.50	42	0.52	<0.50	38	1.3

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MGMS1-2(60) (continued)	03/25/09	<0.50	<0.50	<0.50	<0.50	3.1	<0.50	1.3	71	0.75	<0.50	40	0.65	<0.50	37	0.54
	06/15/09	<0.50	<0.50	<0.50	<0.50	1	<0.50	0.8	47	0.9	<0.50	26	<0.50	<0.50	30	0.55
	09/15/09	<0.50	<0.50	<0.50	<0.50	1.8	<0.50	0.82	44	0.58	<0.50	42	<0.50	<0.50	30	0.82
	12/14/09	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	17	<0.50	<0.50	18	<0.50	<0.50	16	<0.50
	03/17/10	<0.50	<0.50	<0.50	<0.50	2.4	<0.50	0.96	61	0.68	<0.50	40	0.51	<0.50	38	<0.50
	06/14/10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	20	<0.50	<0.50	17	<0.50	<0.50	15	<0.50
	09/21/10	<0.5	<0.5	<0.5	<0.5	2.1	<0.5	0.57	46	<0.5	<0.5	42	<0.5	<0.5	32	0.8
	12/07/10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	16	<0.5	<0.5	19	<0.5	<0.5	15	<0.5
	03/08/11	<0.50	<0.50	<0.50	<0.50	0.54	<0.50	<0.50	19	<0.50	<0.50	27	<0.50	<0.50	16	<0.50
	06/06/11	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8.3	<0.5	<0.5	16	<0.5	<0.5	11	<0.5
	09/13/11	<0.50	<0.50	<0.50	<0.50	2.5	<0.50	0.73	42	0.5	<0.50	42	0.89	<0.50	30	0.74
	12/06/11	<0.50	<0.50	<0.50	<0.50	1	<0.50	<0.50	30	<0.50	<0.50	33	<0.50	<0.50	22	0.6
	03/08/12	<0.50	<0.50	<0.50	<0.50	1.6	<0.50	<0.50	32	<0.50	<0.50	36	<0.50	<0.50	21	<5
	06/19/12	<0.5	<0.5	<0.5	<0.5	0.71	<0.5	<0.5	28	<0.5	<0.5	22	<0.5	<0.5	16	<0.5
	09/12/12	<0.50	<0.50	<0.50	<0.50	2.5	<0.50	0.66	36	<0.50	<0.50	33	<0.50	<0.50	20	1.1
	12/11/12	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	20	<0.50	<0.50	19	<0.50	<0.50	11	<0.50
	03/12/13	<0.50	<0.50	<0.50	<0.50	1.8	<0.50	0.56	38	<0.50	<0.50	35	<0.50	<0.50	20	0.66
	06/11/13	<0.50	<0.50	<0.50	<0.50	0.66	<0.50	<0.50	29	<0.50	<0.50	27	<0.50	<0.50	18	<0.50
	09/17/13	<0.50	<0.50	<0.50	<0.50	0.89	<0.50	<0.50	20	<0.50	<0.50	32	<0.50	<0.50	16	0.54
	12/10/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	16	<0.50	<0.50	17	<0.50	<0.50	11	<0.50
	3/18/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	8.5	<0.50	<0.50	10	<0.50	<0.50	5.8	<0.50
	6/26/2014	<0.50	<0.50	<0.50	<0.50	1	<0.50	<0.50	33	<0.50	<0.50	21	<0.50	<0.50	20	<0.50
	9/23/2014	<0.50	<0.50	<0.50	<0.50	2.3	<0.50	<0.50	26	<0.50	<0.50	34	<0.50	<0.50	20	12
	12/12/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	22	<0.50	<0.50	20	<0.50	<0.50	14	<0.50
	3/19/2015	<0.50	<0.50	<0.50	<0.50	1.1	<0.50	<0.50	26.1	<0.50	<0.50	22.7	<0.50	<0.50	16.1	<0.50
	6/18/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.95	<0.50	<0.50	17.7	<0.50	<0.50	9.1	<0.50
	9/21/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	2.3	<0.50	<0.50	1.6	<0.50
	12/8/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	18.8	<0.50	<0.50	13.8	<0.50	<0.50	12.4	<0.50
	3/9/2016	<0.50	<0.50	<0.50	<0.50	0.5	<0.50	<0.50	17.5	<0.50	<0.50	16.9	<0.50	<0.50	14	<0.50
	6/17/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	11.8	<0.50	<0.50	18	<0.50	<0.50	11.1	<0.50
9/30/2016	<0.50	<2	<0.50	<0.50	0.89	<0.50	<0.50	17.7	<0.50	<0.50	22.5	<0.50	<0.50	17.6	<0.50	
12/16/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	5.1	<0.50	<0.50	7.6	<0.50	<0.50	4.7	<0.50	
3/31/2017	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<0.5	15.6	<0.5	<0.5	13.6	<0.5	<0.5	13.2	<0.5	
6/12/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	6.0	<0.50	<0.50	12.8	<0.50	<0.50	7.1	<0.50	
9/29/2017	<2.0	<2.0	<0.50	<0.50	2.00	<1.0	<0.50	18.3	<0.50	<0.50	18.3	<0.50	<0.50	13.4	<0.50	
11/7/2017	<2.0	<2.0	<0.50	<0.50	1.60	<0.50	<0.50	24.9	<0.50	<0.50	14.0	<0.50	<0.50	14.7	<0.50	

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MGMS1-1(110)	06/28/00	<1	<5	<0.50	<0.50	<0.50	<0.50	<0.50	3.78	<0.50	<0.50	3.9	<1	--	3.35	<0.50
	08/30/00	<5	<25	<2.5	<2.5	3.7	<2.5	3.32	55	<2.5	<2.5	510	24	--	130	<2.5
	11/29/00	<5	<25	<2.5	<2.5	4.21	<2.5	4.59	51	<2.5	<2.5	583	23.2	--	166	<2.5
	02/27/01	<5	<25	<2.5	<2.5	5.21	<2.5	3.39	47.5	<2.5	<2.5	385	16.5	--	105	<2.5
	05/31/01	<10	<50	<5	<5	<5	<5	<5	55.8	<5	<5	639	13.8	--	141	<5
	09/24/01	<1.3	<1.3	<1.3	<1.3	6.1	<1.3	2.9	57	<1.3	<1.3	580	20	--	120	<1.3
	12/18/01	<5	<25	<2.5	<2.5	5.04	<2.5	2.68	54.8	<2.5	<2.5	527	20.2	--	131	<2.5
	03/19/02	<5	<2.5	<2.5	<5	5.25	<2.5	<2.5	54	<2.5	<2.5	454	10.8	--	98	<2.5
	05/29/02	<5	<2.5	<2.5	<5	4.9	<2.5	<2.5	62.3	<2.5	<2.5	299	9.7	--	65.1	<2.5
	08/29/02	<1	<0.50	<0.50	<1	5.43	<0.50	1.32	110	0.8	<0.50	60.2	3.62	--	47.8	<0.50
	11/11/02	<2	<1	<1	<2	4.74	<1	1.2	46.1	<1	<1	208	7.84	--	66.1	<1
	01/23/03	<2	<1	<1	<2	4.44	<1	1.24	65.3	<1	<1	210	6.54	--	74.1	<1
	05/28/03	<2	<1	<1	<2	3.96	<1	<1	69.2	<1	<1	109	2.48	--	57.5	<1
	11/11/03	<2	<2	<2	<2	4.14	<2	<2	44.8	<2	<2	256	3.6	--	60.2	<2
	01/27/04	<2	<1	<1	<2	4.22	<1	1.1	67.1	<1	<1	167	4.16	--	69.7	<1
	05/03/04	<1	<1	<1	<1	3.66	<1	<1	47.2	<1	<1	190	2.18	--	55.9	<1
	11/15/04	<2.5	<2.5	<2.5	<2.5	3.7	<2.5	<2.5	95	<2.5	<2.5	76	<2.5	--	64	<2.5
	06/20/05	<2	<1	<1	<2	9.22	<1	2.58	283	1.8	<1	23.6	1.62	--	70	1.24
	11/17/05	<1	<0.500	<0.500	<1	2.93	<0.500	<0.500	51.3	<0.500	<0.500	102	1.95	--	76.1	<0.500
	06/06/06	<1	<1	<1	<1	2.15	<1	<1	44	<1	<1	94.4	1.36	--	66.8	<1
	12/06/06	<1	<0.50	<0.50	<1	5.81	<0.50	0.6	142	<0.50	<0.50	53.8	0.88	--	74.6	0.57
	09/11/07	<2	<1	<1	<2	3.78	<1	1.2	189	<1	<1	31.6	<1	--	61.1	<1
	03/04/08	<1	<0.500	<0.500	<1	3.73	<0.500	0.91	242	2.37	<0.500	32.7	0.64	<0.500	44.4	<0.500
	03/25/09	<0.50	<0.50	<0.50	<0.50	2.6	<0.50	0.87	160	0.9	<0.50	25	<0.50	<0.50	39	<0.50
	06/15/09	<0.50	<0.50	<0.50	<0.50	2.3	<0.50	0.74	130	1	<0.50	24	<0.50	<0.50	39	<0.50
	09/15/09	<2.5	<2.5	<2.5	<2.5	20	<2.5	2.7	620	3.6	<2.5	24	<2.5	<2.5	75	<2.5
	03/17/10	<2.5	<2.5	<2.5	<2.5	20	<2.5	4.3	720	3.7	<2.5	20	<2.5	<2.5	79	<2.5
	09/21/10	<0.5	<0.5	<0.5	<0.5	2.5	<0.5	1.1	150	1	<0.5	28	<0.5	<0.5	53	<0.5
	03/10/11	<0.50	<0.50	<0.50	<0.50	1.4	<0.50	0.57	83	0.52	<0.50	26	<0.50	<0.50	31	<0.50
	09/13/11	<0.50	<0.50	<0.50	<0.50	1.9	<0.50	1.2	110	0.96	<0.50	30	<0.50	<0.50	59	<0.50
03/08/12	<0.50	<0.50	<0.50	<0.50	1	<0.50	<0.50	62	<0.50	<0.50	22	<0.50	<0.50	21	<0.50	
09/12/12	<0.50	<0.50	<0.50	<0.50	0.93	<0.50	0.53	60	<0.50	<0.50	22	<0.50	<0.50	25	<0.50	
03/12/13	<0.50	<0.50	<0.50	<0.50	0.95	<0.50	<0.50	65	<0.50	<0.50	23	<0.50	<0.50	24	<0.50	
09/17/13	<0.50	<0.50	<0.50	<0.50	1.1	<0.50	0.56	68	<0.50	<0.50	26	<0.50	<0.50	32	<0.50	
3/18/2014	<0.50	<0.50	<0.50	<0.50	1.2	<0.50	<0.50	63	<0.50	<0.50	23	<0.50	<0.50	27	0.65	

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MGMS1-1(110) (continued)	9/24/2014	Not sampled: 60 foot port accidentally sampled twice.														
	3/19/2015	<0.50	<0.50	<0.50	<0.50	2.7	<0.50	0.69	126	<0.50	<0.50	23.7	<0.50	<0.50	41.5	0.82
	9/21/2015	<0.50	<0.50	<0.50	<0.50	1.1	<0.50	<0.50	49	<0.50	<0.50	19.4	<0.50	<0.50	20.4	<0.50
	9/30/2016	<0.50	<0.50	<0.50	<0.50	1.2	<0.50	<0.50	56.7	<0.50	<0.50	18.4	<0.50	<0.50	28.7	<0.50
	3/31/2017	<0.50	<2.0	<0.50	<0.50	13.3	<0.50	1.1	328	0.7	<0.50	20.1	<0.50	<0.50	62	6.5
	9/29/2017	<2.0	<2.0	<0.50	<0.50	5.9	<1.0	0.5	173	<0.50	<0.50	9.0	<0.50	<0.50	33	0.6
	11/7/2017	<2.0	<2.0	<0.50	<0.50	10.5	<0.50	0.9	257	0.7	<0.50	11.5	<0.50	<0.50	42	0.9
MGMS2-4(40)	06/28/00	<50	<250	<25	<25	44.9	<25	<25	1,210	<25	<25	5,030	215	--	3,090	<25
	08/30/00	<10	<50	<5	<5	23.4	<5	31.3	644	7.28	<5	2,980	152	--	1,850	<5
	11/29/00	<100	<500	<50	<50	51.3	<50	94	1,420	<50	<50	8,740	424	--	3,980	<50
	02/27/01	<50	<250	<25	<25	35.6	<25	66.2	753	<25	<25	7,360	280	--	3,360	<25
	05/31/01	<50	<250	<25	<25	<25	<25	<25	604	<25	<25	3,610	94.4	--	2,050	<25
	09/24/01	<5	<5	<5	<5	28	<5	26	780	13	<5	2,600	170	--	1,700	<5
	12/18/01	<50	<250	<25	<25	175	<25	77	1,350	<25	<25	5,590	374	--	3,220	<25
	03/19/02	<50	<25	<25	<50	36	<25	36	868	<25	<25	6,240	180	--	3,040	<25
	05/29/02	<50	<25	<25	<50	76	<25	53	1,330	<25	<25	6,580	230	--	2,530	<25
	11/11/02	<20	<10	<10	<20	19.8	<10	13.6	639	<10	<10	3,080	89.4	--	1,820	<10
	01/23/03	<20	<10	<10	<20	13.4	<10	<10	353	<10	<10	2,290	52.6	--	1,480	<10
	05/28/03	<10	<5	<5	<10	5.4	<5	<5	110	<5	<5	1,190	19.1	--	474	<5
	11/11/03	<10	<10	<10	<10	<10	<10	<10	54.1	<10	<10	1,820	14	--	398	<10
	01/27/04	<20	<10	<10	<20	45.2	<10	10	397	<10	<10	1,740	55.8	--	688	<10
	05/03/04	<10	<10	<10	<10	<10	<10	<10	41.2	<10	<10	599	<10	--	200	<10
	08/17/04	<10	<5	<5	<10	9.7	<5	6.1	158	<5	<5	1,530	30.7	--	705	<5
	11/15/04	<25	<25	<25	<25	<25	<25	<25	310	<25	<25	2,900	<25	--	1,300	<25
	03/24/05	<20	<10	<10	<20	10.8	<10	<10	159	<10	<10	1,900	25.8	--	834	<10
	05/16/05	<20	<10	<10	<20	34.2	<10	28.2	489	<10	<10	2,540	52.2	--	1,150	<10
	11/16/05	<50	<25	<25	<50	43.5	<25	<25	396	<25	<25	4,240	82.5	--	1,750	<25
	06/06/06	<50	<50	<50	<50	62	<50	<50	917	<50	<50	4,820	55	--	1,770	<50
	12/05/06	<50	<25	<25	<50	<25	<25	<25	370	<25	<25	3,090	31.5	--	1,200	<25
	05/21/07	<20	<20	<20	<20	27.4	<20	<20	359	<20	<20	2,880	38.2	--	1,080	<20
09/10/07	<50	<25	<25	<50	<25	<25	<25	402	<25	<25	2,010	52.5	--	1,600	<25	
12/12/07	<50	<25	<25	<50	26	<25	<25	330	<25	<25	2,080	35.5	--	914	<25	
03/04/08 ⁷	<1	<0.500	<0.500	<1	20.4	<0.500	16.1	181	7.71	<0.500	1,810	53.7	0.51	950	4.68	
09/16/08	<50	<25	<25	<25	<25	<25	<25	208	<25	<25	2,330	32	<25	1,130	<25	
12/08/08	Not sampled. Air leak in sampling point prohibited the collection of the sample.															
03/24/09	<2	<2	<2	<2	8.4	<2	3.6	100	2	<2	990	14	<2	430	<2	

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MGMS2-4(40) (continued)	09/15/09	<1.5	<1.5	<1.5	<1.5	3.1	<1.5	<1.5	52	<1.5	<1.5	440	4.1	<1.5	200	<1.5
	12/14/09	<1.5	<1.5	<1.5	<1.5	54	<1.5	16	360	6.9	<1.5	2,400	62	<1.5	1,000	2.6
	03/16/10	<7	<7	<7	<7	16	<7	<7	140	<7	<7	1,800	19	<7	810	<7
	06/14/10	<25	<25	<25	<25	72	<25	41	1,400	<25	<25	6,400	68	<25	1,500	43
	09/21/10	<2.5	<2.5	<2.5	<2.5	35	<2.5	17	480	9	<2.5	3,500	48	<2.5	1,500	5.4
	12/07/10	<15	<15	<15	<15	69	<15	26	700	<15	<15	4,100	83	<15	1,600	<15
	03/07/11	<15	<15	<15	<15	88	<15	30	930	<15	<15	3,700	91	<15	1,600	<15
	06/07/11	<15	<15	<15	<15	65	<15	30	1,600	17	<15	4,400	57	<15	1,400	48
	09/12/11	<15	<15	<15	<15	44	<15	28	7,400	20	<15	790	48	<15	380	58
	12/07/11	<15	<15	<15	<15	35	<15	<15	5,300	<15	<15	61	<15	<15	39	460
	03/08/12	<2	<2	<2	<2	38	<2	2.3	470	2.8	<2	9.9	5.2	<2	5.4	260
	06/19/12	<0.5	3.9	<0.5	<0.5	53	<0.5	<0.5	20	1.3	<0.5	7.2	<0.5	<0.5	2.5	63
	09/13/12	<1.5	1.8	<1.5	<1.5	39	<1.5	2.8	310	3.2	<1.5	89	5	<1.5	80	440
	12/11/12	<0.50	30	<0.50	<0.50	4.8	<0.50	<0.50	33	1.3	<0.50	10	<0.50	<0.50	3.4	4
	03/12/13	<0.50	8.2	<0.50	<0.50	28	<0.50	1.9	300	2	<0.50	5.6	2.5	<0.50	2.2	270
	06/11/13	<0.50	15	<0.50	<0.50	8.3	<0.50	<0.50	7.9	<0.50	<0.50	0.94	<0.50	<0.50	<0.50	4.8
	09/17/13	<0.50	9.4	<0.50	<0.50	28	<0.50	4.8	290	1.4	<0.50	16	1.6	<0.50	17	330
	12/16/13	<0.50	6.9	<0.50	<0.50	9.7	<0.50	<0.50	8.4	<0.50	<0.50	2.4	<0.50	<0.50	1.4	3.4
	3/24/2014	<0.50	2.4	<0.50	<0.50	45	<0.50	2.9	84	<0.50	<0.50	2.6	<0.50	<0.50	1.8	270
	6/26/2014	<0.50	6.1	<0.50	<0.50	31	<0.50	10	88	0.84	<0.50	21	<0.50	<0.50	22	90
	9/23/2014	<0.50	2.5	<0.50	<0.50	30	<0.50	30	590	2.4	<0.50	170	3.2	<0.50	110	800
	12/12/2014	<0.50	12	<0.50	<0.50	35	<0.50	<0.50	10	<0.50	<0.50	3.4	<0.50	<0.50	2.3	18
	3/20/2015	<0.50	<0.50	<0.50	<0.50	4.3	<0.50	3.9	47	<0.50	<0.50	30.6	<0.50	<0.50	22.1	17.3
	6/19/2015	<0.50	<0.50	<0.50	<0.50	13.8	<0.50	1.3	53.8	<0.50	<0.50	18.4	<0.50	<0.50	12.8	48.3
	9/25/2015	<0.50	<0.50	<0.50	<0.50	12.3	<0.50	4.2	105	0.61	<0.50	67.4	0.92	<0.50	45.9	57.8
	12/8/2015	<0.50	3.8	<0.50	<0.50	13.5	<0.50	<0.50	7	<0.50	<0.50	4	<0.50	<0.50	2.8	3.3
	3/9/2016	<0.50	<2	<0.50	<0.50	20.6	<0.50	1.6	36	<0.50	<0.50	6.5	<0.50	<0.50	6.2	36
	6/17/2016	<0.50	<2	<0.50	<0.50	24.9	<0.50	26.4	744	2.8	<0.50	223	3.1	<0.50	146	227
	9/29/2016	<0.50	<2	<0.50	<0.50	12.1	<0.50	<0.50	115	<0.50	<0.50	33.3	<0.50	<0.50	24.8	142
	12/16/2016	<0.50	<2	<0.50	<0.50	10.3	<0.50	<0.50	5.2	<0.50	<0.50	2.6	<0.50	<0.50	1.9	2
3/31/2017	<0.5	<2	<0.5	<0.5	57.6	<0.5	14.3	236	0.6	<0.5	4.3	<0.5	<0.5	14.4	235	
6/15/2017	<0.50	<2.0	<0.50	<0.50	38.6	<0.50	3.5	46.2	<0.50	<0.50	5.1	<0.50	<0.50	4.9	98.9	
9/29/2017	<2.0	<2.0	<0.50	<0.50	21.7	<1.0	6.8	195.0	0.74	<0.50	41.5	0.67	<0.50	31.3	428.0	
11/9/2017	<2.0	<2.0	<0.50	<0.50	21.3	<0.50	0.9	61.6	0.52	<0.50	13.2	<0.50	<0.50	9.2	170.0	

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MGMS2-3(60)	06/28/00	<5	<25	<2.5	<2.5	35.6	<2.5	8.3	433	<2.5	<2.5	110	22.3	--	198	<2.5
	08/30/00	<10	<50	<5	<5	36	<5	13	1,120	<5	<5	164	32	--	136	<5
	11/29/00	<5	<25	<2.5	<2.5	5.08	<2.5	3.88	279	<2.5	<2.5	26.8	<5	--	38	<2.5
	02/27/01	<2	<10	<1	<1	40.2	<1	2.65	46.6	<1	<1	20.7	12.4	--	27	173
	05/31/01	<1	<5	<0.50	<0.50	2.47	<0.50	2.3	39.1	<0.50	<0.50	113	3.44	--	75.6	5.06
	09/24/01	<2.5	<2.5	<2.5	<2.5	14	<2.5	11	180	3.6	<2.5	340	11	--	220	48
	12/18/01	<1	<5	<0.50	<0.50	0.607	<0.50	1.01	15	<0.50	<0.50	64.4	2.06	--	47.7	<0.50
	03/19/02	<1	<0.50	<0.50	<1	5.4	<0.50	2.96	62.9	0.81	<0.50	91.9	5.78	--	80.1	15.2
	05/29/02	<1	<0.50	<0.50	<1	2.55	<0.50	2.02	59.7	0.82	<0.50	119	4.8	--	67.6	1.06
	01/23/03	<1	<0.50	<0.50	<1	10.1	<0.50	2.7	114	1.12	<0.50	111	6.06	--	96	22.8
	05/28/03	<2	<1	<1	<2	15	<1	3.28	178	1.48	<1	131	9.3	--	126	15.6
	11/11/03	<2	<2	<2	<2	21.3	<2	4.56	208	<2	<2	223	9.06	--	139	20.6
	01/27/04	<1	<0.50	<0.50	<1	17.2	<0.50	2.83	117	1.57	<0.50	96.3	5.38	--	92.2	17.7
	05/03/04	<1	<1	<1	<1	4.79	<1	1.96	86.4	<1	<1	121	3.31	--	84	<1
	11/15/04	<2.5	<2.5	<2.5	<2.5	<2.5	13	4.4	220	2.8	<2.5	170	6.4	--	140	11
	02/01/05	<1	<0.50	<0.50	<1	2.49	<0.50	1.47	92	2.46	<0.50	97.7	2.41	--	73.9	0.6
	05/16/05	<1	<0.50	<0.50	<1	1.49	<0.50	1.51	45.2	0.59	<0.50	74.1	1.61	--	41.5	<0.50
	08/18/05	<1	<0.500	<0.500	<1	<0.500	<0.500	<0.500	27.6 B	<0.500	<0.500	23.5 B	<0.500	--	13 B	<0.500
	11/16/05	<1	<0.500	<0.500	<1	7.5	<0.500	2.05	90.9	1.16	<0.500	107	3.1	--	78.3	2.68
	02/20/06	<1	<0.500	<0.500	<1	3.35	<0.500	1.6	65	0.82	<0.500	99.5	1.55	--	62.3	1.27
	06/06/06	<1	<1	<1	<1	<1	<1	<1	55	<1	<1	76.3	1.01	--	36.2	<1
	09/05/06	<1	<0.50	<0.50	<1	2.85	<0.50	1.13	75.1	0.73	<0.50	73	1.11	--	45.6	0.83
	12/05/06	<1	<0.50	<0.50	<1	2.58	<0.50	1.44	77	0.75	<0.50	98.7	1.27	--	61.2	0.79
	02/07/07	<1	<0.50	<0.50	<1	3.36	<0.50	1.3	96.5	0.79	<0.50	76.3	1.64	--	55	1.51
	05/21/07	<1	<1	<1	<1	2.45	<1	1.33	73.7	<1	<1	99.1	1.51	--	54.5	<1
	09/10/07	<10	<5	<5	<10	31.2	<5	8.2	559	<5	<5	221	10.8	--	192	26.7
	12/12/07	<1	<0.50	<0.50	<1	1.49	<0.50	0.88	78.6	0.56	<0.50	66.1	0.98	--	36.8	1.75
	03/04/08	<1	<0.500	<0.500	<1	4.46	<0.500	2.19	164	1.37	<0.500	89.7	2.32	<0.500	72.2	6.88
	09/16/08	<5	<2.50	<2.50	<5	10.4	<2.50	3.65	166	<2.50	<2.50	111	3.85	<2.50	96.4	7.15
	12/08/08	<0.80	<0.80	<0.80	<0.80	11	<0.80	3	160	1.7	<0.80	110	3.2	<0.80	80	10
03/24/09	<0.50	<0.50	<0.50	<0.50	5.8	<0.50	1.6	110	1	<0.50	84	2.2	<0.50	53	3.7	
09/15/09	<0.50	<0.50	<0.50	<0.50	6.4	<0.50	2.3	91	1.2	<0.50	110	2.4	<0.50	72	4.2	
12/14/09	<0.50	<0.50	<0.50	<0.50	2.1	<0.50	1.1	61	0.75	<0.50	84	1.1	<0.50	54	0.96	
03/16/10	<0.50	<0.50	<0.50	<0.50	15	<0.50	3.6	140	1.6	<0.50	160	8.2	<0.50	110	12	
06/14/10	<0.50	<0.50	<0.50	<0.50	1.2	<0.50	0.75	46	0.55	<0.50	73	0.86	<0.50	38	0.88	
09/21/10	<0.5	<0.5	<0.5	<0.5	11	<0.5	3	130	1.5	<0.5	150	5.8	<0.5	100	6.8	

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MGMS2-3(60) (continued)	12/07/10	<0.5	<0.5	<0.5	<0.5	4.1	<0.5	1.8	86	1.2	<0.5	120	1.7	<0.5	77	1.6
	03/07/11	<0.50	<0.50	<0.50	<0.50	1.5	<0.50	0.86	73	0.62	<0.50	61	1.2	<0.50	34	1.4
	06/06/11	<0.5	<0.5	<0.5	<0.5	0.64	<0.5	<0.5	22	<0.5	<0.5	64	0.54	<0.5	27	<0.5
	09/12/11	<0.50	<0.50	<0.50	<0.50	10	<0.50	3.2	110	1.4	<0.50	170	6	<0.50	100	2
	12/05/11	<0.50	<0.50	<0.50	<0.50	2.6	<0.50	0.95	51	0.54	<0.50	84	1	<0.50	41	<0.50
	03/08/12	<0.50	<0.50	<0.50	<0.50	10	<0.50	2.9	300	1.9	<0.50	71	1.5	<0.50	45	43
	06/19/12	<0.5	<0.5	<0.5	<0.5	2	<0.5	1	79	0.87	<0.5	78	0.78	<0.5	45	5.3
	09/12/12	<0.50	<0.50	<0.50	<0.50	1.5	<0.50	0.56	48	<0.50	<0.50	44	<0.50	<0.50	20	2.7
	12/11/12	<0.50	<0.50	<0.50	<0.50	2.6	<0.50	2.5	59	1.5	<0.50	57	0.62	<0.50	36	16
	03/12/13	<0.50	<0.50	<0.50	<0.50	0.74	<0.50	<0.50	22	<0.50	<0.50	16	<0.50	<0.50	9	<0.50
	06/11/13	<0.50	<0.50	<0.50	<0.50	2.4	<0.50	1.5	53	0.58	<0.50	29	0.55	<0.50	21	12
	09/17/13	<0.50	<0.50	<0.50	<0.50	5.4	<0.50	0.98	73	0.66	<0.50	24	0.6	<0.50	13	29
	12/10/13	<0.50	<0.50	<0.50	<0.50	3	<0.50	1	88	0.88	<0.50	23	0.6	<0.50	18	13
	3/18/2014	<0.50	<0.50	<0.50	<0.50	0.96	<0.50	<0.50	28	<0.50	<0.50	33	<0.50	<0.50	13	1.7
	9/23/2014	Insufficient air pressure to inflate dedicated bladder; no sample collected.														
	12/12/2014	Insufficient air pressure to inflate dedicated bladder; no sample collected.														
	3/20/2015	<0.50	<0.50	<0.50	<0.50	1.6	<0.50	<0.50	29.4	<0.50	<0.50	41.4	<0.50	<0.50	24.3	5.2
	6/19/2015	<0.50	<0.50	<0.50	<0.50	2	<0.50	0.56	38.1	<0.50	<0.50	35.1	<0.50	<0.50	23.5	7.9
	9/25/2015	<0.50	<0.50	<0.50	<0.50	2.5	<0.50	0.5	51.6	<0.50	<0.50	18.4	<0.50	<0.50	15.8	9.7
	12/8/2015	Well Damaged, Unable to Sample														
6/17/2016	<0.50	<2	<0.50	<0.50	1.1	<0.50	<0.50	19.4	<0.50	<0.50	17.2	<0.50	<0.50	11.8	3.4	
9/30/2016	<0.50	<2	<0.50	<0.50	2	<0.50	<0.50	40	<0.50	<0.50	9.6	<0.50	<0.50	11.5	9.6	
12/16/2016	<0.50	<2	<0.50	<0.50	1.7	<0.50	<0.50	35.3	<0.50	<0.50	40.7	<0.50	<0.50	24.8	1.4	
3/31/2017	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<0.5	18.5	<0.5	<0.5	26	<0.5	<0.5	11.2	0.75	
6/15/2017	<2.0	<2.0	<0.50	<0.50	0.88	<1.0	<0.50	20.7	<0.50	<0.50	40.4	<0.50	<0.50	17.3	1.3	
9/29/2017	<2.0	<2.0	<0.50	<0.50	2.30	<1.0	<0.50	30.4	<0.50	<0.50	17.5	<0.50	<0.50	12.0	6.7	
11/9/2017	<2.0	<2.0	<0.50	<0.50	1.80	<0.50	<0.50	30.2	<0.50	<0.50	34.2	<0.50	<0.50	20.1	1.1	
MGMS2-2(110)	06/28/00	<1	<5	<0.50	<0.50	<0.50	<0.50	<0.50	12.2	<0.50	<0.50	6.04	<1	--	17.1	<0.50
	08/30/00	<1	<5	<0.50	<0.50	<0.50	<0.50	<0.50	4.41	<0.50	<0.50	16.4	<1	--	14.7	<0.50
	11/29/00	<1	<5	<0.50	<0.50	<0.50	<0.50	0.717	8.23	<0.50	<0.50	13	<1	--	19.3	<0.50
	02/27/01	<1	<5	<0.50	<0.50	<0.50	<0.50	0.756	7.31	<0.50	<0.50	15.2	<1	--	21.6	<0.50
	05/31/01	<1	<5	<0.50	<0.50	<0.50	<0.50	0.938	10.7	<0.50	<0.50	24.4	1.14	--	29.1	<0.50
	09/24/01	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.6	6.8	<0.50	<0.50	37	1.1	--	34	<0.50

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MGMS2-2(110) (continued)	12/18/01	<1	<5	<0.50	<0.50	<0.50	<0.50	0.62	4.91	<0.50	<0.50	35.1	<1	--	27.5	<0.50
	03/19/02	<1	<0.50	<0.50	<1	<0.50	<0.50	0.61	9.97	<0.50	<0.50	35.6	1.23	--	24.6	<0.50
	05/29/02	<1	<0.50	<0.50	<1	<0.50	<0.50	1.21	31.9	<0.50	<0.50	114	2.39	--	51	0.61
	01/23/03	<1	<0.50	<0.50	<1	<0.50	<0.50	1.01	57.1	<0.50	<0.50	47.8	2.79	--	44.1	2.98
	05/28/03	<1	<0.50	<0.50	<1	0.61	<0.50	0.73	63.9	<0.50	<0.50	54.6	1.98	--	43.1	1.13
	11/11/03	<1	<1	<1	<1	1.14	<1	<1	76.7	1.07	<1	32.4	2.19	--	30.8	2.03
	01/27/04	<1	<0.50	<0.50	<1	0.63	<0.50	<0.50	49	<0.50	<0.50	67.9	1.17	--	30	1
	05/03/04	<1	<1	<1	<1	<1	<1	<1	14	<1	<1	28	<1	--	13.6	<1
	11/15/04	<0.50	<0.50	<0.50	<0.50	<0.50	0.7	0.62	60	<0.50	<0.50	50	1.6	--	30	<0.50
	05/16/05	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	27.9	<0.50	<0.50	21.5	0.52	--	10.9	<0.50
	11/16/05	<1	<0.500	<0.500	<1	<0.500	<0.500	<0.500	15.1	<0.500	<0.500	18	<0.500	--	8.42	<0.500
	06/06/06	<1	<1	<1	<1	<1	<1	<1	30.9	<1	<1	13.9	<1	--	6.59	<1
	12/05/06	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	36.2	<0.50	<0.50	17.9	<0.50	--	8.27	<0.50
	09/10/07	<5	<2.50	<2.50	<5	<2.50	<2.50	3.2	512	<2.50	<2.50	146	5.65	--	94.4	14.9
	03/04/08	<1	<0.500	<0.500	<1	<0.500	<0.500	<0.500	59.5	<0.500	<0.500	33.4	0.75	<0.500	16.7	2.82
	09/16/08	<1	<0.500	<0.500	<1	<0.500	<0.500	0.71	77	<0.500	<0.500	44	1.18	<0.500	23.8	3.45
	03/24/09	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	40	<0.50	<0.50	27	<0.50	<0.50	11	2.5
	06/15/09	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	31	<0.50	<0.50	20	0.57	<0.50	8.9	2.3
	09/15/09	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	26	<0.50	<0.50	16	<0.50	<0.50	6.7	1.8
	03/15/10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	28	<0.50	<0.50	21	<0.50	<0.50	8.1	1.6
	09/21/10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	33	<0.5	<0.5	34	0.6	<0.5	14	1.3
	03/07/11	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	24	<0.50	<0.50	26	<0.50	<0.50	8.6	1
	09/12/11	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	15	<0.50	<0.50	22	<0.50	<0.50	8.3	<0.50
	03/08/12	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	31	<0.50	<0.50	23	<0.50	<0.50	9.3	2.4
	09/12/12	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	18	<0.50	<0.50	20	<0.50	<0.50	8.3	1.4
	03/12/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	34	<0.50	<0.50	23	0.52	<0.50	10	2.7
	09/17/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	30	<0.50	<0.50	18	<0.50	<0.50	8.7	2.2
	3/18/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	21	<0.50	<0.50	13	<0.50	<0.50	6.2	2.5
	9/23/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	25	<0.50	<0.50	12	<0.50	<0.50	7.3	4.9
	3/19/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	18.3	<0.50	<0.50	7.9	<0.50	<0.50	4.8	4.6
9/25/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	15.3	<0.50	<0.50	9.4	<0.50	<0.50	5.9	4.1	
3/9/2016	<0.50	<2	<0.50	<0.50	0.73	<0.50	<0.50	22.6	<0.50	<0.50	7.1	<0.50	<0.50	8	10	
9/29/2016	<0.50	<2	<0.50	<0.50	0.62	<0.50	<0.50	16.8	<0.50	<0.50	6.5	<0.50	<0.50	6.3	5.8	
3/31/2017	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<0.5	19.5	<0.5	<0.5	6.4	<0.5	<0.5	6.6	6.4	
9/29/2017	<2.0	<2.0	<0.50	<0.50	2.8	<1.0	<0.50	63.5	<0.50	<0.50	2.2	<0.50	<0.50	5.3	25.0	
11/9/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	6.3	<0.50	<0.50	3.9	<0.50	<0.50	3.1	1.9	

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MGMS2-1(132)	06/28/00	<1	<5	<0.50	<0.50	1.25	<0.50	1.77	27.6	<0.50	<0.50	27.5	2.06	--	54.3	<0.50
	08/30/00	<1	<5	<0.50	<0.50	0.903	<0.50	<0.50	23	<0.50	<0.50	77.8	2.47	--	52.9	<0.50
	11/29/00	<1	<5	<0.50	<0.50	<0.50	<0.50	0.569	12.4	<0.50	<0.50	25.3	<1	--	27.8	<0.50
	02/27/01	<1	<5	<0.50	<0.50	0.537	<0.50	0.605	11.4	<0.50	<0.50	25.2	<1	--	24.4	2.6
	05/31/01	<1	<5	<0.50	<0.50	<0.50	<0.50	<0.50	8.86	<0.50	<0.50	25.5	<1	--	24.4	<0.50
	09/24/01	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.76	7.6	<0.50	<0.50	29	1.1	--	30	<0.50
	12/18/01	<1	<5	<0.50	<0.50	<0.50	<0.50	0.773	6.81	<0.50	<0.50	26.8	1.36	--	23.8	<0.50
	03/19/02	<1	<0.50	<0.50	<1	<0.50	<0.50	0.53	8.62	<0.50	<0.50	33.5	0.77	--	24.2	<0.50
	05/29/02	<1	<0.50	<0.50	<1	<0.50	<0.50	1.29	35.4	0.52	<0.50	117	2.5	--	53.6	0.62
	01/23/03	<1	<0.50	<0.50	<1	<0.50	<0.50	0.96	57.4	<0.50	<0.50	49.9	2.35	--	46.2	3.19
	05/28/03	<1	<0.50	<0.50	<1	<0.50	<0.50	0.53	27.2	<0.50	<0.50	29.3	0.98	--	24	1.07
	11/11/03	<1	<1	<1	<1	<1	<1	<1	46.3	<1	<1	28.8	1.56	--	29.7	1.49
	01/27/04	<1	<0.50	<0.50	<1	0.63	<0.50	0.56	37.6	<0.50	<0.50	28	0.96	--	22.2	1.51
	05/04/04	<1	<1	<1	<1	<1	<1	<1	38.2	<1	<1	7.55	<1	--	5.22	<1
	11/15/04	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.58	62	<0.50	<0.50	38	1.1	--	26	0.85
	05/16/05	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	29.5	<0.50	<0.50	23.7	0.56	--	15.2	0.86
	11/16/05	<1	<0.500	<0.500	<1	<0.500	<0.500	<0.500	8.85	<0.500	<0.500	13	<0.500	--	6.06	<0.500
	06/06/06	<1	<1	<1	<1	<1	<1	<1	23.1	<1	<1	14.8	<1	--	6.71	<1
	12/05/06	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	27.6	<0.50	<0.50	14.9	<0.50	--	7.89	<0.50
	09/10/07	<5	<2.50	<2.50	<5	4.55	<2.50	3	615	<2.50	<2.50	93.2	5.5	--	61	21.5
	03/04/08	<1	<0.500	<0.500	<1	<0.500	<0.500	<0.500	37.3 J	<0.500	<0.500	22.6 J	0.59	<0.500	12.9 J	2.4
	09/16/08	<1	<0.500	<0.500	<1	0.53	<0.500	1	101	0.56	<0.500	38.3	1.37	<0.500	26.1	6.11
	03/24/09	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	32	<0.50	<0.50	24	0.57	<0.50	11	1.5
	06/15/09	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	32	<0.50	<0.50	24	<0.50	<0.50	12	1.6
	09/15/09	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	26	<0.50	<0.50	18	<0.50	<0.50	8	1.5
	03/15/10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	28	<0.50	<0.50	23	<0.50	<0.50	9.9	1.6
	09/21/10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	28	<0.5	<0.5	31	<0.5	<0.5	12	1.1
	03/07/11	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	30	<0.50	<0.50	41	0.56	<0.50	13	0.97
	03/08/12	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	26	<0.50	<0.50	24	<0.50	<0.50	9.4	1.8
	09/12/12	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	22	<0.50	<0.50	22	<0.50	<0.50	9	2
03/12/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	24	<0.50	<0.50	19	<0.50	<0.50	8.3	1.9	
09/17/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	35	<0.50	<0.50	15	<0.50	<0.50	8.1	2.7	
3/18/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	22	<0.50	<0.50	12	<0.50	<0.50	5.4	2.6	
9/23/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	32	<0.50	<0.50	9.8	<0.50	<0.50	6	5.5	
3/19/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	10.5	<0.50	<0.50	9.4	<0.50	<0.50	4.4	0.75	

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MGMS2-1(132) (continued)	3/9/2016	<0.50	<0.50	<0.50	<0.50	0.86	<0.50	<0.50	36.8	<0.50	<0.50	7.9	0.69	<0.50	10.7	12.4
	9/29/2016	<0.50	<0.50	<0.50	<0.50	0.7	<0.50	<0.50	31.4	<0.50	<0.50	6.4	<0.50	<0.50	7.9	8.2
	3/31/2017	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<0.5	15.6	<0.5	<0.5	5.2	<0.5	<0.5	4.7	4.8
	9/29/2017	<2.0	<2.0	<0.50	<0.50	2.2	<1.0	<0.50	64.9	<0.50	<0.50	2.4	0.6	<0.50	6.3	19.4
	11/9/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	14.3	<0.50	<0.50	3.6	<0.50	<0.50	4.5	5.0
MGMS3-4(40)	08/30/00	<10	<50	<5	<5	13.2	<5	5.01	858	14.1	<5	580	10.8	--	205	6.65
	11/29/00	<20	<100	<10	<10	<10	<10	<10	820	10.6	<10	2,810	<20	--	395	<10
	02/27/01	<50	<250	<25	<25	39.4	<25	29.2	4,570	<25	<25	2,970	<50	--	756	79.3
	05/31/01	<50	<250	<25	<25	<25	<25	<25	2,920	38.5	<25	3,960	<50	--	716	<25
	09/24/01	<2.5	<2.5	<2.5	<2.5	5.8	<2.5	<2.5	730	5.4	<2.5	1,400	9.2	--	230	3.5
	12/18/01	<50	<250	<25	<25	<25	<25	<25	2,550	<25	<25	3,310	<50	--	631	31
	03/19/02	<20	<10	<10	<20	34.6	<10	15.4	3,370	30.2	<10	3,560	23.8	--	707	57
	05/29/02	<50	<25	<25	<50	71.5	<25	26	5,180	38.5	<25	2,470	33.5	--	728	86
	11/11/02	<50	<25	<25	<50	<25	<25	<25	1,520	<25	<25	2,750	<25	--	309	<25
	01/23/03	<20	<10	<10	<20	137	<10	38.4	3,530	32.6	<10	2,380	118	--	1,400	83.6
	05/28/03	<50	<25	<25	<50	56	<25	28.5	1,720	<25	<25	3,560	<25	--	1,470	<25
	11/11/03	<10	<10	<10	<10	<10	<10	<10	672	<10	<10	58.3	<10	--	32.4	<10
	01/27/04	<20	<10	<10	<20	20	<10	<10	1,900	19.4	<10	1,350	10	--	246	20
	05/03/04	<20	<20	<20	<20	50	<20	<20	1,420	<20	<20	2,700	34.2	--	913	24.8
	08/17/04	<20	<10	<10	<20	71.6	<10	17	3,300	31	<10	1,360	29.2	--	569	45.2
	11/15/04	<25	<25	<25	<25	<25	<25	<25	1,400	<25	<25	1,600	<25	--	290	<25
	03/24/05	<20	<10	<10	<20	79.4	<10	30	3,440	34.2	<10	2,330	43.8	--	1,080	60.2
	03/24/05 DUP	<20	<10	<10	<20	83.2	<10	29.2	3,450	34	<10	2,150	44	--	1,040	58.6
	05/16/05	<10	<5	<5	<10	7	<5	<5	657	11.3	<5	1,130	8.1	--	224	<5
	11/16/05	<10	<5	<5	<10	5.8	<5	<5	794	8.4	<5	1,180	7.6	--	210	<5
	03/14/06	<50	<50	<50	<50	51	<50	<50	4,130	<50	<50	1,410	<50	--	484	<50
	06/06/06	<20	<20	<20	<20	20.4	<20	<20	2,290	32.2	<20	1,410	<20	--	401	23.6
	12/05/06	<20	<10	<10	<20	29.8	<10	<10	3,570	29	<10	1,020	<10	--	360	95.4
	05/22/07	<20	<20	<20	<20	20.8	<20	<20	2,640	20.2	<20	952	<20	--	349	22.6
09/10/07	<50	<25	<25	<50	<25	<25	<25	2,340	<25	<25	499	<25	--	215	25.5	
12/12/07	<50	<25	<25	<50	<25	<25	<25	723	<25	<25	536	<25	--	133	<25	
03/04/08	<1	<0.500	<0.500	<1	32.4	3.08	22	2,280	25.4	3.86	1,580	27.5	<0.500	972	85.1	
09/16/08	<50	<25	<25	<50	64.5	<25	<25	2,700	<25	<25	714	<25	<25	462	47	
12/08/08	<9	<9	<9	<9	24	<9	<9	1,800	20	<9	350	<9	<9	160	90	
03/24/09	<7	<7	<7	<7	36	<7	7.9	1,600	12	<7	600	11	<7	280	33	
09/15/09	<5	<5	<5	<5	15	<5	<5	1,500	13	<5	550	<5	<5	180	8.2	
09/15/09 DUP	<5	<5	<5	<5	15	<5	<5	1,400	13	<5	540	<5	<5	170	9.8	

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MGMS3-4(40) (continued)	12/14/09	<2.5	<2.5	<2.5	<2.5	8.1	<2.5	<2.5	750	5.3	<2.5	180	<2.5	<2.5	74	19
	03/17/10	<2.5	<2.5	<2.5	<2.5	52	<2.5	14	1,800	18	2.9	810	16	<2.5	490	41
	03/17/10 DUP	<5	<5	<5	<5	51	<5	14	1,600	18	<5	780	16	<5	470	39
	06/14/10	<0.90	<0.90	<0.90	<0.90	2.4	<0.90	<0.90	230	2.3	<0.90	300	2.2	<0.90	88	1.5
	09/20/10	<7	<7	<7	<7	32	<7	8.6	1,800	16	<7	530	7.9	<7	230	31
	09/20/10 DUP	<6	<6	<6	<6	31	<6	7.4	1,700	15	<6	510	7.4	<6	220	29
	12/07/10	<2	<2	<2	<2	5.3	<2	<2	460	3.9	<2	330	2.2	<2	95	3.2
	03/07/11	<2	<2	<2	<2	20	<2	4.7	1,300	10	<2	330	4	<2	140	53
	03/07/11 DUP	<4	<4	<4	<4	19	<4	4.9	1,200	10	<4	320	<4	<4	140	46
	06/06/11	<3	<3	<3	<3	6.5	<3	4.1	780	7	<3	370	5.4	<3	150	8.5
	09/13/11	<5	<5	<5	<5	45	<5	13	1,800	19	<5	560	15	<5	380	29
	09/13/11 DUP	<7	<7	<7	<7	40	<7	12	1,700	16	<7	570	12	<7	330	23
	12/06/11	<5	<5	<5	<5	14	<5	<5	1,000	9.3	<5	140	<5	<5	64	44
	03/08/12	<5	<5	<5	<5	33	<5	13	1,400	14	<5	930	17	<5	450	28
	03/08/12 DUP	<6	<6	<6	<6	35	<6	14	1,400	14	<6	990	18	<6	480	30
	06/21/2012	<5	<5	<5	<5	22	<5	5.6	1,300	11	<5	220	<5	<5	140	44
	09/12/12	<5	<5	<5	<5	23	<5	6.2	1,400	13	<5	220	<5	<5	120	85
	09/12/12 DUP	<5	<5	<5	<5	23	<5	5.3	1,400	13	<5	230	<5	<5	120	86
	12/11/12	<2	<2	<2	<2	7.1	<2	<2	510	6.5	<2	180	<2	<2	72	6.5
	03/12/13	<2	<2	<2	<2	30	<2	8.4	1,400	12	<2	510	8.7	<2	260	35
	03/12/13 DUP	<2	<2	<2	<2	29	<2	8.8	1,300	12	<2	470	8.4	<2	250	35
	06/11/13	<2.5	<2.5	<2.5	<2.5	11	<2.5	<2.5	740	7.1	<2.5	110	<2.5	<2.5	58	34
	09/16/13	<2	<2	<2	<2	7.7	<2	<2	360	4.6	<2	100	<2	<2	48	24
	09/16/13 DUP	<2	<2	<2	<2	8.5	<2	<2	380	5.1	<2	100	<2	<2	49	25
	12/10/13	<0.90	<0.90	<0.90	<0.90	4.7	<0.90	<0.90	230	2.8	<0.90	60	<0.90	<0.90	29	2
	12/10/13 DUP	<0.90	<0.90	<0.90	<0.90	4.6	<0.90	<0.90	230	2.7	<0.90	61	<0.90	<0.90	29	1.9
	3/18/2014	<0.90	<0.90	<0.90	<0.90	2.7	<0.90	0.98	280	1.8	0.91	84	<0.90	<0.90	38	<0.90
	3/18/2014 DUP	<0.90	<0.90	<0.90	<0.90	2.6	<0.90	<0.90	280	1.9	0.93	86	<0.90	<0.90	39	<0.90
	6/26/2014	<0.90	<0.90	<0.90	<0.90	12	<0.90	3.5	690	5.7	<0.90	180	1.3	<0.90	100	20
	6/26/14 DUP	<0.90	<0.90	<0.90	<0.90	11	<0.90	2.8	490	5	<0.90	160	1.1	<0.90	930	14
9/23/2014	<0.90	<0.90	<0.90	<0.90	10	<0.90	1.7	410	5.8	<0.90	72	<0.90	<0.90	55	74	
9/23/2014 DUP	<0.20	<0.20	<0.20	<0.20	11	<0.20	<0.20	430	5.5	<0.20	70	<0.20	<0.20	53	75	

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MGMS3-4(40) (continued)	12/12/2014	<2	<2	<2	<2	7.9	<2	<2	490	4.2	<2	36	<2	<2	28	20
	3/18/2015	<1.6	<1.6	<1.6	<1.6	20	<1.6	3.2	896	7.3	<1.6	249	<1.6	<1.6	159	21.7
	3/18/2015 DUP	<0.50	<0.50	<0.50	<0.50	17	<0.50	2.4	713	5.5	<0.50	194	<0.50	<0.50	124	16.8
	6/19/2015	<0.84	<0.84	<0.84	<0.84	7.2	<0.84	<0.84	339	3.2	<0.84	34.4	<0.84	<0.84	32.8	73.3
	9/22/2015	<0.50	<0.50	<0.50	<0.50	2.8	<0.50	<0.50	164	<0.50	<0.50	2.5	<0.50	<0.50	8.6	61.9
	9/22/2015 DUP	<0.50	<0.50	<0.50	<0.50	2.5	<0.50	<0.50	151	1.2	<0.50	2.3	<0.50	<0.50	7.8	51.9
	12/7/2015	<0.50	<0.50	<0.50	<0.50	9.1	<0.50	2	370	3.1	<0.50	109	<0.50	<0.50	94.8	4
	3/9/2016	<2.5	<10	<2.5	<2.5	11.6	<2.5	<2.5	610	4	<2.5	86.7	<2.5	<2.5	89.7	22.9
	3/8/2016 DUP	<2.5	<10	<2.5	<2.5	12.4	<2.5	<2.5	643	5.4	<2.5	97.4	<2.5	<2.5	102	28
	6/17/2016	<1.2	<5	<1.2	<1.2	24.5	<1.2	6	955	9.1	<1.2	232	<1.2	<1.2	209	85.9
	9/30/2016	<0.50	<2	<0.50	<0.50	4.1	<0.50	0.54	226	1.8	<0.50	1.7	<0.50	<0.50	1.3	45.8
	9/30/2016 DUP	<0.50	<2	<0.50	<0.50	4.5	<0.50	0.6	219	2	<0.50	1.5	<0.50	<0.50	1.4	52.1
	12/16/2016	<0.50	<2	<0.50	<0.50	1	<0.50	<0.50	1.3	0.97	<0.50	0.63	<0.50	<0.50	<0.50	0.88
	3/28/2017	<0.5	<2	<0.5	<0.5	22.5	0.68	2.8	979	5.5	<0.5	1.4	<0.5	<0.5	0.6	257
	3/28/2017 DUP	<2.5	<10	<2.5	<2.5	20.7	<2.5	3.3	1,050	6	<2.5	<2.5	<2.5	<2.5	<2.5	323
	6/12/2017	<0.50	<2.0	<0.50	<0.50	3.3	<0.50	<0.50	1.7	<0.50	<0.50	0.97	<0.50	<0.50	<0.50	<0.50
	9/26/2017	<2.0	<2.0	<0.50	<0.50	1.1	<1.0	<0.50	0.7	<0.50	<0.50	0.79	<0.50	<0.50	<0.50	<0.50
	9/26/2017 DUP	<2.0	<2.0	<0.50	<0.50	1.1	<1.0	<0.50	0.8	<0.50	<0.50	0.86	<0.50	<0.50	<0.50	<0.50
	11/10/2017	<2.0	<2.0	<0.50	<0.50	4.2	<0.50	<0.50	7.6	<0.50	<0.50	0.85	<0.50	<0.50	<0.50	12.80
	11/10/2017 DUP	<2.0	<2.0	<0.50	<0.50	4.3	<0.50	<0.50	8.0	<0.50	<0.50	0.71	<0.50	<0.50	<0.50	15.80
MGMS3-3(60)	08/30/00	<1	<5	<0.50	<0.50	<0.50	<0.50	<0.50	7.7	<0.50	<0.50	7.03	<1	--	3.31	<0.50
	11/29/00	<1	<5	<0.50	<0.50	<0.50	<0.50	<0.50	3.11	<0.50	<0.50	2.8	<1	--	1.28	<0.50
	02/27/01	<1	<5	<0.50	<0.50	<0.50	<0.50	<0.50	21.5	<0.50	<0.50	14.9	<1	--	7.32	<0.50
	05/31/01	<1	<5	<0.50	<0.50	<0.50	<0.50	<0.50	10.1	<0.50	<0.50	9.84	<1	--	4.76	<0.50
	09/24/01	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	7.1	<0.50	<0.50	9.7	<0.50	--	3.7	<0.50
	12/18/01	<1	<5	<0.50	<0.50	<0.50	<0.50	<0.50	3.26	<0.50	<0.50	17	<1	--	3.84	<0.50
	03/19/02	<1	<0.50	<0.50	<1	0.68	<0.50	<0.50	17.6	<0.50	<0.50	32.3	0.5	--	14	<0.50
	05/29/02	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	40.5	<0.50	<0.50	20.8	<0.50	--	7.92	<0.50
	01/23/03	<1	<0.50	<0.50	<1	0.5	<0.50	<0.50	33.9	<0.50	<0.50	20.3	<0.50	--	12.7	<0.50
	05/28/03	<1	<0.50	<0.50	<1	0.58	<0.50	<0.50	88.3	0.53	<0.50	16.9	<0.50	--	11.9	0.7
	11/11/03	<2	<2	<2	<2	<2	<2	<2	298	<2	<2	36.1	<2	--	23	<2
	01/27/04	<2	<1	<1	<2	1.2	<1	<1	274	1.24	<1	25.2	<1	--	23.4	1.28
	05/03/04	<2	<2	<2	<2	<2	<2	<2	274	<2	<2	46.6	<2	--	27	<2
	11/15/04	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	43	<0.50	<0.50	8.8	<0.50	--	3.4	<0.50
	02/01/05	<2	<1	<1	<2	<1	<1	<1	179	1.72	<1	15.6	<1	--	7.9	<1
	05/16/05	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	33.8	<0.50	<0.50	5.7	<0.50	--	2.39	<0.50
	08/18/05	<1	<0.500	<0.500	<1	<0.500	<0.500	<0.500	47.9	<0.500	<0.500	4.39 B	<0.500	--	1.96 B	0.66 B

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MGMS3-3(60) (continued)	11/16/05	<1	<0.500	<0.500	<1	<0.500	<0.500	<0.500	8.39	<0.500	<0.500	2.59	<0.500	--	0.83	<0.500
	02/21/06	<5	<2.50	<2.50	<5	2.65	<2.50	<2.50	558	<2.50	<2.50	25	<2.50	--	14.4	21.6
	03/14/06	<1	<1	<1	<1	2.92	<1	1.37	97.1	<1	<1	50.6	<1	--	39.2	<1
	06/06/06	<1	<1	<1	<1	<1	<1	<1	7.97	<1	<1	2.84	<1	--	1.04	<1
	09/05/06	<1	<0.50	<0.50	<1	2.75	<0.50	1.17	108	0.78	<0.50	47.3	0.93	--	34.2	0.65
	12/05/06	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	19.8	<0.50	<0.50	10.5	<0.50	--	5.57	<0.50
	02/07/07	<1	<0.50	<0.50	<1	1.08	<0.50	<0.50	44.3	<0.50	<0.50	21.5	<0.50	--	15.4	<0.50
	05/22/07	<1	<1	<1	<1	<1	<1	<1	32.5	<1	<1	45.2	<1	--	18.2	<1
	09/10/07	<2	<1	<1	<2	2.98	<1	<1	148	<1	<1	28.8	<1	--	31.6	1.67
	12/12/07	<2	<1	<1	<2	<1	<1	<1	11.5	<1	<1	4.22	<1	--	1.9	1.18
	03/04/08	<1	<0.500	<0.500	<1	1.58	<0.500	0.68	72.1	0.6	<0.500	27.2	0.5	<0.500	22.7	2.33
	12/08/08	<0.50	<0.50	<0.50	<0.50	0.73	<0.50	<0.50	44	<0.50	<0.50	12	<0.50	<0.50	9.2	1.3
	03/24/09	<0.50	<0.50	<0.50	<0.50	1	<0.50	<0.50	42	<0.50	<0.50	21	<0.50	<0.50	14	0.91
	09/15/09	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	15	<0.50	<0.50	8.5	<0.50	<0.50	4.3	0.84
	12/14/09	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	3.8	<0.50	<0.50	2	<0.50	<0.50	0.85	<0.50
	03/17/10	<0.50	<0.50	<0.50	<0.50	0.69	<0.50	<0.50	25	<0.50	<0.50	17	<0.50	<0.50	10	0.57
	06/14/10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	4.8	<0.50	<0.50	2.4	<0.50	<0.50	1.1	0.69
	09/20/10	<0.5	<0.5	<0.5	<0.5	0.81	<0.5	<0.5	28	<0.5	<0.5	18	<0.5	<0.5	11	0.52
	12/07/10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	9	<0.5	<0.5	3.4	<0.5	<0.5	1.5	0.94
	03/07/11	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	17	<0.50	<0.50	10	<0.50	<0.50	4.6	0.67
	06/06/11	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	3.9	<0.5	<0.5	2	<0.5	<0.5	0.73	<0.5
	09/13/11	<0.50	<0.50	<0.50	<0.50	0.94	<0.50	<0.50	34	<0.50	<0.50	17	<0.50	<0.50	12	<0.50
	12/05/11	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	14	<0.50	<0.50	14	<0.50	<0.50	7.3	<0.50
	03/08/12	<0.50	<0.50	<0.50	<0.50	0.58	<0.50	<0.50	21	<0.50	<0.50	15	<0.50	<0.50	9	<0.50
	06/21/12	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	3.9	<0.5	<0.5	3	<0.5	<0.5	1.2	<0.5
	09/12/12	<0.50	<0.50	<0.50	<0.50	1	<0.50	<0.50	39	<0.50	<0.50	18	<0.50	<0.50	12	<0.50
	12/11/12	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	3.1	<0.50	<0.50	2.3	<0.50	<0.50	0.9	<0.50
	03/12/13	<0.50	<0.50	<0.50	<0.50	0.74	<0.50	<0.50	22	<0.50	<0.50	16	<0.50	<0.50	9	<0.50
	06/11/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	16	<0.50	<0.50	11	<0.50	<0.50	5.4	<0.50
	09/16/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	11	<0.50	<0.50	6.8	<0.50	<0.50	3.3	<0.50
12/10/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	5.1	<0.50	<0.50	3.6	<0.50	<0.50	1.5	<0.50	
3/18/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	4	<0.50	<0.50	2.5	<0.50	<0.50	0.89	<0.50	
6/26/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	4.5	<0.50	<0.50	3.4	<0.50	<0.50	1.4	<0.50	

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MGMS3-3(60) (continued)	9/23/2014	<0.50	<0.50	<0.50	<0.50	0.71	<0.50	<0.50	2	<0.50	<0.50	8.8	<0.50	<0.50	4.7	<0.50
	12/12/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.9	<0.50	<0.50	2.2	<0.50	<0.50	0.72	<0.50
	3/18/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	12.2	<0.50	<0.50	6	<0.50	<0.50	3.7	<0.50
	6/19/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	6	<0.50	<0.50	3.5	<0.50	<0.50	1.6	<0.50
	9/22/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	7.7	<0.50	<0.50	3.9	<0.50	<0.50	2	0.6
	12/7/2015	<0.50	<0.50	<0.50	<0.50	0.75	<0.50	<0.50	13.9	<0.50	<0.50	4.2	<0.50	<0.50	2.5	16.7
	3/9/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	1.4	<0.50	<0.50	2.8	<0.50	<0.50	0.78	<0.50
	6/17/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	17.4	<0.50	<0.50	5.8	<0.50	<0.50	5	<0.50
	9/30/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	7.7	<0.50	<0.50	3.7	<0.50	<0.50	1.9	<0.50
	12/16/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	1.4	<0.50	<0.50	1.7	<0.50	<0.50	0.68	<0.50
	3/28/2017	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<0.5	0.62	<0.5	<0.5	1.1	<0.5	<0.5	<0.5	<0.5
	6/12/2017	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	2.3	<0.50	<0.50	1.3	<0.50	<0.50	0.64	<0.50
	9/26/2017	<2.0	<2.0	<0.50	<0.50	1.20	<1.0	<0.50	34.2	<0.50	<0.50	8.6	<0.50	<0.50	7.80	<0.50
	11/10/2017	<2.0	<2.0	<0.50	<0.50	1.70	<0.50	<0.50	37.6	<0.50	<0.50	0.8	<0.50	<0.50	1.50	13.90
	MGMS3-2(101)	08/30/00	<10	<50	<5	<5	7.28	<5	<5	120	<5	<5	154	12.1	--	98.2
11/29/00		<5	<25	<2.5	<2.5	<2.5	<2.5	<2.5	11.4	<2.5	<2.5	11.5	<5	--	13	<2.5
02/27/01		<2	<10	<1	<1	<1	<1	<1	2.4	<1	<1	3.36	<2	--	1.98	<1
05/31/01		<1	<5	<0.50	<0.50	<0.50	<0.50	<0.50	4.24	<0.50	<0.50	3.07	<1	--	1.85	<0.50
09/24/01		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	3.6	<0.50	<0.50	5.3	<0.50	--	2.4	<0.50
12/18/01		<1	<5	<0.50	<0.50	0.864	<0.50	0.913	10.3	<0.50	<0.50	50.9	2.98	--	23.9	<0.50
03/19/02		<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	4.02	<0.50	<0.50	6.88	<0.50	--	2.54	<0.50
05/29/02		<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	8.19	<0.50	<0.50	11.5	<0.50	--	3.9	<0.50
01/23/03		<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	21.2	<0.50	<0.50	17.2	<0.50	--	8.38	<0.50
05/28/03		<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	28.6	<0.50	<0.50	18.4	<0.50	--	8.76	<0.50
11/11/03		<1	<1	<1	<1	<1	<1	<1	53.7	<1	<1	18.3	<1	--	9.3	<1
01/27/04		<1	<0.50	<0.50	<1	0.53	<0.50	<0.50	114	0.8	<0.50	24	<0.50	--	15.1	<0.50
05/03/04		<1	<1	<1	<1	<1	<1	<1	22.1	<1	<1	6.74	<1	--	4.21	<1
11/15/04		<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	47	<0.50	<0.50	6.3	<0.50	--	2.9	<0.50
05/16/05		<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	66.5	<0.50	<0.50	3.59	<0.50	--	1.48	0.77
11/16/05		<1	<0.500	<0.500	<1	<0.500	<0.500	<0.500	25.3	<0.500	<0.500	4.93	<0.500	--	1.66	0.66
03/14/06		<1	<1	<1	<1	<1	<1	<1	23.1	<1	<1	2.91	<1	--	1.14	1.06
06/06/06		<1	<1	<1	<1	<1	<1	<1	15.9	<1	<1	3.56	<1	--	1.88	1.06
12/05/06		<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	32.6	<0.50	<0.50	2.84	<0.50	--	1.17	2.85
09/10/07		<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	40.4	<0.50	<0.50	6.32	<0.50	--	3.7	13.2

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MGMS3-2(101) (continued)	03/04/08	<1	<0.500	<0.500	<1	<0.500	<0.500	<0.500	18.1	<0.500	<0.500	3.4	<0.500	<0.500	1.47	5.64
	09/16/08	<1	<0.500	<0.500	<1	<0.500	<0.500	<0.500	20.4	<0.500	<0.500	6.34	<0.500	<0.500	3.5	4.24
	03/24/09	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	15	<0.50	<0.50	3	<0.50	<0.50	1.5	2.3
	06/15/09	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	5.8	<0.50	<0.50	2.4	<0.50	<0.50	1.2	2.2
	09/15/09	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	14	<0.50	<0.50	3.8	<0.50	<0.50	2.1	3.2
	03/17/10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	7	<0.50	<0.50	3.1	<0.50	<0.50	1.8	1.2
	09/20/10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	5.5	<0.5	<0.5	3	<0.5	<0.5	1.4	1.2
	03/07/11	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	5.8	<0.50	<0.50	3.7	<0.50	<0.50	2.2	0.86
	03/08/12	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	5.9	<0.50	<0.50	5.9	<0.50	<0.50	4.5	<0.50
	09/12/12	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	4.1	<0.50	<0.50	2.7	<0.50	<0.50	1.3	<0.50
	03/12/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	6.9	<0.50	<0.50	5.6	<0.50	<0.50	4.4	0.59
	09/16/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	3.9	<0.50	<0.50	3.6	<0.50	<0.50	2.1	<0.50
	3/18/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	6.8	<0.50	<0.50	9.1	<0.50	<0.50	6.5	<0.50
	9/23/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	3.7	<0.50	<0.50	3	<0.50	<0.50	1.5	<0.50
	3/18/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	5.1	<0.50	<0.50	4.4	<0.50	<0.50	2.8	<0.50
	9/22/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	5.3	<0.50	<0.50	3.8	<0.50	<0.50	2.6	1.2
	3/9/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	7.3	<0.50	<0.50	7.5	<0.50	<0.50	6.1	<0.50
	9/30/2016	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50	6.5	<0.50	<0.50	4.4	<0.50	<0.50	3	<0.50
	3/28/2017	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<0.5	7	<0.5	<0.5	7	<0.5	<0.5	6	<0.5
	9/26/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	5	<0.50	<0.50	0.96	<0.50	<0.50	1	0.9
11/10/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	2	<0.50	<0.50	2.50	<0.50	<0.50	2	<0.50	
MGMS3-1(132)	08/30/00	<1	<5	<0.50	<0.50	<0.50	<0.50	<0.50	0.53	<0.50	<0.50	5.58	<1	--	0.746	<0.50
	11/29/00	<1	<5	<0.50	<0.50	<0.50	<0.50	<0.50	2.04	<0.50	<0.50	0.754	<1	--	<0.50	<0.50
	02/27/01	<1	<5	<0.50	<0.50	<0.50	<0.50	<0.50	1.08	<0.50	<0.50	2.62	<1	--	0.722	<0.50
	05/31/01	<1	<5	<0.50	<0.50	<0.50	<0.50	<0.50	6.67	<0.50	<0.50	3.13	<1	--	1.44	<0.50
	09/24/01	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	3.8	<0.50	<0.50	6.1	<0.50	--	1.9	<0.50
	12/18/01	<1	<5	<0.50	<0.50	<0.50	<0.50	<0.50	4.11	<0.50	<0.50	8.75	<1	--	2.24	<0.50
	03/19/02	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	4.88	<0.50	<0.50	9.63	<0.50	--	3.02	<0.50
	05/29/02	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	11.8	<0.50	<0.50	14.6	<0.50	--	4.28	<0.50
	01/23/03	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	16.8	<0.50	<0.50	11.4	<0.50	--	6.04	<0.50
	05/28/03	<1	<0.50	<0.50	<1	0.59	<0.50	<0.50	93.3	0.76	<0.50	16.3	<0.50	--	10.1	0.83
	11/11/03	<1	<1	<1	<1	<1	<1	<1	72.4	<1	<1	12.2	<1	--	8	<1
	01/27/04	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	34.9	0.61	<0.50	12.7	<0.50	--	9.47	<0.50
	05/03/04	<1	<1	<1	<1	<1	<1	<1	11.9	<1	<1	<1	<1	--	14.2	<1
	11/15/04	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	200	<2.5	<2.5	6.2	<2.5	--	3.4	<2.5

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MGMS3-1(132) (continued)	05/16/05	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	42.6	0.79	<0.50	4.42	<0.50	--	2.23	<0.50
	11/16/05	<1	<0.500	<0.500	<1	<0.500	<0.500	<0.500	19.9	<0.500	<0.500	2.41	<0.500	--	0.8	<0.500
	03/14/06	<1	<1	<1	<1	<1	<1	<1	20.3	<1	<1	2.13	<1	--	<1	<1
	06/06/06	<1	<1	<1	<1	<1	<1	<1	18.6	<1	<1	1.57	<1	--	<1	1.36
	12/05/06	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	24.1	<0.50	<0.50	3.05	<0.50	--	1.08	4.68
	09/10/07	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	36.5	<0.50	<0.50	4.69	<0.50	--	3.17	16.8
	03/04/08	<1	<0.500	<0.500	<1	<0.500	<0.500	<0.500	21.8	<0.500	<0.500	3.37	<0.500	<0.500	1.64	6.83
	09/16/08	<1	<0.500	<0.500	<1	<0.500	<0.500	<0.500	26	<0.500	<0.500	4.86	<0.500	<0.500	3.52	4.96
	03/24/09	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	6.3	<0.50	<0.50	1.8	<0.50	<0.50	0.79	2.4
	03/24/09 DUP	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	5.8	<0.50	<0.50	1.6	<0.50	<0.50	0.78	2.3
	06/15/09	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	12	<0.50	<0.50	4.3	<0.50	<0.50	1.9	1.6
	09/15/09	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	7.7	<0.50	<0.50	2.1	<0.50	<0.50	1.2	2
	03/17/10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	7.2	<0.50	<0.50	2.6	<0.50	<0.50	1.9	0.92
	09/20/10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	6.5	<0.5	<0.5	2.9	<0.5	<0.5	2.3	1.3
	03/07/11	<0.50	<0.50	<0.50	<0.50	0.64	<0.50	<0.50	18	<0.50	<0.50	4	<0.50	<0.50	3.8	4.3
	09/13/11	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	5.6	<0.50	<0.50	3.8	<0.50	<0.50	3.4	0.55
	03/08/12	<0.50	<0.50	<0.50	<0.50	0.5	<0.50	<0.50	9.3	<0.50	<0.50	7	<0.50	<0.50	6.9	0.67
	09/12/12	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	6	<0.50	<0.50	4.9	<0.50	<0.50	4	<0.50
	03/12/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	9.4	<0.50	<0.50	8.1	<0.50	<0.50	7.2	0.98
	09/16/13	<0.50	<0.50	<0.50	<0.50	0.58	<0.50	<0.50	9.8	<0.50	<0.50	7.9	<0.50	<0.50	8.1	0.84
	3/18/2014	<0.50	<0.50	<0.50	<0.50	0.62	<0.50	0.51	11	<0.50	<0.50	13	<0.50	<0.50	11	0.76
	9/23/2014	<0.50	<0.50	<0.50	<0.50	0.54	<0.50	<0.50	8.9	<0.50	<0.50	9	<0.50	<0.50	7.9	<0.50
	3/18/2015	<0.50	<0.50	<0.50	<0.50	0.53	<0.50	<0.50	9.3	<0.50	<0.50	6.3	<0.50	<0.50	6	0.56
9/22/2015	<0.50	<0.50	<0.50	<0.50	0.74	<0.50	<0.50	13.3	<0.50	<0.50	8.1	<0.50	<0.50	8.2	1.2	
3/9/2016	<0.50	<2	<0.50	<0.50	1	<0.50	0.56	14.4	<0.50	<0.50	13.5	0.56	<0.50	12.7	0.8	
9/30/2016	<0.50	<2	<0.50	<0.50	0.84	<0.50	0.54	12.9	<0.50	<0.50	13.8	<0.50	<0.50	11.9	<0.50	
3/28/2017	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<0.5	7.9	<0.5	<0.5	13.8	<0.5	<0.5	9.6	<0.5	
9/26/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0	<0.50	3.4	<0.50	<0.50	3.0	<0.50	<0.50	2.8	<0.50	
11/10/2017	<2.0	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	3.3	<0.50	<0.50	5.1	<0.50	<0.50	3.8	<0.50	
CMT1-1	11/11/03	<1	<1	2.87	<1	<1	<1	<1	<1	<1	<1	<1	<1	--	<1	<1
	01/26/04	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	--	<0.50	<0.50
	05/03/04	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	--	<1	<1
	08/19/04	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	--	<0.50	<0.50
	11/17/04	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	--	<5	<5

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
CMT1-1 (continued)	03/23/05	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	--	<0.50	<0.50
	05/17/05	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	--	<0.50	<0.50
	11/17/05	<1	<0.500	<0.500	<1	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	--	<0.500	<0.500
	05/26/06	Well Abandoned														
CMT1-2	11/11/03	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	--	<1	<1
	01/26/04	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.75	<0.50	--	1.03	<0.50
	05/03/04	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	--	<1	<1
	08/19/04	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	--	<0.50	<0.50
	11/17/04	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.7	<0.50	--	0.88	<0.50
	02/01/05	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.37	<0.50	--	0.99	<0.50
	05/16/05	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.77	<0.50	--	0.69	<0.50
	11/17/05	<1	<0.500	<0.500	<1	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	0.6	<0.500	--	<0.500	<0.500
05/26/06	Well Abandoned															
CMT1-3	11/11/03	<2	<2	3.56	<2	<2	<2	<2	<2	<2	<2	<2	<2	--	<2	<2
	01/26/04	<1	<0.50	1.1	<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	--	<0.50	<0.50
	05/03/04	<1	<1	2.97	<1	<1	<1	<1	<1	<1	<1	<1	<1	--	<1	<1
	08/19/04	<1	<0.50	2.16	<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	--	<0.50	<0.50
	11/17/04	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	--	<25	<25
	05/16/05	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.6	<0.50	--	<0.50	<0.50
	11/17/05	<1	<0.500	<0.500	<1	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	--	<0.500	<0.500
05/26/06	Well Abandoned															
EX	03/23/09	<5	<5	<5	<5	<5	<5	<5	50	<5	<5	1,400	43	<5	420	<5
	06/18/09	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	4.2	<0.50	<0.50	24	1.1	<0.50	11	<0.50
	09/18/09	<0.50	<0.50	<0.50	<0.50	4.1	<0.50	3.3	120	0.76	<0.50	2,100	38	<0.50	380	1.1
	12/18/09	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	5.6	<2.5	<2.5	700	3.7	<2.5	56	<2.5
	03/16/10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	20	<0.50	<0.50	150	3.2	<0.50	33	<0.50
	06/17/10	<0.50	<0.50	<0.50	<0.50	0.97	<0.50	<0.50	92	<0.50	<0.50	150	2.3	<0.50	39	2.2
	09/23/10	<0.5	<0.5	<0.5	<0.5	1.5	<0.5	1.6	90	0.53	<0.5	2,400	20	<0.5	220	1.8
	12/21/10	<0.5	<0.5	<0.5	<0.5	0.83	<0.5	0.59	30	<0.50	<0.5	900	6.7	<0.5	99	0.71
	03/31/11	<4	<4	<4	<4	8.2	<4	8.1	240	<4	<4	6,800	110	<4	910	5.1
	06/07/11	<4	<4	<4	<4	<4	<4	<4	140	<4	<4	1,400	15	<4	170	<4

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)															
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride	
EX (continued)	09/19/11	<5	<5	<5	<5	7.9	<5	11	290	<5	<5	4,100	73	<5	460	14	
	12/07/11	<5	<5	<5	<5	16	<5	19	12,000	9.3	<5	<50	17	<5	<50	140	
	03/09/12	<4	<4	<4	<4	5	<4	<4	1,400	8.6	<4	33	<4	<4	10	290	
	06/22/12	<0.5	5.5	<0.5	<0.5	3.4	<0.5	0.68	170	1.3	<0.5	3	0.59	<0.5	1.1	120	
	09/14/12	<1.5	2.7	<1.5	<1.5	1.5	<1.5	<1.5	320	<1.5	<1.5	3	<1.5	<1.5	<1.5	42	
	12/14/12	<0.50	1.4	<0.50	<0.50	<0.50	<0.50	<0.50	26	<0.50	<0.50	0.87	<0.50	<0.50	<0.50	12	
	03/15/13	<0.50	2.8	<0.50	<0.50	<0.50	<0.50	<0.50	9.5	<0.50	<0.50	1.2	<0.50	<0.50	<0.50	4.4	
	06/14/13	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.6	<0.50	<0.50	0.79	<0.50	<0.50	<0.50	<0.50	
	09/20/13	<0.50	1.9	<0.50	<0.50	1.9	<0.50	0.54	71	0.68	<0.50	4.1	<0.50	<0.50	2.6	30	
	12/16/13	<0.50	1.4	<0.50	<0.50	3.8	<0.50	<0.50	34	<0.50	<0.50	2	<0.50	<0.50	1.4	28	
	3/24/2014	<0.50	<0.50	<0.50	<0.50	0.8	<0.50	<0.50	30	<0.50	<0.50	20	<0.50	<0.50	7.5	11	
	6/23/2014	<0.50	<0.50	<0.50	<0.50	2.9	<0.50	1.1	160	0.97	<0.50	29	<0.50	<0.50	15	38	
	9/30/2014	Insufficient water for sampling .															
	12/15/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	10	<0.50	<0.50	22	<0.50	<0.50	2.7	<0.50
	3/19/2015	<0.50	<0.50	<0.50	<0.50	3.5	<0.50	2.1	688	1.9	<0.50	168	2.5	<0.50	55.8	2.8	
	6/18/2015	<0.50	<0.50	<0.50	<0.50	2.6	<0.50	2.6	420	1.6	<0.50	186	0.88	<0.50	42	3.2	
	9/22/2015	<0.50	<0.50	<0.50	<0.50	2.9	<0.50	3.7	543	2.6	<0.50	302	0.65	<0.50	61.9	24.4	
	12/8/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	427	<0.50	<0.50	94	<0.50	<0.50	21.3	2.1	
	3/8/2016	<1.2	<5	<1.2	<1.2	4	<1.2	2.9	1,160	3.6	<1.2	274	5	<1.2	71.1	13.3	
	6/17/2016	<5	<20	<5	<5	<5	<5	<5	1,040	<5	<5	592	<5	<5	90.8	<5	
9/28/2016	<1.7	<6.7	<1.7	<1.7	4.6	<1.7	3.5	2,230	3.8	<1.7	39.4	2.5	<1.7	549	128		
12/12/2016	<0.50	3.7	<0.50	<0.50	<0.50	<0.50	<0.50	8.1	<0.50	<0.50	4.3	<0.50	<0.50	0.96	51.9		
3/28/2017	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<0.5	5.2	<0.5	<0.5	6.1	<0.5	<0.5	1.9	<0.5		
6/14/2017	<2.0	10.2	<0.50	<0.50	10.7	<1.0	<0.50	11.7	0.56	<0.50	9.5	<0.50	<0.50	3.0	1.3		
9/26/2017	<2.0	3.4	<0.50	<0.50	8.8	<1.0	<0.50	6.9	<0.50	<0.50	0.8	<0.50	<0.50	0.6	10.1		
MP-1	03/23/09	<4	<4	<4	<4	6	<4	<4	89	<4	<4	1,200	10	<4	180	<4	
	06/18/09	<4	<4	<4	<4	4.3	<4	<4	43	<4	<4	1,500	12	<4	180	<4	
	09/18/09	<4	<4	<4	<4	14	<4	<4	240	8.9	<4	1,100	8.2	<4	310	7.3	
	12/18/09	<4	<4	<4	<4	<4	<4	<4	58	<4	<4	1,000	7.1	<4	180	<4	
	03/16/10	<3	<3	<3	<3	22	<3	4.7	410	13	<3	1,500	8.6	<3	400	10	
	06/17/10	<3	<3	<3	<3	3.2	<3	<3	120	<3	<3	800	5.4	<3	140	<3	
	09/23/10	<3	<3	<3	<3	<3	<3	<3	41	<3	<3	730	4	<3	120	<3	

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MP-1 (continued)	12/10/10	<3	<3	<3	<3	<3	<3	<3	27	<3	<3	1,000	4.5	<3	150	<3
	03/14/11	<3	<3	<3	<3	7.1	<3	<3	150	<3	<3	1,200	6.4	<3	180	5.9
	06/07/11	<2.5	<2.5	<2.5	<2.5	4.9	<2.5	<2.5	75	<2.5	<2.5	640	3.3	<2.5	130	<2.5
	09/19/11	<1.5	<1.5	<1.5	<1.5	2.4	<1.5	<1.5	41	<1.5	<1.5	300	1.9	<1.5	72	1.6
	12/07/11	<2.5	<2.5	<2.5	<2.5	2.6	<2.5	<2.5	49	3.1	<2.5	640	3.1	<2.5	120	<2.5
	03/09/12	<1.5	<1.5	<1.5	<1.5	9.4	<1.5	2.8	440	6.3	<1.5	490	3.5	<1.5	140	21
	06/22/12	<2.5	<2.5	<2.5	<2.5	5.6	<2.5	2.8	530	2.9	<2.5	690	12	<2.5	120	48
	09/14/12	<1.5	<1.5	<1.5	<1.5	4	<1.5	<1.5	170	2.2	<1.5	340	2	<1.5	83	4.5
	12/14/12	<0.90	<0.90	<0.90	<0.90	2	<0.90	<0.90	170	1.7	<0.90	230	1	<0.90	48	1.8
	03/15/13	<0.90	<0.90	<0.90	<0.90	5.1	<0.90	0.94	140	2.5	<0.90	230	1	<0.90	69	1.8
	06/14/13	<0.90	<0.90	<0.90	<0.90	4.5	<0.90	1.4	190	1.6	<0.90	330	1.4	<0.90	70	1.8
	09/20/13	<0.90	<0.90	<0.90	<0.90	2.9	<0.90	<0.90	77	1.5	<0.90	260	0.95	<0.90	66	<0.90
	12/16/13	<0.90	<0.90	<0.90	<0.90	1.7	<0.90	1.1	67	0.92	<0.90	290	1.2	<0.90	70	<0.90
	3/24/2014	<1.5	<1.5	<1.5	<1.5	2.2	<1.5	<1.5	240	<1.5	<1.5	360	1.8	<1.5	54	<1.5
	6/23/2014	<1.5	<1.5	<1.5	<1.5	4.9	<1.5	2.3	290	1.7	<1.5	1,200	9.5	<1.5	130	5
	9/30/2014	<2	<2	<2	<2	2.8	<2	<2	110	<2	<2	360	<2	<2	63	16
	12/15/2014	<1.5	<1.5	<1.5	<1.5	1.7	<1.5	<1.5	58	<1.5	<1.5	320	<1.5	<1.5	59	<1.5
	3/20/2015	<1	<1	<1	<1	3.6	<1	1.5	188	1.5	<1	565	1	<1	95.6	24.8
	6/18/2015	<0.84	<0.84	<0.84	<0.84	2.9	<0.84	1.5	91	0.87	<0.84	376	<0.84	<0.84	80.8	<0.84
	9/22/2015	<1.2	<1.2	<1.2	<1.2	1.8	<1.2	1.4	38.3	<1.2	<1.2	343	<1.2	<1.2	68.3	<1.2
12/8/2015	<1.2	<1.2	<1.2	<1.2	1.8	<1.2	1.5	50.9	<1.2	<1.2	308	<1.2	<1.2	62.6	<1.2	
3/8/2016	<0.84	<3.3	<0.84	<0.84	7.5	<0.84	2.1	148	1.2	<0.84	433	<0.84	<0.84	100	<0.84	
6/17/2016	<0.50	<2	<0.50	<0.50	5	<0.50	1.5	125	0.97	<0.50	206	<0.50	<0.50	67.3	<0.50	

Please refer to notes at end of table.

Appendix B
Historical Groundwater Analytical Results
NuStar Vancouver Facility
Vancouver, Washington

Well Number	Sample Date	Concentrations in ug/L (ppb)														
		Bromo- form	Chloro- ethane	Chloro- form	Dibromo- chloro- methane	1,1- Dichloro- ethane	1,2- Dichloro- ethane	1,1- Dichloro- ethene	cis-1,2- Dichloro- ethene	trans-1,2- Dichloro- ethene	1,2- Dichloro- propane	Tetra- chloro- ethene	1,1,1- Trichloro- ethane	1,1,2- Trichloro- ethane	Trichloro- ethene	Vinyl Chloride
MP-1 (continued)	9/28/2016	<0.50	<2	<0.50	<0.50	1.3	<0.50	3.1	40.5	<0.50	<0.50	99.4	<0.50	<0.50	35.5	3.3
	12/13/2016	<0.50	<2	<0.50	<0.50	0.64	<0.50	0.92	209	0.55	<0.50	2.9	<0.50	<0.50	1	4.3
	3/30/2017	<0.5	71.4	<0.5	<0.5	7.5	<0.5	<0.5	177	6	<0.5	<0.5	<0.5	<0.5	0.79	186
	6/14/2017	<2.0	4.0	<0.50	<0.50	2.3	<1.0	<0.50	143	1.9	<0.50	16.2	<0.50	<0.50	8.5	29.4
	9/26/2017	<2.0	<2.0	<0.50	<0.50	3.4	<1.0	4.50	83	0.8	<0.50	307.0	<0.50	<0.50	65.9	2.3
	11/9/2017	<2.0	<2.0	<0.50	<0.50	3.3	<0.50	4.30	105	0.9	<0.50	198.0	<0.50	<0.50	74.0	2.6

Notes:

1. HVOCs = Halogenated volatile organic compounds analysis by U.S. Environmental Protection Agency (EPA) Method 8260B: results reported in micrograms per liter (µg/L).
2. TPH = Total petroleum hydrocarbons in the diesel and heavy oil range analysis by Washington Department of Ecology (WDOE) Method TPH-418.1 Results reported in milligrams per liter (mg/L).
3. -- = Not sampled or not analyzed.
4. < = Not detected at or above the specified laboratory method reporting limit (MRL).
5. B = Estimated concentration based on data quality review - similar detection in associated equipment blank (less than 5x difference).
6. J = Estimated concentration based on data quality review.
7. n-Propylbenzene, 1,1,1,2-Tetrachloro-ethane, and 1,1,2-Trichloroethane were detected during the first semi-annual 2008 monitoring event. Refer to Table 3 of the *First Semi-Annual 2008 Groundwater Monitoring Report* for detection concentrations.
8. ND = Not detected and no reporting limit specified.
9. B = Chloroform was detected in one or more field blank during the March 2009 and September 2009 sampling events. Chloroform was flagged with a "B" in samples where the concentration was five times or less than the maximum detection in the field blank.
10. E = Chloroform was detected in the equipment blank during the March 2009 and September 2009 sampling events. Chloroform was flagged with an "E" in samples where the concentration was five times or less than the maximum detection in the equipment blank.

Appendix C

**Laboratory Analytical Reports and Data Quality Review
(on CD)**

Appendix C – Laboratory Analytical Reports and Data Quality Review

1.0 Introduction

This appendix documents the results of a quality assurance/quality control (QA/QC) review of the analytical data for groundwater samples collected during the September and November 2017 groundwater sampling events and air samples collected during the July through December 2017 soil vapor extraction (SVE) effluent sampling events for the NuStar Terminals Services, Inc. (NuStar) Vancouver Facility (Facility) in Vancouver, Washington. TestAmerica Laboratories in West Sacramento, California, Pace Analytical (Pace) in Davis, California and ALS Group USA, Corp. of Kelso, Washington performed the analyses. A copy of each analytical laboratory report is included in this appendix.

Report	Report Date	Sampling Event
1297909	January 31, 2018	Third Quarter Groundwater Monitoring
320-30334-1	August 16, 2017	July SVE Monitoring
320-31189-1	September 14, 2017	August SVE Monitoring
320-32107-1	October 13, 2017	September SVE Monitoring
320-32763-1	November 9, 2017	October SVE Monitoring
320-33769-1	December 8, 2017	November SVE Monitoring
320-3471-1	January 15, 2018	December SVE Monitoring
12100804	January 25, 2018	Fourth Quarter Groundwater Monitoring
K1712068	November 28, 2017	Fourth Quarter Groundwater Monitoring
K1712125	November 22, 2017	Fourth Quarter Groundwater Monitoring
K1712221	November 22, 2017	Fourth Quarter Groundwater Monitoring
K1712223	November 22, 2017	Fourth Quarter Groundwater Monitoring
K1712276	November 22, 2017	Fourth Quarter Groundwater Monitoring

2.0 Data Validation

The QA review outlines the applicable quality control criteria utilized during the data review process, as well as any deviations from those criteria. Examination and validation of the laboratory summary reports include:

- Analytical preparation and quantitation methods
- Analytical method holding times

Appendix C – Laboratory Analytical Reports and Data Quality Review

- Sample handling
- Chain of custody handling
- Detection and reporting limits
- Method blank, field blank, equipment blank and trip blank detections
- Laboratory control samples, matrix spikes and surrogates to assess laboratory accuracy
- Laboratory control sample duplicates, matrix spike duplicates and laboratory duplicates to assess laboratory precision
- Field duplicates to assess sampling and laboratory precision

The QA review did not include a review of raw data.

3.0 Analytical Methods

Chemical analyses on collected water samples consisted of volatile organic compounds (VOCs) by U.S. Environmental Protection Agency (EPA) Method 8260B. Select groundwater samples were also analyzed for total organic carbon (TOC) by EPA Method 5310, ethene by EPA Method RSK-175M, ammonia as nitrogen by EPA Method 350.1 and nitrate as nitrogen and nitrite as nitrogen by EPA Method 300.0. SVE effluent vapor samples were analyzed for VOCs using EPA Method TO-15.

4.0 Quality Assurance Objectives and Review

The general QA objectives for this project were to develop and implement procedures for obtaining, evaluating, and confirming the usability of data of a specified quality for monitoring groundwater quality trends and SVE monitoring data at the Facility. To collect such information, analytical data must have an appropriate degree of accuracy and reproducibility, samples collected must be representative of actual field conditions, and samples must be collected and analyzed using unbroken chain-of-custody procedures.

Reporting limits and analytical results were compared to action levels for each parameter in the media of concern. Precision, accuracy, representativeness, completeness, and comparability parameters used to indicate data quality are defined below.

Sample Receipt. Samples were received by the laboratory in good condition and on ice. VOA containers for VOC analysis arrived without headspace.

Appendix C – Laboratory Analytical Reports and Data Quality Review

Reporting Limits. Detection limits are set by the laboratory and are based on instrumentation abilities, sample matrix, and suggested detection limits by the EPA or the Washington State Department of Ecology (Ecology). In some cases, the detection limits may be raised due to high concentrations of analytes in the samples or matrix interferences. Detection limits were generally consistent with industry standards and below promulgated regulatory standards when possible (if not raised, as previously discussed). Reporting limits were reviewed and are generally acceptable for this project. Reporting limits for individual samples are varied based on the magnitude of the chemical impact. It is not expected that any of the raised detection limits compromise the usability of the data.

Holding Times. For MW-19 DUP, VOC analytes, with the exception of vinyl chloride, trichloroethene, tetrachloroethene, and cis-1,2-dichloroethene, were analyzed outside of hold due to insufficient preservation. Results detected above the reporting limit may be biased low and are “J-” flagged as estimated values. Non-detected results are “UJ” flagged as estimated at the reporting limit.

Calibration and Analysis. Calibration was within control limit for analytes presented in Table 3. For MGMS1-43, cis-1,2-dichloroethene was analyzed from a VOC analysis container that contained headspace greater than 6 millimeters (mm). This result is “J-” flagged as an estimated value with a low bias.

Method Blanks. A method, or laboratory, blank is a sample prepared in the laboratory along with the actual samples and analyzed for the same parameters at the same time. It is used to assess if detected contaminants may have been the result of contamination of the samples in the laboratory. No analytes were detected in the laboratory method blanks for the groundwater or air analyses.

Laboratory Control Samples and Laboratory Control Sample Duplicate. Laboratory Control Samples (LCS) were also analyzed by the laboratories to assess the accuracy of the analytical equipment. LCS are prepared from an analyte-free matrix that is then spiked with known levels of the constituents of interest (COI; i.e., a standard). The concentrations are measured and the results compared to the known spiked levels. This comparison is expressed as percent recovery.

Chloroethane was recovered above the upper control limit for batch 131759. Samples associated with this analytical batch were not detected and no data was flagged.

Matrix Spike Analyses. A matrix spike QC sample is used to assess the performance of the analytical method by determining potential matrix interferences. Matrix spike (MS) and matrix spike duplicate (MSD) analyses are performed on one environmental sample per analytical batch. A matrix spike sample uses an environmental sample that is spiked with known concentrations of analytes of interest. The matrix spike is then prepared and analyzed with the same analytical procedures as environmental samples in the analytical batch. The resulting concentration of the matrix spike is then compared to the known - or true - values plus

Appendix C – Laboratory Analytical Reports and Data Quality Review

the non-spiked environmental sample concentration. This comparison is expressed as a percent recovery. The matrix spike duplicate is then compared to the matrix spike of the same batch and expressed as an RPD value. The percent recovery and RPD values are then compared to control limits to assess data quality.

No MS or MSD samples were analyzed as part of the air sample QC batch.

For groundwater, chloroethane and 1,1,2-trichloroethane were recovered above the upper control limit for batches 131759 and 131767, but the source sample was not from report 12100804; therefore, no data was flagged.

PCE was recovered above the upper control limit for the MSD in batch 127528. The result for PCE in this MSD was above the calibration range and estimated. Sample results are accepted based on the recovery of the MS, LCS, and LCSD.

TOC was recovered above the upper control limit for batch 95043. The TOC result for MW-12 is "J+" flagged as an estimated result with a possible high bias.

Surrogate Recovery. Surrogates are organic compounds that are similar in chemical composition to the COI and spiked into environmental and batch quality control samples prior to sample preparation and analysis. Surrogate recoveries for environmental samples are used to evaluate matrix interference on a sample-specific basis. Surrogate recoveries were within acceptable control limits for environmental samples.

Laboratory Duplicate. A laboratory duplicate is a second analysis of an environmental sample received by the laboratory, which serves as an internal check on laboratory quality as well as potential variability of the sample matrix. The laboratory duplicate is analyzed and compared to the primary sample analysis to assess the precision of the analytical method. This comparison can be expressed by the RPD between the original and duplicate samples. Laboratory duplicate sample RPD values were within control limits.

Field Duplicate. A field duplicate is a second field sample collected from a selected monitoring well. Field duplicate samples serve as a check on laboratory quality as well as potential variability of the sample matrix. The field duplicate is analyzed and compared with the second sample to assess the precision of the analytical method. This comparison can be expressed by the RPD between the original and duplicate samples. Select VOC analytes were outside of the RPD limit of 30 percent for MW-19 and MW-7. These analytes are "D" flagged as estimated values.

Field Blank. A field blank is a sample of analyte-free water poured into a clean sample container in the field, preserved, and shipped to the laboratory with field samples. Field blanks assess the potential for contamination from field conditions during sampling. No analytes were identified in the field blanks collected

Appendix C – Laboratory Analytical Reports and Data Quality Review

during the third and fourth quarter 2017 monitoring events. Field blanks samples did not contain analytes above the laboratory reporting limit.

Equipment Blank. An equipment blank is a sample of analyte-free water poured over or through decontaminated field sampling equipment during a sampling event. Equipment blanks assess the potential for contamination from the total sampling, sample preparation, and measurement process when decontaminated sampling equipment is used to collect groundwater samples. No analytes were identified in the equipment blanks collected during the third and fourth quarter 2017 monitoring events.

Trip Blank. A trip blank is a sample of analyte-free water that is taken from the laboratory to the sampling site and transported back to the laboratory without having been exposed to sampling procedures. Trip blanks assess contamination introduced during shipping and field-handling activities. Trip blank samples did not contain analytes above the laboratory reporting limit.

Conclusion. In conclusion, the overall QA objectives have been met, and the data are of adequate quality for use in this project.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

TestAmerica Job ID: 320-30334-1
Client Project/Site: NuStar Vapor Testing

For:
Apex Companies LLC
3015 SW 1st Avenue
Portland, Oregon 97201

Attn: Heather Gosack



Authorized for release by:
8/16/2017 2:55:38 PM

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-30334-1

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-30334-1

Job ID: 320-30334-1

Laboratory: TestAmerica Sacramento

Narrative

Receipt

The samples were received on 8/2/2017 11:10 AM; the samples arrived in good condition, properly preserved and, where required, on ice.

Air - GC/MS VOA

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

VOA Prep

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

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Detection Summary

Client: Apex Companies LLC
 Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-30334-1

Client Sample ID: SVE_South_Pre_Carbon_073117

Lab Sample ID: 320-30334-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	55		33		ppb v/v	82.1		TO-15	Total/NA
cis-1,2-Dichloroethene	100		33		ppb v/v	82.1		TO-15	Total/NA
Tetrachloroethene	2500		33		ppb v/v	82.1		TO-15	Total/NA
Toluene	91		33		ppb v/v	82.1		TO-15	Total/NA
Trichloroethene	190		33		ppb v/v	82.1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	180		100		ug/m3 Air	82.1		TO-15	Total/NA
cis-1,2-Dichloroethene	400		130		ug/m3 Air	82.1		TO-15	Total/NA
Tetrachloroethene	17000		220		ug/m3 Air	82.1		TO-15	Total/NA
Toluene	340		120		ug/m3 Air	82.1		TO-15	Total/NA
Trichloroethene	1000		180		ug/m3 Air	82.1		TO-15	Total/NA

Client Sample ID: SVE_South_Post_Carbon_073117

Lab Sample ID: 320-30334-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	19		5.0		ppb v/v	1		TO-15	Total/NA
Benzene	0.40		0.40		ppb v/v	1		TO-15	Total/NA
2-Butanone (MEK)	3.5		0.80		ppb v/v	1		TO-15	Total/NA
Carbon disulfide	37		0.80		ppb v/v	1		TO-15	Total/NA
Chloromethane	1.3		0.80		ppb v/v	1		TO-15	Total/NA
Methylene Chloride	0.68		0.40		ppb v/v	1		TO-15	Total/NA
4-Methyl-2-pentanone (MIBK)	0.96		0.40		ppb v/v	1		TO-15	Total/NA
Tetrachloroethene	0.96		0.40		ppb v/v	1		TO-15	Total/NA
Toluene	2.2		0.40		ppb v/v	1		TO-15	Total/NA
Trichloroethene	0.72		0.40		ppb v/v	1		TO-15	Total/NA
Vinyl chloride	0.94		0.40		ppb v/v	1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	46		12		ug/m3 Air	1		TO-15	Total/NA
Benzene	1.3		1.3		ug/m3 Air	1		TO-15	Total/NA
2-Butanone (MEK)	10		2.4		ug/m3 Air	1		TO-15	Total/NA
Carbon disulfide	110		2.5		ug/m3 Air	1		TO-15	Total/NA
Chloromethane	2.6		1.7		ug/m3 Air	1		TO-15	Total/NA
Methylene Chloride	2.4		1.4		ug/m3 Air	1		TO-15	Total/NA
4-Methyl-2-pentanone (MIBK)	3.9		1.6		ug/m3 Air	1		TO-15	Total/NA
Tetrachloroethene	6.5		2.7		ug/m3 Air	1		TO-15	Total/NA
Toluene	8.2		1.5		ug/m3 Air	1		TO-15	Total/NA
Trichloroethene	3.9		2.1		ug/m3 Air	1		TO-15	Total/NA
Vinyl chloride	2.4		1.0		ug/m3 Air	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-30334-1

Client Sample ID: SVE_South_Pre_Carbon_073117

Lab Sample ID: 320-30334-1

Date Collected: 07/31/17 08:08

Matrix: Air

Date Received: 08/02/17 11:10

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		410		ppb v/v			08/14/17 16:48	82.1
Benzene	55		33		ppb v/v			08/14/17 16:48	82.1
Benzyl chloride	ND		66		ppb v/v			08/14/17 16:48	82.1
Bromodichloromethane	ND		25		ppb v/v			08/14/17 16:48	82.1
Bromoform	ND		33		ppb v/v			08/14/17 16:48	82.1
Bromomethane	ND		66		ppb v/v			08/14/17 16:48	82.1
2-Butanone (MEK)	ND		66		ppb v/v			08/14/17 16:48	82.1
Carbon disulfide	ND		66		ppb v/v			08/14/17 16:48	82.1
Carbon tetrachloride	ND		66		ppb v/v			08/14/17 16:48	82.1
Chlorobenzene	ND		25		ppb v/v			08/14/17 16:48	82.1
Dibromochloromethane	ND		33		ppb v/v			08/14/17 16:48	82.1
Chloroethane	ND		66		ppb v/v			08/14/17 16:48	82.1
Chloroform	ND		25		ppb v/v			08/14/17 16:48	82.1
Chloromethane	ND		66		ppb v/v			08/14/17 16:48	82.1
1,2-Dibromoethane (EDB)	ND		66		ppb v/v			08/14/17 16:48	82.1
1,2-Dichlorobenzene	ND		33		ppb v/v			08/14/17 16:48	82.1
1,3-Dichlorobenzene	ND		33		ppb v/v			08/14/17 16:48	82.1
1,4-Dichlorobenzene	ND		33		ppb v/v			08/14/17 16:48	82.1
Dichlorodifluoromethane	ND		33		ppb v/v			08/14/17 16:48	82.1
1,1-Dichloroethane	ND		25		ppb v/v			08/14/17 16:48	82.1
1,2-Dichloroethane	ND		66		ppb v/v			08/14/17 16:48	82.1
1,1-Dichloroethene	ND		66		ppb v/v			08/14/17 16:48	82.1
cis-1,2-Dichloroethene	100		33		ppb v/v			08/14/17 16:48	82.1
trans-1,2-Dichloroethene	ND		33		ppb v/v			08/14/17 16:48	82.1
1,2-Dichloropropane	ND		33		ppb v/v			08/14/17 16:48	82.1
cis-1,3-Dichloropropene	ND		33		ppb v/v			08/14/17 16:48	82.1
trans-1,3-Dichloropropene	ND		33		ppb v/v			08/14/17 16:48	82.1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		33		ppb v/v			08/14/17 16:48	82.1
Ethylbenzene	ND		33		ppb v/v			08/14/17 16:48	82.1
4-Ethyltoluene	ND		33		ppb v/v			08/14/17 16:48	82.1
Hexachlorobutadiene	ND		160		ppb v/v			08/14/17 16:48	82.1
2-Hexanone	ND		33		ppb v/v			08/14/17 16:48	82.1
Methylene Chloride	ND		33		ppb v/v			08/14/17 16:48	82.1
4-Methyl-2-pentanone (MIBK)	ND		33		ppb v/v			08/14/17 16:48	82.1
Styrene	ND		33		ppb v/v			08/14/17 16:48	82.1
1,1,2,2-Tetrachloroethane	ND		33		ppb v/v			08/14/17 16:48	82.1
Tetrachloroethene	2500		33		ppb v/v			08/14/17 16:48	82.1
Toluene	91		33		ppb v/v			08/14/17 16:48	82.1
1,2,4-Trichlorobenzene	ND		160		ppb v/v			08/14/17 16:48	82.1
1,1,1-Trichloroethane	ND		25		ppb v/v			08/14/17 16:48	82.1
1,1,2-Trichloroethane	ND		33		ppb v/v			08/14/17 16:48	82.1
Trichloroethene	190		33		ppb v/v			08/14/17 16:48	82.1
Trichlorofluoromethane	ND		33		ppb v/v			08/14/17 16:48	82.1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		33		ppb v/v			08/14/17 16:48	82.1
1,2,4-Trimethylbenzene	ND		66		ppb v/v			08/14/17 16:48	82.1
1,3,5-Trimethylbenzene	ND		33		ppb v/v			08/14/17 16:48	82.1
Vinyl acetate	ND		66		ppb v/v			08/14/17 16:48	82.1
Vinyl chloride	ND		33		ppb v/v			08/14/17 16:48	82.1

TestAmerica Sacramento

Client Sample Results

Client: Apex Companies LLC
 Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-30334-1

Client Sample ID: SVE_South_Pre_Carbon_073117

Lab Sample ID: 320-30334-1

Date Collected: 07/31/17 08:08

Matrix: Air

Date Received: 08/02/17 11:10

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	ND		66		ppb v/v			08/14/17 16:48	82.1
o-Xylene	ND		33		ppb v/v			08/14/17 16:48	82.1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		980		ug/m3 Air			08/14/17 16:48	82.1
Benzene	180		100		ug/m3 Air			08/14/17 16:48	82.1
Benzyl chloride	ND		340		ug/m3 Air			08/14/17 16:48	82.1
Bromodichloromethane	ND		170		ug/m3 Air			08/14/17 16:48	82.1
Bromoform	ND		340		ug/m3 Air			08/14/17 16:48	82.1
Bromomethane	ND		260		ug/m3 Air			08/14/17 16:48	82.1
2-Butanone (MEK)	ND		190		ug/m3 Air			08/14/17 16:48	82.1
Carbon disulfide	ND		200		ug/m3 Air			08/14/17 16:48	82.1
Carbon tetrachloride	ND		410		ug/m3 Air			08/14/17 16:48	82.1
Chlorobenzene	ND		110		ug/m3 Air			08/14/17 16:48	82.1
Dibromochloromethane	ND		280		ug/m3 Air			08/14/17 16:48	82.1
Chloroethane	ND		170		ug/m3 Air			08/14/17 16:48	82.1
Chloroform	ND		120		ug/m3 Air			08/14/17 16:48	82.1
Chloromethane	ND		140		ug/m3 Air			08/14/17 16:48	82.1
1,2-Dibromoethane (EDB)	ND		500		ug/m3 Air			08/14/17 16:48	82.1
1,2-Dichlorobenzene	ND		200		ug/m3 Air			08/14/17 16:48	82.1
1,3-Dichlorobenzene	ND		200		ug/m3 Air			08/14/17 16:48	82.1
1,4-Dichlorobenzene	ND		200		ug/m3 Air			08/14/17 16:48	82.1
Dichlorodifluoromethane	ND		160		ug/m3 Air			08/14/17 16:48	82.1
1,1-Dichloroethane	ND		100		ug/m3 Air			08/14/17 16:48	82.1
1,2-Dichloroethane	ND		270		ug/m3 Air			08/14/17 16:48	82.1
1,1-Dichloroethene	ND		260		ug/m3 Air			08/14/17 16:48	82.1
cis-1,2-Dichloroethene	400		130		ug/m3 Air			08/14/17 16:48	82.1
trans-1,2-Dichloroethene	ND		130		ug/m3 Air			08/14/17 16:48	82.1
1,2-Dichloropropane	ND		150		ug/m3 Air			08/14/17 16:48	82.1
cis-1,3-Dichloropropene	ND		150		ug/m3 Air			08/14/17 16:48	82.1
trans-1,3-Dichloropropene	ND		150		ug/m3 Air			08/14/17 16:48	82.1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		230		ug/m3 Air			08/14/17 16:48	82.1
Ethylbenzene	ND		140		ug/m3 Air			08/14/17 16:48	82.1
4-Ethyltoluene	ND		160		ug/m3 Air			08/14/17 16:48	82.1
Hexachlorobutadiene	ND		1800		ug/m3 Air			08/14/17 16:48	82.1
2-Hexanone	ND		130		ug/m3 Air			08/14/17 16:48	82.1
Methylene Chloride	ND		110		ug/m3 Air			08/14/17 16:48	82.1
4-Methyl-2-pentanone (MIBK)	ND		130		ug/m3 Air			08/14/17 16:48	82.1
Styrene	ND		140		ug/m3 Air			08/14/17 16:48	82.1
1,1,2,2-Tetrachloroethane	ND		230		ug/m3 Air			08/14/17 16:48	82.1
Tetrachloroethene	17000		220		ug/m3 Air			08/14/17 16:48	82.1
Toluene	340		120		ug/m3 Air			08/14/17 16:48	82.1
1,2,4-Trichlorobenzene	ND		1200		ug/m3 Air			08/14/17 16:48	82.1
1,1,1-Trichloroethane	ND		130		ug/m3 Air			08/14/17 16:48	82.1
1,1,2-Trichloroethane	ND		180		ug/m3 Air			08/14/17 16:48	82.1
Trichloroethene	1000		180		ug/m3 Air			08/14/17 16:48	82.1
Trichlorofluoromethane	ND		180		ug/m3 Air			08/14/17 16:48	82.1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		250		ug/m3 Air			08/14/17 16:48	82.1
1,2,4-Trimethylbenzene	ND		320		ug/m3 Air			08/14/17 16:48	82.1

TestAmerica Sacramento

Client Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-30334-1

Client Sample ID: SVE_South_Pre_Carbon_073117

Lab Sample ID: 320-30334-1

Date Collected: 07/31/17 08:08

Matrix: Air

Date Received: 08/02/17 11:10

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,3,5-Trimethylbenzene	ND		160		ug/m3 Air			08/14/17 16:48	82.1
Vinyl acetate	ND		230		ug/m3 Air			08/14/17 16:48	82.1
Vinyl chloride	ND		84		ug/m3 Air			08/14/17 16:48	82.1
m,p-Xylene	ND		290		ug/m3 Air			08/14/17 16:48	82.1
o-Xylene	ND		140		ug/m3 Air			08/14/17 16:48	82.1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	89		70 - 130		08/14/17 16:48	82.1
1,2-Dichloroethane-d4 (Surr)	101		70 - 130		08/14/17 16:48	82.1
Toluene-d8 (Surr)	100		70 - 130		08/14/17 16:48	82.1

Client Sample ID: SVE_South_Post_Carbon_073117

Lab Sample ID: 320-30334-2

Date Collected: 07/31/17 08:11

Matrix: Air

Date Received: 08/02/17 11:10

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	19		5.0		ppb v/v			08/12/17 00:13	1
Benzene	0.40		0.40		ppb v/v			08/12/17 00:13	1
Benzyl chloride	ND		0.80		ppb v/v			08/12/17 00:13	1
Bromodichloromethane	ND		0.30		ppb v/v			08/12/17 00:13	1
Bromoform	ND		0.40		ppb v/v			08/12/17 00:13	1
Bromomethane	ND		0.80		ppb v/v			08/12/17 00:13	1
2-Butanone (MEK)	3.5		0.80		ppb v/v			08/12/17 00:13	1
Carbon disulfide	37		0.80		ppb v/v			08/12/17 00:13	1
Carbon tetrachloride	ND		0.80		ppb v/v			08/12/17 00:13	1
Chlorobenzene	ND		0.30		ppb v/v			08/12/17 00:13	1
Dibromochloromethane	ND		0.40		ppb v/v			08/12/17 00:13	1
Chloroethane	ND		0.80		ppb v/v			08/12/17 00:13	1
Chloroform	ND		0.30		ppb v/v			08/12/17 00:13	1
Chloromethane	1.3		0.80		ppb v/v			08/12/17 00:13	1
1,2-Dibromoethane (EDB)	ND		0.80		ppb v/v			08/12/17 00:13	1
1,2-Dichlorobenzene	ND		0.40		ppb v/v			08/12/17 00:13	1
1,3-Dichlorobenzene	ND		0.40		ppb v/v			08/12/17 00:13	1
1,4-Dichlorobenzene	ND		0.40		ppb v/v			08/12/17 00:13	1
Dichlorodifluoromethane	ND		0.40		ppb v/v			08/12/17 00:13	1
1,1-Dichloroethane	ND		0.30		ppb v/v			08/12/17 00:13	1
1,2-Dichloroethane	ND		0.80		ppb v/v			08/12/17 00:13	1
1,1-Dichloroethene	ND		0.80		ppb v/v			08/12/17 00:13	1
cis-1,2-Dichloroethene	ND		0.40		ppb v/v			08/12/17 00:13	1
trans-1,2-Dichloroethene	ND		0.40		ppb v/v			08/12/17 00:13	1
1,2-Dichloropropane	ND		0.40		ppb v/v			08/12/17 00:13	1
cis-1,3-Dichloropropene	ND		0.40		ppb v/v			08/12/17 00:13	1
trans-1,3-Dichloropropene	ND		0.40		ppb v/v			08/12/17 00:13	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40		ppb v/v			08/12/17 00:13	1
Ethylbenzene	ND		0.40		ppb v/v			08/12/17 00:13	1
4-Ethyltoluene	ND		0.40		ppb v/v			08/12/17 00:13	1
Hexachlorobutadiene	ND		2.0		ppb v/v			08/12/17 00:13	1

TestAmerica Sacramento

Client Sample Results

Client: Apex Companies LLC
 Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-30334-1

Client Sample ID: SVE_South_Post_Carbon_073117

Lab Sample ID: 320-30334-2

Date Collected: 07/31/17 08:11

Matrix: Air

Date Received: 08/02/17 11:10

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Hexanone	ND		0.40		ppb v/v			08/12/17 00:13	1
Methylene Chloride	0.68		0.40		ppb v/v			08/12/17 00:13	1
4-Methyl-2-pentanone (MIBK)	0.96		0.40		ppb v/v			08/12/17 00:13	1
Styrene	ND		0.40		ppb v/v			08/12/17 00:13	1
1,1,2,2-Tetrachloroethane	ND		0.40		ppb v/v			08/12/17 00:13	1
Tetrachloroethene	0.96		0.40		ppb v/v			08/12/17 00:13	1
Toluene	2.2		0.40		ppb v/v			08/12/17 00:13	1
1,2,4-Trichlorobenzene	ND		2.0		ppb v/v			08/12/17 00:13	1
1,1,1-Trichloroethane	ND		0.30		ppb v/v			08/12/17 00:13	1
1,1,2-Trichloroethane	ND		0.40		ppb v/v			08/12/17 00:13	1
Trichloroethene	0.72		0.40		ppb v/v			08/12/17 00:13	1
Trichlorofluoromethane	ND		0.40		ppb v/v			08/12/17 00:13	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40		ppb v/v			08/12/17 00:13	1
1,2,4-Trimethylbenzene	ND		0.80		ppb v/v			08/12/17 00:13	1
1,3,5-Trimethylbenzene	ND		0.40		ppb v/v			08/12/17 00:13	1
Vinyl acetate	ND		0.80		ppb v/v			08/12/17 00:13	1
Vinyl chloride	0.94		0.40		ppb v/v			08/12/17 00:13	1
m,p-Xylene	ND		0.80		ppb v/v			08/12/17 00:13	1
o-Xylene	ND		0.40		ppb v/v			08/12/17 00:13	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	46		12		ug/m3 Air			08/12/17 00:13	1
Benzene	1.3		1.3		ug/m3 Air			08/12/17 00:13	1
Benzyl chloride	ND		4.1		ug/m3 Air			08/12/17 00:13	1
Bromodichloromethane	ND		2.0		ug/m3 Air			08/12/17 00:13	1
Bromoform	ND		4.1		ug/m3 Air			08/12/17 00:13	1
Bromomethane	ND		3.1		ug/m3 Air			08/12/17 00:13	1
2-Butanone (MEK)	10		2.4		ug/m3 Air			08/12/17 00:13	1
Carbon disulfide	110		2.5		ug/m3 Air			08/12/17 00:13	1
Carbon tetrachloride	ND		5.0		ug/m3 Air			08/12/17 00:13	1
Chlorobenzene	ND		1.4		ug/m3 Air			08/12/17 00:13	1
Dibromochloromethane	ND		3.4		ug/m3 Air			08/12/17 00:13	1
Chloroethane	ND		2.1		ug/m3 Air			08/12/17 00:13	1
Chloroform	ND		1.5		ug/m3 Air			08/12/17 00:13	1
Chloromethane	2.6		1.7		ug/m3 Air			08/12/17 00:13	1
1,2-Dibromoethane (EDB)	ND		6.1		ug/m3 Air			08/12/17 00:13	1
1,2-Dichlorobenzene	ND		2.4		ug/m3 Air			08/12/17 00:13	1
1,3-Dichlorobenzene	ND		2.4		ug/m3 Air			08/12/17 00:13	1
1,4-Dichlorobenzene	ND		2.4		ug/m3 Air			08/12/17 00:13	1
Dichlorodifluoromethane	ND		2.0		ug/m3 Air			08/12/17 00:13	1
1,1-Dichloroethane	ND		1.2		ug/m3 Air			08/12/17 00:13	1
1,2-Dichloroethane	ND		3.2		ug/m3 Air			08/12/17 00:13	1
1,1-Dichloroethene	ND		3.2		ug/m3 Air			08/12/17 00:13	1
cis-1,2-Dichloroethene	ND		1.6		ug/m3 Air			08/12/17 00:13	1
trans-1,2-Dichloroethene	ND		1.6		ug/m3 Air			08/12/17 00:13	1
1,2-Dichloropropane	ND		1.8		ug/m3 Air			08/12/17 00:13	1
cis-1,3-Dichloropropene	ND		1.8		ug/m3 Air			08/12/17 00:13	1
trans-1,3-Dichloropropene	ND		1.8		ug/m3 Air			08/12/17 00:13	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8		ug/m3 Air			08/12/17 00:13	1

TestAmerica Sacramento

Client Sample Results

Client: Apex Companies LLC
 Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-30334-1

Client Sample ID: SVE_South_Post_Carbon_073117

Lab Sample ID: 320-30334-2

Date Collected: 07/31/17 08:11

Matrix: Air

Date Received: 08/02/17 11:10

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	ND		1.7		ug/m3 Air			08/12/17 00:13	1
4-Ethyltoluene	ND		2.0		ug/m3 Air			08/12/17 00:13	1
Hexachlorobutadiene	ND		21		ug/m3 Air			08/12/17 00:13	1
2-Hexanone	ND		1.6		ug/m3 Air			08/12/17 00:13	1
Methylene Chloride	2.4		1.4		ug/m3 Air			08/12/17 00:13	1
4-Methyl-2-pentanone (MIBK)	3.9		1.6		ug/m3 Air			08/12/17 00:13	1
Styrene	ND		1.7		ug/m3 Air			08/12/17 00:13	1
1,1,2,2-Tetrachloroethane	ND		2.7		ug/m3 Air			08/12/17 00:13	1
Tetrachloroethene	6.5		2.7		ug/m3 Air			08/12/17 00:13	1
Toluene	8.2		1.5		ug/m3 Air			08/12/17 00:13	1
1,2,4-Trichlorobenzene	ND		15		ug/m3 Air			08/12/17 00:13	1
1,1,1-Trichloroethane	ND		1.6		ug/m3 Air			08/12/17 00:13	1
1,1,2-Trichloroethane	ND		2.2		ug/m3 Air			08/12/17 00:13	1
Trichloroethene	3.9		2.1		ug/m3 Air			08/12/17 00:13	1
Trichlorofluoromethane	ND		2.2		ug/m3 Air			08/12/17 00:13	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1		ug/m3 Air			08/12/17 00:13	1
1,2,4-Trimethylbenzene	ND		3.9		ug/m3 Air			08/12/17 00:13	1
1,3,5-Trimethylbenzene	ND		2.0		ug/m3 Air			08/12/17 00:13	1
Vinyl acetate	ND		2.8		ug/m3 Air			08/12/17 00:13	1
Vinyl chloride	2.4		1.0		ug/m3 Air			08/12/17 00:13	1
m,p-Xylene	ND		3.5		ug/m3 Air			08/12/17 00:13	1
o-Xylene	ND		1.7		ug/m3 Air			08/12/17 00:13	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	89		70 - 130		08/12/17 00:13	1
1,2-Dichloroethane-d4 (Surr)	95		70 - 130		08/12/17 00:13	1
Toluene-d8 (Surr)	98		70 - 130		08/12/17 00:13	1

Surrogate Summary

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-30334-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Matrix: Air

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	BFB (70-130)	12DCE (70-130)	TOL (70-130)
320-30334-1	SVE_South_Pre_Carbon_07311	89	101	100
320-30334-2	SVE_South_Post_Carbon_073 117	89	95	98
LCS 320-179031/4	Lab Control Sample	110	106	100
LCS 320-179186/4	Lab Control Sample	101	105	98
LCSD 320-179031/5	Lab Control Sample Dup	109	104	100
LCSD 320-179186/5	Lab Control Sample Dup	105	105	96
MB 320-179031/9	Method Blank	88	100	101
MB 320-179186/9	Method Blank	88	99	100

Surrogate Legend

BFB = 4-Bromofluorobenzene (Surr)

12DCE = 1,2-Dichloroethane-d4 (Surr)

TOL = Toluene-d8 (Surr)

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-30334-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Lab Sample ID: MB 320-179031/9

Matrix: Air

Analysis Batch: 179031

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		5.0		ppb v/v			08/11/17 21:29	1
Benzene	ND		0.40		ppb v/v			08/11/17 21:29	1
Benzyl chloride	ND		0.80		ppb v/v			08/11/17 21:29	1
Bromodichloromethane	ND		0.30		ppb v/v			08/11/17 21:29	1
Bromoform	ND		0.40		ppb v/v			08/11/17 21:29	1
Bromomethane	ND		0.80		ppb v/v			08/11/17 21:29	1
2-Butanone (MEK)	ND		0.80		ppb v/v			08/11/17 21:29	1
Carbon disulfide	ND		0.80		ppb v/v			08/11/17 21:29	1
Carbon tetrachloride	ND		0.80		ppb v/v			08/11/17 21:29	1
Chlorobenzene	ND		0.30		ppb v/v			08/11/17 21:29	1
Dibromochloromethane	ND		0.40		ppb v/v			08/11/17 21:29	1
Chloroethane	ND		0.80		ppb v/v			08/11/17 21:29	1
Chloroform	ND		0.30		ppb v/v			08/11/17 21:29	1
Chloromethane	ND		0.80		ppb v/v			08/11/17 21:29	1
1,2-Dibromoethane (EDB)	ND		0.80		ppb v/v			08/11/17 21:29	1
1,2-Dichlorobenzene	ND		0.40		ppb v/v			08/11/17 21:29	1
1,3-Dichlorobenzene	ND		0.40		ppb v/v			08/11/17 21:29	1
1,4-Dichlorobenzene	ND		0.40		ppb v/v			08/11/17 21:29	1
Dichlorodifluoromethane	ND		0.40		ppb v/v			08/11/17 21:29	1
1,1-Dichloroethane	ND		0.30		ppb v/v			08/11/17 21:29	1
1,2-Dichloroethane	ND		0.80		ppb v/v			08/11/17 21:29	1
1,1-Dichloroethene	ND		0.80		ppb v/v			08/11/17 21:29	1
cis-1,2-Dichloroethene	ND		0.40		ppb v/v			08/11/17 21:29	1
trans-1,2-Dichloroethene	ND		0.40		ppb v/v			08/11/17 21:29	1
1,2-Dichloropropane	ND		0.40		ppb v/v			08/11/17 21:29	1
cis-1,3-Dichloropropene	ND		0.40		ppb v/v			08/11/17 21:29	1
trans-1,3-Dichloropropene	ND		0.40		ppb v/v			08/11/17 21:29	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40		ppb v/v			08/11/17 21:29	1
Ethylbenzene	ND		0.40		ppb v/v			08/11/17 21:29	1
4-Ethyltoluene	ND		0.40		ppb v/v			08/11/17 21:29	1
Hexachlorobutadiene	ND		2.0		ppb v/v			08/11/17 21:29	1
2-Hexanone	ND		0.40		ppb v/v			08/11/17 21:29	1
Methylene Chloride	ND		0.40		ppb v/v			08/11/17 21:29	1
4-Methyl-2-pentanone (MIBK)	ND		0.40		ppb v/v			08/11/17 21:29	1
Styrene	ND		0.40		ppb v/v			08/11/17 21:29	1
1,1,2,2-Tetrachloroethane	ND		0.40		ppb v/v			08/11/17 21:29	1
Tetrachloroethene	ND		0.40		ppb v/v			08/11/17 21:29	1
Toluene	ND		0.40		ppb v/v			08/11/17 21:29	1
1,2,4-Trichlorobenzene	ND		2.0		ppb v/v			08/11/17 21:29	1
1,1,1-Trichloroethane	ND		0.30		ppb v/v			08/11/17 21:29	1
1,1,2-Trichloroethane	ND		0.40		ppb v/v			08/11/17 21:29	1
Trichloroethene	ND		0.40		ppb v/v			08/11/17 21:29	1
Trichlorofluoromethane	ND		0.40		ppb v/v			08/11/17 21:29	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40		ppb v/v			08/11/17 21:29	1
1,2,4-Trimethylbenzene	ND		0.80		ppb v/v			08/11/17 21:29	1
1,3,5-Trimethylbenzene	ND		0.40		ppb v/v			08/11/17 21:29	1
Vinyl acetate	ND		0.80		ppb v/v			08/11/17 21:29	1
Vinyl chloride	ND		0.40		ppb v/v			08/11/17 21:29	1

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
 Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-30334-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 320-179031/9
Matrix: Air
Analysis Batch: 179031

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
m,p-Xylene	ND		0.80		ppb v/v			08/11/17 21:29	1
o-Xylene	ND		0.40		ppb v/v			08/11/17 21:29	1
Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Acetone	ND		12		ug/m3 Air			08/11/17 21:29	1
Benzene	ND		1.3		ug/m3 Air			08/11/17 21:29	1
Benzyl chloride	ND		4.1		ug/m3 Air			08/11/17 21:29	1
Bromodichloromethane	ND		2.0		ug/m3 Air			08/11/17 21:29	1
Bromoform	ND		4.1		ug/m3 Air			08/11/17 21:29	1
Bromomethane	ND		3.1		ug/m3 Air			08/11/17 21:29	1
2-Butanone (MEK)	ND		2.4		ug/m3 Air			08/11/17 21:29	1
Carbon disulfide	ND		2.5		ug/m3 Air			08/11/17 21:29	1
Carbon tetrachloride	ND		5.0		ug/m3 Air			08/11/17 21:29	1
Chlorobenzene	ND		1.4		ug/m3 Air			08/11/17 21:29	1
Dibromochloromethane	ND		3.4		ug/m3 Air			08/11/17 21:29	1
Chloroethane	ND		2.1		ug/m3 Air			08/11/17 21:29	1
Chloroform	ND		1.5		ug/m3 Air			08/11/17 21:29	1
Chloromethane	ND		1.7		ug/m3 Air			08/11/17 21:29	1
1,2-Dibromoethane (EDB)	ND		6.1		ug/m3 Air			08/11/17 21:29	1
1,2-Dichlorobenzene	ND		2.4		ug/m3 Air			08/11/17 21:29	1
1,3-Dichlorobenzene	ND		2.4		ug/m3 Air			08/11/17 21:29	1
1,4-Dichlorobenzene	ND		2.4		ug/m3 Air			08/11/17 21:29	1
Dichlorodifluoromethane	ND		2.0		ug/m3 Air			08/11/17 21:29	1
1,1-Dichloroethane	ND		1.2		ug/m3 Air			08/11/17 21:29	1
1,2-Dichloroethane	ND		3.2		ug/m3 Air			08/11/17 21:29	1
1,1-Dichloroethene	ND		3.2		ug/m3 Air			08/11/17 21:29	1
cis-1,2-Dichloroethene	ND		1.6		ug/m3 Air			08/11/17 21:29	1
trans-1,2-Dichloroethene	ND		1.6		ug/m3 Air			08/11/17 21:29	1
1,2-Dichloropropane	ND		1.8		ug/m3 Air			08/11/17 21:29	1
cis-1,3-Dichloropropene	ND		1.8		ug/m3 Air			08/11/17 21:29	1
trans-1,3-Dichloropropene	ND		1.8		ug/m3 Air			08/11/17 21:29	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8		ug/m3 Air			08/11/17 21:29	1
Ethylbenzene	ND		1.7		ug/m3 Air			08/11/17 21:29	1
4-Ethyltoluene	ND		2.0		ug/m3 Air			08/11/17 21:29	1
Hexachlorobutadiene	ND		21		ug/m3 Air			08/11/17 21:29	1
2-Hexanone	ND		1.6		ug/m3 Air			08/11/17 21:29	1
Methylene Chloride	ND		1.4		ug/m3 Air			08/11/17 21:29	1
4-Methyl-2-pentanone (MIBK)	ND		1.6		ug/m3 Air			08/11/17 21:29	1
Styrene	ND		1.7		ug/m3 Air			08/11/17 21:29	1
1,1,2,2-Tetrachloroethane	ND		2.7		ug/m3 Air			08/11/17 21:29	1
Tetrachloroethene	ND		2.7		ug/m3 Air			08/11/17 21:29	1
Toluene	ND		1.5		ug/m3 Air			08/11/17 21:29	1
1,2,4-Trichlorobenzene	ND		15		ug/m3 Air			08/11/17 21:29	1
1,1,1-Trichloroethane	ND		1.6		ug/m3 Air			08/11/17 21:29	1
1,1,2-Trichloroethane	ND		2.2		ug/m3 Air			08/11/17 21:29	1
Trichloroethene	ND		2.1		ug/m3 Air			08/11/17 21:29	1
Trichlorofluoromethane	ND		2.2		ug/m3 Air			08/11/17 21:29	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1		ug/m3 Air			08/11/17 21:29	1

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-30334-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 320-179031/9
Matrix: Air
Analysis Batch: 179031

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4-Trimethylbenzene	ND		3.9		ug/m3 Air			08/11/17 21:29	1
1,3,5-Trimethylbenzene	ND		2.0		ug/m3 Air			08/11/17 21:29	1
Vinyl acetate	ND		2.8		ug/m3 Air			08/11/17 21:29	1
Vinyl chloride	ND		1.0		ug/m3 Air			08/11/17 21:29	1
m,p-Xylene	ND		3.5		ug/m3 Air			08/11/17 21:29	1
o-Xylene	ND		1.7		ug/m3 Air			08/11/17 21:29	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	88		70 - 130		08/11/17 21:29	1
1,2-Dichloroethane-d4 (Surr)	100		70 - 130		08/11/17 21:29	1
Toluene-d8 (Surr)	101		70 - 130		08/11/17 21:29	1

Lab Sample ID: LCS 320-179031/4
Matrix: Air
Analysis Batch: 179031

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	20.0	19.7		ppb v/v		99	71 - 131
Benzene	20.0	21.2		ppb v/v		106	68 - 128
Benzyl chloride	16.0	17.1		ppb v/v		107	58 - 120
Bromodichloromethane	20.0	21.9		ppb v/v		110	65 - 130
Bromoform	20.0	21.2		ppb v/v		106	64 - 144
Bromomethane	20.0	19.9		ppb v/v		99	70 - 131
2-Butanone (MEK)	20.0	21.7		ppb v/v		109	71 - 131
Carbon disulfide	20.0	20.5		ppb v/v		102	63 - 123
Carbon tetrachloride	20.0	20.8		ppb v/v		104	67 - 127
Chlorobenzene	20.0	20.8		ppb v/v		104	70 - 132
Dibromochloromethane	20.0	21.4		ppb v/v		107	68 - 128
Chloroethane	20.0	20.7		ppb v/v		104	70 - 131
Chloroform	20.0	20.7		ppb v/v		103	69 - 129
Chloromethane	20.0	21.4		ppb v/v		107	67 - 127
1,2-Dibromoethane (EDB)	20.0	20.7		ppb v/v		103	68 - 131
1,2-Dichlorobenzene	20.0	21.3		ppb v/v		107	73 - 143
1,3-Dichlorobenzene	20.0	22.0		ppb v/v		110	77 - 136
1,4-Dichlorobenzene	20.0	22.7		ppb v/v		114	73 - 143
Dichlorodifluoromethane	20.0	21.7		ppb v/v		109	69 - 129
1,1-Dichloroethane	20.0	20.8		ppb v/v		104	65 - 125
1,2-Dichloroethane	20.0	22.4		ppb v/v		112	71 - 131
1,1-Dichloroethene	20.0	21.2		ppb v/v		106	53 - 128
cis-1,2-Dichloroethene	20.0	20.3		ppb v/v		101	68 - 128
trans-1,2-Dichloroethene	20.0	21.2		ppb v/v		106	70 - 130
1,2-Dichloropropane	20.0	22.3		ppb v/v		112	74 - 128
cis-1,3-Dichloropropene	20.0	21.4		ppb v/v		107	78 - 132
trans-1,3-Dichloropropene	20.0	20.9		ppb v/v		104	56 - 136
1,2-Dichloro-1,1,2,2-tetrafluoroethane	20.0	22.0		ppb v/v		110	64 - 124
Ethylbenzene	20.0	21.3		ppb v/v		106	76 - 136
4-Ethyltoluene	20.0	22.4		ppb v/v		112	62 - 136

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
 Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-30334-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 320-179031/4
Matrix: Air
Analysis Batch: 179031

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Hexachlorobutadiene	20.0	20.6		ppb v/v		103	42 - 150
2-Hexanone	20.0	20.6		ppb v/v		103	70 - 128
Methylene Chloride	20.0	20.5		ppb v/v		102	65 - 125
4-Methyl-2-pentanone (MIBK)	20.0	20.9		ppb v/v		104	73 - 133
Styrene	20.0	21.4		ppb v/v		107	76 - 144
1,1,2,2-Tetrachloroethane	20.0	21.4		ppb v/v		107	75 - 135
Tetrachloroethene	20.0	20.2		ppb v/v		101	56 - 138
Toluene	20.0	21.0		ppb v/v		105	71 - 132
1,2,4-Trichlorobenzene	20.0	21.0		ppb v/v		105	59 - 150
1,1,1-Trichloroethane	20.0	20.8		ppb v/v		104	65 - 124
1,1,2-Trichloroethane	20.0	20.8		ppb v/v		104	71 - 131
Trichloroethene	20.0	21.4		ppb v/v		107	64 - 127
Trichlorofluoromethane	20.0	20.9		ppb v/v		105	68 - 128
1,1,2-Trichloro-1,2,2-trifluoroethane	20.0	20.8		ppb v/v		104	50 - 132
1,2,4-Trimethylbenzene	20.0	22.6		ppb v/v		113	61 - 145
1,3,5-Trimethylbenzene	20.0	22.2		ppb v/v		111	65 - 136
Vinyl acetate	20.0	20.8		ppb v/v		104	77 - 134
Vinyl chloride	20.0	21.5		ppb v/v		107	69 - 129
m,p-Xylene	40.0	43.5		ppb v/v		109	75 - 138
o-Xylene	20.0	21.7		ppb v/v		109	77 - 132

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	48	46.8		ug/m3 Air		99	71 - 131
Benzene	64	67.6		ug/m3 Air		106	68 - 128
Benzyl chloride	83	88.8		ug/m3 Air		107	58 - 120
Bromodichloromethane	130	147		ug/m3 Air		110	65 - 130
Bromoform	210	219		ug/m3 Air		106	64 - 144
Bromomethane	78	77.1		ug/m3 Air		99	70 - 131
2-Butanone (MEK)	59	64.1		ug/m3 Air		109	71 - 131
Carbon disulfide	62	63.7		ug/m3 Air		102	63 - 123
Carbon tetrachloride	130	131		ug/m3 Air		104	67 - 127
Chlorobenzene	92	95.7		ug/m3 Air		104	70 - 132
Dibromochloromethane	170	182		ug/m3 Air		107	68 - 128
Chloroethane	53	54.6		ug/m3 Air		104	70 - 131
Chloroform	98	101		ug/m3 Air		103	69 - 129
Chloromethane	41	44.2		ug/m3 Air		107	67 - 127
1,2-Dibromoethane (EDB)	150	159		ug/m3 Air		103	68 - 131
1,2-Dichlorobenzene	120	128		ug/m3 Air		107	73 - 143
1,3-Dichlorobenzene	120	132		ug/m3 Air		110	77 - 136
1,4-Dichlorobenzene	120	137		ug/m3 Air		114	73 - 143
Dichlorodifluoromethane	99	107		ug/m3 Air		109	69 - 129
1,1-Dichloroethane	81	84.2		ug/m3 Air		104	65 - 125
1,2-Dichloroethane	81	90.5		ug/m3 Air		112	71 - 131
1,1-Dichloroethene	79	83.9		ug/m3 Air		106	53 - 128
cis-1,2-Dichloroethene	79	80.4		ug/m3 Air		101	68 - 128
trans-1,2-Dichloroethene	79	84.2		ug/m3 Air		106	70 - 130
1,2-Dichloropropane	92	103		ug/m3 Air		112	74 - 128

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-30334-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 320-179031/4

Matrix: Air

Analysis Batch: 179031

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
cis-1,3-Dichloropropene	91	97.1		ug/m3 Air		107	78 - 132
trans-1,3-Dichloropropene	91	94.7		ug/m3 Air		104	56 - 136
1,2-Dichloro-1,1,2,2-tetrafluoroethane	140	154		ug/m3 Air		110	64 - 124
Ethylbenzene	87	92.3		ug/m3 Air		106	76 - 136
4-Ethyltoluene	98	110		ug/m3 Air		112	62 - 136
Hexachlorobutadiene	210	219		ug/m3 Air		103	42 - 150
2-Hexanone	82	84.4		ug/m3 Air		103	70 - 128
Methylene Chloride	69	71.1		ug/m3 Air		102	65 - 125
4-Methyl-2-pentanone (MIBK)	82	85.5		ug/m3 Air		104	73 - 133
Styrene	85	91.3		ug/m3 Air		107	76 - 144
1,1,2,2-Tetrachloroethane	140	147		ug/m3 Air		107	75 - 135
Tetrachloroethene	140	137		ug/m3 Air		101	56 - 138
Toluene	75	79.2		ug/m3 Air		105	71 - 132
1,2,4-Trichlorobenzene	150	156		ug/m3 Air		105	59 - 150
1,1,1-Trichloroethane	110	113		ug/m3 Air		104	65 - 124
1,1,2-Trichloroethane	110	113		ug/m3 Air		104	71 - 131
Trichloroethene	110	115		ug/m3 Air		107	64 - 127
Trichlorofluoromethane	110	118		ug/m3 Air		105	68 - 128
1,1,2-Trichloro-1,2,2-trifluoroethane	150	159		ug/m3 Air		104	50 - 132
1,2,4-Trimethylbenzene	98	111		ug/m3 Air		113	61 - 145
1,3,5-Trimethylbenzene	98	109		ug/m3 Air		111	65 - 136
Vinyl acetate	70	73.1		ug/m3 Air		104	77 - 134
Vinyl chloride	51	54.9		ug/m3 Air		107	69 - 129
m,p-Xylene	170	189		ug/m3 Air		109	75 - 138
o-Xylene	87	94.3		ug/m3 Air		109	77 - 132

Surrogate	LCS %Recovery	LCS Qualifier	Limits
4-Bromofluorobenzene (Surr)	110		70 - 130
1,2-Dichloroethane-d4 (Surr)	106		70 - 130
Toluene-d8 (Surr)	100		70 - 130

Lab Sample ID: LCSD 320-179031/5

Matrix: Air

Analysis Batch: 179031

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Acetone	20.0	19.3		ppb v/v		97	71 - 131	2	25
Benzene	20.0	20.6		ppb v/v		103	68 - 128	2	25
Benzyl chloride	16.0	17.0		ppb v/v		106	58 - 120	1	25
Bromodichloromethane	20.0	21.6		ppb v/v		108	65 - 130	1	25
Bromoform	20.0	21.0		ppb v/v		105	64 - 144	1	25
Bromomethane	20.0	20.5		ppb v/v		102	70 - 131	3	25
2-Butanone (MEK)	20.0	22.2		ppb v/v		111	71 - 131	2	25
Carbon disulfide	20.0	20.1		ppb v/v		101	63 - 123	2	25
Carbon tetrachloride	20.0	20.2		ppb v/v		101	67 - 127	3	25
Chlorobenzene	20.0	20.9		ppb v/v		104	70 - 132	0	25

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-30334-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-179031/5

Client Sample ID: Lab Control Sample Dup

Matrix: Air

Prep Type: Total/NA

Analysis Batch: 179031

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Dibromochloromethane	20.0	21.4		ppb v/v		107	68 - 128	0	25
Chloroethane	20.0	20.2		ppb v/v		101	70 - 131	2	25
Chloroform	20.0	20.8		ppb v/v		104	69 - 129	1	25
Chloromethane	20.0	22.4		ppb v/v		112	67 - 127	5	25
1,2-Dibromoethane (EDB)	20.0	20.8		ppb v/v		104	68 - 131	1	25
1,2-Dichlorobenzene	20.0	21.1		ppb v/v		105	73 - 143	1	25
1,3-Dichlorobenzene	20.0	21.9		ppb v/v		110	77 - 136	0	25
1,4-Dichlorobenzene	20.0	22.4		ppb v/v		112	73 - 143	2	25
Dichlorodifluoromethane	20.0	18.8		ppb v/v		94	69 - 129	14	25
1,1-Dichloroethane	20.0	20.8		ppb v/v		104	65 - 125	0	25
1,2-Dichloroethane	20.0	21.8		ppb v/v		109	71 - 131	3	25
1,1-Dichloroethene	20.0	20.7		ppb v/v		104	53 - 128	2	25
cis-1,2-Dichloroethene	20.0	20.5		ppb v/v		103	68 - 128	1	25
trans-1,2-Dichloroethene	20.0	21.0		ppb v/v		105	70 - 130	1	25
1,2-Dichloropropane	20.0	21.8		ppb v/v		109	74 - 128	2	25
cis-1,3-Dichloropropene	20.0	21.3		ppb v/v		106	78 - 132	0	25
trans-1,3-Dichloropropene	20.0	21.1		ppb v/v		105	56 - 136	1	25
1,2-Dichloro-1,1,2,2-tetrafluoroethane	20.0	21.0		ppb v/v		105	64 - 124	4	25
Ethylbenzene	20.0	21.2		ppb v/v		106	76 - 136	0	25
4-Ethyltoluene	20.0	22.1		ppb v/v		110	62 - 136	1	25
Hexachlorobutadiene	20.0	21.0		ppb v/v		105	42 - 150	2	25
2-Hexanone	20.0	20.8		ppb v/v		104	70 - 128	1	25
Methylene Chloride	20.0	20.1		ppb v/v		101	65 - 125	2	25
4-Methyl-2-pentanone (MIBK)	20.0	21.0		ppb v/v		105	73 - 133	0	25
Styrene	20.0	21.3		ppb v/v		106	76 - 144	1	25
1,1,2,2-Tetrachloroethane	20.0	21.2		ppb v/v		106	75 - 135	1	25
Tetrachloroethene	20.0	20.3		ppb v/v		101	56 - 138	0	25
Toluene	20.0	20.9		ppb v/v		105	71 - 132	0	25
1,2,4-Trichlorobenzene	20.0	21.9		ppb v/v		110	59 - 150	4	25
1,1,1-Trichloroethane	20.0	20.9		ppb v/v		105	65 - 124	1	25
1,1,2-Trichloroethane	20.0	20.9		ppb v/v		104	71 - 131	1	25
Trichloroethene	20.0	21.2		ppb v/v		106	64 - 127	1	25
Trichlorofluoromethane	20.0	20.5		ppb v/v		102	68 - 128	2	25
1,1,2-Trichloro-1,2,2-trifluoroethane	20.0	20.5		ppb v/v		103	50 - 132	1	25
1,2,4-Trimethylbenzene	20.0	22.5		ppb v/v		113	61 - 145	0	25
1,3,5-Trimethylbenzene	20.0	21.8		ppb v/v		109	65 - 136	2	25
Vinyl acetate	20.0	20.4		ppb v/v		102	77 - 134	2	25
Vinyl chloride	20.0	20.9		ppb v/v		104	69 - 129	3	25
m,p-Xylene	40.0	43.2		ppb v/v		108	75 - 138	1	25
o-Xylene	20.0	21.5		ppb v/v		108	77 - 132	1	25
Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Acetone	48	45.9		ug/m3 Air		97	71 - 131	2	25
Benzene	64	65.9		ug/m3 Air		103	68 - 128	2	25
Benzyl chloride	83	88.2		ug/m3 Air		106	58 - 120	1	25
Bromodichloromethane	130	145		ug/m3 Air		108	65 - 130	1	25
Bromoform	210	217		ug/m3 Air		105	64 - 144	1	25

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
 Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-30334-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-179031/5

Client Sample ID: Lab Control Sample Dup

Matrix: Air

Prep Type: Total/NA

Analysis Batch: 179031

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Bromomethane	78	79.5		ug/m3 Air		102	70 - 131	3	25
2-Butanone (MEK)	59	65.4		ug/m3 Air		111	71 - 131	2	25
Carbon disulfide	62	62.7		ug/m3 Air		101	63 - 123	2	25
Carbon tetrachloride	130	127		ug/m3 Air		101	67 - 127	3	25
Chlorobenzene	92	96.1		ug/m3 Air		104	70 - 132	0	25
Dibromochloromethane	170	182		ug/m3 Air		107	68 - 128	0	25
Chloroethane	53	53.3		ug/m3 Air		101	70 - 131	2	25
Chloroform	98	101		ug/m3 Air		104	69 - 129	1	25
Chloromethane	41	46.2		ug/m3 Air		112	67 - 127	5	25
1,2-Dibromoethane (EDB)	150	160		ug/m3 Air		104	68 - 131	1	25
1,2-Dichlorobenzene	120	127		ug/m3 Air		105	73 - 143	1	25
1,3-Dichlorobenzene	120	132		ug/m3 Air		110	77 - 136	0	25
1,4-Dichlorobenzene	120	135		ug/m3 Air		112	73 - 143	2	25
Dichlorodifluoromethane	99	93.1		ug/m3 Air		94	69 - 129	14	25
1,1-Dichloroethane	81	84.0		ug/m3 Air		104	65 - 125	0	25
1,2-Dichloroethane	81	88.0		ug/m3 Air		109	71 - 131	3	25
1,1-Dichloroethene	79	82.2		ug/m3 Air		104	53 - 128	2	25
cis-1,2-Dichloroethene	79	81.3		ug/m3 Air		103	68 - 128	1	25
trans-1,2-Dichloroethene	79	83.4		ug/m3 Air		105	70 - 130	1	25
1,2-Dichloropropane	92	101		ug/m3 Air		109	74 - 128	2	25
cis-1,3-Dichloropropene	91	96.6		ug/m3 Air		106	78 - 132	0	25
trans-1,3-Dichloropropene	91	95.7		ug/m3 Air		105	56 - 136	1	25
1,2-Dichloro-1,1,2,2-tetrafluoroethane	140	147		ug/m3 Air		105	64 - 124	4	25
Ethylbenzene	87	92.2		ug/m3 Air		106	76 - 136	0	25
4-Ethyltoluene	98	109		ug/m3 Air		110	62 - 136	1	25
Hexachlorobutadiene	210	223		ug/m3 Air		105	42 - 150	2	25
2-Hexanone	82	85.1		ug/m3 Air		104	70 - 128	1	25
Methylene Chloride	69	69.9		ug/m3 Air		101	65 - 125	2	25
4-Methyl-2-pentanone (MIBK)	82	85.9		ug/m3 Air		105	73 - 133	0	25
Styrene	85	90.7		ug/m3 Air		106	76 - 144	1	25
1,1,2,2-Tetrachloroethane	140	146		ug/m3 Air		106	75 - 135	1	25
Tetrachloroethene	140	137		ug/m3 Air		101	56 - 138	0	25
Toluene	75	78.9		ug/m3 Air		105	71 - 132	0	25
1,2,4-Trichlorobenzene	150	163		ug/m3 Air		110	59 - 150	4	25
1,1,1-Trichloroethane	110	114		ug/m3 Air		105	65 - 124	1	25
1,1,2-Trichloroethane	110	114		ug/m3 Air		104	71 - 131	1	25
Trichloroethene	110	114		ug/m3 Air		106	64 - 127	1	25
Trichlorofluoromethane	110	115		ug/m3 Air		102	68 - 128	2	25
1,1,2-Trichloro-1,2,2-trifluoroethane	150	157		ug/m3 Air		103	50 - 132	1	25
1,2,4-Trimethylbenzene	98	111		ug/m3 Air		113	61 - 145	0	25
1,3,5-Trimethylbenzene	98	107		ug/m3 Air		109	65 - 136	2	25
Vinyl acetate	70	71.9		ug/m3 Air		102	77 - 134	2	25
Vinyl chloride	51	53.4		ug/m3 Air		104	69 - 129	3	25
m,p-Xylene	170	187		ug/m3 Air		108	75 - 138	1	25
o-Xylene	87	93.5		ug/m3 Air		108	77 - 132	1	25

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-30334-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-179031/5
Matrix: Air
Analysis Batch: 179031

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

<i>Surrogate</i>	<i>%Recovery</i>	<i>LCSD Qualifier</i>	<i>LCSD Limits</i>
4-Bromofluorobenzene (Surr)	109		70 - 130
1,2-Dichloroethane-d4 (Surr)	104		70 - 130
Toluene-d8 (Surr)	100		70 - 130

Lab Sample ID: MB 320-179186/9
Matrix: Air
Analysis Batch: 179186

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		5.0		ppb v/v			08/14/17 15:55	1
Benzene	ND		0.40		ppb v/v			08/14/17 15:55	1
Benzyl chloride	ND		0.80		ppb v/v			08/14/17 15:55	1
Bromodichloromethane	ND		0.30		ppb v/v			08/14/17 15:55	1
Bromoform	ND		0.40		ppb v/v			08/14/17 15:55	1
Bromomethane	ND		0.80		ppb v/v			08/14/17 15:55	1
2-Butanone (MEK)	ND		0.80		ppb v/v			08/14/17 15:55	1
Carbon disulfide	ND		0.80		ppb v/v			08/14/17 15:55	1
Carbon tetrachloride	ND		0.80		ppb v/v			08/14/17 15:55	1
Chlorobenzene	ND		0.30		ppb v/v			08/14/17 15:55	1
Dibromochloromethane	ND		0.40		ppb v/v			08/14/17 15:55	1
Chloroethane	ND		0.80		ppb v/v			08/14/17 15:55	1
Chloroform	ND		0.30		ppb v/v			08/14/17 15:55	1
Chloromethane	ND		0.80		ppb v/v			08/14/17 15:55	1
1,2-Dibromoethane (EDB)	ND		0.80		ppb v/v			08/14/17 15:55	1
1,2-Dichlorobenzene	ND		0.40		ppb v/v			08/14/17 15:55	1
1,3-Dichlorobenzene	ND		0.40		ppb v/v			08/14/17 15:55	1
1,4-Dichlorobenzene	ND		0.40		ppb v/v			08/14/17 15:55	1
Dichlorodifluoromethane	ND		0.40		ppb v/v			08/14/17 15:55	1
1,1-Dichloroethane	ND		0.30		ppb v/v			08/14/17 15:55	1
1,2-Dichloroethane	ND		0.80		ppb v/v			08/14/17 15:55	1
1,1-Dichloroethene	ND		0.80		ppb v/v			08/14/17 15:55	1
cis-1,2-Dichloroethene	ND		0.40		ppb v/v			08/14/17 15:55	1
trans-1,2-Dichloroethene	ND		0.40		ppb v/v			08/14/17 15:55	1
1,2-Dichloropropane	ND		0.40		ppb v/v			08/14/17 15:55	1
cis-1,3-Dichloropropene	ND		0.40		ppb v/v			08/14/17 15:55	1
trans-1,3-Dichloropropene	ND		0.40		ppb v/v			08/14/17 15:55	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40		ppb v/v			08/14/17 15:55	1
Ethylbenzene	ND		0.40		ppb v/v			08/14/17 15:55	1
4-Ethyltoluene	ND		0.40		ppb v/v			08/14/17 15:55	1
Hexachlorobutadiene	ND		2.0		ppb v/v			08/14/17 15:55	1
2-Hexanone	ND		0.40		ppb v/v			08/14/17 15:55	1
Methylene Chloride	ND		0.40		ppb v/v			08/14/17 15:55	1
4-Methyl-2-pentanone (MIBK)	ND		0.40		ppb v/v			08/14/17 15:55	1
Styrene	ND		0.40		ppb v/v			08/14/17 15:55	1
1,1,2,2-Tetrachloroethane	ND		0.40		ppb v/v			08/14/17 15:55	1
Tetrachloroethene	ND		0.40		ppb v/v			08/14/17 15:55	1
Toluene	ND		0.40		ppb v/v			08/14/17 15:55	1
1,2,4-Trichlorobenzene	ND		2.0		ppb v/v			08/14/17 15:55	1

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
 Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-30334-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 320-179186/9
Matrix: Air
Analysis Batch: 179186

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.30		ppb v/v			08/14/17 15:55	1
1,1,2-Trichloroethane	ND		0.40		ppb v/v			08/14/17 15:55	1
Trichloroethene	ND		0.40		ppb v/v			08/14/17 15:55	1
Trichlorofluoromethane	ND		0.40		ppb v/v			08/14/17 15:55	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40		ppb v/v			08/14/17 15:55	1
1,2,4-Trimethylbenzene	ND		0.80		ppb v/v			08/14/17 15:55	1
1,3,5-Trimethylbenzene	ND		0.40		ppb v/v			08/14/17 15:55	1
Vinyl acetate	ND		0.80		ppb v/v			08/14/17 15:55	1
Vinyl chloride	ND		0.40		ppb v/v			08/14/17 15:55	1
m,p-Xylene	ND		0.80		ppb v/v			08/14/17 15:55	1
o-Xylene	ND		0.40		ppb v/v			08/14/17 15:55	1

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		12		ug/m3 Air			08/14/17 15:55	1
Benzene	ND		1.3		ug/m3 Air			08/14/17 15:55	1
Benzyl chloride	ND		4.1		ug/m3 Air			08/14/17 15:55	1
Bromodichloromethane	ND		2.0		ug/m3 Air			08/14/17 15:55	1
Bromoform	ND		4.1		ug/m3 Air			08/14/17 15:55	1
Bromomethane	ND		3.1		ug/m3 Air			08/14/17 15:55	1
2-Butanone (MEK)	ND		2.4		ug/m3 Air			08/14/17 15:55	1
Carbon disulfide	ND		2.5		ug/m3 Air			08/14/17 15:55	1
Carbon tetrachloride	ND		5.0		ug/m3 Air			08/14/17 15:55	1
Chlorobenzene	ND		1.4		ug/m3 Air			08/14/17 15:55	1
Dibromochloromethane	ND		3.4		ug/m3 Air			08/14/17 15:55	1
Chloroethane	ND		2.1		ug/m3 Air			08/14/17 15:55	1
Chloroform	ND		1.5		ug/m3 Air			08/14/17 15:55	1
Chloromethane	ND		1.7		ug/m3 Air			08/14/17 15:55	1
1,2-Dibromoethane (EDB)	ND		6.1		ug/m3 Air			08/14/17 15:55	1
1,2-Dichlorobenzene	ND		2.4		ug/m3 Air			08/14/17 15:55	1
1,3-Dichlorobenzene	ND		2.4		ug/m3 Air			08/14/17 15:55	1
1,4-Dichlorobenzene	ND		2.4		ug/m3 Air			08/14/17 15:55	1
Dichlorodifluoromethane	ND		2.0		ug/m3 Air			08/14/17 15:55	1
1,1-Dichloroethane	ND		1.2		ug/m3 Air			08/14/17 15:55	1
1,2-Dichloroethane	ND		3.2		ug/m3 Air			08/14/17 15:55	1
1,1-Dichloroethene	ND		3.2		ug/m3 Air			08/14/17 15:55	1
cis-1,2-Dichloroethene	ND		1.6		ug/m3 Air			08/14/17 15:55	1
trans-1,2-Dichloroethene	ND		1.6		ug/m3 Air			08/14/17 15:55	1
1,2-Dichloropropane	ND		1.8		ug/m3 Air			08/14/17 15:55	1
cis-1,3-Dichloropropene	ND		1.8		ug/m3 Air			08/14/17 15:55	1
trans-1,3-Dichloropropene	ND		1.8		ug/m3 Air			08/14/17 15:55	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8		ug/m3 Air			08/14/17 15:55	1
Ethylbenzene	ND		1.7		ug/m3 Air			08/14/17 15:55	1
4-Ethyltoluene	ND		2.0		ug/m3 Air			08/14/17 15:55	1
Hexachlorobutadiene	ND		21		ug/m3 Air			08/14/17 15:55	1
2-Hexanone	ND		1.6		ug/m3 Air			08/14/17 15:55	1
Methylene Chloride	ND		1.4		ug/m3 Air			08/14/17 15:55	1
4-Methyl-2-pentanone (MIBK)	ND		1.6		ug/m3 Air			08/14/17 15:55	1
Styrene	ND		1.7		ug/m3 Air			08/14/17 15:55	1

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-30334-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 320-179186/9
Matrix: Air
Analysis Batch: 179186

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	ND		2.7		ug/m3 Air			08/14/17 15:55	1
Tetrachloroethene	ND		2.7		ug/m3 Air			08/14/17 15:55	1
Toluene	ND		1.5		ug/m3 Air			08/14/17 15:55	1
1,2,4-Trichlorobenzene	ND		15		ug/m3 Air			08/14/17 15:55	1
1,1,1-Trichloroethane	ND		1.6		ug/m3 Air			08/14/17 15:55	1
1,1,2-Trichloroethane	ND		2.2		ug/m3 Air			08/14/17 15:55	1
Trichloroethene	ND		2.1		ug/m3 Air			08/14/17 15:55	1
Trichlorofluoromethane	ND		2.2		ug/m3 Air			08/14/17 15:55	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1		ug/m3 Air			08/14/17 15:55	1
1,2,4-Trimethylbenzene	ND		3.9		ug/m3 Air			08/14/17 15:55	1
1,3,5-Trimethylbenzene	ND		2.0		ug/m3 Air			08/14/17 15:55	1
Vinyl acetate	ND		2.8		ug/m3 Air			08/14/17 15:55	1
Vinyl chloride	ND		1.0		ug/m3 Air			08/14/17 15:55	1
m,p-Xylene	ND		3.5		ug/m3 Air			08/14/17 15:55	1
o-Xylene	ND		1.7		ug/m3 Air			08/14/17 15:55	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	88		70 - 130		08/14/17 15:55	1
1,2-Dichloroethane-d4 (Surr)	99		70 - 130		08/14/17 15:55	1
Toluene-d8 (Surr)	100		70 - 130		08/14/17 15:55	1

Lab Sample ID: LCS 320-179186/4
Matrix: Air
Analysis Batch: 179186

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	20.0	19.6		ppb v/v		98	71 - 131
Benzene	20.0	20.9		ppb v/v		105	68 - 128
Benzyl chloride	16.0	16.3		ppb v/v		102	58 - 120
Bromodichloromethane	20.0	21.9		ppb v/v		109	65 - 130
Bromoform	20.0	21.5		ppb v/v		107	64 - 144
Bromomethane	20.0	23.0		ppb v/v		115	70 - 131
2-Butanone (MEK)	20.0	22.0		ppb v/v		110	71 - 131
Carbon disulfide	20.0	20.3		ppb v/v		102	63 - 123
Carbon tetrachloride	20.0	19.1		ppb v/v		96	67 - 127
Chlorobenzene	20.0	21.7		ppb v/v		108	70 - 132
Dibromochloromethane	20.0	22.3		ppb v/v		111	68 - 128
Chloroethane	20.0	20.2		ppb v/v		101	70 - 131
Chloroform	20.0	20.8		ppb v/v		104	69 - 129
Chloromethane	20.0	22.4		ppb v/v		112	67 - 127
1,2-Dibromoethane (EDB)	20.0	21.8		ppb v/v		109	68 - 131
1,2-Dichlorobenzene	20.0	21.5		ppb v/v		108	73 - 143
1,3-Dichlorobenzene	20.0	22.3		ppb v/v		112	77 - 136
1,4-Dichlorobenzene	20.0	23.0		ppb v/v		115	73 - 143
Dichlorodifluoromethane	20.0	18.2		ppb v/v		91	69 - 129
1,1-Dichloroethane	20.0	20.6		ppb v/v		103	65 - 125
1,2-Dichloroethane	20.0	21.9		ppb v/v		110	71 - 131
1,1-Dichloroethene	20.0	20.7		ppb v/v		103	53 - 128

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-30334-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 320-179186/4

Matrix: Air

Analysis Batch: 179186

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
cis-1,2-Dichloroethene	20.0	20.4		ppb v/v		102	68 - 128
trans-1,2-Dichloroethene	20.0	21.2		ppb v/v		106	70 - 130
1,2-Dichloropropane	20.0	22.3		ppb v/v		112	74 - 128
cis-1,3-Dichloropropene	20.0	21.2		ppb v/v		106	78 - 132
trans-1,3-Dichloropropene	20.0	22.0		ppb v/v		110	56 - 136
1,2-Dichloro-1,1,2,2-tetrafluoroethane	20.0	21.2		ppb v/v		106	64 - 124
Ethylbenzene	20.0	22.1		ppb v/v		110	76 - 136
4-Ethyltoluene	20.0	22.3		ppb v/v		111	62 - 136
Hexachlorobutadiene	20.0	20.0		ppb v/v		100	42 - 150
2-Hexanone	20.0	21.2		ppb v/v		106	70 - 128
Methylene Chloride	20.0	20.2		ppb v/v		101	65 - 125
4-Methyl-2-pentanone (MIBK)	20.0	20.4		ppb v/v		102	73 - 133
Styrene	20.0	22.0		ppb v/v		110	76 - 144
1,1,2,2-Tetrachloroethane	20.0	21.9		ppb v/v		110	75 - 135
Tetrachloroethene	20.0	21.1		ppb v/v		105	56 - 138
Toluene	20.0	20.6		ppb v/v		103	71 - 132
1,2,4-Trichlorobenzene	20.0	21.0		ppb v/v		105	59 - 150
1,1,1-Trichloroethane	20.0	20.8		ppb v/v		104	65 - 124
1,1,2-Trichloroethane	20.0	22.0		ppb v/v		110	71 - 131
Trichloroethene	20.0	21.1		ppb v/v		106	64 - 127
Trichlorofluoromethane	20.0	20.5		ppb v/v		103	68 - 128
1,1,2-Trichloro-1,2,2-trifluoroethane	20.0	20.7		ppb v/v		104	50 - 132
1,2,4-Trimethylbenzene	20.0	22.8		ppb v/v		114	61 - 145
1,3,5-Trimethylbenzene	20.0	22.5		ppb v/v		113	65 - 136
Vinyl acetate	20.0	19.1		ppb v/v		96	77 - 134
Vinyl chloride	20.0	21.2		ppb v/v		106	69 - 129
m,p-Xylene	40.0	45.0		ppb v/v		113	75 - 138
o-Xylene	20.0	22.4		ppb v/v		112	77 - 132

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	48	46.6		ug/m3 Air		98	71 - 131
Benzene	64	66.9		ug/m3 Air		105	68 - 128
Benzyl chloride	83	84.2		ug/m3 Air		102	58 - 120
Bromodichloromethane	130	147		ug/m3 Air		109	65 - 130
Bromoform	210	222		ug/m3 Air		107	64 - 144
Bromomethane	78	89.4		ug/m3 Air		115	70 - 131
2-Butanone (MEK)	59	64.8		ug/m3 Air		110	71 - 131
Carbon disulfide	62	63.3		ug/m3 Air		102	63 - 123
Carbon tetrachloride	130	120		ug/m3 Air		96	67 - 127
Chlorobenzene	92	99.8		ug/m3 Air		108	70 - 132
Dibromochloromethane	170	190		ug/m3 Air		111	68 - 128
Chloroethane	53	53.3		ug/m3 Air		101	70 - 131
Chloroform	98	102		ug/m3 Air		104	69 - 129
Chloromethane	41	46.2		ug/m3 Air		112	67 - 127
1,2-Dibromoethane (EDB)	150	167		ug/m3 Air		109	68 - 131
1,2-Dichlorobenzene	120	129		ug/m3 Air		108	73 - 143
1,3-Dichlorobenzene	120	134		ug/m3 Air		112	77 - 136

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-30334-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 320-179186/4
Matrix: Air
Analysis Batch: 179186

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,4-Dichlorobenzene	120	138		ug/m3 Air		115	73 - 143
Dichlorodifluoromethane	99	90.1		ug/m3 Air		91	69 - 129
1,1-Dichloroethane	81	83.6		ug/m3 Air		103	65 - 125
1,2-Dichloroethane	81	88.7		ug/m3 Air		110	71 - 131
1,1-Dichloroethene	79	82.0		ug/m3 Air		103	53 - 128
cis-1,2-Dichloroethene	79	80.8		ug/m3 Air		102	68 - 128
trans-1,2-Dichloroethene	79	83.9		ug/m3 Air		106	70 - 130
1,2-Dichloropropane	92	103		ug/m3 Air		112	74 - 128
cis-1,3-Dichloropropene	91	96.2		ug/m3 Air		106	78 - 132
trans-1,3-Dichloropropene	91	99.8		ug/m3 Air		110	56 - 136
1,2-Dichloro-1,1,2,2-tetrafluoroethane	140	148		ug/m3 Air		106	64 - 124
Ethylbenzene	87	95.8		ug/m3 Air		110	76 - 136
4-Ethyltoluene	98	109		ug/m3 Air		111	62 - 136
Hexachlorobutadiene	210	214		ug/m3 Air		100	42 - 150
2-Hexanone	82	86.8		ug/m3 Air		106	70 - 128
Methylene Chloride	69	70.2		ug/m3 Air		101	65 - 125
4-Methyl-2-pentanone (MIBK)	82	83.4		ug/m3 Air		102	73 - 133
Styrene	85	93.7		ug/m3 Air		110	76 - 144
1,1,1,2-Tetrachloroethane	140	151		ug/m3 Air		110	75 - 135
Tetrachloroethene	140	143		ug/m3 Air		105	56 - 138
Toluene	75	77.8		ug/m3 Air		103	71 - 132
1,2,4-Trichlorobenzene	150	156		ug/m3 Air		105	59 - 150
1,1,1-Trichloroethane	110	114		ug/m3 Air		104	65 - 124
1,1,2-Trichloroethane	110	120		ug/m3 Air		110	71 - 131
Trichloroethene	110	114		ug/m3 Air		106	64 - 127
Trichlorofluoromethane	110	115		ug/m3 Air		103	68 - 128
1,1,2-Trichloro-1,2,2-trifluoroethane	150	159		ug/m3 Air		104	50 - 132
1,2,4-Trimethylbenzene	98	112		ug/m3 Air		114	61 - 145
1,3,5-Trimethylbenzene	98	111		ug/m3 Air		113	65 - 136
Vinyl acetate	70	67.3		ug/m3 Air		96	77 - 134
Vinyl chloride	51	54.2		ug/m3 Air		106	69 - 129
m,p-Xylene	170	195		ug/m3 Air		113	75 - 138
o-Xylene	87	97.2		ug/m3 Air		112	77 - 132

Surrogate	LCS %Recovery	LCS Qualifier	Limits
4-Bromofluorobenzene (Surr)	101		70 - 130
1,2-Dichloroethane-d4 (Surr)	105		70 - 130
Toluene-d8 (Surr)	98		70 - 130

Lab Sample ID: LCSD 320-179186/5
Matrix: Air
Analysis Batch: 179186

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Acetone	20.0	19.4		ppb v/v		97	71 - 131	1	25
Benzene	20.0	21.3		ppb v/v		107	68 - 128	2	25

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-30334-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-179186/5

Matrix: Air

Analysis Batch: 179186

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzyl chloride	16.0	16.9		ppb v/v		106	58 - 120	4	25
Bromodichloromethane	20.0	21.9		ppb v/v		110	65 - 130	0	25
Bromoform	20.0	22.0		ppb v/v		110	64 - 144	3	25
Bromomethane	20.0	19.7		ppb v/v		99	70 - 131	15	25
2-Butanone (MEK)	20.0	22.1		ppb v/v		110	71 - 131	0	25
Carbon disulfide	20.0	20.5		ppb v/v		102	63 - 123	1	25
Carbon tetrachloride	20.0	19.4		ppb v/v		97	67 - 127	2	25
Chlorobenzene	20.0	21.9		ppb v/v		110	70 - 132	1	25
Dibromochloromethane	20.0	22.3		ppb v/v		111	68 - 128	0	25
Chloroethane	20.0	20.7		ppb v/v		104	70 - 131	3	25
Chloroform	20.0	20.8		ppb v/v		104	69 - 129	0	25
Chloromethane	20.0	20.7		ppb v/v		104	67 - 127	8	25
1,2-Dibromoethane (EDB)	20.0	21.9		ppb v/v		110	68 - 131	1	25
1,2-Dichlorobenzene	20.0	22.4		ppb v/v		112	73 - 143	4	25
1,3-Dichlorobenzene	20.0	23.0		ppb v/v		115	77 - 136	3	25
1,4-Dichlorobenzene	20.0	23.8		ppb v/v		119	73 - 143	3	25
Dichlorodifluoromethane	20.0	18.1		ppb v/v		91	69 - 129	0	25
1,1-Dichloroethane	20.0	20.8		ppb v/v		104	65 - 125	1	25
1,2-Dichloroethane	20.0	22.3		ppb v/v		112	71 - 131	2	25
1,1-Dichloroethene	20.0	21.0		ppb v/v		105	53 - 128	1	25
cis-1,2-Dichloroethene	20.0	20.5		ppb v/v		102	68 - 128	0	25
trans-1,2-Dichloroethene	20.0	21.2		ppb v/v		106	70 - 130	0	25
1,2-Dichloropropane	20.0	22.6		ppb v/v		113	74 - 128	1	25
cis-1,3-Dichloropropene	20.0	21.5		ppb v/v		107	78 - 132	1	25
trans-1,3-Dichloropropene	20.0	21.9		ppb v/v		110	56 - 136	0	25
1,2-Dichloro-1,1,2,2-tetrafluoroethane	20.0	21.4		ppb v/v		107	64 - 124	1	25
Ethylbenzene	20.0	22.4		ppb v/v		112	76 - 136	2	25
4-Ethyltoluene	20.0	22.9		ppb v/v		114	62 - 136	3	25
Hexachlorobutadiene	20.0	21.4		ppb v/v		107	42 - 150	6	25
2-Hexanone	20.0	21.5		ppb v/v		107	70 - 128	1	25
Methylene Chloride	20.0	20.3		ppb v/v		101	65 - 125	0	25
4-Methyl-2-pentanone (MIBK)	20.0	20.7		ppb v/v		103	73 - 133	2	25
Styrene	20.0	22.4		ppb v/v		112	76 - 144	2	25
1,1,2,2-Tetrachloroethane	20.0	22.5		ppb v/v		112	75 - 135	2	25
Tetrachloroethene	20.0	21.3		ppb v/v		106	56 - 138	1	25
Toluene	20.0	20.9		ppb v/v		104	71 - 132	1	25
1,2,4-Trichlorobenzene	20.0	22.6		ppb v/v		113	59 - 150	7	25
1,1,1-Trichloroethane	20.0	20.8		ppb v/v		104	65 - 124	0	25
1,1,2-Trichloroethane	20.0	21.9		ppb v/v		109	71 - 131	0	25
Trichloroethene	20.0	21.5		ppb v/v		108	64 - 127	2	25
Trichlorofluoromethane	20.0	20.8		ppb v/v		104	68 - 128	2	25
1,1,2-Trichloro-1,2,2-trifluoroethane	20.0	20.8		ppb v/v		104	50 - 132	0	25
1,2,4-Trimethylbenzene	20.0	23.4		ppb v/v		117	61 - 145	3	25
1,3,5-Trimethylbenzene	20.0	23.1		ppb v/v		115	65 - 136	2	25
Vinyl acetate	20.0	19.3		ppb v/v		96	77 - 134	1	25
Vinyl chloride	20.0	20.7		ppb v/v		104	69 - 129	2	25
m,p-Xylene	40.0	45.8		ppb v/v		115	75 - 138	2	25

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-30334-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-179186/5

Client Sample ID: Lab Control Sample Dup

Matrix: Air

Prep Type: Total/NA

Analysis Batch: 179186

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
o-Xylene	20.0	22.7		ppb v/v		114	77 - 132	1	25
Acetone	48	46.1		ug/m3 Air		97	71 - 131	1	25
Benzene	64	68.1		ug/m3 Air		107	68 - 128	2	25
Benzyl chloride	83	87.7		ug/m3 Air		106	58 - 120	4	25
Bromodichloromethane	130	147		ug/m3 Air		110	65 - 130	0	25
Bromoform	210	228		ug/m3 Air		110	64 - 144	3	25
Bromomethane	78	76.6		ug/m3 Air		99	70 - 131	15	25
2-Butanone (MEK)	59	65.1		ug/m3 Air		110	71 - 131	0	25
Carbon disulfide	62	63.7		ug/m3 Air		102	63 - 123	1	25
Carbon tetrachloride	130	122		ug/m3 Air		97	67 - 127	2	25
Chlorobenzene	92	101		ug/m3 Air		110	70 - 132	1	25
Dibromochloromethane	170	190		ug/m3 Air		111	68 - 128	0	25
Chloroethane	53	54.7		ug/m3 Air		104	70 - 131	3	25
Chloroform	98	101		ug/m3 Air		104	69 - 129	0	25
Chloromethane	41	42.8		ug/m3 Air		104	67 - 127	8	25
1,2-Dibromoethane (EDB)	150	168		ug/m3 Air		110	68 - 131	1	25
1,2-Dichlorobenzene	120	135		ug/m3 Air		112	73 - 143	4	25
1,3-Dichlorobenzene	120	138		ug/m3 Air		115	77 - 136	3	25
1,4-Dichlorobenzene	120	143		ug/m3 Air		119	73 - 143	3	25
Dichlorodifluoromethane	99	89.7		ug/m3 Air		91	69 - 129	0	25
1,1-Dichloroethane	81	84.0		ug/m3 Air		104	65 - 125	1	25
1,2-Dichloroethane	81	90.3		ug/m3 Air		112	71 - 131	2	25
1,1-Dichloroethene	79	83.2		ug/m3 Air		105	53 - 128	1	25
cis-1,2-Dichloroethene	79	81.1		ug/m3 Air		102	68 - 128	0	25
trans-1,2-Dichloroethene	79	83.9		ug/m3 Air		106	70 - 130	0	25
1,2-Dichloropropane	92	104		ug/m3 Air		113	74 - 128	1	25
cis-1,3-Dichloropropene	91	97.6		ug/m3 Air		107	78 - 132	1	25
trans-1,3-Dichloropropene	91	99.4		ug/m3 Air		110	56 - 136	0	25
1,2-Dichloro-1,1,2,2-tetrafluoroethane	140	149		ug/m3 Air		107	64 - 124	1	25
Ethylbenzene	87	97.4		ug/m3 Air		112	76 - 136	2	25
4-Ethyltoluene	98	112		ug/m3 Air		114	62 - 136	3	25
Hexachlorobutadiene	210	228		ug/m3 Air		107	42 - 150	6	25
2-Hexanone	82	88.0		ug/m3 Air		107	70 - 128	1	25
Methylene Chloride	69	70.4		ug/m3 Air		101	65 - 125	0	25
4-Methyl-2-pentanone (MIBK)	82	84.7		ug/m3 Air		103	73 - 133	2	25
Styrene	85	95.3		ug/m3 Air		112	76 - 144	2	25
1,1,1,2-Tetrachloroethane	140	154		ug/m3 Air		112	75 - 135	2	25
Tetrachloroethene	140	144		ug/m3 Air		106	56 - 138	1	25
Toluene	75	78.7		ug/m3 Air		104	71 - 132	1	25
1,2,4-Trichlorobenzene	150	168		ug/m3 Air		113	59 - 150	7	25
1,1,1-Trichloroethane	110	114		ug/m3 Air		104	65 - 124	0	25
1,1,2-Trichloroethane	110	119		ug/m3 Air		109	71 - 131	0	25
Trichloroethene	110	116		ug/m3 Air		108	64 - 127	2	25
Trichlorofluoromethane	110	117		ug/m3 Air		104	68 - 128	2	25
1,1,2-Trichloro-1,2,2-trifluoroethane	150	159		ug/m3 Air		104	50 - 132	0	25

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
 Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-30334-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-179186/5

Client Sample ID: Lab Control Sample Dup

Matrix: Air

Prep Type: Total/NA

Analysis Batch: 179186

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2,4-Trimethylbenzene	98	115		ug/m3 Air		117	61 - 145	3	25
1,3,5-Trimethylbenzene	98	113		ug/m3 Air		115	65 - 136	2	25
Vinyl acetate	70	67.9		ug/m3 Air		96	77 - 134	1	25
Vinyl chloride	51	53.0		ug/m3 Air		104	69 - 129	2	25
m,p-Xylene	170	199		ug/m3 Air		115	75 - 138	2	25
o-Xylene	87	98.7		ug/m3 Air		114	77 - 132	1	25

Surrogate	LCSD %Recovery	LCSD Qualifier	LCSD Limits
4-Bromofluorobenzene (Surr)	105		70 - 130
1,2-Dichloroethane-d4 (Surr)	105		70 - 130
Toluene-d8 (Surr)	96		70 - 130

QC Association Summary

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-30334-1

Air - GC/MS VOA

Analysis Batch: 179031

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-30334-2	SVE_South_Post_Carbon_073117	Total/NA	Air	TO-15	
MB 320-179031/9	Method Blank	Total/NA	Air	TO-15	
LCS 320-179031/4	Lab Control Sample	Total/NA	Air	TO-15	
LCSD 320-179031/5	Lab Control Sample Dup	Total/NA	Air	TO-15	

Analysis Batch: 179186

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-30334-1	SVE_South_Pre_Carbon_073117	Total/NA	Air	TO-15	
MB 320-179186/9	Method Blank	Total/NA	Air	TO-15	
LCS 320-179186/4	Lab Control Sample	Total/NA	Air	TO-15	
LCSD 320-179186/5	Lab Control Sample Dup	Total/NA	Air	TO-15	

Lab Chronicle

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-30334-1

Client Sample ID: SVE_South_Pre_Carbon_073117

Lab Sample ID: 320-30334-1

Date Collected: 07/31/17 08:08

Matrix: Air

Date Received: 08/02/17 11:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		82.1	4 mL	250 mL	179186	08/14/17 16:48	AP1	TAL SAC

Client Sample ID: SVE_South_Post_Carbon_073117

Lab Sample ID: 320-30334-2

Date Collected: 07/31/17 08:11

Matrix: Air

Date Received: 08/02/17 11:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	334 mL	250 mL	179031	08/12/17 00:13	AP1	TAL SAC

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: Apex Companies LLC
 Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-30334-1

Laboratory: TestAmerica Sacramento

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Alaska (UST)	State Program	10	UST-055	12-18-17
Arizona	State Program	9	AZ0708	08-11-17 *
Arkansas DEQ	State Program	6	88-0691	06-17-18
California	State Program	9	2897	01-31-18
Colorado	State Program	8	CA00044	08-31-17
Connecticut	State Program	1	PH-0691	06-30-19
Florida	NELAP	4	E87570	06-30-18
Georgia	State Program	4	N/A	01-29-18
Hawaii	State Program	9	N/A	01-29-18
Illinois	NELAP	5	200060	03-17-18
Kansas	NELAP	7	E-10375	10-31-17
L-A-B	DoD ELAP		L2468	01-20-18
Louisiana	NELAP	6	30612	06-30-18
Maine	State Program	1	CA0004	04-18-18
Michigan	State Program	5	9947	01-31-18
Nevada	State Program	9	CA00044	07-31-18
New Hampshire	NELAP	1	2997	04-18-18
New Jersey	NELAP	2	CA005	06-30-18
New York	NELAP	2	11666	04-01-18
Oregon	NELAP	10	4040	01-28-18
Pennsylvania	NELAP	3	68-01272	03-31-18
Texas	NELAP	6	T104704399	05-31-18
US Fish & Wildlife	Federal		LE148388-0	10-31-17
USDA	Federal		P330-11-00436	12-30-17
USEPA UCMR	Federal	1	CA00044	11-06-18
Utah	NELAP	8	CA00044	02-28-18
Virginia	NELAP	3	460278	03-14-18
Washington	State Program	10	C581	05-05-18
West Virginia (DW)	State Program	3	9930C	12-31-17
Wyoming	State Program	8	8TMS-L	01-29-17 *

Laboratory: TestAmerica Portland

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
N/A	N/A	N/A	None on record.	

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-30334-1

Method	Method Description	Protocol	Laboratory
TO-15	Volatile Organic Compounds in Ambient Air	EPA	TAL SAC

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

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Sample Summary

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-30334-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-30334-1	SVE_South_Pre_Carbon_073117	Air	07/31/17 08:08	08/02/17 11:10
320-30334-2	SVE_South_Post_Carbon_073117	Air	07/31/17 08:11	08/02/17 11:10

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- 16

TestAmerica Sacramento
880 Riverside Parkway

West Sacramento, CA 95605
phone 916.374.4378 fax 916.372.1059

Canister Samples Chain of Custody Record

TestAmerica Laboratories, Inc. assumes no liability with respect to the collection and shipment of these samples.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Client Contact Information Company Name: Apex Company, Inc. Address: 3015 SW 1st Avenue City/State/Zip: Portland, OR 97201 Phone: 503 934-4704 FAX: Project Name: Mustar Vancouver REM Site/Location: Mustar Vancouver P.O.#: 1126-20		Project Manager: Heather Gosack Phone: 503 934 4704 x 1913 Email: Heather.Gosack@Apexcos.com Site Contact: TA Contact: Analysis Turnaround Time Standard (Specific): X Rush (Specify):		Samples Collected By: Kyle Kline COC No: _____ of _____ COCs							
Sample Identification SVE - South - Pre carbon - 073117 SVE - South - Post carbon - 073117	Sample Date(s) 7/31/17 7/31/17	Time Start 807 810	Time Stop 808 811	Canister Vacuum in Field, 'Hg (Start) -30 -30	Canister Vacuum in Field, 'Hg (Stop) -1 -2	Flow Controller ID - -	Canister ID 340012 77 8448	TO-15 (Med / Std / Low / SIM) X X	MA-APH EPA 3C EPA 25C / 25.3 ASTM D-1946 / 1945 / 3588 EPA 15/16 TO-3 Other (Please specify in notes section)	Indoor Air Ambient Air Soil Gas Landfill Gas Other (Please specify in notes section)	Sample Specific Notes:



Special Instructions/QC Requirements & Comments: Email Results to: Heather.Gosack@Apexcos.com

Samples Shipped by: Kyle Kline Date / Time: 7/31/17 1200	Samples Received by: [Signature] Date / Time: 8-1-17 1240
Samples Relinquished by: [Signature] Date / Time: 8/1/17 1350	Received by: [Signature] Date / Time: 8/1/17 1350
Relinquished by: [Signature] Date / Time: 8/1/17 1350	Received by: [Signature] Date / Time: 8/1/17 1350
Lab Use Only: [Signature] Shipped Name: [Signature]	Condition: [Signature]

Receipt number 1110-10-5



Login Sample Receipt Checklist

Client: Apex Companies LLC

Job Number: 320-30334-1

Login Number: 30334
List Number: 1
Creator: Nelson, Kym D

List Source: TestAmerica Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	N/A	
Cooler Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



Certification Type TO-15 SCAN
 Date Cleaned/Batch ID 5/18/17 320-28395
 Date of QC 5/19/17
 Data File Number 5/22/17 MS6051907



CANISTER ID NUMBERS

<u>8448 *</u>	<u>34001210</u>	<u> </u>
<u>34001421</u>	<u>34001298</u>	<u> </u>
<u>34000049</u>	<u>34001277</u>	<u> </u>
<u>34001555</u>	<u>34001402</u>	<u> </u>
<u>34000340</u>	<u> </u>	<u> </u>
<u>34000216</u>	<u> </u>	<u> </u>
<u>34000219</u>	<u> </u>	<u> </u>
<u>34001255</u>	<u> </u>	<u> </u>

The above canisters were cleaned as a batch. This certifies this batch contains no target analyte concentration greater than or equal to the method criteria for the "Certification Type" indicated above.

"*" INDICATES THE CAN OR CANS WHICH WERE SCREENED.

dw for AP
 1st level Reviewed By:

5/22/17
 Date:

[Signature]
 2nd level Reviewed By:

5/22/17
 Date:



FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-28395-1
 SDG No.: _____
 Client Sample ID: 8448 Lab Sample ID: 320-28395-1
 Matrix: Air Lab File ID: MS6051907.D
 Analysis Method: TO-15 Date Collected: 05/18/2017 00:00
 Sample wt/vol: 500 (mL) Date Analyzed: 05/19/2017 16:47
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: RTX-Volatiles ID: 0.32 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 165335 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
67-64-1	Acetone	0.42	J	5.0	0.18
107-02-8	Acrolein	ND		2.0	0.22
107-13-1	Acrylonitrile	ND		2.0	0.19
107-05-1	Allyl chloride	ND		0.80	0.11
71-43-2	Benzene	ND		0.40	0.079
100-44-7	Benzyl chloride	ND		0.80	0.16
75-27-4	Bromodichloromethane	ND		0.30	0.066
75-25-2	Bromoform	ND		0.40	0.070
74-83-9	Bromomethane	ND		0.80	0.34
106-99-0	1,3-Butadiene	ND		0.80	0.15
106-97-8	n-Butane	ND		0.40	0.15
78-93-3	2-Butanone (MEK)	ND		0.80	0.20
75-65-0	tert-Butyl alcohol (TBA)	ND		2.0	0.11
104-51-8	n-Butylbenzene	ND		0.40	0.18
135-98-8	sec-Butylbenzene	ND		0.40	0.070
98-06-6	tert-Butylbenzene	ND		0.80	0.068
75-15-0	Carbon disulfide	ND		0.80	0.078
56-23-5	Carbon tetrachloride	ND		0.80	0.064
108-90-7	Chlorobenzene	ND		0.30	0.064
75-45-6	Chlorodifluoromethane	ND		0.80	0.27
75-00-3	Chloroethane	ND		0.80	0.31
67-66-3	Chloroform	ND		0.30	0.095
74-87-3	Chloromethane	ND		0.80	0.20
95-49-8	2-Chlorotoluene	ND		0.40	0.080
110-82-7	Cyclohexane	ND		0.40	0.084
124-48-1	Dibromochloromethane	ND		0.40	0.079
106-93-4	1,2-Dibromoethane (EDB)	ND		0.80	0.075
74-95-3	Dibromomethane	ND		0.40	0.057
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16
95-50-1	1,2-Dichlorobenzene	ND		0.40	0.13
541-73-1	1,3-Dichlorobenzene	ND		0.40	0.11
106-46-7	1,4-Dichlorobenzene	ND		0.40	0.15
75-71-8	Dichlorodifluoromethane	ND		0.40	0.15
75-34-3	1,1-Dichloroethane	ND		0.30	0.072
107-06-2	1,2-Dichloroethane	ND		0.80	0.088

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-28395-1
 SDG No.: _____
 Client Sample ID: 8448 Lab Sample ID: 320-28395-1
 Matrix: Air Lab File ID: MS6051907.D
 Analysis Method: TO-15 Date Collected: 05/18/2017 00:00
 Sample wt/vol: 500 (mL) Date Analyzed: 05/19/2017 16:47
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: RTX-Volatiles ID: 0.32 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 165335 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
75-35-4	1,1-Dichloroethene	ND		0.80	0.13
156-59-2	cis-1,2-Dichloroethene	ND		0.40	0.089
156-60-5	trans-1,2-Dichloroethene	ND		0.40	0.10
78-87-5	1,2-Dichloropropane	ND		0.40	0.24
10061-01-5	cis-1,3-Dichloropropene	ND		0.40	0.10
10061-02-6	trans-1,3-Dichloropropene	ND		0.40	0.088
123-91-1	1,4-Dioxane	ND		0.80	0.10
141-78-6	Ethyl acetate	ND		0.30	0.18
100-41-4	Ethylbenzene	ND		0.40	0.063
622-96-8	4-Ethyltoluene	ND		0.40	0.19
142-82-5	n-Heptane	ND		0.80	0.063
87-68-3	Hexachlorobutadiene	ND		2.0	0.43
110-54-3	n-Hexane	ND		0.80	0.075
591-78-6	2-Hexanone	ND		0.40	0.087
98-82-8	Isopropylbenzene	ND		0.80	0.10
99-87-6	4-Isopropyltoluene	ND		0.80	0.12
1634-04-4	Methyl-t-Butyl Ether (MTBE)	ND		0.80	0.12
80-62-6	Methyl methacrylate	ND		0.80	0.16
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14
75-09-2	Methylene Chloride	0.19	J	0.40	0.072
98-83-9	alpha-Methylstyrene	ND		0.40	0.065
91-20-3	Naphthalene	ND		0.80	0.56
111-65-9	n-Octane	ND		0.40	0.055
109-66-0	n-Pentane	ND		0.80	0.26
115-07-1	Propylene	ND		0.40	0.099
103-65-1	N-Propylbenzene	ND		0.40	0.059
100-42-5	Styrene	ND		0.40	0.059
79-34-5	1,1,2,2-Tetrachloroethane	ND		0.40	0.069
127-18-4	Tetrachloroethene	ND		0.40	0.051
109-99-9	Tetrahydrofuran	ND		0.80	0.21
108-88-3	Toluene	ND		0.40	0.051
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16
120-82-1	1,2,4-Trichlorobenzene	ND		2.0	0.43
71-55-6	1,1,1-Trichloroethane	ND		0.30	0.065
79-00-5	1,1,2-Trichloroethane	ND		0.40	0.067

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-28395-1
 SDG No.: _____
 Client Sample ID: 8448 Lab Sample ID: 320-28395-1
 Matrix: Air Lab File ID: MS6051907.D
 Analysis Method: TO-15 Date Collected: 05/18/2017 00:00
 Sample wt/vol: 500 (mL) Date Analyzed: 05/19/2017 16:47
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: RTX-Volatiles ID: 0.32 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 165335 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-01-6	Trichloroethene	ND		0.40	0.11
75-69-4	Trichlorofluoromethane	ND		0.40	0.20
96-18-4	1,2,3-Trichloropropane	ND		0.40	0.17
95-63-6	1,2,4-Trimethylbenzene	ND		0.80	0.16
108-67-8	1,3,5-Trimethylbenzene	ND		0.40	0.13
540-84-1	2,2,4-Trimethylpentane	ND		0.40	0.071
108-05-4	Vinyl acetate	ND		0.80	0.15
593-60-2	Vinyl bromide	ND		0.80	0.26
75-01-4	Vinyl chloride	ND		0.40	0.12
179601-23-1	m,p-Xylene	ND		0.80	0.10
95-47-6	o-Xylene	ND		0.40	0.054

CAS NO.	SURROGATE	%REC	Q	LIMITS
460-00-4	4-Bromofluorobenzene (Surr)	102		70-130
17060-07-0	1,2-Dichloroethane-d4 (Surr)	97		70-130
2037-26-5	Toluene-d8 (Surr)	96		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\ATMS6\20170519-43295.b\MS6051907.D
 Lims ID: 320-28395-A-1
 Client ID: 8448
 Sample Type: Client
 Inject. Date: 19-May-2017 16:47:30 ALS Bottle#: 5 Worklist Smp#: 22
 Purge Vol: 25.000 mL Dil. Factor: 1.0000
 Sample Info: 320-28395-A-1
 Misc. Info.: 500 mL CAN CERT
 Operator ID: SV Instrument ID: ATMS6
 Method: \\ChromNA\Sacramento\ChromData\ATMS6\20170519-43295.b\TO15_ATMS6.m
 Limit Group: MSA - TO15 - ICAL
 Last Update: 22-May-2017 10:06:59 Calib Date: 19-May-2017 11:49:30
 Integrator: RTE ID Type: Deconvolution ID
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\ATMS6\20170519-43295.b\MS6051902.D
 Column 1 : RTX Volatiles (0.32 mm) Det: MS SCAN
 Process Host: XAWRK029

First Level Reviewer: phanthasena

Date: 22-May-2017 10:06:59

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ppb v/v	Flags
* 1 Chlorobromomethane (IS)	130	13.100	13.100	0.000	93	40559	4.00	
* 2 1,4-Difluorobenzene	114	15.248	15.242	0.006	95	149634	4.00	
* 3 Chlorobenzene-d5 (IS)	117	21.988	21.988	0.000	89	141098	4.00	
\$ 4 1,2-Dichloroethane-d4 (Sur	65	14.311	14.305	0.006	99	72508	3.90	
\$ 5 Toluene-d8 (Surr)	100	18.703	18.697	0.006	97	89844	3.83	
\$ 6 4-Bromofluorobenzene (Surr	95	24.549	24.549	0.000	87	102735	4.07	
11 Propene	41	4.510	4.486	0.024	19	497	0.0622	
16 Chloromethane	50	5.076	5.064	0.012	43	1182	0.1060	
17 Butane	43	5.301	5.295	0.006	73	1479	0.0792	
32 Acetone	43	8.264	8.276	-0.012	98	8666	0.4175	
39 Methylene Chloride	49	9.523	9.511	0.012	96	2624	0.1931	

Reagents:

VAMSIS20_00002

Amount Added: 50.00

Units: mL

Run Reagent

Data File: \\ChromNA\Sacramento\ChromData\ATMS6\20170519-43295.b\MS6051907.D

Injection Date: 19-May-2017 16:47:30

Instrument ID: ATMS6

Operator ID: SV

Lims ID: 320-28395-A-1

Lab Sample ID: 320-28395-1

Worklist Smp#: 22

Client ID: 8448

Purge Vol: 25.000 mL

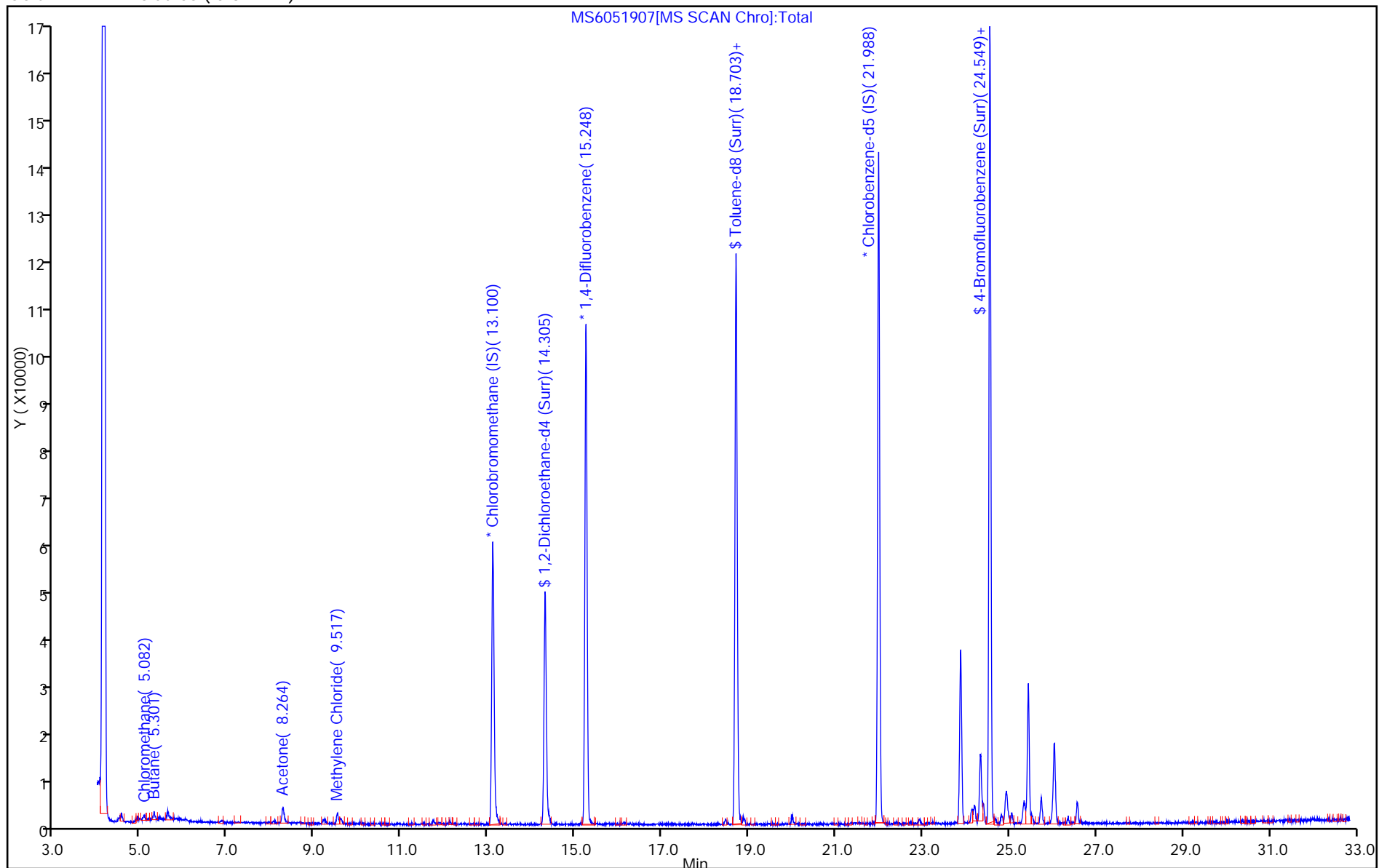
Dil. Factor: 1.0000

ALS Bottle#: 5

Method: TO15_ATMS6

Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm)



TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS6\20170519-43295.b\MS6051907.D

Injection Date: 19-May-2017 16:47:30

Instrument ID: ATMS6

Lims ID: 320-28395-A-1

Lab Sample ID: 320-28395-1

Client ID: 8448

Operator ID: SV

ALS Bottle#: 5 Worklist Smp#: 22

Purge Vol: 25.000 mL

Dil. Factor: 1.0000

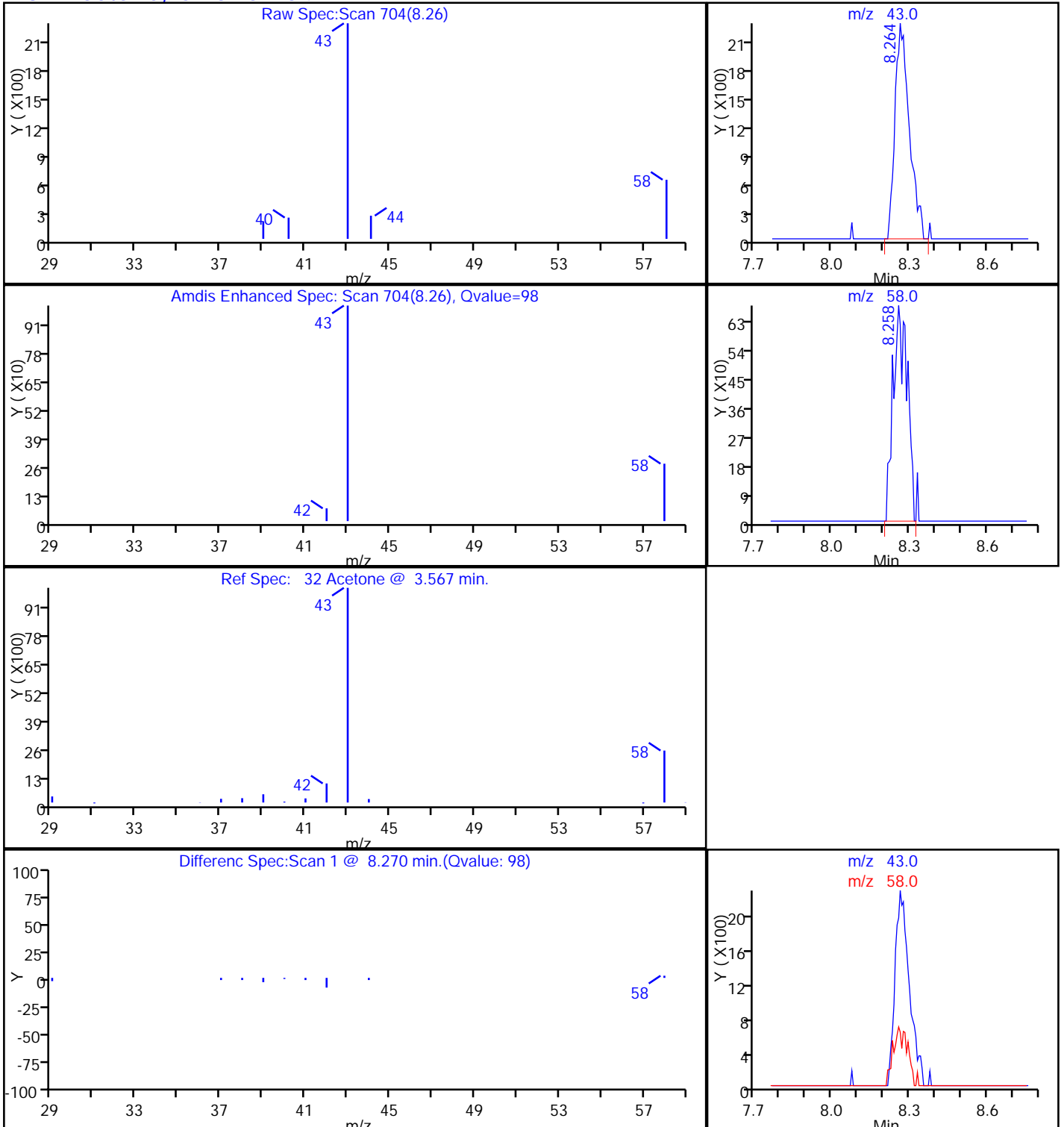
Method: TO15_ATMS6

Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm)

Detector: MS SCAN

32 Acetone, CAS: 67-64-1



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TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS6\20170519-43295.b\MS6051907.D

Injection Date: 19-May-2017 16:47:30

Instrument ID: ATMS6

Lims ID: 320-28395-A-1

Lab Sample ID: 320-28395-1

Client ID: 8448

Operator ID: SV

ALS Bottle#: 5 Worklist Smp#: 22

Purge Vol: 25.000 mL

Dil. Factor: 1.0000

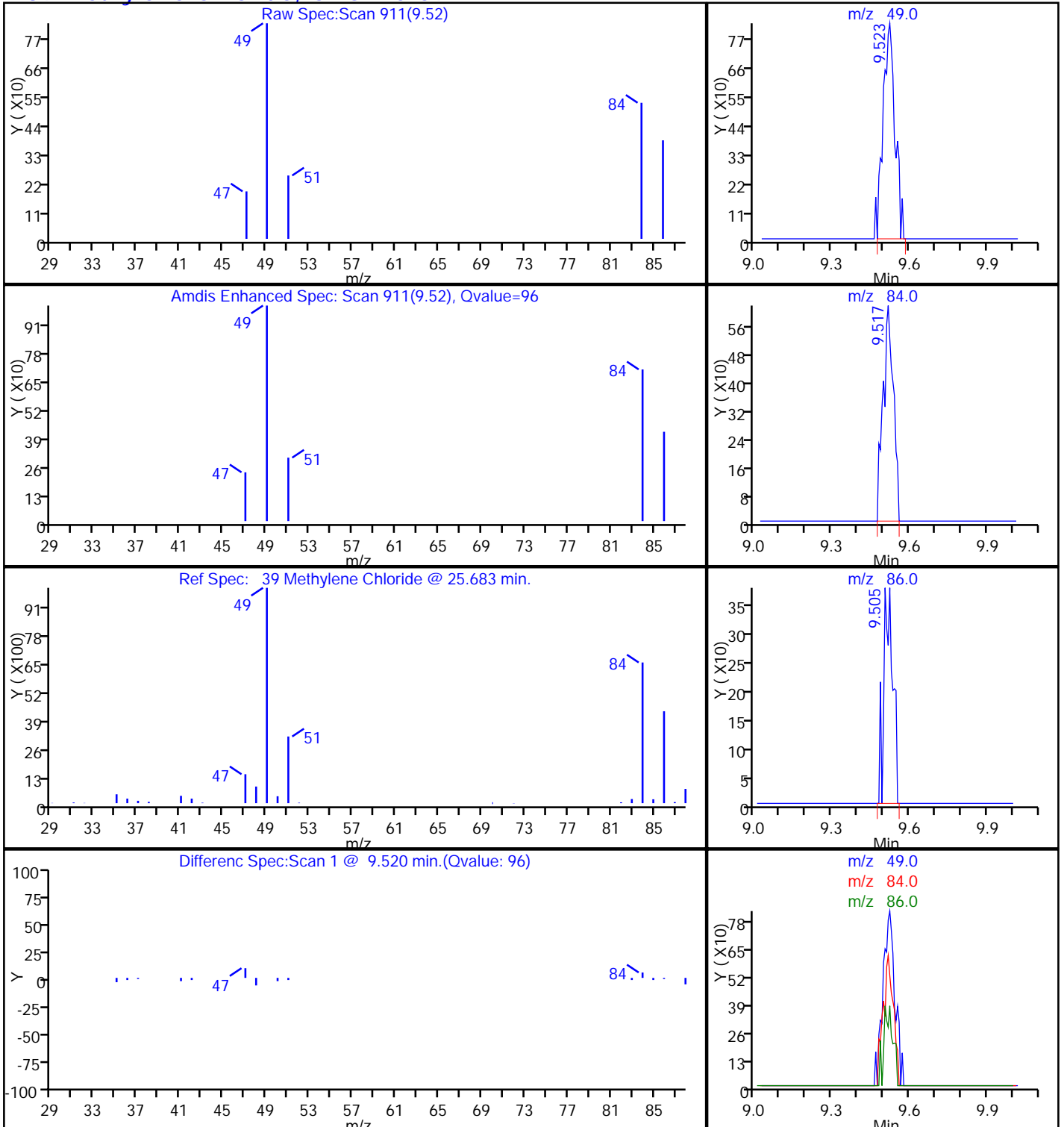
Method: TO15_ATMS6

Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm)

Detector: MS SCAN

39 Methylene Chloride, CAS: 75-09-2



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

TestAmerica Job ID: 320-31189-1
Client Project/Site: NuStar Vancouver

For:
Apex Companies LLC
3015 SW 1st Avenue
Portland, Oregon 97201

Attn: Heather Gosack



Authorized for release by:
9/14/2017 4:09:12 PM

Cathy Gamble, Project Manager I
(253)922-2310
cathy.gamble@testamericainc.com

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Apex Companies LLC
Project/Site: NuStar Vancouver

TestAmerica Job ID: 320-31189-1

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Apex Companies LLC
Project/Site: NuStar Vancouver

TestAmerica Job ID: 320-31189-1

Job ID: 320-31189-1

Laboratory: TestAmerica Sacramento

Narrative

Receipt

The samples were received on 8/30/2017 9:50 AM; the samples arrived in good condition, properly preserved and, where required, on ice.

Receipt Exceptions

The container label for the following samples did not match the information listed on the Chain-of-Custody (COC):
SVE_SOUTH_PRECARBON_082817 (320-31189-1) and SVE_SOUTH_POSTCARBON_082817 (320-31189-2).

1. The canister asset lists 34000147, while the COC lists C8426.
2. The canister asset lists 34000478, while the COC lists 9568BB.

Air - GC/MS VOA

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

VOA Prep

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.



Detection Summary

Client: Apex Companies LLC
Project/Site: NuStar Vancouver

TestAmerica Job ID: 320-31189-1

Client Sample ID: SVE_SOUTH_PRECARBON_082817

Lab Sample ID: 320-31189-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	16		15		ppb v/v	49.5		TO-15	Total/NA
cis-1,2-Dichloroethene	80		20		ppb v/v	49.5		TO-15	Total/NA
Trichloroethene	200		20		ppb v/v	49.5		TO-15	Total/NA
Tetrachloroethene - DL	4700		50		ppb v/v	126		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	90		81		ug/m3 Air	49.5		TO-15	Total/NA
cis-1,2-Dichloroethene	320		79		ug/m3 Air	49.5		TO-15	Total/NA
Trichloroethene	1100		110		ug/m3 Air	49.5		TO-15	Total/NA
Tetrachloroethene - DL	32000		340		ug/m3 Air	126		TO-15	Total/NA

Client Sample ID: SVE_SOUTH_POSTCARBON_082817

Lab Sample ID: 320-31189-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1-Dichloroethene	1.5		0.80		ppb v/v	1		TO-15	Total/NA
2-Butanone (MEK)	3.0		0.80		ppb v/v	1		TO-15	Total/NA
Acetone	16		5.0		ppb v/v	1		TO-15	Total/NA
cis-1,2-Dichloroethene	0.55		0.40		ppb v/v	1		TO-15	Total/NA
Methylene Chloride	0.70		0.40		ppb v/v	1		TO-15	Total/NA
Tetrachloroethene	24		0.40		ppb v/v	1		TO-15	Total/NA
Toluene	0.60		0.40		ppb v/v	1		TO-15	Total/NA
Trichloroethene	2.2		0.40		ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.60		0.40		ppb v/v	1		TO-15	Total/NA
Vinyl chloride	0.88		0.40		ppb v/v	1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1-Dichloroethene	5.8		3.2		ug/m3 Air	1		TO-15	Total/NA
2-Butanone (MEK)	8.9		2.4		ug/m3 Air	1		TO-15	Total/NA
Acetone	38		12		ug/m3 Air	1		TO-15	Total/NA
cis-1,2-Dichloroethene	2.2		1.6		ug/m3 Air	1		TO-15	Total/NA
Methylene Chloride	2.4		1.4		ug/m3 Air	1		TO-15	Total/NA
Tetrachloroethene	160		2.7		ug/m3 Air	1		TO-15	Total/NA
Toluene	2.3		1.5		ug/m3 Air	1		TO-15	Total/NA
Trichloroethene	12		2.1		ug/m3 Air	1		TO-15	Total/NA
Trichlorofluoromethane	3.4		2.2		ug/m3 Air	1		TO-15	Total/NA
Vinyl chloride	2.2		1.0		ug/m3 Air	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vancouver

TestAmerica Job ID: 320-31189-1

Client Sample ID: SVE_SOUTH_PRECARBON_082817

Lab Sample ID: 320-31189-1

Date Collected: 08/17/17 13:06

Matrix: Air

Date Received: 08/30/17 09:50

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	16		15		ppb v/v			09/13/17 17:14	49.5
1,1,2,2-Tetrachloroethane	ND		20		ppb v/v			09/13/17 17:14	49.5
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		20		ppb v/v			09/13/17 17:14	49.5
1,1,2-Trichloroethane	ND		20		ppb v/v			09/13/17 17:14	49.5
1,1-Dichloroethane	ND		15		ppb v/v			09/13/17 17:14	49.5
1,1-Dichloroethene	ND		40		ppb v/v			09/13/17 17:14	49.5
1,2,4-Trichlorobenzene	ND		99		ppb v/v			09/13/17 17:14	49.5
1,2,4-Trimethylbenzene	ND		40		ppb v/v			09/13/17 17:14	49.5
1,2-Dibromoethane (EDB)	ND		40		ppb v/v			09/13/17 17:14	49.5
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		20		ppb v/v			09/13/17 17:14	49.5
1,2-Dichlorobenzene	ND		20		ppb v/v			09/13/17 17:14	49.5
1,2-Dichloroethane	ND		40		ppb v/v			09/13/17 17:14	49.5
1,2-Dichloropropane	ND		20		ppb v/v			09/13/17 17:14	49.5
1,3,5-Trimethylbenzene	ND		20		ppb v/v			09/13/17 17:14	49.5
1,3-Dichlorobenzene	ND		20		ppb v/v			09/13/17 17:14	49.5
1,4-Dichlorobenzene	ND		20		ppb v/v			09/13/17 17:14	49.5
2-Butanone (MEK)	ND		40		ppb v/v			09/13/17 17:14	49.5
2-Hexanone	ND		20		ppb v/v			09/13/17 17:14	49.5
4-Ethyltoluene	ND		20		ppb v/v			09/13/17 17:14	49.5
4-Methyl-2-pentanone (MIBK)	ND		20		ppb v/v			09/13/17 17:14	49.5
Acetone	ND		250		ppb v/v			09/13/17 17:14	49.5
Benzene	ND		20		ppb v/v			09/13/17 17:14	49.5
Benzyl chloride	ND		40		ppb v/v			09/13/17 17:14	49.5
Bromodichloromethane	ND		15		ppb v/v			09/13/17 17:14	49.5
Bromoform	ND		20		ppb v/v			09/13/17 17:14	49.5
Bromomethane	ND		40		ppb v/v			09/13/17 17:14	49.5
Carbon disulfide	ND		40		ppb v/v			09/13/17 17:14	49.5
Carbon tetrachloride	ND		40		ppb v/v			09/13/17 17:14	49.5
Chlorobenzene	ND		15		ppb v/v			09/13/17 17:14	49.5
Chloroethane	ND		40		ppb v/v			09/13/17 17:14	49.5
Chloroform	ND		15		ppb v/v			09/13/17 17:14	49.5
Chloromethane	ND		40		ppb v/v			09/13/17 17:14	49.5
cis-1,2-Dichloroethene	80		20		ppb v/v			09/13/17 17:14	49.5
cis-1,3-Dichloropropene	ND		20		ppb v/v			09/13/17 17:14	49.5
Dibromochloromethane	ND		20		ppb v/v			09/13/17 17:14	49.5
Dichlorodifluoromethane	ND		20		ppb v/v			09/13/17 17:14	49.5
Ethylbenzene	ND		20		ppb v/v			09/13/17 17:14	49.5
Hexachlorobutadiene	ND		99		ppb v/v			09/13/17 17:14	49.5
m,p-Xylene	ND		40		ppb v/v			09/13/17 17:14	49.5
Methylene Chloride	ND		20		ppb v/v			09/13/17 17:14	49.5
o-Xylene	ND		20		ppb v/v			09/13/17 17:14	49.5
Styrene	ND		20		ppb v/v			09/13/17 17:14	49.5
Toluene	ND		20		ppb v/v			09/13/17 17:14	49.5
trans-1,2-Dichloroethene	ND		20		ppb v/v			09/13/17 17:14	49.5
trans-1,3-Dichloropropene	ND		20		ppb v/v			09/13/17 17:14	49.5
Trichloroethene	200		20		ppb v/v			09/13/17 17:14	49.5
Trichlorofluoromethane	ND		20		ppb v/v			09/13/17 17:14	49.5
Vinyl acetate	ND		40		ppb v/v			09/13/17 17:14	49.5

TestAmerica Sacramento

Client Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vancouver

TestAmerica Job ID: 320-31189-1

Client Sample ID: SVE_SOUTH_PRECARBON_082817

Lab Sample ID: 320-31189-1

Date Collected: 08/17/17 13:06

Matrix: Air

Date Received: 08/30/17 09:50

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	ND		20		ppb v/v			09/13/17 17:14	49.5
1,1,1-Trichloroethane	90		81		ug/m3 Air			09/13/17 17:14	49.5
1,1,2,2-Tetrachloroethane	ND		140		ug/m3 Air			09/13/17 17:14	49.5
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		150		ug/m3 Air			09/13/17 17:14	49.5
1,1,2-Trichloroethane	ND		110		ug/m3 Air			09/13/17 17:14	49.5
1,1-Dichloroethane	ND		60		ug/m3 Air			09/13/17 17:14	49.5
1,1-Dichloroethene	ND		160		ug/m3 Air			09/13/17 17:14	49.5
1,2,4-Trichlorobenzene	ND		730		ug/m3 Air			09/13/17 17:14	49.5
1,2,4-Trimethylbenzene	ND		190		ug/m3 Air			09/13/17 17:14	49.5
1,2-Dibromoethane (EDB)	ND		300		ug/m3 Air			09/13/17 17:14	49.5
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		140		ug/m3 Air			09/13/17 17:14	49.5
1,2-Dichlorobenzene	ND		120		ug/m3 Air			09/13/17 17:14	49.5
1,2-Dichloroethane	ND		160		ug/m3 Air			09/13/17 17:14	49.5
1,2-Dichloropropane	ND		92		ug/m3 Air			09/13/17 17:14	49.5
1,3,5-Trimethylbenzene	ND		97		ug/m3 Air			09/13/17 17:14	49.5
1,3-Dichlorobenzene	ND		120		ug/m3 Air			09/13/17 17:14	49.5
1,4-Dichlorobenzene	ND		120		ug/m3 Air			09/13/17 17:14	49.5
2-Butanone (MEK)	ND		120		ug/m3 Air			09/13/17 17:14	49.5
2-Hexanone	ND		81		ug/m3 Air			09/13/17 17:14	49.5
4-Ethyltoluene	ND		97		ug/m3 Air			09/13/17 17:14	49.5
4-Methyl-2-pentanone (MIBK)	ND		81		ug/m3 Air			09/13/17 17:14	49.5
Acetone	ND		590		ug/m3 Air			09/13/17 17:14	49.5
Benzene	ND		63		ug/m3 Air			09/13/17 17:14	49.5
Benzyl chloride	ND		210		ug/m3 Air			09/13/17 17:14	49.5
Bromodichloromethane	ND		100		ug/m3 Air			09/13/17 17:14	49.5
Bromoform	ND		200		ug/m3 Air			09/13/17 17:14	49.5
Bromomethane	ND		150		ug/m3 Air			09/13/17 17:14	49.5
Carbon disulfide	ND		120		ug/m3 Air			09/13/17 17:14	49.5
Carbon tetrachloride	ND		250		ug/m3 Air			09/13/17 17:14	49.5
Chlorobenzene	ND		68		ug/m3 Air			09/13/17 17:14	49.5
Chloroethane	ND		100		ug/m3 Air			09/13/17 17:14	49.5
Chloroform	ND		73		ug/m3 Air			09/13/17 17:14	49.5
Chloromethane	ND		82		ug/m3 Air			09/13/17 17:14	49.5
cis-1,2-Dichloroethene	320		79		ug/m3 Air			09/13/17 17:14	49.5
cis-1,3-Dichloropropene	ND		90		ug/m3 Air			09/13/17 17:14	49.5
Dibromochloromethane	ND		170		ug/m3 Air			09/13/17 17:14	49.5
Dichlorodifluoromethane	ND		98		ug/m3 Air			09/13/17 17:14	49.5
Ethylbenzene	ND		86		ug/m3 Air			09/13/17 17:14	49.5
Hexachlorobutadiene	ND		1100		ug/m3 Air			09/13/17 17:14	49.5
m,p-Xylene	ND		170		ug/m3 Air			09/13/17 17:14	49.5
Methylene Chloride	ND		69		ug/m3 Air			09/13/17 17:14	49.5
o-Xylene	ND		86		ug/m3 Air			09/13/17 17:14	49.5
Styrene	ND		84		ug/m3 Air			09/13/17 17:14	49.5
Toluene	ND		75		ug/m3 Air			09/13/17 17:14	49.5
trans-1,2-Dichloroethene	ND		79		ug/m3 Air			09/13/17 17:14	49.5
trans-1,3-Dichloropropene	ND		90		ug/m3 Air			09/13/17 17:14	49.5
Trichloroethene	1100		110		ug/m3 Air			09/13/17 17:14	49.5

TestAmerica Sacramento

Client Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vancouver

TestAmerica Job ID: 320-31189-1

Client Sample ID: SVE_SOUTH_PRECARBON_082817

Lab Sample ID: 320-31189-1

Date Collected: 08/17/17 13:06

Matrix: Air

Date Received: 08/30/17 09:50

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Trichlorofluoromethane	ND		110		ug/m3 Air			09/13/17 17:14	49.5
Vinyl acetate	ND		140		ug/m3 Air			09/13/17 17:14	49.5
Vinyl chloride	ND		51		ug/m3 Air			09/13/17 17:14	49.5
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	93		70 - 130					09/13/17 17:14	49.5
4-Bromofluorobenzene (Surr)	87		70 - 130					09/13/17 17:14	49.5
Toluene-d8 (Surr)	96		70 - 130					09/13/17 17:14	49.5

Method: TO-15 - Volatile Organic Compounds in Ambient Air - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	4700		50		ppb v/v			09/14/17 08:22	126
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	32000		340		ug/m3 Air			09/14/17 08:22	126
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	95		70 - 130					09/14/17 08:22	126
4-Bromofluorobenzene (Surr)	75		70 - 130					09/14/17 08:22	126
Toluene-d8 (Surr)	88		70 - 130					09/14/17 08:22	126

Client Sample ID: SVE_SOUTH_POSTCARBON_082817

Lab Sample ID: 320-31189-2

Date Collected: 08/17/17 13:21

Matrix: Air

Date Received: 08/30/17 09:50

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.30		ppb v/v			09/13/17 18:12	1
1,1,2,2-Tetrachloroethane	ND		0.40		ppb v/v			09/13/17 18:12	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40		ppb v/v			09/13/17 18:12	1
1,1,2-Trichloroethane	ND		0.40		ppb v/v			09/13/17 18:12	1
1,1-Dichloroethane	ND		0.30		ppb v/v			09/13/17 18:12	1
1,1-Dichloroethene	1.5		0.80		ppb v/v			09/13/17 18:12	1
1,2,4-Trichlorobenzene	ND		2.0		ppb v/v			09/13/17 18:12	1
1,2,4-Trimethylbenzene	ND		0.80		ppb v/v			09/13/17 18:12	1
1,2-Dibromoethane (EDB)	ND		0.80		ppb v/v			09/13/17 18:12	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40		ppb v/v			09/13/17 18:12	1
1,2-Dichlorobenzene	ND		0.40		ppb v/v			09/13/17 18:12	1
1,2-Dichloroethane	ND		0.80		ppb v/v			09/13/17 18:12	1
1,2-Dichloropropane	ND		0.40		ppb v/v			09/13/17 18:12	1
1,3,5-Trimethylbenzene	ND		0.40		ppb v/v			09/13/17 18:12	1
1,3-Dichlorobenzene	ND		0.40		ppb v/v			09/13/17 18:12	1
1,4-Dichlorobenzene	ND		0.40		ppb v/v			09/13/17 18:12	1
2-Butanone (MEK)	3.0		0.80		ppb v/v			09/13/17 18:12	1
2-Hexanone	ND		0.40		ppb v/v			09/13/17 18:12	1
4-Ethyltoluene	ND		0.40		ppb v/v			09/13/17 18:12	1
4-Methyl-2-pentanone (MIBK)	ND		0.40		ppb v/v			09/13/17 18:12	1
Acetone	16		5.0		ppb v/v			09/13/17 18:12	1
Benzene	ND		0.40		ppb v/v			09/13/17 18:12	1

TestAmerica Sacramento

Client Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vancouver

TestAmerica Job ID: 320-31189-1

Client Sample ID: SVE_SOUTH_POSTCARBON_082817

Lab Sample ID: 320-31189-2

Date Collected: 08/17/17 13:21

Matrix: Air

Date Received: 08/30/17 09:50

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzyl chloride	ND		0.80		ppb v/v			09/13/17 18:12	1
Bromodichloromethane	ND		0.30		ppb v/v			09/13/17 18:12	1
Bromoform	ND		0.40		ppb v/v			09/13/17 18:12	1
Bromomethane	ND		0.80		ppb v/v			09/13/17 18:12	1
Carbon disulfide	ND		0.80		ppb v/v			09/13/17 18:12	1
Carbon tetrachloride	ND		0.80		ppb v/v			09/13/17 18:12	1
Chlorobenzene	ND		0.30		ppb v/v			09/13/17 18:12	1
Chloroethane	ND		0.80		ppb v/v			09/13/17 18:12	1
Chloroform	ND		0.30		ppb v/v			09/13/17 18:12	1
Chloromethane	ND		0.80		ppb v/v			09/13/17 18:12	1
cis-1,2-Dichloroethene	0.55		0.40		ppb v/v			09/13/17 18:12	1
cis-1,3-Dichloropropene	ND		0.40		ppb v/v			09/13/17 18:12	1
Dibromochloromethane	ND		0.40		ppb v/v			09/13/17 18:12	1
Dichlorodifluoromethane	ND		0.40		ppb v/v			09/13/17 18:12	1
Ethylbenzene	ND		0.40		ppb v/v			09/13/17 18:12	1
Hexachlorobutadiene	ND		2.0		ppb v/v			09/13/17 18:12	1
m,p-Xylene	ND		0.80		ppb v/v			09/13/17 18:12	1
Methylene Chloride	0.70		0.40		ppb v/v			09/13/17 18:12	1
o-Xylene	ND		0.40		ppb v/v			09/13/17 18:12	1
Styrene	ND		0.40		ppb v/v			09/13/17 18:12	1
Tetrachloroethene	24		0.40		ppb v/v			09/13/17 18:12	1
Toluene	0.60		0.40		ppb v/v			09/13/17 18:12	1
trans-1,2-Dichloroethene	ND		0.40		ppb v/v			09/13/17 18:12	1
trans-1,3-Dichloropropene	ND		0.40		ppb v/v			09/13/17 18:12	1
Trichloroethene	2.2		0.40		ppb v/v			09/13/17 18:12	1
Trichlorofluoromethane	0.60		0.40		ppb v/v			09/13/17 18:12	1
Vinyl acetate	ND		0.80		ppb v/v			09/13/17 18:12	1
Vinyl chloride	0.88		0.40		ppb v/v			09/13/17 18:12	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.6		ug/m3 Air			09/13/17 18:12	1
1,1,2,2-Tetrachloroethane	ND		2.7		ug/m3 Air			09/13/17 18:12	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1		ug/m3 Air			09/13/17 18:12	1
1,1,2-Trichloroethane	ND		2.2		ug/m3 Air			09/13/17 18:12	1
1,1-Dichloroethane	ND		1.2		ug/m3 Air			09/13/17 18:12	1
1,1-Dichloroethene	5.8		3.2		ug/m3 Air			09/13/17 18:12	1
1,2,4-Trichlorobenzene	ND		15		ug/m3 Air			09/13/17 18:12	1
1,2,4-Trimethylbenzene	ND		3.9		ug/m3 Air			09/13/17 18:12	1
1,2-Dibromoethane (EDB)	ND		6.1		ug/m3 Air			09/13/17 18:12	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8		ug/m3 Air			09/13/17 18:12	1
1,2-Dichlorobenzene	ND		2.4		ug/m3 Air			09/13/17 18:12	1
1,2-Dichloroethane	ND		3.2		ug/m3 Air			09/13/17 18:12	1
1,2-Dichloropropane	ND		1.8		ug/m3 Air			09/13/17 18:12	1
1,3,5-Trimethylbenzene	ND		2.0		ug/m3 Air			09/13/17 18:12	1
1,3-Dichlorobenzene	ND		2.4		ug/m3 Air			09/13/17 18:12	1
1,4-Dichlorobenzene	ND		2.4		ug/m3 Air			09/13/17 18:12	1
2-Butanone (MEK)	8.9		2.4		ug/m3 Air			09/13/17 18:12	1
2-Hexanone	ND		1.6		ug/m3 Air			09/13/17 18:12	1
4-Ethyltoluene	ND		2.0		ug/m3 Air			09/13/17 18:12	1

TestAmerica Sacramento

Client Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vancouver

TestAmerica Job ID: 320-31189-1

Client Sample ID: SVE_SOUTH_POSTCARBON_082817

Lab Sample ID: 320-31189-2

Date Collected: 08/17/17 13:21

Matrix: Air

Date Received: 08/30/17 09:50

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4-Methyl-2-pentanone (MIBK)	ND		1.6		ug/m3 Air			09/13/17 18:12	1
Acetone	38		12		ug/m3 Air			09/13/17 18:12	1
Benzene	ND		1.3		ug/m3 Air			09/13/17 18:12	1
Benzyl chloride	ND		4.1		ug/m3 Air			09/13/17 18:12	1
Bromodichloromethane	ND		2.0		ug/m3 Air			09/13/17 18:12	1
Bromoform	ND		4.1		ug/m3 Air			09/13/17 18:12	1
Bromomethane	ND		3.1		ug/m3 Air			09/13/17 18:12	1
Carbon disulfide	ND		2.5		ug/m3 Air			09/13/17 18:12	1
Carbon tetrachloride	ND		5.0		ug/m3 Air			09/13/17 18:12	1
Chlorobenzene	ND		1.4		ug/m3 Air			09/13/17 18:12	1
Chloroethane	ND		2.1		ug/m3 Air			09/13/17 18:12	1
Chloroform	ND		1.5		ug/m3 Air			09/13/17 18:12	1
Chloromethane	ND		1.7		ug/m3 Air			09/13/17 18:12	1
cis-1,2-Dichloroethene	2.2		1.6		ug/m3 Air			09/13/17 18:12	1
cis-1,3-Dichloropropene	ND		1.8		ug/m3 Air			09/13/17 18:12	1
Dibromochloromethane	ND		3.4		ug/m3 Air			09/13/17 18:12	1
Dichlorodifluoromethane	ND		2.0		ug/m3 Air			09/13/17 18:12	1
Ethylbenzene	ND		1.7		ug/m3 Air			09/13/17 18:12	1
Hexachlorobutadiene	ND		21		ug/m3 Air			09/13/17 18:12	1
m,p-Xylene	ND		3.5		ug/m3 Air			09/13/17 18:12	1
Methylene Chloride	2.4		1.4		ug/m3 Air			09/13/17 18:12	1
o-Xylene	ND		1.7		ug/m3 Air			09/13/17 18:12	1
Styrene	ND		1.7		ug/m3 Air			09/13/17 18:12	1
Tetrachloroethene	160		2.7		ug/m3 Air			09/13/17 18:12	1
Toluene	2.3		1.5		ug/m3 Air			09/13/17 18:12	1
trans-1,2-Dichloroethene	ND		1.6		ug/m3 Air			09/13/17 18:12	1
trans-1,3-Dichloropropene	ND		1.8		ug/m3 Air			09/13/17 18:12	1
Trichloroethene	12		2.1		ug/m3 Air			09/13/17 18:12	1
Trichlorofluoromethane	3.4		2.2		ug/m3 Air			09/13/17 18:12	1
Vinyl acetate	ND		2.8		ug/m3 Air			09/13/17 18:12	1
Vinyl chloride	2.2		1.0		ug/m3 Air			09/13/17 18:12	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	92		70 - 130		09/13/17 18:12	1
4-Bromofluorobenzene (Surr)	97		70 - 130		09/13/17 18:12	1
Toluene-d8 (Surr)	93		70 - 130		09/13/17 18:12	1

TestAmerica Sacramento

Surrogate Summary

Client: Apex Companies LLC
Project/Site: NuStar Vancouver

TestAmerica Job ID: 320-31189-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Matrix: Air

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)		
		12DCE (70-130)	BFB (70-130)	TOL (70-130)
320-31189-1 - DL	SVE_SOUTH_PRECARBON_08	95	75	88
320-31189-1	SVE_SOUTH_PRECARBON_08	93	87	96
320-31189-2	SVE_SOUTH_POSTCARBON_1	92	97	93
	2817			
	82817			
LCS 320-184143/4	Lab Control Sample	99	106	101
LCSD 320-184143/5	Lab Control Sample Dup	99	107	100
MB 320-184143/7	Method Blank	88	88	94

Surrogate Legend

12DCE = 1,2-Dichloroethane-d4 (Surr)

BFB = 4-Bromofluorobenzene (Surr)

TOL = Toluene-d8 (Surr)

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vancouver

TestAmerica Job ID: 320-31189-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Lab Sample ID: MB 320-184143/7

Matrix: Air

Analysis Batch: 184143

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.30		ppb v/v			09/13/17 16:22	1
1,1,2,2-Tetrachloroethane	ND		0.40		ppb v/v			09/13/17 16:22	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40		ppb v/v			09/13/17 16:22	1
1,1,2-Trichloroethane	ND		0.40		ppb v/v			09/13/17 16:22	1
1,1-Dichloroethane	ND		0.30		ppb v/v			09/13/17 16:22	1
1,1-Dichloroethene	ND		0.80		ppb v/v			09/13/17 16:22	1
1,2,4-Trichlorobenzene	ND		2.0		ppb v/v			09/13/17 16:22	1
1,2,4-Trimethylbenzene	ND		0.80		ppb v/v			09/13/17 16:22	1
1,2-Dibromoethane (EDB)	ND		0.80		ppb v/v			09/13/17 16:22	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40		ppb v/v			09/13/17 16:22	1
1,2-Dichlorobenzene	ND		0.40		ppb v/v			09/13/17 16:22	1
1,2-Dichloroethane	ND		0.80		ppb v/v			09/13/17 16:22	1
1,2-Dichloropropane	ND		0.40		ppb v/v			09/13/17 16:22	1
1,3,5-Trimethylbenzene	ND		0.40		ppb v/v			09/13/17 16:22	1
1,3-Dichlorobenzene	ND		0.40		ppb v/v			09/13/17 16:22	1
1,4-Dichlorobenzene	ND		0.40		ppb v/v			09/13/17 16:22	1
2-Butanone (MEK)	ND		0.80		ppb v/v			09/13/17 16:22	1
2-Hexanone	ND		0.40		ppb v/v			09/13/17 16:22	1
4-Ethyltoluene	ND		0.40		ppb v/v			09/13/17 16:22	1
4-Methyl-2-pentanone (MIBK)	ND		0.40		ppb v/v			09/13/17 16:22	1
Acetone	ND		5.0		ppb v/v			09/13/17 16:22	1
Benzene	ND		0.40		ppb v/v			09/13/17 16:22	1
Benzyl chloride	ND		0.80		ppb v/v			09/13/17 16:22	1
Bromodichloromethane	ND		0.30		ppb v/v			09/13/17 16:22	1
Bromoform	ND		0.40		ppb v/v			09/13/17 16:22	1
Bromomethane	ND		0.80		ppb v/v			09/13/17 16:22	1
Carbon disulfide	ND		0.80		ppb v/v			09/13/17 16:22	1
Carbon tetrachloride	ND		0.80		ppb v/v			09/13/17 16:22	1
Chlorobenzene	ND		0.30		ppb v/v			09/13/17 16:22	1
Chloroethane	ND		0.80		ppb v/v			09/13/17 16:22	1
Chloroform	ND		0.30		ppb v/v			09/13/17 16:22	1
Chloromethane	ND		0.80		ppb v/v			09/13/17 16:22	1
cis-1,2-Dichloroethene	ND		0.40		ppb v/v			09/13/17 16:22	1
cis-1,3-Dichloropropene	ND		0.40		ppb v/v			09/13/17 16:22	1
Dibromochloromethane	ND		0.40		ppb v/v			09/13/17 16:22	1
Dichlorodifluoromethane	ND		0.40		ppb v/v			09/13/17 16:22	1
Ethylbenzene	ND		0.40		ppb v/v			09/13/17 16:22	1
Hexachlorobutadiene	ND		2.0		ppb v/v			09/13/17 16:22	1
m,p-Xylene	ND		0.80		ppb v/v			09/13/17 16:22	1
Methylene Chloride	ND		0.40		ppb v/v			09/13/17 16:22	1
o-Xylene	ND		0.40		ppb v/v			09/13/17 16:22	1
Styrene	ND		0.40		ppb v/v			09/13/17 16:22	1
Tetrachloroethene	ND		0.40		ppb v/v			09/13/17 16:22	1
Toluene	ND		0.40		ppb v/v			09/13/17 16:22	1
trans-1,2-Dichloroethene	ND		0.40		ppb v/v			09/13/17 16:22	1
trans-1,3-Dichloropropene	ND		0.40		ppb v/v			09/13/17 16:22	1
Trichloroethene	ND		0.40		ppb v/v			09/13/17 16:22	1
Trichlorofluoromethane	ND		0.40		ppb v/v			09/13/17 16:22	1

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
 Project/Site: NuStar Vancouver

TestAmerica Job ID: 320-31189-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 320-184143/7

Matrix: Air

Analysis Batch: 184143

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl acetate	ND		0.80		ppb v/v			09/13/17 16:22	1
Vinyl chloride	ND		0.40		ppb v/v			09/13/17 16:22	1
Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.6		ug/m3 Air			09/13/17 16:22	1
1,1,2,2-Tetrachloroethane	ND		2.7		ug/m3 Air			09/13/17 16:22	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1		ug/m3 Air			09/13/17 16:22	1
1,1,2-Trichloroethane	ND		2.2		ug/m3 Air			09/13/17 16:22	1
1,1-Dichloroethane	ND		1.2		ug/m3 Air			09/13/17 16:22	1
1,1-Dichloroethene	ND		3.2		ug/m3 Air			09/13/17 16:22	1
1,2,4-Trichlorobenzene	ND		15		ug/m3 Air			09/13/17 16:22	1
1,2,4-Trimethylbenzene	ND		3.9		ug/m3 Air			09/13/17 16:22	1
1,2-Dibromoethane (EDB)	ND		6.1		ug/m3 Air			09/13/17 16:22	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8		ug/m3 Air			09/13/17 16:22	1
1,2-Dichlorobenzene	ND		2.4		ug/m3 Air			09/13/17 16:22	1
1,2-Dichloroethane	ND		3.2		ug/m3 Air			09/13/17 16:22	1
1,2-Dichloropropane	ND		1.8		ug/m3 Air			09/13/17 16:22	1
1,3,5-Trimethylbenzene	ND		2.0		ug/m3 Air			09/13/17 16:22	1
1,3-Dichlorobenzene	ND		2.4		ug/m3 Air			09/13/17 16:22	1
1,4-Dichlorobenzene	ND		2.4		ug/m3 Air			09/13/17 16:22	1
2-Butanone (MEK)	ND		2.4		ug/m3 Air			09/13/17 16:22	1
2-Hexanone	ND		1.6		ug/m3 Air			09/13/17 16:22	1
4-Ethyltoluene	ND		2.0		ug/m3 Air			09/13/17 16:22	1
4-Methyl-2-pentanone (MIBK)	ND		1.6		ug/m3 Air			09/13/17 16:22	1
Acetone	ND		12		ug/m3 Air			09/13/17 16:22	1
Benzene	ND		1.3		ug/m3 Air			09/13/17 16:22	1
Benzyl chloride	ND		4.1		ug/m3 Air			09/13/17 16:22	1
Bromodichloromethane	ND		2.0		ug/m3 Air			09/13/17 16:22	1
Bromoform	ND		4.1		ug/m3 Air			09/13/17 16:22	1
Bromomethane	ND		3.1		ug/m3 Air			09/13/17 16:22	1
Carbon disulfide	ND		2.5		ug/m3 Air			09/13/17 16:22	1
Carbon tetrachloride	ND		5.0		ug/m3 Air			09/13/17 16:22	1
Chlorobenzene	ND		1.4		ug/m3 Air			09/13/17 16:22	1
Chloroethane	ND		2.1		ug/m3 Air			09/13/17 16:22	1
Chloroform	ND		1.5		ug/m3 Air			09/13/17 16:22	1
Chloromethane	ND		1.7		ug/m3 Air			09/13/17 16:22	1
cis-1,2-Dichloroethene	ND		1.6		ug/m3 Air			09/13/17 16:22	1
cis-1,3-Dichloropropene	ND		1.8		ug/m3 Air			09/13/17 16:22	1
Dibromochloromethane	ND		3.4		ug/m3 Air			09/13/17 16:22	1
Dichlorodifluoromethane	ND		2.0		ug/m3 Air			09/13/17 16:22	1
Ethylbenzene	ND		1.7		ug/m3 Air			09/13/17 16:22	1
Hexachlorobutadiene	ND		21		ug/m3 Air			09/13/17 16:22	1
m,p-Xylene	ND		3.5		ug/m3 Air			09/13/17 16:22	1
Methylene Chloride	ND		1.4		ug/m3 Air			09/13/17 16:22	1
o-Xylene	ND		1.7		ug/m3 Air			09/13/17 16:22	1
Styrene	ND		1.7		ug/m3 Air			09/13/17 16:22	1
Tetrachloroethene	ND		2.7		ug/m3 Air			09/13/17 16:22	1
Toluene	ND		1.5		ug/m3 Air			09/13/17 16:22	1

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vancouver

TestAmerica Job ID: 320-31189-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 320-184143/7

Matrix: Air

Analysis Batch: 184143

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
trans-1,2-Dichloroethene	ND		1.6		ug/m3 Air			09/13/17 16:22	1
trans-1,3-Dichloropropene	ND		1.8		ug/m3 Air			09/13/17 16:22	1
Trichloroethene	ND		2.1		ug/m3 Air			09/13/17 16:22	1
Trichlorofluoromethane	ND		2.2		ug/m3 Air			09/13/17 16:22	1
Vinyl acetate	ND		2.8		ug/m3 Air			09/13/17 16:22	1
Vinyl chloride	ND		1.0		ug/m3 Air			09/13/17 16:22	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	88		70 - 130		09/13/17 16:22	1
4-Bromofluorobenzene (Surr)	88		70 - 130		09/13/17 16:22	1
Toluene-d8 (Surr)	94		70 - 130		09/13/17 16:22	1

Lab Sample ID: LCS 320-184143/4

Matrix: Air

Analysis Batch: 184143

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	20.0	20.2		ppb v/v		101	65 - 124
1,1,1,2-Tetrachloroethane	20.0	21.2		ppb v/v		106	75 - 135
1,1,1,2-Trichloro-1,2,2-trifluoroethane	20.0	20.2		ppb v/v		101	50 - 132
1,1,2-Trichloroethane	20.0	20.9		ppb v/v		105	71 - 131
1,1-Dichloroethane	20.0	19.9		ppb v/v		99	65 - 125
1,1-Dichloroethene	20.0	20.1		ppb v/v		100	53 - 128
1,2,4-Trichlorobenzene	20.0	23.0		ppb v/v		115	59 - 150
1,2,4-Trimethylbenzene	20.0	22.9		ppb v/v		115	61 - 145
1,2-Dibromoethane (EDB)	20.0	21.3		ppb v/v		106	68 - 131
1,2-Dichloro-1,1,2,2-tetrafluoroethane	20.0	21.4		ppb v/v		107	64 - 124
1,2-Dichlorobenzene	20.0	22.3		ppb v/v		111	73 - 143
1,2-Dichloroethane	20.0	20.7		ppb v/v		104	71 - 131
1,2-Dichloropropane	20.0	21.7		ppb v/v		109	74 - 128
1,3,5-Trimethylbenzene	20.0	21.8		ppb v/v		109	65 - 136
1,3-Dichlorobenzene	20.0	22.9		ppb v/v		115	77 - 136
1,4-Dichlorobenzene	20.0	22.7		ppb v/v		114	73 - 143
2-Butanone (MEK)	20.0	20.6		ppb v/v		103	71 - 131
2-Hexanone	20.0	21.0		ppb v/v		105	70 - 128
4-Ethyltoluene	20.0	23.0		ppb v/v		115	62 - 136
4-Methyl-2-pentanone (MIBK)	20.0	19.8		ppb v/v		99	73 - 133
Acetone	20.0	18.0		ppb v/v		90	71 - 131
Benzene	20.0	20.4		ppb v/v		102	68 - 128
Benzyl chloride	16.0	16.9		ppb v/v		105	58 - 120
Bromodichloromethane	20.0	21.7		ppb v/v		109	65 - 130
Bromoform	20.0	22.1		ppb v/v		111	64 - 144
Bromomethane	20.0	21.3		ppb v/v		106	70 - 131
Carbon disulfide	20.0	20.0		ppb v/v		100	63 - 123
Carbon tetrachloride	20.0	19.3		ppb v/v		97	67 - 127
Chlorobenzene	20.0	21.0		ppb v/v		105	70 - 132

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vancouver

TestAmerica Job ID: 320-31189-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 320-184143/4

Matrix: Air

Analysis Batch: 184143

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloroethane	20.0	22.0		ppb v/v		110	70 - 131
Chloroform	20.0	20.7		ppb v/v		104	69 - 129
Chloromethane	20.0	16.5		ppb v/v		82	67 - 127
cis-1,2-Dichloroethene	20.0	20.8		ppb v/v		104	68 - 128
cis-1,3-Dichloropropene	20.0	21.6		ppb v/v		108	78 - 132
Dibromochloromethane	20.0	21.3		ppb v/v		107	68 - 128
Dichlorodifluoromethane	20.0	19.0		ppb v/v		95	69 - 129
Ethylbenzene	20.0	21.4		ppb v/v		107	76 - 136
Hexachlorobutadiene	20.0	22.2		ppb v/v		111	42 - 150
m,p-Xylene	40.0	43.8		ppb v/v		110	75 - 138
Methylene Chloride	20.0	18.3		ppb v/v		91	65 - 125
o-Xylene	20.0	21.9		ppb v/v		109	77 - 132
Styrene	20.0	22.6		ppb v/v		113	76 - 144
Tetrachloroethene	20.0	21.1		ppb v/v		106	56 - 138
Toluene	20.0	20.9		ppb v/v		105	71 - 132
trans-1,2-Dichloroethene	20.0	20.4		ppb v/v		102	70 - 130
trans-1,3-Dichloropropene	20.0	20.7		ppb v/v		104	56 - 136
Trichloroethene	20.0	21.8		ppb v/v		109	64 - 127
Trichlorofluoromethane	20.0	20.0		ppb v/v		100	68 - 128
Vinyl acetate	20.0	18.5		ppb v/v		93	77 - 134
Vinyl chloride	20.0	18.6		ppb v/v		93	69 - 129
Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	110	110		ug/m3 Air		101	65 - 124
1,1,1,2-Tetrachloroethane	140	145		ug/m3 Air		106	75 - 135
1,1,2-Trichloro-1,2,2-trifluoroethane	150	155		ug/m3 Air		101	50 - 132
1,1,2-Trichloroethane	110	114		ug/m3 Air		105	71 - 131
1,1-Dichloroethane	81	80.5		ug/m3 Air		99	65 - 125
1,1-Dichloroethene	79	79.6		ug/m3 Air		100	53 - 128
1,2,4-Trichlorobenzene	150	171		ug/m3 Air		115	59 - 150
1,2,4-Trimethylbenzene	98	113		ug/m3 Air		115	61 - 145
1,2-Dibromoethane (EDB)	150	163		ug/m3 Air		106	68 - 131
1,2-Dichloro-1,1,2,2-tetrafluoroethane	140	150		ug/m3 Air		107	64 - 124
1,2-Dichlorobenzene	120	134		ug/m3 Air		111	73 - 143
1,2-Dichloroethane	81	83.9		ug/m3 Air		104	71 - 131
1,2-Dichloropropane	92	100		ug/m3 Air		109	74 - 128
1,3,5-Trimethylbenzene	98	107		ug/m3 Air		109	65 - 136
1,3-Dichlorobenzene	120	138		ug/m3 Air		115	77 - 136
1,4-Dichlorobenzene	120	137		ug/m3 Air		114	73 - 143
2-Butanone (MEK)	59	60.7		ug/m3 Air		103	71 - 131
2-Hexanone	82	86.1		ug/m3 Air		105	70 - 128
4-Ethyltoluene	98	113		ug/m3 Air		115	62 - 136
4-Methyl-2-pentanone (MIBK)	82	81.1		ug/m3 Air		99	73 - 133
Acetone	48	42.7		ug/m3 Air		90	71 - 131
Benzene	64	65.2		ug/m3 Air		102	68 - 128
Benzyl chloride	83	87.4		ug/m3 Air		105	58 - 120
Bromodichloromethane	130	146		ug/m3 Air		109	65 - 130

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vancouver

TestAmerica Job ID: 320-31189-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 320-184143/4

Matrix: Air

Analysis Batch: 184143

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Bromoform	210	229		ug/m3 Air		111	64 - 144
Bromomethane	78	82.7		ug/m3 Air		106	70 - 131
Carbon disulfide	62	62.2		ug/m3 Air		100	63 - 123
Carbon tetrachloride	130	122		ug/m3 Air		97	67 - 127
Chlorobenzene	92	96.9		ug/m3 Air		105	70 - 132
Chloroethane	53	58.1		ug/m3 Air		110	70 - 131
Chloroform	98	101		ug/m3 Air		104	69 - 129
Chloromethane	41	34.1		ug/m3 Air		82	67 - 127
cis-1,2-Dichloroethene	79	82.4		ug/m3 Air		104	68 - 128
cis-1,3-Dichloropropene	91	98.0		ug/m3 Air		108	78 - 132
Dibromochloromethane	170	182		ug/m3 Air		107	68 - 128
Dichlorodifluoromethane	99	94.0		ug/m3 Air		95	69 - 129
Ethylbenzene	87	93.1		ug/m3 Air		107	76 - 136
Hexachlorobutadiene	210	236		ug/m3 Air		111	42 - 150
m,p-Xylene	170	190		ug/m3 Air		110	75 - 138
Methylene Chloride	69	63.4		ug/m3 Air		91	65 - 125
o-Xylene	87	94.9		ug/m3 Air		109	77 - 132
Styrene	85	96.3		ug/m3 Air		113	76 - 144
Tetrachloroethene	140	143		ug/m3 Air		106	56 - 138
Toluene	75	78.9		ug/m3 Air		105	71 - 132
trans-1,2-Dichloroethene	79	80.8		ug/m3 Air		102	70 - 130
trans-1,3-Dichloropropene	91	94.1		ug/m3 Air		104	56 - 136
Trichloroethene	110	117		ug/m3 Air		109	64 - 127
Trichlorofluoromethane	110	113		ug/m3 Air		100	68 - 128
Vinyl acetate	70	65.2		ug/m3 Air		93	77 - 134
Vinyl chloride	51	47.5		ug/m3 Air		93	69 - 129

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	99		70 - 130
4-Bromofluorobenzene (Surr)	106		70 - 130
Toluene-d8 (Surr)	101		70 - 130

Lab Sample ID: LCSD 320-184143/5

Matrix: Air

Analysis Batch: 184143

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	20.0	20.4		ppb v/v		102	65 - 124	1	25
1,1,2,2-Tetrachloroethane	20.0	21.0		ppb v/v		105	75 - 135	1	25
1,1,2-Trichloro-1,2,2-trifluoroethane	20.0	20.5		ppb v/v		103	50 - 132	2	25
1,1,2-Trichloroethane	20.0	20.9		ppb v/v		104	71 - 131	0	25
1,1-Dichloroethane	20.0	20.2		ppb v/v		101	65 - 125	2	25
1,1-Dichloroethene	20.0	20.2		ppb v/v		101	53 - 128	1	25
1,2,4-Trichlorobenzene	20.0	23.1		ppb v/v		116	59 - 150	0	25
1,2,4-Trimethylbenzene	20.0	22.5		ppb v/v		113	61 - 145	2	25
1,2-Dibromoethane (EDB)	20.0	21.1		ppb v/v		105	68 - 131	1	25

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vancouver

TestAmerica Job ID: 320-31189-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-184143/5

Client Sample ID: Lab Control Sample Dup

Matrix: Air

Prep Type: Total/NA

Analysis Batch: 184143

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2-Dichloro-1,1,2,2-tetrafluoroethane	20.0	21.5		ppb v/v		107	64 - 124	0	25
1,2-Dichlorobenzene	20.0	22.2		ppb v/v		111	73 - 143	0	25
1,2-Dichloroethane	20.0	20.4		ppb v/v		102	71 - 131	2	25
1,2-Dichloropropane	20.0	21.5		ppb v/v		108	74 - 128	1	25
1,3,5-Trimethylbenzene	20.0	21.6		ppb v/v		108	65 - 136	1	25
1,3-Dichlorobenzene	20.0	23.0		ppb v/v		115	77 - 136	0	25
1,4-Dichlorobenzene	20.0	22.9		ppb v/v		114	73 - 143	1	25
2-Butanone (MEK)	20.0	21.3		ppb v/v		107	71 - 131	4	25
2-Hexanone	20.0	21.0		ppb v/v		105	70 - 128	0	25
4-Ethyltoluene	20.0	23.0		ppb v/v		115	62 - 136	0	25
4-Methyl-2-pentanone (MIBK)	20.0	19.8		ppb v/v		99	73 - 133	0	25
Acetone	20.0	18.1		ppb v/v		91	71 - 131	1	25
Benzene	20.0	20.4		ppb v/v		102	68 - 128	0	25
Benzyl chloride	16.0	16.9		ppb v/v		105	58 - 120	0	25
Bromodichloromethane	20.0	21.7		ppb v/v		109	65 - 130	0	25
Bromoform	20.0	22.0		ppb v/v		110	64 - 144	0	25
Bromomethane	20.0	23.8		ppb v/v		119	70 - 131	11	25
Carbon disulfide	20.0	20.2		ppb v/v		101	63 - 123	1	25
Carbon tetrachloride	20.0	19.3		ppb v/v		96	67 - 127	0	25
Chlorobenzene	20.0	20.9		ppb v/v		105	70 - 132	1	25
Chloroethane	20.0	22.1		ppb v/v		110	70 - 131	0	25
Chloroform	20.0	20.9		ppb v/v		105	69 - 129	1	25
Chloromethane	20.0	17.2		ppb v/v		86	67 - 127	4	25
cis-1,2-Dichloroethene	20.0	20.9		ppb v/v		104	68 - 128	0	25
cis-1,3-Dichloropropene	20.0	21.7		ppb v/v		108	78 - 132	0	25
Dibromochloromethane	20.0	21.2		ppb v/v		106	68 - 128	1	25
Dichlorodifluoromethane	20.0	18.4		ppb v/v		92	69 - 129	3	25
Ethylbenzene	20.0	21.3		ppb v/v		106	76 - 136	1	25
Hexachlorobutadiene	20.0	21.9		ppb v/v		109	42 - 150	1	25
m,p-Xylene	40.0	43.6		ppb v/v		109	75 - 138	0	25
Methylene Chloride	20.0	18.1		ppb v/v		90	65 - 125	1	25
o-Xylene	20.0	21.7		ppb v/v		109	77 - 132	1	25
Styrene	20.0	22.6		ppb v/v		113	76 - 144	0	25
Tetrachloroethene	20.0	21.0		ppb v/v		105	56 - 138	1	25
Toluene	20.0	20.9		ppb v/v		105	71 - 132	0	25
trans-1,2-Dichloroethene	20.0	20.6		ppb v/v		103	70 - 130	1	25
trans-1,3-Dichloropropene	20.0	20.5		ppb v/v		103	56 - 136	1	25
Trichloroethene	20.0	21.7		ppb v/v		108	64 - 127	1	25
Trichlorofluoromethane	20.0	20.2		ppb v/v		101	68 - 128	1	25
Vinyl acetate	20.0	18.1		ppb v/v		91	77 - 134	2	25
Vinyl chloride	20.0	19.6		ppb v/v		98	69 - 129	6	25

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	110	111		ug/m3 Air		102	65 - 124	1	25
1,1,2,2-Tetrachloroethane	140	144		ug/m3 Air		105	75 - 135	1	25
1,1,2-Trichloro-1,2,2-trifluoroethane	150	157		ug/m3 Air		103	50 - 132	2	25
1,1,2-Trichloroethane	110	114		ug/m3 Air		104	71 - 131	0	25

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vancouver

TestAmerica Job ID: 320-31189-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-184143/5

Client Sample ID: Lab Control Sample Dup

Matrix: Air

Prep Type: Total/NA

Analysis Batch: 184143

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1-Dichloroethane	81	82.0		ug/m3 Air		101	65 - 125	2	25
1,1-Dichloroethene	79	80.0		ug/m3 Air		101	53 - 128	1	25
1,2,4-Trichlorobenzene	150	172		ug/m3 Air		116	59 - 150	0	25
1,2,4-Trimethylbenzene	98	111		ug/m3 Air		113	61 - 145	2	25
1,2-Dibromoethane (EDB)	150	162		ug/m3 Air		105	68 - 131	1	25
1,2-Dichloro-1,1,2,2-tetrafluoroethane	140	150		ug/m3 Air		107	64 - 124	0	25
1,2-Dichlorobenzene	120	133		ug/m3 Air		111	73 - 143	0	25
1,2-Dichloroethane	81	82.5		ug/m3 Air		102	71 - 131	2	25
1,2-Dichloropropane	92	99.5		ug/m3 Air		108	74 - 128	1	25
1,3,5-Trimethylbenzene	98	106		ug/m3 Air		108	65 - 136	1	25
1,3-Dichlorobenzene	120	138		ug/m3 Air		115	77 - 136	0	25
1,4-Dichlorobenzene	120	138		ug/m3 Air		114	73 - 143	1	25
2-Butanone (MEK)	59	62.9		ug/m3 Air		107	71 - 131	4	25
2-Hexanone	82	85.9		ug/m3 Air		105	70 - 128	0	25
4-Ethyltoluene	98	113		ug/m3 Air		115	62 - 136	0	25
4-Methyl-2-pentanone (MIBK)	82	81.0		ug/m3 Air		99	73 - 133	0	25
Acetone	48	43.1		ug/m3 Air		91	71 - 131	1	25
Benzene	64	65.1		ug/m3 Air		102	68 - 128	0	25
Benzyl chloride	83	87.2		ug/m3 Air		105	58 - 120	0	25
Bromodichloromethane	130	146		ug/m3 Air		109	65 - 130	0	25
Bromoform	210	227		ug/m3 Air		110	64 - 144	0	25
Bromomethane	78	92.5		ug/m3 Air		119	70 - 131	11	25
Carbon disulfide	62	62.9		ug/m3 Air		101	63 - 123	1	25
Carbon tetrachloride	130	121		ug/m3 Air		96	67 - 127	0	25
Chlorobenzene	92	96.3		ug/m3 Air		105	70 - 132	1	25
Chloroethane	53	58.3		ug/m3 Air		110	70 - 131	0	25
Chloroform	98	102		ug/m3 Air		105	69 - 129	1	25
Chloromethane	41	35.6		ug/m3 Air		86	67 - 127	4	25
cis-1,2-Dichloroethene	79	82.8		ug/m3 Air		104	68 - 128	0	25
cis-1,3-Dichloropropene	91	98.3		ug/m3 Air		108	78 - 132	0	25
Dibromochloromethane	170	180		ug/m3 Air		106	68 - 128	1	25
Dichlorodifluoromethane	99	91.0		ug/m3 Air		92	69 - 129	3	25
Ethylbenzene	87	92.4		ug/m3 Air		106	76 - 136	1	25
Hexachlorobutadiene	210	233		ug/m3 Air		109	42 - 150	1	25
m,p-Xylene	170	190		ug/m3 Air		109	75 - 138	0	25
Methylene Chloride	69	62.9		ug/m3 Air		90	65 - 125	1	25
o-Xylene	87	94.3		ug/m3 Air		109	77 - 132	1	25
Styrene	85	96.1		ug/m3 Air		113	76 - 144	0	25
Tetrachloroethene	140	143		ug/m3 Air		105	56 - 138	1	25
Toluene	75	78.9		ug/m3 Air		105	71 - 132	0	25
trans-1,2-Dichloroethene	79	81.6		ug/m3 Air		103	70 - 130	1	25
trans-1,3-Dichloropropene	91	93.1		ug/m3 Air		103	56 - 136	1	25
Trichloroethene	110	116		ug/m3 Air		108	64 - 127	1	25
Trichlorofluoromethane	110	114		ug/m3 Air		101	68 - 128	1	25
Vinyl acetate	70	63.8		ug/m3 Air		91	77 - 134	2	25
Vinyl chloride	51	50.2		ug/m3 Air		98	69 - 129	6	25

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vancouver

TestAmerica Job ID: 320-31189-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-184143/5

Matrix: Air

Analysis Batch: 184143

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Surrogate	LCSD		Limits
	%Recovery	Qualifier	
1,2-Dichloroethane-d4 (Surr)	99		70 - 130
4-Bromofluorobenzene (Surr)	107		70 - 130
Toluene-d8 (Surr)	100		70 - 130

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QC Association Summary

Client: Apex Companies LLC
Project/Site: NuStar Vancouver

TestAmerica Job ID: 320-31189-1

Air - GC/MS VOA

Analysis Batch: 184143

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-31189-1	SVE_SOUTH_PRECARBON_082817	Total/NA	Air	TO-15	
320-31189-1 - DL	SVE_SOUTH_PRECARBON_082817	Total/NA	Air	TO-15	
320-31189-2	SVE_SOUTH_POSTCARBON_082817	Total/NA	Air	TO-15	
MB 320-184143/7	Method Blank	Total/NA	Air	TO-15	
LCS 320-184143/4	Lab Control Sample	Total/NA	Air	TO-15	
LCSD 320-184143/5	Lab Control Sample Dup	Total/NA	Air	TO-15	



Lab Chronicle

Client: Apex Companies LLC
Project/Site: NuStar Vancouver

TestAmerica Job ID: 320-31189-1

Client Sample ID: SVE_SOUTH_PRECARBON_082817

Lab Sample ID: 320-31189-1

Date Collected: 08/17/17 13:06

Matrix: Air

Date Received: 08/30/17 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		49.5	8.25 mL	250 mL	184143	09/13/17 17:14	AP1	TAL SAC
Total/NA	Analysis	TO-15	DL	126	3.24 mL	250 mL	184143	09/14/17 08:22	AP1	TAL SAC

Client Sample ID: SVE_SOUTH_POSTCARBON_082817

Lab Sample ID: 320-31189-2

Date Collected: 08/17/17 13:21

Matrix: Air

Date Received: 08/30/17 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	522 mL	250 mL	184143	09/13/17 18:12	AP1	TAL SAC

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: Apex Companies LLC
Project/Site: NuStar Vancouver

TestAmerica Job ID: 320-31189-1

Laboratory: TestAmerica Sacramento

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Alaska (UST)	State Program	10	UST-055	12-18-17
Arizona	State Program	9	AZ0708	08-11-17 *
Arkansas DEQ	State Program	6	88-0691	06-17-18
California	State Program	9	2897	01-31-18
Colorado	State Program	8	CA00044	08-31-18
Connecticut	State Program	1	PH-0691	06-30-19
Florida	NELAP	4	E87570	06-30-18
Georgia	State Program	4	N/A	01-29-18
Hawaii	State Program	9	N/A	01-29-18
Illinois	NELAP	5	200060	03-17-18
Kansas	NELAP	7	E-10375	10-31-17
L-A-B	DoD ELAP		L2468	01-20-18
Louisiana	NELAP	6	30612	06-30-18
Maine	State Program	1	CA0004	04-18-18
Michigan	State Program	5	9947	01-31-18
Nevada	State Program	9	CA00044	07-31-18
New Hampshire	NELAP	1	2997	04-18-18
New Jersey	NELAP	2	CA005	06-30-18
New York	NELAP	2	11666	04-01-18
Oregon	NELAP	10	4040	01-28-18
Pennsylvania	NELAP	3	68-01272	03-31-18
Texas	NELAP	6	T104704399	05-31-18
US Fish & Wildlife	Federal		LE148388-0	07-31-18
USDA	Federal		P330-11-00436	12-30-17
USEPA UCMR	Federal	1	CA00044	11-06-18
Utah	NELAP	8	CA00044	02-28-18
Virginia	NELAP	3	460278	03-14-18
Washington	State Program	10	C581	05-05-18
West Virginia (DW)	State Program	3	9930C	12-31-17
Wyoming	State Program	8	8TMS-L	01-29-17 *

Laboratory: TestAmerica Portland

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
N/A	N/A	N/A	None on record.	

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: Apex Companies LLC
Project/Site: NuStar Vancouver

TestAmerica Job ID: 320-31189-1

Method	Method Description	Protocol	Laboratory
TO-15	Volatile Organic Compounds in Ambient Air	EPA	TAL SAC

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

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Sample Summary

Client: Apex Companies LLC
Project/Site: NuStar Vancouver

TestAmerica Job ID: 320-31189-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-31189-1	SVE_SOUTH_PRECARBON_082817	Air	08/17/17 13:06	08/30/17 09:50
320-31189-2	SVE_SOUTH_POSTCARBON_082817	Air	08/17/17 13:21	08/30/17 09:50

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West Sacramento, CA 95605
phone 916.374.4378 fax 916.372.1059

TestAmerica Laboratories, Inc. assumes no liability with respect to the collection and shipment of these samples.

TestAmerica Laboratories, Inc.

Client Contact Information		Project Manager: <i>Heather Gosack</i>		Samples Collected By: <i>Jake Munsey</i>	
Company Name: <i>Apex Companies</i>	Phone: <i>503-924-4704x1913</i>	COC No: <i>1</i> of <i>1</i> COCs			
Address: <i>3015 SW 151 Ave</i>	Email: <i>Heather.Gosack@Apexcos.com</i>	For Lab Use Only:			
City/State/Zip: <i>Portland, OR 97201</i>	Site Contact: <i>Apexcos.com</i>	Walk-in Client:			
Phone: <i>503-924-4704</i>	TA Contact:	Lab Sampling:			
FAX:		Job / SDG No.:			
Project Name: <i>Mustak Vancouver</i>	Analysis Turnaround Time	(See below for Add'l Items)			
Site/Location:	Standard (Specify): <i>X</i>				
P.O. # <i>126-20</i>	Rush (Specify):				

Sample Identification	Sample Date(s)	Time Start	Time Stop	Canister Vacuum In Field, 'Hg (Start)	Canister Vacuum In Field, 'Hg (Stop)	Flow Controller ID	Canister ID	TO-15 (Med / Std / Low / SIM)	MA-APH	EPA 3C	EPA 25C / 25.3	ASTM D-1946 / 1945 / 3588	EPA 15/16	TO-3	Other (Please specify in notes section)	Sample Type	Indoor Air	Ambient Air	Soil Gas	Landfill Gas	Other (Please specify in notes section)	
<i>SVE - South - Pre carbon 082817 (B17)</i>	<i>1305</i>	<i>1306</i>	<i>1306</i>	<i>-30</i>	<i>-1</i>	<i>-</i>	<i>18426</i>	<i>X</i>														
<i>SVE - South - Post carbon 082817 (B17)</i>	<i>1320</i>	<i>1321</i>	<i>1321</i>	<i>-30</i>	<i>-10</i>	<i>-</i>	<i>95888</i>	<i>X</i>														



Special Instructions/QC Requirements & Comments: *Email Results To: Heather.Gosack@APEXCOS.COM*

Samples Shipped by: *Jake Munsey* Date / Time: *8/28/17/1530* Samples Received by: *JM* Date / Time: *8/29/17 1500*

Samples Relinquished by: *JM* Date / Time: *8/29/17 1700* Received by: *JM Nubom* Date / Time: *8/30/17 0500*

Relinquished by: *JM* Date / Time: *8/29/17 1700* Opened by: *JM* Shipper Name: *JM*

Lab Use Only: *JM* Shipper Name: *JM*



Login Sample Receipt Checklist

Client: Apex Companies LLC

Job Number: 320-31189-1

Login Number: 31189

List Source: TestAmerica Sacramento

List Number: 1

Creator: Nelson, Kym D

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	N/A	
Cooler Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	False	Canister IDs on COC don't match canisters rec'd
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Certification Type

TO-15 (SCAN)

Date Cleaned/Batch ID

B0615-17 32029136

Date of QC

6/29/17

Data File Number

M59062920



320-29136 Chain of Custody

CANISTER ID NUMBERS

* 7963	34001577	
34000248	34001359	
34001351	34001397	
34000147	34000478	
34002101		
34001480		
34000576		
34000050		

The above canisters were cleaned as a batch. This certifies this batch contains no target analyte concentration greater than or equal to the method criteria for the "Certification Type" indicated above.

"*" INDICATES THE CAN OR CANS WHICH WERE SCREENED.

Shel VanD
1st level Reviewed By:

7/3/17
Date:

[Signature]
2nd level Reviewed By:

7/7/17
Date:

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-29136-1
 SDG No.: _____
 Client Sample ID: 7963 Lab Sample ID: 320-29136-1
 Matrix: Air Lab File ID: MS9062920.D
 Analysis Method: TO-15 Date Collected: 06/15/2017 00:00
 Sample wt/vol: 500 (mL) Date Analyzed: 06/30/2017 04:51
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: RTX-Volatiles ID: 0.32 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 171680 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
67-64-1	Acetone	0.34	J	5.0	0.18
107-02-8	Acrolein	ND		2.0	0.22
107-13-1	Acrylonitrile	ND		2.0	0.19
107-05-1	Allyl chloride	ND		0.80	0.11
71-43-2	Benzene	ND		0.40	0.079
100-44-7	Benzyl chloride	ND		0.80	0.16
75-27-4	Bromodichloromethane	ND		0.30	0.066
75-25-2	Bromoform	ND		0.40	0.070
74-83-9	Bromomethane	ND		0.80	0.34
106-99-0	1,3-Butadiene	ND		0.80	0.15
106-97-8	n-Butane	ND		0.40	0.15
78-93-3	2-Butanone (MEK)	ND		0.80	0.20
75-65-0	tert-Butyl alcohol (TBA)	ND		2.0	0.11
104-51-8	n-Butylbenzene	ND		0.40	0.18
135-98-8	sec-Butylbenzene	ND		0.40	0.070
98-06-6	tert-Butylbenzene	ND		0.80	0.068
75-15-0	Carbon disulfide	0.11	J	0.80	0.078
56-23-5	Carbon tetrachloride	ND		0.80	0.064
108-90-7	Chlorobenzene	ND		0.30	0.064
75-45-6	Chlorodifluoromethane	ND		0.80	0.27
75-00-3	Chloroethane	ND		0.80	0.31
67-66-3	Chloroform	ND		0.30	0.095
74-87-3	Chloromethane	ND		0.80	0.20
95-49-8	2-Chlorotoluene	ND		0.40	0.080
110-82-7	Cyclohexane	ND		0.40	0.084
124-48-1	Dibromochloromethane	ND		0.40	0.079
106-93-4	1,2-Dibromoethane (EDB)	ND		0.80	0.075
74-95-3	Dibromomethane	ND		0.40	0.057
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16
95-50-1	1,2-Dichlorobenzene	ND		0.40	0.13
541-73-1	1,3-Dichlorobenzene	ND		0.40	0.11
106-46-7	1,4-Dichlorobenzene	ND		0.40	0.15
75-71-8	Dichlorodifluoromethane	ND		0.40	0.15
75-34-3	1,1-Dichloroethane	ND		0.30	0.072
107-06-2	1,2-Dichloroethane	ND		0.80	0.088

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-29136-1
 SDG No.: _____
 Client Sample ID: 7963 Lab Sample ID: 320-29136-1
 Matrix: Air Lab File ID: MS9062920.D
 Analysis Method: TO-15 Date Collected: 06/15/2017 00:00
 Sample wt/vol: 500 (mL) Date Analyzed: 06/30/2017 04:51
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: RTX-Volatiles ID: 0.32 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 171680 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
75-35-4	1,1-Dichloroethene	ND		0.80	0.13
156-59-2	cis-1,2-Dichloroethene	ND		0.40	0.089
156-60-5	trans-1,2-Dichloroethene	ND		0.40	0.10
78-87-5	1,2-Dichloropropane	ND		0.40	0.24
10061-01-5	cis-1,3-Dichloropropene	ND		0.40	0.10
10061-02-6	trans-1,3-Dichloropropene	ND		0.40	0.088
123-91-1	1,4-Dioxane	ND		0.80	0.10
141-78-6	Ethyl acetate	ND		0.30	0.18
100-41-4	Ethylbenzene	ND		0.40	0.063
622-96-8	4-Ethyltoluene	ND		0.40	0.19
142-82-5	n-Heptane	ND		0.80	0.063
87-68-3	Hexachlorobutadiene	ND		2.0	0.43
110-54-3	n-Hexane	ND		0.80	0.075
591-78-6	2-Hexanone	ND		0.40	0.087
98-82-8	Isopropylbenzene	ND		0.80	0.10
99-87-6	4-Isopropyltoluene	ND		0.80	0.12
1634-04-4	Methyl-t-Butyl Ether (MTBE)	ND		0.80	0.12
80-62-6	Methyl methacrylate	ND		0.80	0.16
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14
75-09-2	Methylene Chloride	0.15	J	0.40	0.072
98-83-9	alpha-Methylstyrene	ND		0.40	0.065
91-20-3	Naphthalene	ND		0.80	0.56
111-65-9	n-Octane	ND		0.40	0.055
109-66-0	n-Pentane	ND		0.80	0.26
115-07-1	Propylene	ND		0.40	0.099
103-65-1	N-Propylbenzene	ND		0.40	0.059
100-42-5	Styrene	ND		0.40	0.059
79-34-5	1,1,2,2-Tetrachloroethane	ND		0.40	0.069
127-18-4	Tetrachloroethene	ND		0.40	0.051
109-99-9	Tetrahydrofuran	ND		0.80	0.21
108-88-3	Toluene	ND		0.40	0.051
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16
120-82-1	1,2,4-Trichlorobenzene	ND		2.0	0.43
71-55-6	1,1,1-Trichloroethane	ND		0.30	0.065
79-00-5	1,1,2-Trichloroethane	ND		0.40	0.067

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-29136-1
 SDG No.: _____
 Client Sample ID: 7963 Lab Sample ID: 320-29136-1
 Matrix: Air Lab File ID: MS9062920.D
 Analysis Method: TO-15 Date Collected: 06/15/2017 00:00
 Sample wt/vol: 500 (mL) Date Analyzed: 06/30/2017 04:51
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: RTX-Volatiles ID: 0.32 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 171680 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-01-6	Trichloroethene	ND		0.40	0.11
75-69-4	Trichlorofluoromethane	ND		0.40	0.20
96-18-4	1,2,3-Trichloropropane	ND		0.40	0.17
95-63-6	1,2,4-Trimethylbenzene	ND		0.80	0.16
108-67-8	1,3,5-Trimethylbenzene	ND		0.40	0.13
540-84-1	2,2,4-Trimethylpentane	ND		0.40	0.071
108-05-4	Vinyl acetate	ND		0.80	0.15
593-60-2	Vinyl bromide	ND		0.80	0.26
75-01-4	Vinyl chloride	ND		0.40	0.12
179601-23-1	m,p-Xylene	ND		0.80	0.10
95-47-6	o-Xylene	ND		0.40	0.054

CAS NO.	SURROGATE	%REC	Q	LIMITS
460-00-4	4-Bromofluorobenzene (Surr)	93		70-130
17060-07-0	1,2-Dichloroethane-d4 (Surr)	110		70-130
2037-26-5	Toluene-d8 (Surr)	101		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20170629-44882.b\MS9062920.D
 Lims ID: 320-29136-A-1
 Client ID: 7963
 Sample Type: Client
 Inject. Date: 30-Jun-2017 04:51:30 ALS Bottle#: 3 Worklist Smp#: 20
 Purge Vol: 5.000 mL Dil. Factor: 1.0000
 Sample Info: 320-29136-A-01
 Misc. Info.: 500
 Operator ID: SV Instrument ID: ATMS9
 Method: \\ChromNA\Sacramento\ChromData\ATMS9\20170629-44882.b\TO15_ATMS9N.m
 Limit Group: MSA - TO15 - ICAL
 Last Update: 30-Jun-2017 09:19:00 Calib Date: 20-Jun-2017 19:30:30
 Integrator: RTE ID Type: Deconvolution ID
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\ATMS9\20170621-44546.b\MS9062012.D
 Column 1 : RTX Volatiles (0.32 mm) Det: MS SCAN
 Process Host: XAWRK022

First Level Reviewer: vanommens

Date: 30-Jun-2017 09:18:59

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ppb v/v	Flags
* 1 Chlorobromomethane (IS)	130	12.314	12.326	-0.012	98	59603	4.00	
* 2 1,4-Difluorobenzene	114	14.407	14.413	-0.006	96	240853	4.00	
* 3 Chlorobenzene-d5 (IS)	117	20.326	20.326	0.000	89	143743	4.00	
\$ 4 1,2-Dichloroethane-d4 (Sur	65	13.482	13.494	-0.012	97	95423	4.41	
\$ 5 Toluene-d8 (Surr)	100	17.564	17.564	0.000	99	109535	4.02	
\$ 6 4-Bromofluorobenzene (Surr	174	22.255	22.249	0.006	89	71010	3.72	
14 Propene	41	4.284	4.260	0.024	26	825	0.0765	
31 Acetone	43	7.715	7.630	0.085	96	8420	0.3429	
47 Methylene Chloride	49	8.908	8.895	0.013	50	2890	0.1466	
48 Carbon disulfide	76	8.956	8.944	0.012	93	3616	0.1072	
88 n-Octane	43	17.564	17.570	-0.006	42	952	0.0211	
85 Toluene	91	17.717	17.723	-0.006	20	1406	0.0264	
126 1,2,4-Trichlorobenzene	180	26.684	26.690	-0.006	83	1761	0.0567	

Reagents:

VAMSIS20_00016 Amount Added: 50.00 Units: mL Run Reagent

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20170629-44882.b\MS9062920.D

Injection Date: 30-Jun-2017 04:51:30

Instrument ID: ATMS9

Operator ID: SV

Lims ID: 320-29136-A-1

Lab Sample ID: 320-29136-1

Worklist Smp#: 20

Client ID: 7963

Purge Vol: 5.000 mL

Dil. Factor: 1.0000

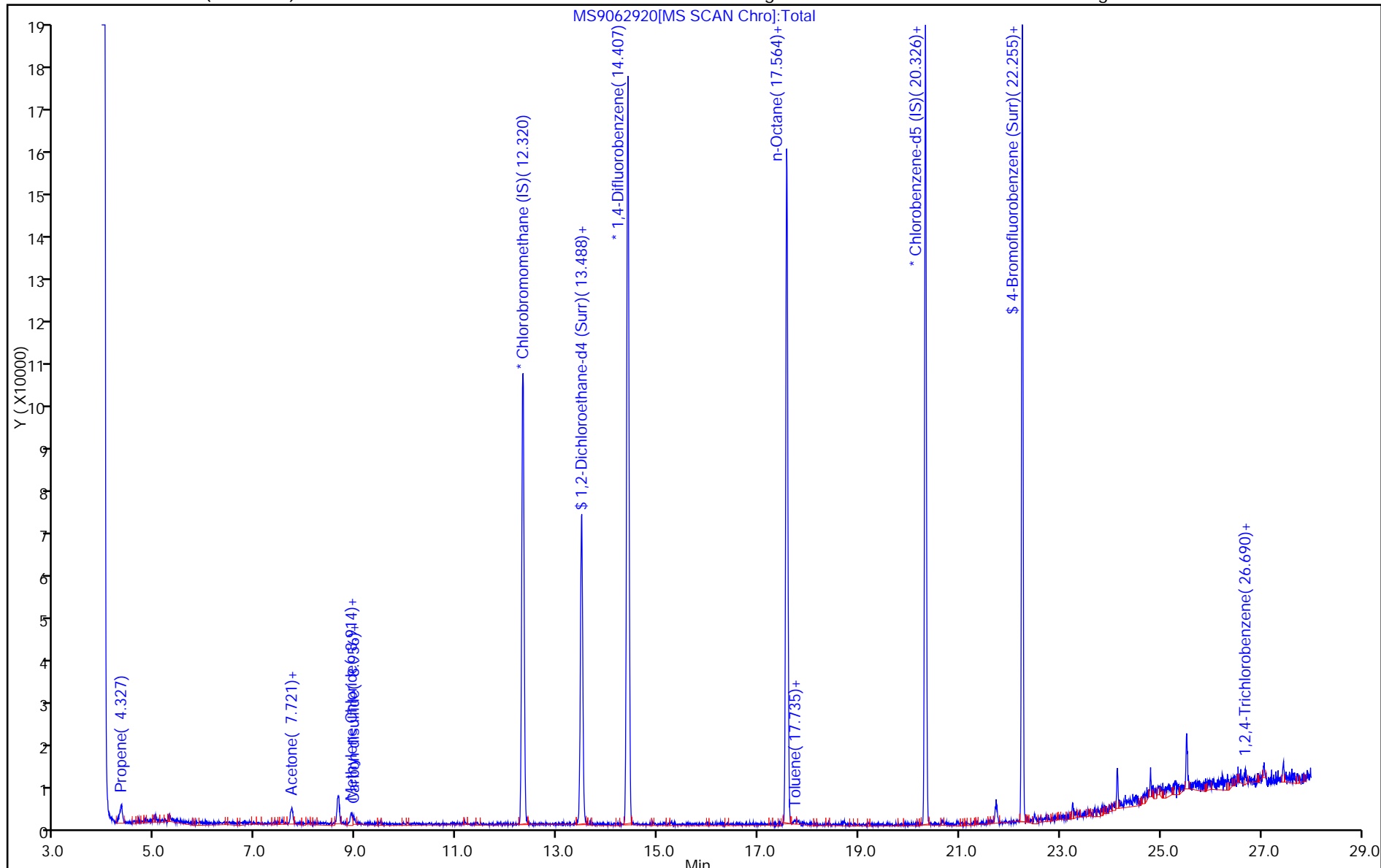
ALS Bottle#: 3

Method: TO15_ATMS9N

Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm)

Y Scaling: Method Defined: Scale to the Nth Largest Peak: 2



TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20170629-44882.b\MS9062920.D

Injection Date: 30-Jun-2017 04:51:30

Instrument ID: ATMS9

Lims ID: 320-29136-A-1

Lab Sample ID: 320-29136-1

Client ID: 7963

Operator ID: SV

ALS Bottle#: 3 Worklist Smp#: 20

Purge Vol: 5.000 mL

Dil. Factor: 1.0000

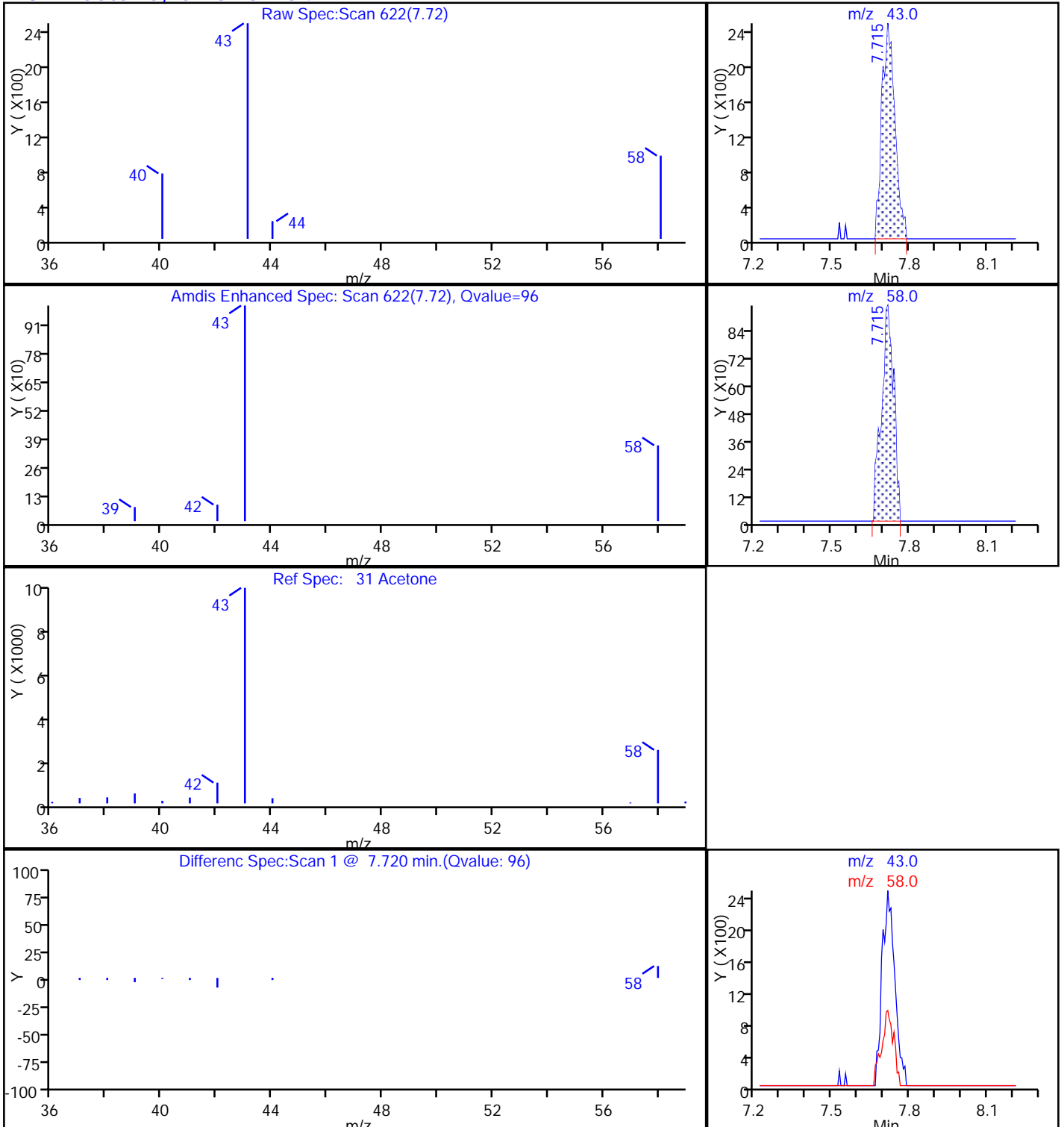
Method: TO15_ATMS9N

Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm)

Detector: MS SCAN

31 Acetone, CAS: 67-64-1



TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20170629-44882.b\MS9062920.D

Injection Date: 30-Jun-2017 04:51:30

Instrument ID: ATMS9

Lims ID: 320-29136-A-1

Lab Sample ID: 320-29136-1

Client ID: 7963

Operator ID: SV

ALS Bottle#: 3 Worklist Smp#: 20

Purge Vol: 5.000 mL

Dil. Factor: 1.0000

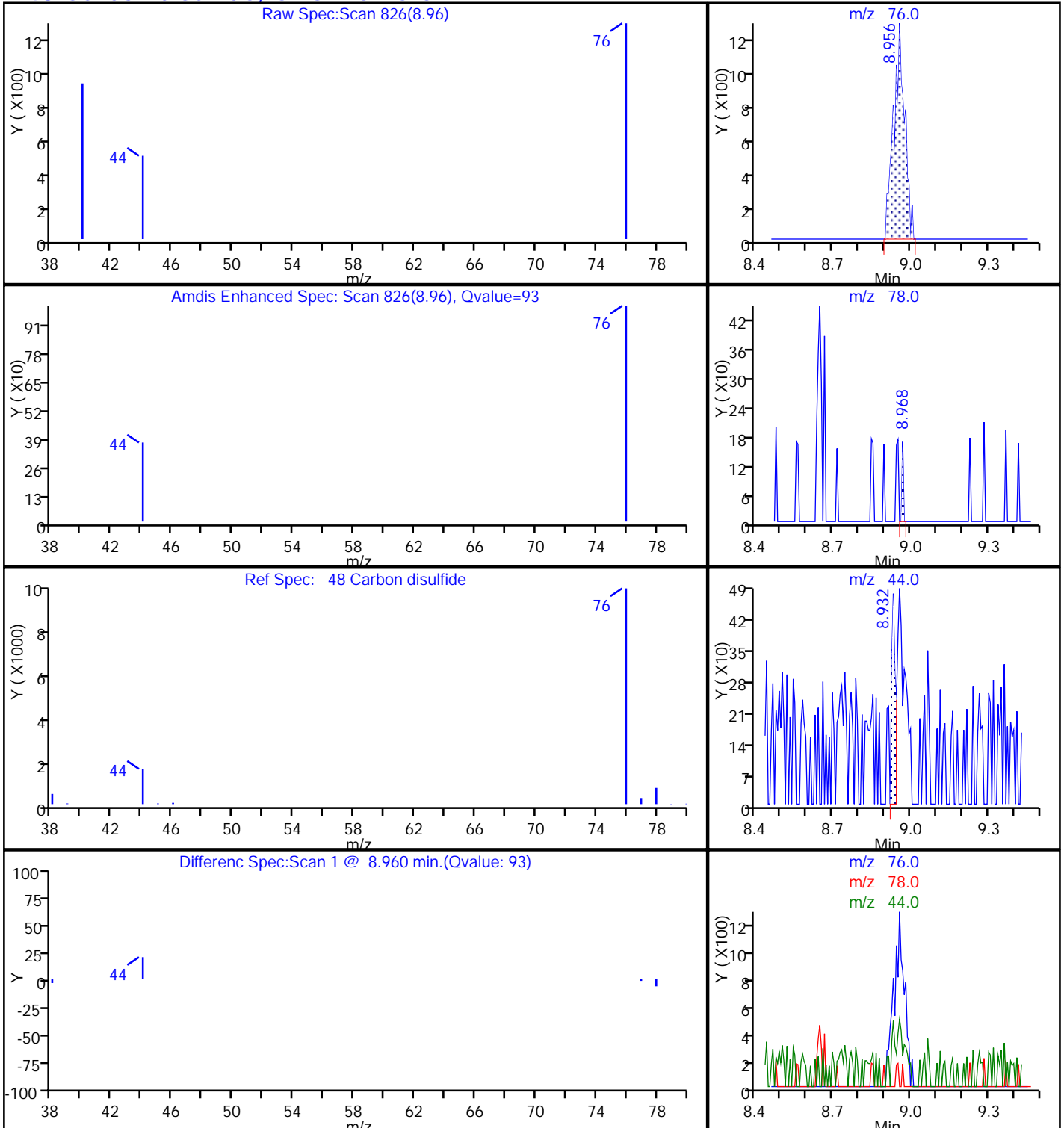
Method: TO15_ATMS9N

Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm)

Detector: MS SCAN

48 Carbon disulfide, CAS: 75-15-0



TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20170629-44882.b\MS9062920.D

Injection Date: 30-Jun-2017 04:51:30

Instrument ID: ATMS9

Lims ID: 320-29136-A-1

Lab Sample ID: 320-29136-1

Client ID: 7963

Operator ID: SV

ALS Bottle#: 3 Worklist Smp#: 20

Purge Vol: 5.000 mL

Dil. Factor: 1.0000

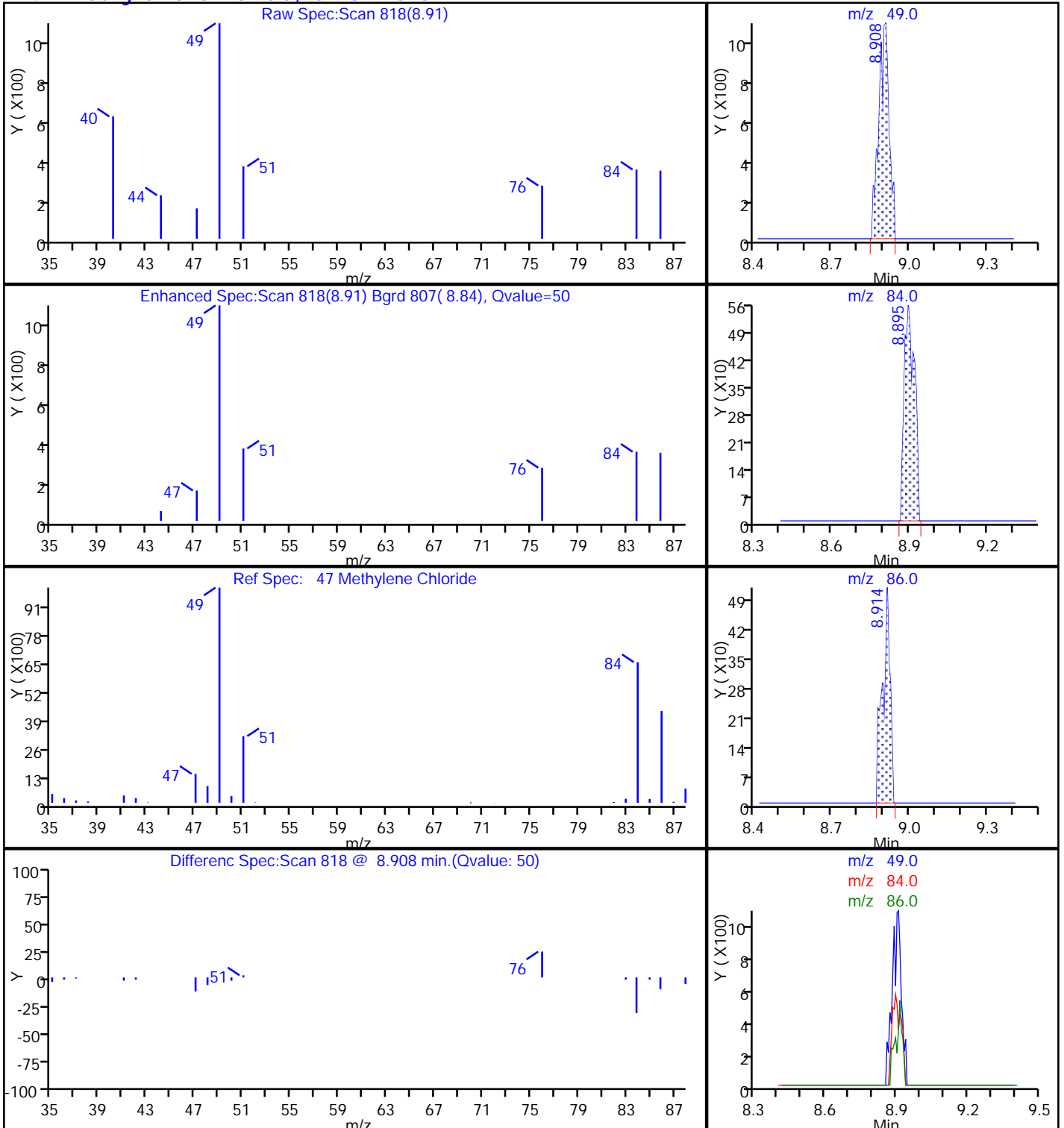
Method: TO15_ATMS9N

Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm)

Detector: MS SCAN

47 Methylene Chloride, CAS: 75-09-2



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

TestAmerica Job ID: 320-32107-1
Client Project/Site: NuStar Vapor Testing

For:
Apex Companies LLC
3015 SW 1st Avenue
Portland, Oregon 97201

Attn: Heather Gosack



Authorized for release by:
10/13/2017 1:42:35 PM

Cathy Gamble, Project Manager I
(253)922-2310
cathy.gamble@testamericainc.com

LINKS

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32107-1

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32107-1

Job ID: 320-32107-1

Laboratory: TestAmerica Sacramento

Narrative

Receipt

The samples were received on 10/4/2017 10:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice.

Air - GC/MS VOA

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

VOA Prep

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

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Detection Summary

Client: Apex Companies LLC
 Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32107-1

Client Sample ID: SVE_SOUTH_PRECARBON_092517

Lab Sample ID: 320-32107-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	8.3		5.2		ppb v/v	17.3		TO-15	Total/NA
1,1,2-Trichloro-1,2,2-trifluoroethane	7.3		6.9		ppb v/v	17.3		TO-15	Total/NA
Carbon disulfide	20		14		ppb v/v	17.3		TO-15	Total/NA
cis-1,2-Dichloroethene	50		6.9		ppb v/v	17.3		TO-15	Total/NA
Dichlorodifluoromethane	8.5		6.9		ppb v/v	17.3		TO-15	Total/NA
Trichloroethene	86		6.9		ppb v/v	17.3		TO-15	Total/NA
Tetrachloroethene - DL	3400		21		ppb v/v	52		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	45		28		ug/m3 Air	17.3		TO-15	Total/NA
1,1,2-Trichloro-1,2,2-trifluoroethane	56		53		ug/m3 Air	17.3		TO-15	Total/NA
Carbon disulfide	61		43		ug/m3 Air	17.3		TO-15	Total/NA
cis-1,2-Dichloroethene	200		27		ug/m3 Air	17.3		TO-15	Total/NA
Dichlorodifluoromethane	42		34		ug/m3 Air	17.3		TO-15	Total/NA
Trichloroethene	460		37		ug/m3 Air	17.3		TO-15	Total/NA
Tetrachloroethene - DL	23000		140		ug/m3 Air	52		TO-15	Total/NA

Client Sample ID: SVE_SOUTH_POSTCARBON_092517

Lab Sample ID: 320-32107-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.95		0.40		ppb v/v	1		TO-15	Total/NA
1,1-Dichloroethene	2.0		0.80		ppb v/v	1		TO-15	Total/NA
Acetone	6.0		5.0		ppb v/v	1		TO-15	Total/NA
cis-1,2-Dichloroethene	4.1		0.40		ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.68		0.40		ppb v/v	1		TO-15	Total/NA
Methylene Chloride	1.5		0.40		ppb v/v	1		TO-15	Total/NA
Tetrachloroethene	1.0		0.40		ppb v/v	1		TO-15	Total/NA
Vinyl chloride	0.86		0.40		ppb v/v	1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	7.3		3.1		ug/m3 Air	1		TO-15	Total/NA
1,1-Dichloroethene	8.0		3.2		ug/m3 Air	1		TO-15	Total/NA
Acetone	14		12		ug/m3 Air	1		TO-15	Total/NA
cis-1,2-Dichloroethene	16		1.6		ug/m3 Air	1		TO-15	Total/NA
Dichlorodifluoromethane	3.3		2.0		ug/m3 Air	1		TO-15	Total/NA
Methylene Chloride	5.3		1.4		ug/m3 Air	1		TO-15	Total/NA
Tetrachloroethene	6.8		2.7		ug/m3 Air	1		TO-15	Total/NA
Vinyl chloride	2.2		1.0		ug/m3 Air	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

Client: Apex Companies LLC
 Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32107-1

Client Sample ID: SVE_SOUTH_PRECARBON_092517

Lab Sample ID: 320-32107-1

Date Collected: 09/25/17 11:04

Matrix: Air

Date Received: 10/04/17 10:30

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	8.3		5.2		ppb v/v			10/06/17 17:44	17.3
1,1,2,2-Tetrachloroethane	ND		6.9		ppb v/v			10/06/17 17:44	17.3
1,1,2-Trichloro-1,2,2-trifluoroethane	7.3		6.9		ppb v/v			10/06/17 17:44	17.3
1,1,2-Trichloroethane	ND		6.9		ppb v/v			10/06/17 17:44	17.3
1,1-Dichloroethane	ND		5.2		ppb v/v			10/06/17 17:44	17.3
1,1-Dichloroethene	ND		14		ppb v/v			10/06/17 17:44	17.3
1,2,4-Trichlorobenzene	ND		35		ppb v/v			10/06/17 17:44	17.3
1,2,4-Trimethylbenzene	ND		14		ppb v/v			10/06/17 17:44	17.3
1,2-Dibromoethane (EDB)	ND		14		ppb v/v			10/06/17 17:44	17.3
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		6.9		ppb v/v			10/06/17 17:44	17.3
1,2-Dichlorobenzene	ND		6.9		ppb v/v			10/06/17 17:44	17.3
1,2-Dichloroethane	ND		14		ppb v/v			10/06/17 17:44	17.3
1,2-Dichloropropane	ND		6.9		ppb v/v			10/06/17 17:44	17.3
1,3,5-Trimethylbenzene	ND		6.9		ppb v/v			10/06/17 17:44	17.3
1,3-Dichlorobenzene	ND		6.9		ppb v/v			10/06/17 17:44	17.3
1,4-Dichlorobenzene	ND		6.9		ppb v/v			10/06/17 17:44	17.3
2-Butanone (MEK)	ND		14		ppb v/v			10/06/17 17:44	17.3
2-Hexanone	ND		6.9		ppb v/v			10/06/17 17:44	17.3
4-Ethyltoluene	ND		6.9		ppb v/v			10/06/17 17:44	17.3
4-Methyl-2-pentanone (MIBK)	ND		6.9		ppb v/v			10/06/17 17:44	17.3
Acetone	ND		87		ppb v/v			10/06/17 17:44	17.3
Benzene	ND		6.9		ppb v/v			10/06/17 17:44	17.3
Benzyl chloride	ND		14		ppb v/v			10/06/17 17:44	17.3
Bromodichloromethane	ND		5.2		ppb v/v			10/06/17 17:44	17.3
Bromoform	ND		6.9		ppb v/v			10/06/17 17:44	17.3
Bromomethane	ND		14		ppb v/v			10/06/17 17:44	17.3
Carbon disulfide	20		14		ppb v/v			10/06/17 17:44	17.3
Carbon tetrachloride	ND		14		ppb v/v			10/06/17 17:44	17.3
Chlorobenzene	ND		5.2		ppb v/v			10/06/17 17:44	17.3
Chloroethane	ND		14		ppb v/v			10/06/17 17:44	17.3
Chloroform	ND		5.2		ppb v/v			10/06/17 17:44	17.3
Chloromethane	ND		14		ppb v/v			10/06/17 17:44	17.3
cis-1,2-Dichloroethene	50		6.9		ppb v/v			10/06/17 17:44	17.3
cis-1,3-Dichloropropene	ND		6.9		ppb v/v			10/06/17 17:44	17.3
Dibromochloromethane	ND		6.9		ppb v/v			10/06/17 17:44	17.3
Dichlorodifluoromethane	8.5		6.9		ppb v/v			10/06/17 17:44	17.3
Ethylbenzene	ND		6.9		ppb v/v			10/06/17 17:44	17.3
Hexachlorobutadiene	ND		35		ppb v/v			10/06/17 17:44	17.3
m,p-Xylene	ND		14		ppb v/v			10/06/17 17:44	17.3
Methylene Chloride	ND		6.9		ppb v/v			10/06/17 17:44	17.3
o-Xylene	ND		6.9		ppb v/v			10/06/17 17:44	17.3
Styrene	ND		6.9		ppb v/v			10/06/17 17:44	17.3
Toluene	ND		6.9		ppb v/v			10/06/17 17:44	17.3
trans-1,2-Dichloroethene	ND		6.9		ppb v/v			10/06/17 17:44	17.3
trans-1,3-Dichloropropene	ND		6.9		ppb v/v			10/06/17 17:44	17.3
Trichloroethene	86		6.9		ppb v/v			10/06/17 17:44	17.3
Trichlorofluoromethane	ND		6.9		ppb v/v			10/06/17 17:44	17.3

TestAmerica Sacramento

Client Sample Results

Client: Apex Companies LLC
 Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32107-1

Client Sample ID: SVE_SOUTH_PRECARBON_092517

Lab Sample ID: 320-32107-1

Date Collected: 09/25/17 11:04

Matrix: Air

Date Received: 10/04/17 10:30

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl acetate	ND		14		ppb v/v			10/06/17 17:44	17.3
Vinyl chloride	ND		6.9		ppb v/v			10/06/17 17:44	17.3
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	45		28		ug/m3 Air			10/06/17 17:44	17.3
1,1,2,2-Tetrachloroethane	ND		48		ug/m3 Air			10/06/17 17:44	17.3
1,1,2-Trichloro-1,2,2-trifluoroethane	56		53		ug/m3 Air			10/06/17 17:44	17.3
1,1,2-Trichloroethane	ND		38		ug/m3 Air			10/06/17 17:44	17.3
1,1-Dichloroethane	ND		21		ug/m3 Air			10/06/17 17:44	17.3
1,1-Dichloroethene	ND		55		ug/m3 Air			10/06/17 17:44	17.3
1,2,4-Trichlorobenzene	ND		260		ug/m3 Air			10/06/17 17:44	17.3
1,2,4-Trimethylbenzene	ND		68		ug/m3 Air			10/06/17 17:44	17.3
1,2-Dibromoethane (EDB)	ND		110		ug/m3 Air			10/06/17 17:44	17.3
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		48		ug/m3 Air			10/06/17 17:44	17.3
1,2-Dichlorobenzene	ND		42		ug/m3 Air			10/06/17 17:44	17.3
1,2-Dichloroethane	ND		56		ug/m3 Air			10/06/17 17:44	17.3
1,2-Dichloropropane	ND		32		ug/m3 Air			10/06/17 17:44	17.3
1,3,5-Trimethylbenzene	ND		34		ug/m3 Air			10/06/17 17:44	17.3
1,3-Dichlorobenzene	ND		42		ug/m3 Air			10/06/17 17:44	17.3
1,4-Dichlorobenzene	ND		42		ug/m3 Air			10/06/17 17:44	17.3
2-Butanone (MEK)	ND		41		ug/m3 Air			10/06/17 17:44	17.3
2-Hexanone	ND		28		ug/m3 Air			10/06/17 17:44	17.3
4-Ethyltoluene	ND		34		ug/m3 Air			10/06/17 17:44	17.3
4-Methyl-2-pentanone (MIBK)	ND		28		ug/m3 Air			10/06/17 17:44	17.3
Acetone	ND		210		ug/m3 Air			10/06/17 17:44	17.3
Benzene	ND		22		ug/m3 Air			10/06/17 17:44	17.3
Benzyl chloride	ND		72		ug/m3 Air			10/06/17 17:44	17.3
Bromodichloromethane	ND		35		ug/m3 Air			10/06/17 17:44	17.3
Bromoform	ND		72		ug/m3 Air			10/06/17 17:44	17.3
Bromomethane	ND		54		ug/m3 Air			10/06/17 17:44	17.3
Carbon disulfide	61		43		ug/m3 Air			10/06/17 17:44	17.3
Carbon tetrachloride	ND		87		ug/m3 Air			10/06/17 17:44	17.3
Chlorobenzene	ND		24		ug/m3 Air			10/06/17 17:44	17.3
Chloroethane	ND		37		ug/m3 Air			10/06/17 17:44	17.3
Chloroform	ND		25		ug/m3 Air			10/06/17 17:44	17.3
Chloromethane	ND		29		ug/m3 Air			10/06/17 17:44	17.3
cis-1,2-Dichloroethene	200		27		ug/m3 Air			10/06/17 17:44	17.3
cis-1,3-Dichloropropene	ND		31		ug/m3 Air			10/06/17 17:44	17.3
Dibromochloromethane	ND		59		ug/m3 Air			10/06/17 17:44	17.3
Dichlorodifluoromethane	42		34		ug/m3 Air			10/06/17 17:44	17.3
Ethylbenzene	ND		30		ug/m3 Air			10/06/17 17:44	17.3
Hexachlorobutadiene	ND		370		ug/m3 Air			10/06/17 17:44	17.3
m,p-Xylene	ND		60		ug/m3 Air			10/06/17 17:44	17.3
Methylene Chloride	ND		24		ug/m3 Air			10/06/17 17:44	17.3
o-Xylene	ND		30		ug/m3 Air			10/06/17 17:44	17.3
Styrene	ND		29		ug/m3 Air			10/06/17 17:44	17.3
Toluene	ND		26		ug/m3 Air			10/06/17 17:44	17.3
trans-1,2-Dichloroethene	ND		27		ug/m3 Air			10/06/17 17:44	17.3

TestAmerica Sacramento

Client Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32107-1

Client Sample ID: SVE_SOUTH_PRECARBON_092517

Lab Sample ID: 320-32107-1

Date Collected: 09/25/17 11:04

Matrix: Air

Date Received: 10/04/17 10:30

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
trans-1,3-Dichloropropene	ND		31		ug/m3 Air			10/06/17 17:44	17.3
Trichloroethene	460		37		ug/m3 Air			10/06/17 17:44	17.3
Trichlorofluoromethane	ND		39		ug/m3 Air			10/06/17 17:44	17.3
Vinyl acetate	ND		49		ug/m3 Air			10/06/17 17:44	17.3
Vinyl chloride	ND		18		ug/m3 Air			10/06/17 17:44	17.3
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	97		70 - 130					10/06/17 17:44	17.3
4-Bromofluorobenzene (Surr)	90		70 - 130					10/06/17 17:44	17.3
Toluene-d8 (Surr)	105		70 - 130					10/06/17 17:44	17.3

Method: TO-15 - Volatile Organic Compounds in Ambient Air - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	3400		21		ppb v/v			10/09/17 20:54	52
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	23000		140		ug/m3 Air			10/09/17 20:54	52
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	103		70 - 130					10/09/17 20:54	52
4-Bromofluorobenzene (Surr)	88		70 - 130					10/09/17 20:54	52
Toluene-d8 (Surr)	109		70 - 130					10/09/17 20:54	52

Client Sample ID: SVE_SOUTH_POSTCARBON_092517

Lab Sample ID: 320-32107-2

Date Collected: 09/25/17 11:16

Matrix: Air

Date Received: 10/04/17 10:30

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.30		ppb v/v			10/09/17 20:03	1
1,1,2,2-Tetrachloroethane	ND		0.40		ppb v/v			10/09/17 20:03	1
1,1,2-Trichloro-1,2,2-trifluoroethane	0.95		0.40		ppb v/v			10/09/17 20:03	1
1,1,2-Trichloroethane	ND		0.40		ppb v/v			10/09/17 20:03	1
1,1-Dichloroethane	ND		0.30		ppb v/v			10/09/17 20:03	1
1,1-Dichloroethene	2.0		0.80		ppb v/v			10/09/17 20:03	1
1,2,4-Trichlorobenzene	ND		2.0		ppb v/v			10/09/17 20:03	1
1,2,4-Trimethylbenzene	ND		0.80		ppb v/v			10/09/17 20:03	1
1,2-Dibromoethane (EDB)	ND		0.80		ppb v/v			10/09/17 20:03	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40		ppb v/v			10/09/17 20:03	1
1,2-Dichlorobenzene	ND		0.40		ppb v/v			10/09/17 20:03	1
1,2-Dichloroethane	ND		0.80		ppb v/v			10/09/17 20:03	1
1,2-Dichloropropane	ND		0.40		ppb v/v			10/09/17 20:03	1
1,3,5-Trimethylbenzene	ND		0.40		ppb v/v			10/09/17 20:03	1
1,3-Dichlorobenzene	ND		0.40		ppb v/v			10/09/17 20:03	1
1,4-Dichlorobenzene	ND		0.40		ppb v/v			10/09/17 20:03	1
2-Butanone (MEK)	ND		0.80		ppb v/v			10/09/17 20:03	1
2-Hexanone	ND		0.40		ppb v/v			10/09/17 20:03	1
4-Ethyltoluene	ND		0.40		ppb v/v			10/09/17 20:03	1

TestAmerica Sacramento

Client Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32107-1

Client Sample ID: SVE_SOUTH_POSTCARBON_092517

Lab Sample ID: 320-32107-2

Date Collected: 09/25/17 11:16

Matrix: Air

Date Received: 10/04/17 10:30

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4-Methyl-2-pentanone (MIBK)	ND		0.40		ppb v/v			10/09/17 20:03	1
Acetone	6.0		5.0		ppb v/v			10/09/17 20:03	1
Benzene	ND		0.40		ppb v/v			10/09/17 20:03	1
Benzyl chloride	ND		0.80		ppb v/v			10/09/17 20:03	1
Bromodichloromethane	ND		0.30		ppb v/v			10/09/17 20:03	1
Bromoform	ND		0.40		ppb v/v			10/09/17 20:03	1
Bromomethane	ND		0.80		ppb v/v			10/09/17 20:03	1
Carbon disulfide	ND		0.80		ppb v/v			10/09/17 20:03	1
Carbon tetrachloride	ND		0.80		ppb v/v			10/09/17 20:03	1
Chlorobenzene	ND		0.30		ppb v/v			10/09/17 20:03	1
Chloroethane	ND		0.80		ppb v/v			10/09/17 20:03	1
Chloroform	ND		0.30		ppb v/v			10/09/17 20:03	1
Chloromethane	ND		0.80		ppb v/v			10/09/17 20:03	1
cis-1,2-Dichloroethene	4.1		0.40		ppb v/v			10/09/17 20:03	1
cis-1,3-Dichloropropene	ND		0.40		ppb v/v			10/09/17 20:03	1
Dibromochloromethane	ND		0.40		ppb v/v			10/09/17 20:03	1
Dichlorodifluoromethane	0.68		0.40		ppb v/v			10/09/17 20:03	1
Ethylbenzene	ND		0.40		ppb v/v			10/09/17 20:03	1
Hexachlorobutadiene	ND		2.0		ppb v/v			10/09/17 20:03	1
m,p-Xylene	ND		0.80		ppb v/v			10/09/17 20:03	1
Methylene Chloride	1.5		0.40		ppb v/v			10/09/17 20:03	1
o-Xylene	ND		0.40		ppb v/v			10/09/17 20:03	1
Styrene	ND		0.40		ppb v/v			10/09/17 20:03	1
Tetrachloroethene	1.0		0.40		ppb v/v			10/09/17 20:03	1
Toluene	ND		0.40		ppb v/v			10/09/17 20:03	1
trans-1,2-Dichloroethene	ND		0.40		ppb v/v			10/09/17 20:03	1
trans-1,3-Dichloropropene	ND		0.40		ppb v/v			10/09/17 20:03	1
Trichloroethene	ND		0.40		ppb v/v			10/09/17 20:03	1
Trichlorofluoromethane	ND		0.40		ppb v/v			10/09/17 20:03	1
Vinyl acetate	ND		0.80		ppb v/v			10/09/17 20:03	1
Vinyl chloride	0.86		0.40		ppb v/v			10/09/17 20:03	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.6		ug/m3 Air			10/09/17 20:03	1
1,1,2,2-Tetrachloroethane	ND		2.7		ug/m3 Air			10/09/17 20:03	1
1,1,2-Trichloro-1,2,2-trifluoroethane	7.3		3.1		ug/m3 Air			10/09/17 20:03	1
1,1,2-Trichloroethane	ND		2.2		ug/m3 Air			10/09/17 20:03	1
1,1-Dichloroethane	ND		1.2		ug/m3 Air			10/09/17 20:03	1
1,1-Dichloroethene	8.0		3.2		ug/m3 Air			10/09/17 20:03	1
1,2,4-Trichlorobenzene	ND		15		ug/m3 Air			10/09/17 20:03	1
1,2,4-Trimethylbenzene	ND		3.9		ug/m3 Air			10/09/17 20:03	1
1,2-Dibromoethane (EDB)	ND		6.1		ug/m3 Air			10/09/17 20:03	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8		ug/m3 Air			10/09/17 20:03	1
1,2-Dichlorobenzene	ND		2.4		ug/m3 Air			10/09/17 20:03	1
1,2-Dichloroethane	ND		3.2		ug/m3 Air			10/09/17 20:03	1
1,2-Dichloropropane	ND		1.8		ug/m3 Air			10/09/17 20:03	1
1,3,5-Trimethylbenzene	ND		2.0		ug/m3 Air			10/09/17 20:03	1
1,3-Dichlorobenzene	ND		2.4		ug/m3 Air			10/09/17 20:03	1

TestAmerica Sacramento

Client Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32107-1

Client Sample ID: SVE_SOUTH_POSTCARBON_092517

Lab Sample ID: 320-32107-2

Date Collected: 09/25/17 11:16

Matrix: Air

Date Received: 10/04/17 10:30

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dichlorobenzene	ND		2.4		ug/m3 Air			10/09/17 20:03	1
2-Butanone (MEK)	ND		2.4		ug/m3 Air			10/09/17 20:03	1
2-Hexanone	ND		1.6		ug/m3 Air			10/09/17 20:03	1
4-Ethyltoluene	ND		2.0		ug/m3 Air			10/09/17 20:03	1
4-Methyl-2-pentanone (MIBK)	ND		1.6		ug/m3 Air			10/09/17 20:03	1
Acetone	14		12		ug/m3 Air			10/09/17 20:03	1
Benzene	ND		1.3		ug/m3 Air			10/09/17 20:03	1
Benzyl chloride	ND		4.1		ug/m3 Air			10/09/17 20:03	1
Bromodichloromethane	ND		2.0		ug/m3 Air			10/09/17 20:03	1
Bromoform	ND		4.1		ug/m3 Air			10/09/17 20:03	1
Bromomethane	ND		3.1		ug/m3 Air			10/09/17 20:03	1
Carbon disulfide	ND		2.5		ug/m3 Air			10/09/17 20:03	1
Carbon tetrachloride	ND		5.0		ug/m3 Air			10/09/17 20:03	1
Chlorobenzene	ND		1.4		ug/m3 Air			10/09/17 20:03	1
Chloroethane	ND		2.1		ug/m3 Air			10/09/17 20:03	1
Chloroform	ND		1.5		ug/m3 Air			10/09/17 20:03	1
Chloromethane	ND		1.7		ug/m3 Air			10/09/17 20:03	1
cis-1,2-Dichloroethene	16		1.6		ug/m3 Air			10/09/17 20:03	1
cis-1,3-Dichloropropene	ND		1.8		ug/m3 Air			10/09/17 20:03	1
Dibromochloromethane	ND		3.4		ug/m3 Air			10/09/17 20:03	1
Dichlorodifluoromethane	3.3		2.0		ug/m3 Air			10/09/17 20:03	1
Ethylbenzene	ND		1.7		ug/m3 Air			10/09/17 20:03	1
Hexachlorobutadiene	ND		21		ug/m3 Air			10/09/17 20:03	1
m,p-Xylene	ND		3.5		ug/m3 Air			10/09/17 20:03	1
Methylene Chloride	5.3		1.4		ug/m3 Air			10/09/17 20:03	1
o-Xylene	ND		1.7		ug/m3 Air			10/09/17 20:03	1
Styrene	ND		1.7		ug/m3 Air			10/09/17 20:03	1
Tetrachloroethene	6.8		2.7		ug/m3 Air			10/09/17 20:03	1
Toluene	ND		1.5		ug/m3 Air			10/09/17 20:03	1
trans-1,2-Dichloroethene	ND		1.6		ug/m3 Air			10/09/17 20:03	1
trans-1,3-Dichloropropene	ND		1.8		ug/m3 Air			10/09/17 20:03	1
Trichloroethene	ND		2.1		ug/m3 Air			10/09/17 20:03	1
Trichlorofluoromethane	ND		2.2		ug/m3 Air			10/09/17 20:03	1
Vinyl acetate	ND		2.8		ug/m3 Air			10/09/17 20:03	1
Vinyl chloride	2.2		1.0		ug/m3 Air			10/09/17 20:03	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	99		70 - 130					10/09/17 20:03	1
4-Bromofluorobenzene (Surr)	91		70 - 130					10/09/17 20:03	1
Toluene-d8 (Surr)	110		70 - 130					10/09/17 20:03	1

Surrogate Summary

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32107-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Matrix: Air

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	12DCE (70-130)	BFB (70-130)	TOL (70-130)
320-32107-1	SVE_SOUTH_PRECARBON_09	97	90	105
320-32107-1 - DL	SVE_SOUTH_PRECARBON_09	103	88	109
320-32107-2	SVE_SOUTH_POSTCARBON_1 2517	99	91	110
LCS 320-188174/3	Lab Control Sample	100	90	105
LCS 320-188372/3	Lab Control Sample	99	93	108
LCSD 320-188174/4	Lab Control Sample Dup	98	92	106
LCSD 320-188372/4	Lab Control Sample Dup	98	92	107
MB 320-188174/6	Method Blank	99	91	109
MB 320-188372/6	Method Blank	99	86	108

Surrogate Legend

12DCE = 1,2-Dichloroethane-d4 (Surr)

BFB = 4-Bromofluorobenzene (Surr)

TOL = Toluene-d8 (Surr)

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32107-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Lab Sample ID: MB 320-188174/6

Matrix: Air

Analysis Batch: 188174

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.30		ppb v/v			10/06/17 16:52	1
1,1,2,2-Tetrachloroethane	ND		0.40		ppb v/v			10/06/17 16:52	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40		ppb v/v			10/06/17 16:52	1
1,1,2-Trichloroethane	ND		0.40		ppb v/v			10/06/17 16:52	1
1,1-Dichloroethane	ND		0.30		ppb v/v			10/06/17 16:52	1
1,1-Dichloroethene	ND		0.80		ppb v/v			10/06/17 16:52	1
1,2,4-Trichlorobenzene	ND		2.0		ppb v/v			10/06/17 16:52	1
1,2,4-Trimethylbenzene	ND		0.80		ppb v/v			10/06/17 16:52	1
1,2-Dibromoethane (EDB)	ND		0.80		ppb v/v			10/06/17 16:52	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40		ppb v/v			10/06/17 16:52	1
1,2-Dichlorobenzene	ND		0.40		ppb v/v			10/06/17 16:52	1
1,2-Dichloroethane	ND		0.80		ppb v/v			10/06/17 16:52	1
1,2-Dichloropropane	ND		0.40		ppb v/v			10/06/17 16:52	1
1,3,5-Trimethylbenzene	ND		0.40		ppb v/v			10/06/17 16:52	1
1,3-Dichlorobenzene	ND		0.40		ppb v/v			10/06/17 16:52	1
1,4-Dichlorobenzene	ND		0.40		ppb v/v			10/06/17 16:52	1
2-Butanone (MEK)	ND		0.80		ppb v/v			10/06/17 16:52	1
2-Hexanone	ND		0.40		ppb v/v			10/06/17 16:52	1
4-Ethyltoluene	ND		0.40		ppb v/v			10/06/17 16:52	1
4-Methyl-2-pentanone (MIBK)	ND		0.40		ppb v/v			10/06/17 16:52	1
Acetone	ND		5.0		ppb v/v			10/06/17 16:52	1
Benzene	ND		0.40		ppb v/v			10/06/17 16:52	1
Benzyl chloride	ND		0.80		ppb v/v			10/06/17 16:52	1
Bromodichloromethane	ND		0.30		ppb v/v			10/06/17 16:52	1
Bromoform	ND		0.40		ppb v/v			10/06/17 16:52	1
Bromomethane	ND		0.80		ppb v/v			10/06/17 16:52	1
Carbon disulfide	ND		0.80		ppb v/v			10/06/17 16:52	1
Carbon tetrachloride	ND		0.80		ppb v/v			10/06/17 16:52	1
Chlorobenzene	ND		0.30		ppb v/v			10/06/17 16:52	1
Chloroethane	ND		0.80		ppb v/v			10/06/17 16:52	1
Chloroform	ND		0.30		ppb v/v			10/06/17 16:52	1
Chloromethane	ND		0.80		ppb v/v			10/06/17 16:52	1
cis-1,2-Dichloroethene	ND		0.40		ppb v/v			10/06/17 16:52	1
cis-1,3-Dichloropropene	ND		0.40		ppb v/v			10/06/17 16:52	1
Dibromochloromethane	ND		0.40		ppb v/v			10/06/17 16:52	1
Dichlorodifluoromethane	ND		0.40		ppb v/v			10/06/17 16:52	1
Ethylbenzene	ND		0.40		ppb v/v			10/06/17 16:52	1
Hexachlorobutadiene	ND		2.0		ppb v/v			10/06/17 16:52	1
m,p-Xylene	ND		0.80		ppb v/v			10/06/17 16:52	1
Methylene Chloride	ND		0.40		ppb v/v			10/06/17 16:52	1
o-Xylene	ND		0.40		ppb v/v			10/06/17 16:52	1
Styrene	ND		0.40		ppb v/v			10/06/17 16:52	1
Tetrachloroethene	ND		0.40		ppb v/v			10/06/17 16:52	1
Toluene	ND		0.40		ppb v/v			10/06/17 16:52	1
trans-1,2-Dichloroethene	ND		0.40		ppb v/v			10/06/17 16:52	1
trans-1,3-Dichloropropene	ND		0.40		ppb v/v			10/06/17 16:52	1
Trichloroethene	ND		0.40		ppb v/v			10/06/17 16:52	1
Trichlorofluoromethane	ND		0.40		ppb v/v			10/06/17 16:52	1

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
 Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32107-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 320-188174/6

Matrix: Air

Analysis Batch: 188174

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl acetate	ND		0.80		ppb v/v			10/06/17 16:52	1
Vinyl chloride	ND		0.40		ppb v/v			10/06/17 16:52	1
Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.6		ug/m3 Air			10/06/17 16:52	1
1,1,2,2-Tetrachloroethane	ND		2.7		ug/m3 Air			10/06/17 16:52	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1		ug/m3 Air			10/06/17 16:52	1
1,1,2-Trichloroethane	ND		2.2		ug/m3 Air			10/06/17 16:52	1
1,1-Dichloroethane	ND		1.2		ug/m3 Air			10/06/17 16:52	1
1,1-Dichloroethene	ND		3.2		ug/m3 Air			10/06/17 16:52	1
1,2,4-Trichlorobenzene	ND		15		ug/m3 Air			10/06/17 16:52	1
1,2,4-Trimethylbenzene	ND		3.9		ug/m3 Air			10/06/17 16:52	1
1,2-Dibromoethane (EDB)	ND		6.1		ug/m3 Air			10/06/17 16:52	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8		ug/m3 Air			10/06/17 16:52	1
1,2-Dichlorobenzene	ND		2.4		ug/m3 Air			10/06/17 16:52	1
1,2-Dichloroethane	ND		3.2		ug/m3 Air			10/06/17 16:52	1
1,2-Dichloropropane	ND		1.8		ug/m3 Air			10/06/17 16:52	1
1,3,5-Trimethylbenzene	ND		2.0		ug/m3 Air			10/06/17 16:52	1
1,3-Dichlorobenzene	ND		2.4		ug/m3 Air			10/06/17 16:52	1
1,4-Dichlorobenzene	ND		2.4		ug/m3 Air			10/06/17 16:52	1
2-Butanone (MEK)	ND		2.4		ug/m3 Air			10/06/17 16:52	1
2-Hexanone	ND		1.6		ug/m3 Air			10/06/17 16:52	1
4-Ethyltoluene	ND		2.0		ug/m3 Air			10/06/17 16:52	1
4-Methyl-2-pentanone (MIBK)	ND		1.6		ug/m3 Air			10/06/17 16:52	1
Acetone	ND		12		ug/m3 Air			10/06/17 16:52	1
Benzene	ND		1.3		ug/m3 Air			10/06/17 16:52	1
Benzyl chloride	ND		4.1		ug/m3 Air			10/06/17 16:52	1
Bromodichloromethane	ND		2.0		ug/m3 Air			10/06/17 16:52	1
Bromoform	ND		4.1		ug/m3 Air			10/06/17 16:52	1
Bromomethane	ND		3.1		ug/m3 Air			10/06/17 16:52	1
Carbon disulfide	ND		2.5		ug/m3 Air			10/06/17 16:52	1
Carbon tetrachloride	ND		5.0		ug/m3 Air			10/06/17 16:52	1
Chlorobenzene	ND		1.4		ug/m3 Air			10/06/17 16:52	1
Chloroethane	ND		2.1		ug/m3 Air			10/06/17 16:52	1
Chloroform	ND		1.5		ug/m3 Air			10/06/17 16:52	1
Chloromethane	ND		1.7		ug/m3 Air			10/06/17 16:52	1
cis-1,2-Dichloroethene	ND		1.6		ug/m3 Air			10/06/17 16:52	1
cis-1,3-Dichloropropene	ND		1.8		ug/m3 Air			10/06/17 16:52	1
Dibromochloromethane	ND		3.4		ug/m3 Air			10/06/17 16:52	1
Dichlorodifluoromethane	ND		2.0		ug/m3 Air			10/06/17 16:52	1
Ethylbenzene	ND		1.7		ug/m3 Air			10/06/17 16:52	1
Hexachlorobutadiene	ND		21		ug/m3 Air			10/06/17 16:52	1
m,p-Xylene	ND		3.5		ug/m3 Air			10/06/17 16:52	1
Methylene Chloride	ND		1.4		ug/m3 Air			10/06/17 16:52	1
o-Xylene	ND		1.7		ug/m3 Air			10/06/17 16:52	1
Styrene	ND		1.7		ug/m3 Air			10/06/17 16:52	1
Tetrachloroethene	ND		2.7		ug/m3 Air			10/06/17 16:52	1
Toluene	ND		1.5		ug/m3 Air			10/06/17 16:52	1

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32107-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 320-188174/6
Matrix: Air
Analysis Batch: 188174

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
trans-1,2-Dichloroethene	ND		1.6		ug/m3 Air			10/06/17 16:52	1
trans-1,3-Dichloropropene	ND		1.8		ug/m3 Air			10/06/17 16:52	1
Trichloroethene	ND		2.1		ug/m3 Air			10/06/17 16:52	1
Trichlorofluoromethane	ND		2.2		ug/m3 Air			10/06/17 16:52	1
Vinyl acetate	ND		2.8		ug/m3 Air			10/06/17 16:52	1
Vinyl chloride	ND		1.0		ug/m3 Air			10/06/17 16:52	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	99		70 - 130		10/06/17 16:52	1
4-Bromofluorobenzene (Surr)	91		70 - 130		10/06/17 16:52	1
Toluene-d8 (Surr)	109		70 - 130		10/06/17 16:52	1

Lab Sample ID: LCS 320-188174/3
Matrix: Air
Analysis Batch: 188174

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	20.0	19.2		ppb v/v		96	65 - 124
1,1,1,2-Tetrachloroethane	20.0	19.4		ppb v/v		97	75 - 135
1,1,1,2-Trichloro-1,2,2-trifluoroethane	20.0	21.7		ppb v/v		109	50 - 132
1,1,2-Trichloroethane	20.0	18.5		ppb v/v		93	71 - 131
1,1-Dichloroethane	20.0	21.9		ppb v/v		110	65 - 125
1,1-Dichloroethene	20.0	21.5		ppb v/v		108	53 - 128
1,2,4-Trichlorobenzene	20.0	19.3		ppb v/v		97	59 - 150
1,2,4-Trimethylbenzene	20.0	16.5		ppb v/v		83	61 - 145
1,2-Dibromoethane (EDB)	20.0	18.2		ppb v/v		91	68 - 131
1,2-Dichloro-1,1,2,2-tetrafluoroethane	20.0	20.5		ppb v/v		102	64 - 124
1,2-Dichlorobenzene	20.0	17.7		ppb v/v		88	73 - 143
1,2-Dichloroethane	20.0	19.2		ppb v/v		96	71 - 131
1,2-Dichloropropane	20.0	19.3		ppb v/v		97	74 - 128
1,3,5-Trimethylbenzene	20.0	17.6		ppb v/v		88	65 - 136
1,3-Dichlorobenzene	20.0	17.8		ppb v/v		89	77 - 136
1,4-Dichlorobenzene	20.0	18.0		ppb v/v		90	73 - 143
2-Butanone (MEK)	20.0	22.1		ppb v/v		111	71 - 131
2-Hexanone	20.0	20.8		ppb v/v		104	70 - 128
4-Ethyltoluene	20.0	17.5		ppb v/v		87	62 - 136
4-Methyl-2-pentanone (MIBK)	20.0	22.2		ppb v/v		111	73 - 133
Acetone	20.0	21.4		ppb v/v		107	71 - 131
Benzene	20.0	20.7		ppb v/v		104	68 - 128
Benzyl chloride	16.0	15.2		ppb v/v		95	58 - 120
Bromodichloromethane	20.0	19.5		ppb v/v		98	65 - 130
Bromoform	20.0	17.2		ppb v/v		86	64 - 144
Bromomethane	20.0	21.6		ppb v/v		108	70 - 131
Carbon disulfide	20.0	21.9		ppb v/v		109	63 - 123
Carbon tetrachloride	20.0	18.1		ppb v/v		90	67 - 127
Chlorobenzene	20.0	17.7		ppb v/v		89	70 - 132

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32107-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 320-188174/3

Matrix: Air

Analysis Batch: 188174

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloroethane	20.0	23.6		ppb v/v		118	70 - 131
Chloroform	20.0	20.4		ppb v/v		102	69 - 129
Chloromethane	20.0	22.6		ppb v/v		113	67 - 127
cis-1,2-Dichloroethene	20.0	21.0		ppb v/v		105	68 - 128
cis-1,3-Dichloropropene	20.0	20.4		ppb v/v		102	78 - 132
Dibromochloromethane	20.0	17.6		ppb v/v		88	68 - 128
Dichlorodifluoromethane	20.0	19.7		ppb v/v		99	69 - 129
Ethylbenzene	20.0	17.9		ppb v/v		89	76 - 136
Hexachlorobutadiene	20.0	17.9		ppb v/v		90	42 - 150
m,p-Xylene	40.0	34.7		ppb v/v		87	75 - 138
Methylene Chloride	20.0	21.4		ppb v/v		107	65 - 125
o-Xylene	20.0	17.7		ppb v/v		89	77 - 132
Styrene	20.0	18.5		ppb v/v		92	76 - 144
Tetrachloroethene	20.0	17.6		ppb v/v		88	56 - 138
Toluene	20.0	19.5		ppb v/v		98	71 - 132
trans-1,2-Dichloroethene	20.0	21.4		ppb v/v		107	70 - 130
trans-1,3-Dichloropropene	20.0	18.4		ppb v/v		92	56 - 136
Trichloroethene	20.0	19.1		ppb v/v		95	64 - 127
Trichlorofluoromethane	20.0	19.2		ppb v/v		96	68 - 128
Vinyl acetate	20.0	24.9		ppb v/v		124	77 - 134
Vinyl chloride	20.0	22.0		ppb v/v		110	69 - 129
Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	110	105		ug/m3 Air		96	65 - 124
1,1,1,2-Tetrachloroethane	140	133		ug/m3 Air		97	75 - 135
1,1,2-Trichloro-1,2,2-trifluoroethane	150	166		ug/m3 Air		109	50 - 132
1,1,2-Trichloroethane	110	101		ug/m3 Air		93	71 - 131
1,1-Dichloroethane	81	88.6		ug/m3 Air		110	65 - 125
1,1-Dichloroethene	79	85.3		ug/m3 Air		108	53 - 128
1,2,4-Trichlorobenzene	150	143		ug/m3 Air		97	59 - 150
1,2,4-Trimethylbenzene	98	81.2		ug/m3 Air		83	61 - 145
1,2-Dibromoethane (EDB)	150	140		ug/m3 Air		91	68 - 131
1,2-Dichloro-1,1,2,2-tetrafluoroethane	140	143		ug/m3 Air		102	64 - 124
1,2-Dichlorobenzene	120	106		ug/m3 Air		88	73 - 143
1,2-Dichloroethane	81	77.6		ug/m3 Air		96	71 - 131
1,2-Dichloropropane	92	89.4		ug/m3 Air		97	74 - 128
1,3,5-Trimethylbenzene	98	86.4		ug/m3 Air		88	65 - 136
1,3-Dichlorobenzene	120	107		ug/m3 Air		89	77 - 136
1,4-Dichlorobenzene	120	108		ug/m3 Air		90	73 - 143
2-Butanone (MEK)	59	65.3		ug/m3 Air		111	71 - 131
2-Hexanone	82	85.3		ug/m3 Air		104	70 - 128
4-Ethyltoluene	98	85.8		ug/m3 Air		87	62 - 136
4-Methyl-2-pentanone (MIBK)	82	91.0		ug/m3 Air		111	73 - 133
Acetone	48	50.8		ug/m3 Air		107	71 - 131
Benzene	64	66.3		ug/m3 Air		104	68 - 128
Benzyl chloride	83	78.9		ug/m3 Air		95	58 - 120
Bromodichloromethane	130	131		ug/m3 Air		98	65 - 130

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32107-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 320-188174/3
Matrix: Air
Analysis Batch: 188174

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Bromoform	210	178		ug/m3 Air		86	64 - 144
Bromomethane	78	84.0		ug/m3 Air		108	70 - 131
Carbon disulfide	62	68.2		ug/m3 Air		109	63 - 123
Carbon tetrachloride	130	114		ug/m3 Air		90	67 - 127
Chlorobenzene	92	81.6		ug/m3 Air		89	70 - 132
Chloroethane	53	62.3		ug/m3 Air		118	70 - 131
Chloroform	98	99.4		ug/m3 Air		102	69 - 129
Chloromethane	41	46.6		ug/m3 Air		113	67 - 127
cis-1,2-Dichloroethene	79	83.1		ug/m3 Air		105	68 - 128
cis-1,3-Dichloropropene	91	92.6		ug/m3 Air		102	78 - 132
Dibromochloromethane	170	150		ug/m3 Air		88	68 - 128
Dichlorodifluoromethane	99	97.5		ug/m3 Air		99	69 - 129
Ethylbenzene	87	77.6		ug/m3 Air		89	76 - 136
Hexachlorobutadiene	210	191		ug/m3 Air		90	42 - 150
m,p-Xylene	170	151		ug/m3 Air		87	75 - 138
Methylene Chloride	69	74.4		ug/m3 Air		107	65 - 125
o-Xylene	87	76.9		ug/m3 Air		89	77 - 132
Styrene	85	78.6		ug/m3 Air		92	76 - 144
Tetrachloroethene	140	119		ug/m3 Air		88	56 - 138
Toluene	75	73.6		ug/m3 Air		98	71 - 132
trans-1,2-Dichloroethene	79	84.9		ug/m3 Air		107	70 - 130
trans-1,3-Dichloropropene	91	83.3		ug/m3 Air		92	56 - 136
Trichloroethene	110	103		ug/m3 Air		95	64 - 127
Trichlorofluoromethane	110	108		ug/m3 Air		96	68 - 128
Vinyl acetate	70	87.6		ug/m3 Air		124	77 - 134
Vinyl chloride	51	56.3		ug/m3 Air		110	69 - 129

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	100		70 - 130
4-Bromofluorobenzene (Surr)	90		70 - 130
Toluene-d8 (Surr)	105		70 - 130

Lab Sample ID: LCSD 320-188174/4
Matrix: Air
Analysis Batch: 188174

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	20.0	19.1		ppb v/v		95	65 - 124	1	25
1,1,2,2-Tetrachloroethane	20.0	19.9		ppb v/v		100	75 - 135	3	25
1,1,2-Trichloro-1,2,2-trifluoroethane	20.0	21.8		ppb v/v		109	50 - 132	0	25
1,1,2-Trichloroethane	20.0	18.9		ppb v/v		94	71 - 131	2	25
1,1-Dichloroethane	20.0	21.7		ppb v/v		109	65 - 125	1	25
1,1-Dichloroethene	20.0	21.5		ppb v/v		107	53 - 128	0	25
1,2,4-Trichlorobenzene	20.0	19.9		ppb v/v		99	59 - 150	3	25
1,2,4-Trimethylbenzene	20.0	18.6		ppb v/v		93	61 - 145	12	25
1,2-Dibromoethane (EDB)	20.0	18.7		ppb v/v		93	68 - 131	2	25

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32107-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-188174/4

Client Sample ID: Lab Control Sample Dup

Matrix: Air

Prep Type: Total/NA

Analysis Batch: 188174

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2-Dichloro-1,1,2,2-tetrafluoroethane	20.0	20.4		ppb v/v		102	64 - 124	0	25
1,2-Dichlorobenzene	20.0	18.1		ppb v/v		91	73 - 143	2	25
1,2-Dichloroethane	20.0	19.3		ppb v/v		97	71 - 131	1	25
1,2-Dichloropropane	20.0	19.5		ppb v/v		97	74 - 128	1	25
1,3,5-Trimethylbenzene	20.0	18.3		ppb v/v		91	65 - 136	4	25
1,3-Dichlorobenzene	20.0	18.2		ppb v/v		91	77 - 136	2	25
1,4-Dichlorobenzene	20.0	18.3		ppb v/v		91	73 - 143	2	25
2-Butanone (MEK)	20.0	22.3		ppb v/v		112	71 - 131	1	25
2-Hexanone	20.0	21.1		ppb v/v		106	70 - 128	2	25
4-Ethyltoluene	20.0	18.3		ppb v/v		92	62 - 136	5	25
4-Methyl-2-pentanone (MIBK)	20.0	22.7		ppb v/v		113	73 - 133	2	25
Acetone	20.0	21.2		ppb v/v		106	71 - 131	1	25
Benzene	20.0	21.1		ppb v/v		105	68 - 128	2	25
Benzyl chloride	16.0	15.5		ppb v/v		97	58 - 120	2	25
Bromodichloromethane	20.0	19.9		ppb v/v		99	65 - 130	2	25
Bromoform	20.0	17.6		ppb v/v		88	64 - 144	2	25
Bromomethane	20.0	21.5		ppb v/v		107	70 - 131	1	25
Carbon disulfide	20.0	22.0		ppb v/v		110	63 - 123	1	25
Carbon tetrachloride	20.0	18.2		ppb v/v		91	67 - 127	1	25
Chlorobenzene	20.0	18.2		ppb v/v		91	70 - 132	3	25
Chloroethane	20.0	23.8		ppb v/v		119	70 - 131	1	25
Chloroform	20.0	20.4		ppb v/v		102	69 - 129	0	25
Chloromethane	20.0	22.5		ppb v/v		112	67 - 127	0	25
cis-1,2-Dichloroethene	20.0	20.9		ppb v/v		104	68 - 128	0	25
cis-1,3-Dichloropropene	20.0	20.7		ppb v/v		104	78 - 132	2	25
Dibromochloromethane	20.0	17.9		ppb v/v		89	68 - 128	1	25
Dichlorodifluoromethane	20.0	19.7		ppb v/v		99	69 - 129	0	25
Ethylbenzene	20.0	18.4		ppb v/v		92	76 - 136	3	25
Hexachlorobutadiene	20.0	18.3		ppb v/v		91	42 - 150	2	25
m,p-Xylene	40.0	35.8		ppb v/v		90	75 - 138	3	25
Methylene Chloride	20.0	21.4		ppb v/v		107	65 - 125	0	25
o-Xylene	20.0	18.1		ppb v/v		90	77 - 132	2	25
Styrene	20.0	18.9		ppb v/v		94	76 - 144	2	25
Tetrachloroethene	20.0	18.2		ppb v/v		91	56 - 138	3	25
Toluene	20.0	20.0		ppb v/v		100	71 - 132	2	25
trans-1,2-Dichloroethene	20.0	21.5		ppb v/v		108	70 - 130	1	25
trans-1,3-Dichloropropene	20.0	18.8		ppb v/v		94	56 - 136	3	25
Trichloroethene	20.0	19.5		ppb v/v		98	64 - 127	2	25
Trichlorofluoromethane	20.0	19.0		ppb v/v		95	68 - 128	1	25
Vinyl acetate	20.0	24.8		ppb v/v		124	77 - 134	0	25
Vinyl chloride	20.0	22.0		ppb v/v		110	69 - 129	0	25

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	110	104		ug/m3 Air		95	65 - 124	1	25
1,1,2,2-Tetrachloroethane	140	137		ug/m3 Air		100	75 - 135	3	25
1,1,2-Trichloro-1,2,2-trifluoroethane	150	167		ug/m3 Air		109	50 - 132	0	25
1,1,2-Trichloroethane	110	103		ug/m3 Air		94	71 - 131	2	25

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32107-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-188174/4

Client Sample ID: Lab Control Sample Dup

Matrix: Air

Prep Type: Total/NA

Analysis Batch: 188174

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1-Dichloroethane	81	87.9		ug/m3 Air		109	65 - 125	1	25
1,1-Dichloroethene	79	85.1		ug/m3 Air		107	53 - 128	0	25
1,2,4-Trichlorobenzene	150	148		ug/m3 Air		99	59 - 150	3	25
1,2,4-Trimethylbenzene	98	91.5		ug/m3 Air		93	61 - 145	12	25
1,2-Dibromoethane (EDB)	150	144		ug/m3 Air		93	68 - 131	2	25
1,2-Dichloro-1,1,2,2-tetrafluoroethane	140	143		ug/m3 Air		102	64 - 124	0	25
1,2-Dichlorobenzene	120	109		ug/m3 Air		91	73 - 143	2	25
1,2-Dichloroethane	81	78.2		ug/m3 Air		97	71 - 131	1	25
1,2-Dichloropropane	92	90.0		ug/m3 Air		97	74 - 128	1	25
1,3,5-Trimethylbenzene	98	89.9		ug/m3 Air		91	65 - 136	4	25
1,3-Dichlorobenzene	120	110		ug/m3 Air		91	77 - 136	2	25
1,4-Dichlorobenzene	120	110		ug/m3 Air		91	73 - 143	2	25
2-Butanone (MEK)	59	65.9		ug/m3 Air		112	71 - 131	1	25
2-Hexanone	82	86.7		ug/m3 Air		106	70 - 128	2	25
4-Ethyltoluene	98	90.1		ug/m3 Air		92	62 - 136	5	25
4-Methyl-2-pentanone (MIBK)	82	92.8		ug/m3 Air		113	73 - 133	2	25
Acetone	48	50.5		ug/m3 Air		106	71 - 131	1	25
Benzene	64	67.4		ug/m3 Air		105	68 - 128	2	25
Benzyl chloride	83	80.2		ug/m3 Air		97	58 - 120	2	25
Bromodichloromethane	130	133		ug/m3 Air		99	65 - 130	2	25
Bromoform	210	182		ug/m3 Air		88	64 - 144	2	25
Bromomethane	78	83.4		ug/m3 Air		107	70 - 131	1	25
Carbon disulfide	62	68.5		ug/m3 Air		110	63 - 123	1	25
Carbon tetrachloride	130	115		ug/m3 Air		91	67 - 127	1	25
Chlorobenzene	92	83.7		ug/m3 Air		91	70 - 132	3	25
Chloroethane	53	62.7		ug/m3 Air		119	70 - 131	1	25
Chloroform	98	99.5		ug/m3 Air		102	69 - 129	0	25
Chloromethane	41	46.4		ug/m3 Air		112	67 - 127	0	25
cis-1,2-Dichloroethene	79	82.8		ug/m3 Air		104	68 - 128	0	25
cis-1,3-Dichloropropene	91	94.1		ug/m3 Air		104	78 - 132	2	25
Dibromochloromethane	170	152		ug/m3 Air		89	68 - 128	1	25
Dichlorodifluoromethane	99	97.5		ug/m3 Air		99	69 - 129	0	25
Ethylbenzene	87	79.8		ug/m3 Air		92	76 - 136	3	25
Hexachlorobutadiene	210	195		ug/m3 Air		91	42 - 150	2	25
m,p-Xylene	170	156		ug/m3 Air		90	75 - 138	3	25
Methylene Chloride	69	74.5		ug/m3 Air		107	65 - 125	0	25
o-Xylene	87	78.4		ug/m3 Air		90	77 - 132	2	25
Styrene	85	80.5		ug/m3 Air		94	76 - 144	2	25
Tetrachloroethene	140	123		ug/m3 Air		91	56 - 138	3	25
Toluene	75	75.3		ug/m3 Air		100	71 - 132	2	25
trans-1,2-Dichloroethene	79	85.4		ug/m3 Air		108	70 - 130	1	25
trans-1,3-Dichloropropene	91	85.5		ug/m3 Air		94	56 - 136	3	25
Trichloroethene	110	105		ug/m3 Air		98	64 - 127	2	25
Trichlorofluoromethane	110	107		ug/m3 Air		95	68 - 128	1	25
Vinyl acetate	70	87.5		ug/m3 Air		124	77 - 134	0	25
Vinyl chloride	51	56.2		ug/m3 Air		110	69 - 129	0	25

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32107-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-188174/4

Matrix: Air

Analysis Batch: 188174

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

<i>Surrogate</i>	<i>%Recovery</i>	<i>LCSD Qualifier</i>	<i>LCSD Limits</i>
1,2-Dichloroethane-d4 (Surr)	98		70 - 130
4-Bromofluorobenzene (Surr)	92		70 - 130
Toluene-d8 (Surr)	106		70 - 130

Lab Sample ID: MB 320-188372/6

Matrix: Air

Analysis Batch: 188372

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.30		ppb v/v			10/09/17 11:22	1
1,1,2,2-Tetrachloroethane	ND		0.40		ppb v/v			10/09/17 11:22	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40		ppb v/v			10/09/17 11:22	1
1,1,2-Trichloroethane	ND		0.40		ppb v/v			10/09/17 11:22	1
1,1-Dichloroethane	ND		0.30		ppb v/v			10/09/17 11:22	1
1,1-Dichloroethene	ND		0.80		ppb v/v			10/09/17 11:22	1
1,2,4-Trichlorobenzene	ND		2.0		ppb v/v			10/09/17 11:22	1
1,2,4-Trimethylbenzene	ND		0.80		ppb v/v			10/09/17 11:22	1
1,2-Dibromoethane (EDB)	ND		0.80		ppb v/v			10/09/17 11:22	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40		ppb v/v			10/09/17 11:22	1
1,2-Dichlorobenzene	ND		0.40		ppb v/v			10/09/17 11:22	1
1,2-Dichloroethane	ND		0.80		ppb v/v			10/09/17 11:22	1
1,2-Dichloropropane	ND		0.40		ppb v/v			10/09/17 11:22	1
1,3,5-Trimethylbenzene	ND		0.40		ppb v/v			10/09/17 11:22	1
1,3-Dichlorobenzene	ND		0.40		ppb v/v			10/09/17 11:22	1
1,4-Dichlorobenzene	ND		0.40		ppb v/v			10/09/17 11:22	1
2-Butanone (MEK)	ND		0.80		ppb v/v			10/09/17 11:22	1
2-Hexanone	ND		0.40		ppb v/v			10/09/17 11:22	1
4-Ethyltoluene	ND		0.40		ppb v/v			10/09/17 11:22	1
4-Methyl-2-pentanone (MIBK)	ND		0.40		ppb v/v			10/09/17 11:22	1
Acetone	ND		5.0		ppb v/v			10/09/17 11:22	1
Benzene	ND		0.40		ppb v/v			10/09/17 11:22	1
Benzyl chloride	ND		0.80		ppb v/v			10/09/17 11:22	1
Bromodichloromethane	ND		0.30		ppb v/v			10/09/17 11:22	1
Bromoform	ND		0.40		ppb v/v			10/09/17 11:22	1
Bromomethane	ND		0.80		ppb v/v			10/09/17 11:22	1
Carbon disulfide	ND		0.80		ppb v/v			10/09/17 11:22	1
Carbon tetrachloride	ND		0.80		ppb v/v			10/09/17 11:22	1
Chlorobenzene	ND		0.30		ppb v/v			10/09/17 11:22	1
Chloroethane	ND		0.80		ppb v/v			10/09/17 11:22	1
Chloroform	ND		0.30		ppb v/v			10/09/17 11:22	1
Chloromethane	ND		0.80		ppb v/v			10/09/17 11:22	1
cis-1,2-Dichloroethene	ND		0.40		ppb v/v			10/09/17 11:22	1
cis-1,3-Dichloropropene	ND		0.40		ppb v/v			10/09/17 11:22	1
Dibromochloromethane	ND		0.40		ppb v/v			10/09/17 11:22	1
Dichlorodifluoromethane	ND		0.40		ppb v/v			10/09/17 11:22	1
Ethylbenzene	ND		0.40		ppb v/v			10/09/17 11:22	1
Hexachlorobutadiene	ND		2.0		ppb v/v			10/09/17 11:22	1
m,p-Xylene	ND		0.80		ppb v/v			10/09/17 11:22	1

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
 Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32107-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 320-188372/6

Matrix: Air

Analysis Batch: 188372

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methylene Chloride	ND		0.40		ppb v/v			10/09/17 11:22	1
o-Xylene	ND		0.40		ppb v/v			10/09/17 11:22	1
Styrene	ND		0.40		ppb v/v			10/09/17 11:22	1
Tetrachloroethene	ND		0.40		ppb v/v			10/09/17 11:22	1
Toluene	ND		0.40		ppb v/v			10/09/17 11:22	1
trans-1,2-Dichloroethene	ND		0.40		ppb v/v			10/09/17 11:22	1
trans-1,3-Dichloropropene	ND		0.40		ppb v/v			10/09/17 11:22	1
Trichloroethene	ND		0.40		ppb v/v			10/09/17 11:22	1
Trichlorofluoromethane	ND		0.40		ppb v/v			10/09/17 11:22	1
Vinyl acetate	ND		0.80		ppb v/v			10/09/17 11:22	1
Vinyl chloride	ND		0.40		ppb v/v			10/09/17 11:22	1

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.6		ug/m3 Air			10/09/17 11:22	1
1,1,2,2-Tetrachloroethane	ND		2.7		ug/m3 Air			10/09/17 11:22	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1		ug/m3 Air			10/09/17 11:22	1
1,1,2-Trichloroethane	ND		2.2		ug/m3 Air			10/09/17 11:22	1
1,1-Dichloroethane	ND		1.2		ug/m3 Air			10/09/17 11:22	1
1,1-Dichloroethene	ND		3.2		ug/m3 Air			10/09/17 11:22	1
1,2,4-Trichlorobenzene	ND		15		ug/m3 Air			10/09/17 11:22	1
1,2,4-Trimethylbenzene	ND		3.9		ug/m3 Air			10/09/17 11:22	1
1,2-Dibromoethane (EDB)	ND		6.1		ug/m3 Air			10/09/17 11:22	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8		ug/m3 Air			10/09/17 11:22	1
1,2-Dichlorobenzene	ND		2.4		ug/m3 Air			10/09/17 11:22	1
1,2-Dichloroethane	ND		3.2		ug/m3 Air			10/09/17 11:22	1
1,2-Dichloropropane	ND		1.8		ug/m3 Air			10/09/17 11:22	1
1,3,5-Trimethylbenzene	ND		2.0		ug/m3 Air			10/09/17 11:22	1
1,3-Dichlorobenzene	ND		2.4		ug/m3 Air			10/09/17 11:22	1
1,4-Dichlorobenzene	ND		2.4		ug/m3 Air			10/09/17 11:22	1
2-Butanone (MEK)	ND		2.4		ug/m3 Air			10/09/17 11:22	1
2-Hexanone	ND		1.6		ug/m3 Air			10/09/17 11:22	1
4-Ethyltoluene	ND		2.0		ug/m3 Air			10/09/17 11:22	1
4-Methyl-2-pentanone (MIBK)	ND		1.6		ug/m3 Air			10/09/17 11:22	1
Acetone	ND		12		ug/m3 Air			10/09/17 11:22	1
Benzene	ND		1.3		ug/m3 Air			10/09/17 11:22	1
Benzyl chloride	ND		4.1		ug/m3 Air			10/09/17 11:22	1
Bromodichloromethane	ND		2.0		ug/m3 Air			10/09/17 11:22	1
Bromoform	ND		4.1		ug/m3 Air			10/09/17 11:22	1
Bromomethane	ND		3.1		ug/m3 Air			10/09/17 11:22	1
Carbon disulfide	ND		2.5		ug/m3 Air			10/09/17 11:22	1
Carbon tetrachloride	ND		5.0		ug/m3 Air			10/09/17 11:22	1
Chlorobenzene	ND		1.4		ug/m3 Air			10/09/17 11:22	1
Chloroethane	ND		2.1		ug/m3 Air			10/09/17 11:22	1
Chloroform	ND		1.5		ug/m3 Air			10/09/17 11:22	1
Chloromethane	ND		1.7		ug/m3 Air			10/09/17 11:22	1
cis-1,2-Dichloroethene	ND		1.6		ug/m3 Air			10/09/17 11:22	1
cis-1,3-Dichloropropene	ND		1.8		ug/m3 Air			10/09/17 11:22	1
Dibromochloromethane	ND		3.4		ug/m3 Air			10/09/17 11:22	1

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32107-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 320-188372/6
Matrix: Air
Analysis Batch: 188372

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dichlorodifluoromethane	ND		2.0		ug/m3 Air			10/09/17 11:22	1
Ethylbenzene	ND		1.7		ug/m3 Air			10/09/17 11:22	1
Hexachlorobutadiene	ND		21		ug/m3 Air			10/09/17 11:22	1
m,p-Xylene	ND		3.5		ug/m3 Air			10/09/17 11:22	1
Methylene Chloride	ND		1.4		ug/m3 Air			10/09/17 11:22	1
o-Xylene	ND		1.7		ug/m3 Air			10/09/17 11:22	1
Styrene	ND		1.7		ug/m3 Air			10/09/17 11:22	1
Tetrachloroethene	ND		2.7		ug/m3 Air			10/09/17 11:22	1
Toluene	ND		1.5		ug/m3 Air			10/09/17 11:22	1
trans-1,2-Dichloroethene	ND		1.6		ug/m3 Air			10/09/17 11:22	1
trans-1,3-Dichloropropene	ND		1.8		ug/m3 Air			10/09/17 11:22	1
Trichloroethene	ND		2.1		ug/m3 Air			10/09/17 11:22	1
Trichlorofluoromethane	ND		2.2		ug/m3 Air			10/09/17 11:22	1
Vinyl acetate	ND		2.8		ug/m3 Air			10/09/17 11:22	1
Vinyl chloride	ND		1.0		ug/m3 Air			10/09/17 11:22	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	99		70 - 130		10/09/17 11:22	1
4-Bromofluorobenzene (Surr)	86		70 - 130		10/09/17 11:22	1
Toluene-d8 (Surr)	108		70 - 130		10/09/17 11:22	1

Lab Sample ID: LCS 320-188372/3
Matrix: Air
Analysis Batch: 188372

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	20.0	19.9		ppb v/v		100	65 - 124
1,1,1,2-Tetrachloroethane	20.0	19.9		ppb v/v		99	75 - 135
1,1,2-Trichloro-1,2,2-trifluoroethane	20.0	22.2		ppb v/v		111	50 - 132
1,1,2-Trichloroethane	20.0	18.9		ppb v/v		95	71 - 131
1,1-Dichloroethane	20.0	22.2		ppb v/v		111	65 - 125
1,1-Dichloroethene	20.0	22.2		ppb v/v		111	53 - 128
1,2,4-Trichlorobenzene	20.0	20.1		ppb v/v		101	59 - 150
1,2,4-Trimethylbenzene	20.0	16.9		ppb v/v		85	61 - 145
1,2-Dibromoethane (EDB)	20.0	18.7		ppb v/v		94	68 - 131
1,2-Dichloro-1,1,2,2-tetrafluoroethane	20.0	21.3		ppb v/v		106	64 - 124
1,2-Dichlorobenzene	20.0	18.2		ppb v/v		91	73 - 143
1,2-Dichloroethane	20.0	19.7		ppb v/v		99	71 - 131
1,2-Dichloropropane	20.0	19.8		ppb v/v		99	74 - 128
1,3,5-Trimethylbenzene	20.0	17.8		ppb v/v		89	65 - 136
1,3-Dichlorobenzene	20.0	18.2		ppb v/v		91	77 - 136
1,4-Dichlorobenzene	20.0	18.5		ppb v/v		93	73 - 143
2-Butanone (MEK)	20.0	23.0		ppb v/v		115	71 - 131
2-Hexanone	20.0	21.0		ppb v/v		105	70 - 128
4-Ethyltoluene	20.0	17.8		ppb v/v		89	62 - 136
4-Methyl-2-pentanone (MIBK)	20.0	23.0		ppb v/v		115	73 - 133

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32107-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 320-188372/3

Matrix: Air

Analysis Batch: 188372

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	20.0	22.3		ppb v/v		111	71 - 131
Benzene	20.0	21.6		ppb v/v		108	68 - 128
Benzyl chloride	16.0	15.7		ppb v/v		98	58 - 120
Bromodichloromethane	20.0	20.5		ppb v/v		102	65 - 130
Bromoform	20.0	17.6		ppb v/v		88	64 - 144
Bromomethane	20.0	22.3		ppb v/v		111	70 - 131
Carbon disulfide	20.0	22.5		ppb v/v		113	63 - 123
Carbon tetrachloride	20.0	18.6		ppb v/v		93	67 - 127
Chlorobenzene	20.0	18.2		ppb v/v		91	70 - 132
Chloroethane	20.0	24.1		ppb v/v		120	70 - 131
Chloroform	20.0	20.9		ppb v/v		105	69 - 129
Chloromethane	20.0	23.2		ppb v/v		116	67 - 127
cis-1,2-Dichloroethene	20.0	21.5		ppb v/v		108	68 - 128
cis-1,3-Dichloropropene	20.0	21.2		ppb v/v		106	78 - 132
Dibromochloromethane	20.0	18.1		ppb v/v		90	68 - 128
Dichlorodifluoromethane	20.0	20.7		ppb v/v		103	69 - 129
Ethylbenzene	20.0	18.3		ppb v/v		92	76 - 136
Hexachlorobutadiene	20.0	18.4		ppb v/v		92	42 - 150
m,p-Xylene	40.0	35.7		ppb v/v		89	75 - 138
Methylene Chloride	20.0	21.9		ppb v/v		109	65 - 125
o-Xylene	20.0	18.1		ppb v/v		91	77 - 132
Styrene	20.0	18.8		ppb v/v		94	76 - 144
Tetrachloroethene	20.0	18.1		ppb v/v		91	56 - 138
Toluene	20.0	20.2		ppb v/v		101	71 - 132
trans-1,2-Dichloroethene	20.0	21.9		ppb v/v		109	70 - 130
trans-1,3-Dichloropropene	20.0	18.9		ppb v/v		94	56 - 136
Trichloroethene	20.0	19.8		ppb v/v		99	64 - 127
Trichlorofluoromethane	20.0	19.7		ppb v/v		98	68 - 128
Vinyl acetate	20.0	25.1		ppb v/v		125	77 - 134
Vinyl chloride	20.0	23.1		ppb v/v		116	69 - 129
Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	110	109		ug/m3 Air		100	65 - 124
1,1,1,2-Tetrachloroethane	140	136		ug/m3 Air		99	75 - 135
1,1,1,2-Trichloro-1,2,2-trifluoroethane	150	170		ug/m3 Air		111	50 - 132
1,1,2-Trichloroethane	110	103		ug/m3 Air		95	71 - 131
1,1-Dichloroethane	81	89.9		ug/m3 Air		111	65 - 125
1,1-Dichloroethene	79	87.9		ug/m3 Air		111	53 - 128
1,2,4-Trichlorobenzene	150	149		ug/m3 Air		101	59 - 150
1,2,4-Trimethylbenzene	98	83.3		ug/m3 Air		85	61 - 145
1,2-Dibromoethane (EDB)	150	144		ug/m3 Air		94	68 - 131
1,2-Dichloro-1,1,2,2-tetrafluoroethane	140	149		ug/m3 Air		106	64 - 124
1,2-Dichlorobenzene	120	110		ug/m3 Air		91	73 - 143
1,2-Dichloroethane	81	79.7		ug/m3 Air		99	71 - 131
1,2-Dichloropropane	92	91.3		ug/m3 Air		99	74 - 128
1,3,5-Trimethylbenzene	98	87.6		ug/m3 Air		89	65 - 136
1,3-Dichlorobenzene	120	110		ug/m3 Air		91	77 - 136

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32107-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 320-188372/3

Matrix: Air

Analysis Batch: 188372

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,4-Dichlorobenzene	120	111		ug/m3 Air		93	73 - 143
2-Butanone (MEK)	59	67.8		ug/m3 Air		115	71 - 131
2-Hexanone	82	86.3		ug/m3 Air		105	70 - 128
4-Ethyltoluene	98	87.5		ug/m3 Air		89	62 - 136
4-Methyl-2-pentanone (MIBK)	82	94.2		ug/m3 Air		115	73 - 133
Acetone	48	52.9		ug/m3 Air		111	71 - 131
Benzene	64	69.0		ug/m3 Air		108	68 - 128
Benzyl chloride	83	81.0		ug/m3 Air		98	58 - 120
Bromodichloromethane	130	137		ug/m3 Air		102	65 - 130
Bromoform	210	182		ug/m3 Air		88	64 - 144
Bromomethane	78	86.4		ug/m3 Air		111	70 - 131
Carbon disulfide	62	70.1		ug/m3 Air		113	63 - 123
Carbon tetrachloride	130	117		ug/m3 Air		93	67 - 127
Chlorobenzene	92	83.7		ug/m3 Air		91	70 - 132
Chloroethane	53	63.6		ug/m3 Air		120	70 - 131
Chloroform	98	102		ug/m3 Air		105	69 - 129
Chloromethane	41	48.0		ug/m3 Air		116	67 - 127
cis-1,2-Dichloroethene	79	85.2		ug/m3 Air		108	68 - 128
cis-1,3-Dichloropropene	91	96.0		ug/m3 Air		106	78 - 132
Dibromochloromethane	170	154		ug/m3 Air		90	68 - 128
Dichlorodifluoromethane	99	102		ug/m3 Air		103	69 - 129
Ethylbenzene	87	79.7		ug/m3 Air		92	76 - 136
Hexachlorobutadiene	210	196		ug/m3 Air		92	42 - 150
m,p-Xylene	170	155		ug/m3 Air		89	75 - 138
Methylene Chloride	69	76.1		ug/m3 Air		109	65 - 125
o-Xylene	87	78.6		ug/m3 Air		91	77 - 132
Styrene	85	80.1		ug/m3 Air		94	76 - 144
Tetrachloroethene	140	123		ug/m3 Air		91	56 - 138
Toluene	75	76.2		ug/m3 Air		101	71 - 132
trans-1,2-Dichloroethene	79	86.8		ug/m3 Air		109	70 - 130
trans-1,3-Dichloropropene	91	85.7		ug/m3 Air		94	56 - 136
Trichloroethene	110	106		ug/m3 Air		99	64 - 127
Trichlorofluoromethane	110	111		ug/m3 Air		98	68 - 128
Vinyl acetate	70	88.3		ug/m3 Air		125	77 - 134
Vinyl chloride	51	59.1		ug/m3 Air		116	69 - 129

Surrogate	LCS LCS		Limits
	%Recovery	Qualifier	
1,2-Dichloroethane-d4 (Surr)	99		70 - 130
4-Bromofluorobenzene (Surr)	93		70 - 130
Toluene-d8 (Surr)	108		70 - 130

Lab Sample ID: LCSD 320-188372/4

Matrix: Air

Analysis Batch: 188372

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	20.0	19.4		ppb v/v		97	65 - 124	3	25
1,1,1,2-Tetrachloroethane	20.0	19.8		ppb v/v		99	75 - 135	0	25

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32107-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-188372/4

Client Sample ID: Lab Control Sample Dup

Matrix: Air

Prep Type: Total/NA

Analysis Batch: 188372

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,2-Trichloro-1,2,2-trifluoroethane	20.0	22.0		ppb v/v		110	50 - 132	1	25
1,1,2-Trichloroethane	20.0	18.8		ppb v/v		94	71 - 131	1	25
1,1-Dichloroethane	20.0	21.9		ppb v/v		109	65 - 125	1	25
1,1-Dichloroethene	20.0	21.8		ppb v/v		109	53 - 128	1	25
1,2,4-Trichlorobenzene	20.0	19.9		ppb v/v		100	59 - 150	1	25
1,2,4-Trimethylbenzene	20.0	16.8		ppb v/v		84	61 - 145	1	25
1,2-Dibromoethane (EDB)	20.0	18.5		ppb v/v		93	68 - 131	1	25
1,2-Dichloro-1,1,2,2-tetrafluoroethane	20.0	21.2		ppb v/v		106	64 - 124	1	25
1,2-Dichlorobenzene	20.0	18.1		ppb v/v		91	73 - 143	1	25
1,2-Dichloroethane	20.0	19.3		ppb v/v		97	71 - 131	2	25
1,2-Dichloropropane	20.0	19.7		ppb v/v		99	74 - 128	0	25
1,3,5-Trimethylbenzene	20.0	17.7		ppb v/v		89	65 - 136	1	25
1,3-Dichlorobenzene	20.0	18.2		ppb v/v		91	77 - 136	0	25
1,4-Dichlorobenzene	20.0	18.3		ppb v/v		91	73 - 143	1	25
2-Butanone (MEK)	20.0	22.3		ppb v/v		112	71 - 131	3	25
2-Hexanone	20.0	20.9		ppb v/v		105	70 - 128	1	25
4-Ethyltoluene	20.0	17.8		ppb v/v		89	62 - 136	0	25
4-Methyl-2-pentanone (MIBK)	20.0	22.5		ppb v/v		113	73 - 133	2	25
Acetone	20.0	22.0		ppb v/v		110	71 - 131	1	25
Benzene	20.0	21.2		ppb v/v		106	68 - 128	2	25
Benzyl chloride	16.0	15.5		ppb v/v		97	58 - 120	1	25
Bromodichloromethane	20.0	20.0		ppb v/v		100	65 - 130	2	25
Bromoform	20.0	17.6		ppb v/v		88	64 - 144	0	25
Bromomethane	20.0	21.8		ppb v/v		109	70 - 131	2	25
Carbon disulfide	20.0	22.2		ppb v/v		111	63 - 123	1	25
Carbon tetrachloride	20.0	18.2		ppb v/v		91	67 - 127	2	25
Chlorobenzene	20.0	18.0		ppb v/v		90	70 - 132	1	25
Chloroethane	20.0	23.8		ppb v/v		119	70 - 131	1	25
Chloroform	20.0	20.5		ppb v/v		102	69 - 129	2	25
Chloromethane	20.0	22.8		ppb v/v		114	67 - 127	2	25
cis-1,2-Dichloroethene	20.0	21.1		ppb v/v		105	68 - 128	2	25
cis-1,3-Dichloropropene	20.0	20.9		ppb v/v		104	78 - 132	1	25
Dibromochloromethane	20.0	18.0		ppb v/v		90	68 - 128	1	25
Dichlorodifluoromethane	20.0	20.1		ppb v/v		101	69 - 129	3	25
Ethylbenzene	20.0	18.3		ppb v/v		91	76 - 136	0	25
Hexachlorobutadiene	20.0	18.4		ppb v/v		92	42 - 150	0	25
m,p-Xylene	40.0	35.5		ppb v/v		89	75 - 138	0	25
Methylene Chloride	20.0	21.6		ppb v/v		108	65 - 125	2	25
o-Xylene	20.0	18.0		ppb v/v		90	77 - 132	0	25
Styrene	20.0	18.8		ppb v/v		94	76 - 144	0	25
Tetrachloroethene	20.0	18.1		ppb v/v		91	56 - 138	0	25
Toluene	20.0	20.1		ppb v/v		100	71 - 132	1	25
trans-1,2-Dichloroethene	20.0	21.7		ppb v/v		109	70 - 130	1	25
trans-1,3-Dichloropropene	20.0	18.7		ppb v/v		94	56 - 136	1	25
Trichloroethene	20.0	19.4		ppb v/v		97	64 - 127	2	25
Trichlorofluoromethane	20.0	19.4		ppb v/v		97	68 - 128	2	25
Vinyl acetate	20.0	24.6		ppb v/v		123	77 - 134	2	25

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32107-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-188372/4

Client Sample ID: Lab Control Sample Dup

Matrix: Air

Prep Type: Total/NA

Analysis Batch: 188372

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Vinyl chloride	20.0	22.6		ppb v/v		113	69 - 129	2	25
1,1,1-Trichloroethane	110	106		ug/m3 Air		97	65 - 124	3	25
1,1,2,2-Tetrachloroethane	140	136		ug/m3 Air		99	75 - 135	0	25
1,1,2-Trichloro-1,2,2-trifluoroethane	150	169		ug/m3 Air		110	50 - 132	1	25
1,1,2-Trichloroethane	110	102		ug/m3 Air		94	71 - 131	1	25
1,1-Dichloroethane	81	88.6		ug/m3 Air		109	65 - 125	1	25
1,1-Dichloroethene	79	86.6		ug/m3 Air		109	53 - 128	1	25
1,2,4-Trichlorobenzene	150	148		ug/m3 Air		100	59 - 150	1	25
1,2,4-Trimethylbenzene	98	82.8		ug/m3 Air		84	61 - 145	1	25
1,2-Dibromoethane (EDB)	150	143		ug/m3 Air		93	68 - 131	1	25
1,2-Dichloro-1,1,2,2-tetrafluoroethane	140	148		ug/m3 Air		106	64 - 124	1	25
1,2-Dichlorobenzene	120	109		ug/m3 Air		91	73 - 143	1	25
1,2-Dichloroethane	81	78.2		ug/m3 Air		97	71 - 131	2	25
1,2-Dichloropropane	92	91.0		ug/m3 Air		99	74 - 128	0	25
1,3,5-Trimethylbenzene	98	87.1		ug/m3 Air		89	65 - 136	1	25
1,3-Dichlorobenzene	120	109		ug/m3 Air		91	77 - 136	0	25
1,4-Dichlorobenzene	120	110		ug/m3 Air		91	73 - 143	1	25
2-Butanone (MEK)	59	65.9		ug/m3 Air		112	71 - 131	3	25
2-Hexanone	82	85.7		ug/m3 Air		105	70 - 128	1	25
4-Ethyltoluene	98	87.3		ug/m3 Air		89	62 - 136	0	25
4-Methyl-2-pentanone (MIBK)	82	92.2		ug/m3 Air		113	73 - 133	2	25
Acetone	48	52.3		ug/m3 Air		110	71 - 131	1	25
Benzene	64	67.7		ug/m3 Air		106	68 - 128	2	25
Benzyl chloride	83	80.2		ug/m3 Air		97	58 - 120	1	25
Bromodichloromethane	130	134		ug/m3 Air		100	65 - 130	2	25
Bromoform	210	182		ug/m3 Air		88	64 - 144	0	25
Bromomethane	78	84.7		ug/m3 Air		109	70 - 131	2	25
Carbon disulfide	62	69.2		ug/m3 Air		111	63 - 123	1	25
Carbon tetrachloride	130	114		ug/m3 Air		91	67 - 127	2	25
Chlorobenzene	92	82.8		ug/m3 Air		90	70 - 132	1	25
Chloroethane	53	62.7		ug/m3 Air		119	70 - 131	1	25
Chloroform	98	100		ug/m3 Air		102	69 - 129	2	25
Chloromethane	41	47.2		ug/m3 Air		114	67 - 127	2	25
cis-1,2-Dichloroethene	79	83.6		ug/m3 Air		105	68 - 128	2	25
cis-1,3-Dichloropropene	91	94.8		ug/m3 Air		104	78 - 132	1	25
Dibromochloromethane	170	153		ug/m3 Air		90	68 - 128	1	25
Dichlorodifluoromethane	99	99.6		ug/m3 Air		101	69 - 129	3	25
Ethylbenzene	87	79.4		ug/m3 Air		91	76 - 136	0	25
Hexachlorobutadiene	210	196		ug/m3 Air		92	42 - 150	0	25
m,p-Xylene	170	154		ug/m3 Air		89	75 - 138	0	25
Methylene Chloride	69	74.9		ug/m3 Air		108	65 - 125	2	25
o-Xylene	87	78.3		ug/m3 Air		90	77 - 132	0	25
Styrene	85	80.2		ug/m3 Air		94	76 - 144	0	25
Tetrachloroethene	140	123		ug/m3 Air		91	56 - 138	0	25
Toluene	75	75.7		ug/m3 Air		100	71 - 132	1	25

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
 Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32107-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-188372/4

Client Sample ID: Lab Control Sample Dup

Matrix: Air

Prep Type: Total/NA

Analysis Batch: 188372

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
trans-1,2-Dichloroethene	79	86.0		ug/m3 Air		109	70 - 130	1	25
trans-1,3-Dichloropropene	91	85.0		ug/m3 Air		94	56 - 136	1	25
Trichloroethene	110	104		ug/m3 Air		97	64 - 127	2	25
Trichlorofluoromethane	110	109		ug/m3 Air		97	68 - 128	2	25
Vinyl acetate	70	86.5		ug/m3 Air		123	77 - 134	2	25
Vinyl chloride	51	57.8		ug/m3 Air		113	69 - 129	2	25

Surrogate	LCSD %Recovery	LCSD Qualifier	LCSD Limits
1,2-Dichloroethane-d4 (Surr)	98		70 - 130
4-Bromofluorobenzene (Surr)	92		70 - 130
Toluene-d8 (Surr)	107		70 - 130

QC Association Summary

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32107-1

Air - GC/MS VOA

Analysis Batch: 188174

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-32107-1	SVE_SOUTH_PRECARBON_092517	Total/NA	Air	TO-15	
MB 320-188174/6	Method Blank	Total/NA	Air	TO-15	
LCS 320-188174/3	Lab Control Sample	Total/NA	Air	TO-15	
LCSD 320-188174/4	Lab Control Sample Dup	Total/NA	Air	TO-15	

Analysis Batch: 188372

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-32107-1 - DL	SVE_SOUTH_PRECARBON_092517	Total/NA	Air	TO-15	
320-32107-2	SVE_SOUTH_POSTCARBON_092517	Total/NA	Air	TO-15	
MB 320-188372/6	Method Blank	Total/NA	Air	TO-15	
LCS 320-188372/3	Lab Control Sample	Total/NA	Air	TO-15	
LCSD 320-188372/4	Lab Control Sample Dup	Total/NA	Air	TO-15	

Lab Chronicle

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32107-1

Client Sample ID: SVE_SOUTH_PRECARBON_092517

Lab Sample ID: 320-32107-1

Date Collected: 09/25/17 11:04

Matrix: Air

Date Received: 10/04/17 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		17.3	28 mL	250 mL	188174	10/06/17 17:44	GKI	TAL SAC
Total/NA	Analysis	TO-15	DL	52	9.33 mL	250 mL	188372	10/09/17 20:54	HL1	TAL SAC

Client Sample ID: SVE_SOUTH_POSTCARBON_092517

Lab Sample ID: 320-32107-2

Date Collected: 09/25/17 11:16

Matrix: Air

Date Received: 10/04/17 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	500 mL	250 mL	188372	10/09/17 20:03	HL1	TAL SAC

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: Apex Companies LLC
 Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32107-1

Laboratory: TestAmerica Sacramento

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Alaska (UST)	State Program	10	UST-055	12-18-17
Arizona	State Program	9	AZ0708	08-11-18
Arkansas DEQ	State Program	6	88-0691	06-17-18
California	State Program	9	2897	01-31-18
Colorado	State Program	8	CA00044	08-31-18
Connecticut	State Program	1	PH-0691	06-30-19
Florida	NELAP	4	E87570	06-30-18
Georgia	State Program	4	N/A	01-29-18
Hawaii	State Program	9	N/A	01-29-18
Illinois	NELAP	5	200060	03-17-18
Kansas	NELAP	7	E-10375	10-31-17
L-A-B	DoD ELAP		L2468	01-20-18
Louisiana	NELAP	6	30612	06-30-18
Maine	State Program	1	CA0004	04-18-18
Michigan	State Program	5	9947	01-31-18
Nevada	State Program	9	CA00044	07-31-18
New Hampshire	NELAP	1	2997	04-18-18
New Jersey	NELAP	2	CA005	06-30-18
New York	NELAP	2	11666	04-01-18
Oregon	NELAP	10	4040	01-28-18
Pennsylvania	NELAP	3	68-01272	03-31-18
Texas	NELAP	6	T104704399	05-31-18
US Fish & Wildlife	Federal		LE148388-0	07-31-18
USDA	Federal		P330-11-00436	12-30-17
USEPA UCMR	Federal	1	CA00044	11-06-18
Utah	NELAP	8	CA00044	02-28-18
Virginia	NELAP	3	460278	03-14-18
Washington	State Program	10	C581	05-05-18
West Virginia (DW)	State Program	3	9930C	12-31-17
Wyoming	State Program	8	8TMS-L	01-28-18 *

Laboratory: TestAmerica Portland

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
N/A	N/A	N/A	None on record.	

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32107-1

Method	Method Description	Protocol	Laboratory
TO-15	Volatile Organic Compounds in Ambient Air	EPA	TAL SAC

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16

Sample Summary

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32107-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-32107-1	SVE_SOUTH_PRECARBON_092517	Air	09/25/17 11:04	10/04/17 10:30
320-32107-2	SVE_SOUTH_POSTCARBON_092517	Air	09/25/17 11:16	10/04/17 10:30

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16

Login Sample Receipt Checklist

Client: Apex Companies LLC

Job Number: 320-32107-1

Login Number: 32107

List Source: TestAmerica Sacramento

List Number: 1

Creator: Nelson, Kym D

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	N/A	
Cooler Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Certification Type T0-15 SCAN
 Date Cleaned/Batch ID 8-21-17 320-30918
 Date of QC 8/28/17
 Data File Number C:\MSDCHEM\1\DATA\170828



→ MS6082806-d

CANISTER ID NUMBERS

<u>34000168 *</u>	<u>34000069</u>	
<u>8234</u>	<u>8123</u>	
<u>7962</u>	<u>34000055</u>	
<u>34001255</u>	<u>34001207</u>	
<u>34000340</u>		
<u>34001523</u>		
<u>34001588</u>		
<u>34000827</u>		

The above canisters were cleaned as a batch. This certifies this batch contains no target analyte concentration greater than or equal to the method criteria for the "Certification Type" indicated above.

"*" INDICATES THE CAN OR CANS WHICH WERE SCREENED.

[Signature]
1st level Reviewed By:

8/29/17
Date:

[Signature]
2nd level Reviewed By:

8/30/17
Date:



FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-30918-1
 SDG No.: _____
 Client Sample ID: 34000168 Lab Sample ID: 320-30918-1
 Matrix: Air Lab File ID: MS6082806.D
 Analysis Method: TO-15 Date Collected: 08/21/2017 00:00
 Sample wt/vol: 500 (mL) Date Analyzed: 08/28/2017 16:38
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: RTX-Volatiles ID: 0.32 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 181551 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
67-64-1	Acetone	0.33	J	5.0	0.18
107-02-8	Acrolein	ND		2.0	0.22
107-13-1	Acrylonitrile	ND		2.0	0.19
107-05-1	Allyl chloride	ND		0.80	0.11
71-43-2	Benzene	ND		0.40	0.079
100-44-7	Benzyl chloride	ND		0.80	0.16
75-27-4	Bromodichloromethane	ND		0.30	0.066
75-25-2	Bromoform	ND		0.40	0.070
74-83-9	Bromomethane	ND		0.80	0.34
106-99-0	1,3-Butadiene	ND		0.80	0.15
106-97-8	n-Butane	ND		0.40	0.15
78-93-3	2-Butanone (MEK)	ND		0.80	0.20
75-65-0	tert-Butyl alcohol (TBA)	ND		2.0	0.11
104-51-8	n-Butylbenzene	ND		0.40	0.18
135-98-8	sec-Butylbenzene	ND		0.40	0.070
98-06-6	tert-Butylbenzene	ND		0.80	0.068
75-15-0	Carbon disulfide	ND		0.80	0.078
56-23-5	Carbon tetrachloride	ND		0.80	0.064
108-90-7	Chlorobenzene	ND		0.30	0.064
75-45-6	Chlorodifluoromethane	ND		0.80	0.27
75-00-3	Chloroethane	ND		0.80	0.31
67-66-3	Chloroform	ND		0.30	0.095
74-87-3	Chloromethane	ND		0.80	0.20
95-49-8	2-Chlorotoluene	ND		0.40	0.080
110-82-7	Cyclohexane	ND		0.40	0.084
124-48-1	Dibromochloromethane	ND		0.40	0.079
106-93-4	1,2-Dibromoethane (EDB)	ND		0.80	0.075
74-95-3	Dibromomethane	ND		0.40	0.057
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16
95-50-1	1,2-Dichlorobenzene	ND		0.40	0.13
541-73-1	1,3-Dichlorobenzene	ND		0.40	0.11
106-46-7	1,4-Dichlorobenzene	ND		0.40	0.15
75-71-8	Dichlorodifluoromethane	ND		0.40	0.15
75-34-3	1,1-Dichloroethane	ND		0.30	0.072
107-06-2	1,2-Dichloroethane	ND		0.80	0.088

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-30918-1
 SDG No.: _____
 Client Sample ID: 34000168 Lab Sample ID: 320-30918-1
 Matrix: Air Lab File ID: MS6082806.D
 Analysis Method: TO-15 Date Collected: 08/21/2017 00:00
 Sample wt/vol: 500 (mL) Date Analyzed: 08/28/2017 16:38
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: RTX-Volatiles ID: 0.32 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 181551 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
75-35-4	1,1-Dichloroethene	ND		0.80	0.13
156-59-2	cis-1,2-Dichloroethene	ND		0.40	0.089
156-60-5	trans-1,2-Dichloroethene	ND		0.40	0.10
78-87-5	1,2-Dichloropropane	ND		0.40	0.24
10061-01-5	cis-1,3-Dichloropropene	ND		0.40	0.10
10061-02-6	trans-1,3-Dichloropropene	ND		0.40	0.088
123-91-1	1,4-Dioxane	ND		0.80	0.10
141-78-6	Ethyl acetate	ND		0.30	0.18
100-41-4	Ethylbenzene	ND		0.40	0.063
622-96-8	4-Ethyltoluene	ND		0.40	0.19
142-82-5	n-Heptane	ND		0.80	0.063
87-68-3	Hexachlorobutadiene	ND		2.0	0.43
110-54-3	n-Hexane	ND		0.80	0.075
591-78-6	2-Hexanone	ND		0.40	0.087
98-82-8	Isopropylbenzene	ND		0.80	0.10
99-87-6	4-Isopropyltoluene	ND		0.80	0.12
1634-04-4	Methyl-t-Butyl Ether (MTBE)	ND		0.80	0.12
80-62-6	Methyl methacrylate	ND		0.80	0.16
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14
75-09-2	Methylene Chloride	0.13	J	0.40	0.072
98-83-9	alpha-Methylstyrene	ND		0.40	0.065
91-20-3	Naphthalene	ND		0.80	0.56
111-65-9	n-Octane	ND		0.40	0.055
109-66-0	n-Pentane	ND		0.80	0.26
115-07-1	Propylene	0.13	J	0.40	0.099
103-65-1	N-Propylbenzene	ND		0.40	0.059
100-42-5	Styrene	ND		0.40	0.059
79-34-5	1,1,2,2-Tetrachloroethane	ND		0.40	0.069
127-18-4	Tetrachloroethene	ND		0.40	0.051
109-99-9	Tetrahydrofuran	ND		0.80	0.21
108-88-3	Toluene	ND		0.40	0.051
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16
120-82-1	1,2,4-Trichlorobenzene	ND		2.0	0.43
71-55-6	1,1,1-Trichloroethane	ND		0.30	0.065
79-00-5	1,1,2-Trichloroethane	ND		0.40	0.067

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-30918-1
 SDG No.: _____
 Client Sample ID: 34000168 Lab Sample ID: 320-30918-1
 Matrix: Air Lab File ID: MS6082806.D
 Analysis Method: TO-15 Date Collected: 08/21/2017 00:00
 Sample wt/vol: 500 (mL) Date Analyzed: 08/28/2017 16:38
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: RTX-Volatiles ID: 0.32 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 181551 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-01-6	Trichloroethene	ND		0.40	0.11
75-69-4	Trichlorofluoromethane	ND		0.40	0.20
96-18-4	1,2,3-Trichloropropane	ND		0.40	0.17
95-63-6	1,2,4-Trimethylbenzene	ND		0.80	0.16
108-67-8	1,3,5-Trimethylbenzene	ND		0.40	0.13
540-84-1	2,2,4-Trimethylpentane	ND		0.40	0.071
108-05-4	Vinyl acetate	ND		0.80	0.15
593-60-2	Vinyl bromide	ND		0.80	0.26
75-01-4	Vinyl chloride	ND		0.40	0.12
179601-23-1	m,p-Xylene	ND		0.80	0.10
95-47-6	o-Xylene	ND		0.40	0.054

CAS NO.	SURROGATE	%REC	Q	LIMITS
460-00-4	4-Bromofluorobenzene (Surr)	93		70-130
17060-07-0	1,2-Dichloroethane-d4 (Surr)	114		70-130
2037-26-5	Toluene-d8 (Surr)	100		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\ATMS6\20170828-47203.b\MS6082806.D
 Lims ID: 320-30918-A-1
 Client ID: 34000168
 Sample Type: Client
 Inject. Date: 28-Aug-2017 16:38:30 ALS Bottle#: 4 Worklist Smp#: 6
 Purge Vol: 25.000 mL Dil. Factor: 1.0000
 Sample Info: 320-30918-A-1
 Misc. Info.: 500 mL CAN CERT
 Operator ID: LHS Instrument ID: ATMS6
 Method: \\ChromNA\Sacramento\ChromData\ATMS6\20170828-47203.b\TO15_ATMS6.m
 Limit Group: MSA - TO15 - ICAL
 Last Update: 29-Aug-2017 11:21:06 Calib Date: 01-Aug-2017 02:38:30
 Integrator: RTE ID Type: Deconvolution ID
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\ATMS6\20170801-46103.b\MS6073112.D
 Column 1 : RTX Volatiles (0.32 mm) Det: MS SCAN
 Process Host: XAWRK016

First Level Reviewer: phanthasena

Date: 29-Aug-2017 11:21:06

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ppb v/v	Flags
* 1 Chlorobromomethane (IS)	130	13.277	13.295	-0.018	98	36658	4.00	
* 2 1,4-Difluorobenzene	114	15.419	15.431	-0.012	95	135776	4.00	
* 3 Chlorobenzene-d5 (IS)	117	22.147	22.153	-0.006	88	118810	4.00	
\$ 4 1,2-Dichloroethane-d4 (Sur	65	14.482	14.494	-0.012	39	53039	4.57	
\$ 5 Toluene-d8 (Surr)	100	18.868	18.874	-0.006	99	86731	3.99	
\$ 6 4-Bromofluorobenzene (Surr	95	24.714	24.714	0.000	92	70409	3.71	
11 Propene	41	4.626	4.614	0.012	50	1096	0.1271	
16 Chloromethane	50	5.198	5.198	0.000	26	334	0.0360	
32 Acetone	43	8.374	8.307	0.067	95	5568	0.3252	
39 Methylene Chloride	49	9.682	9.694	-0.012	92	1695	0.1305	

Reagents:

VAMSIS20_00030

Amount Added: 50.00

Units: mL

Run Reagent

Data File: \\ChromNA\Sacramento\ChromData\ATMS6\20170828-47203.b\MS6082806.D

Injection Date: 28-Aug-2017 16:38:30

Instrument ID: ATMS6

Operator ID: LHS

Lims ID: 320-30918-A-1

Lab Sample ID: 320-30918-1

Worklist Smp#: 6

Client ID: 34000168

Purge Vol: 25.000 mL

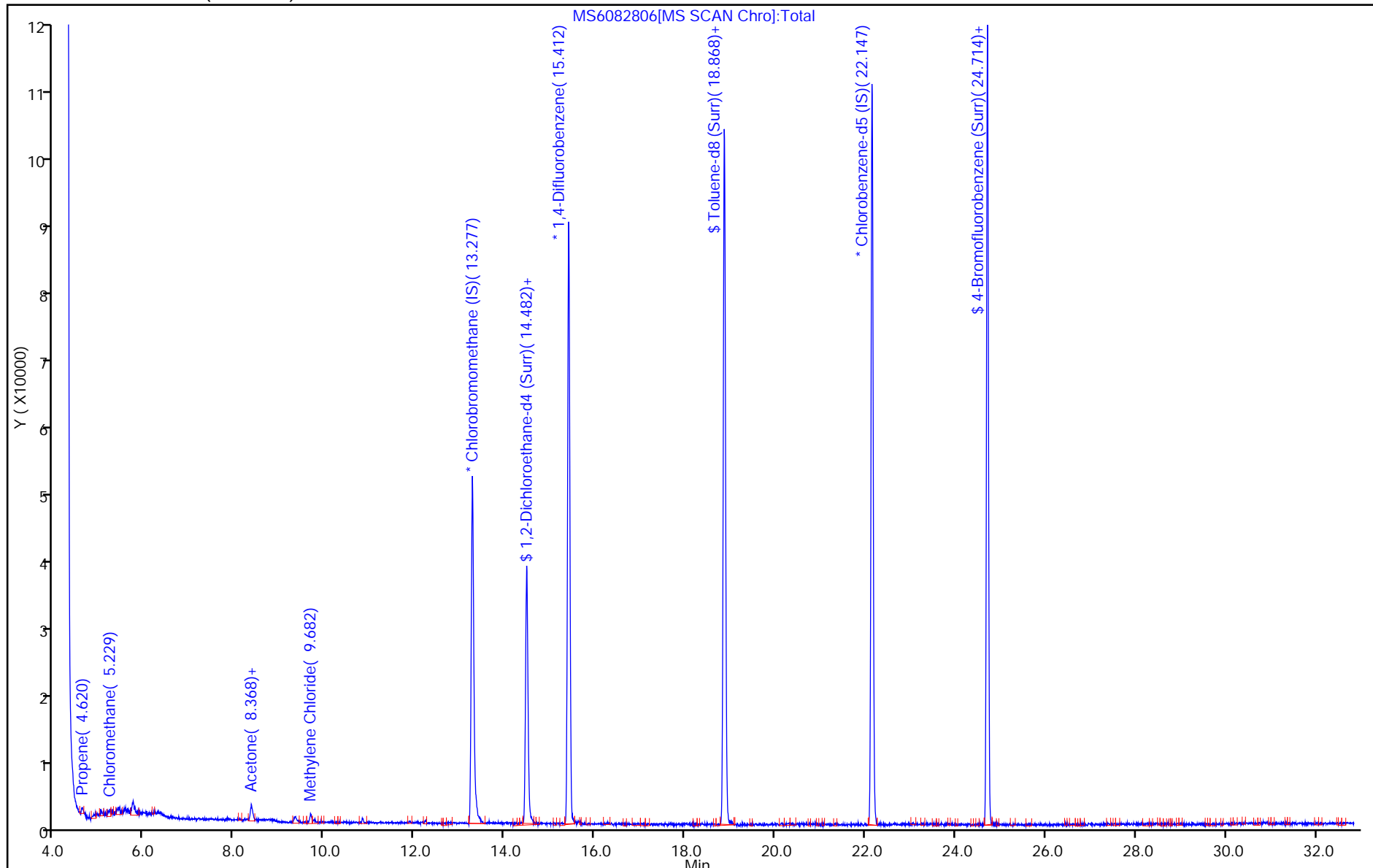
Dil. Factor: 1.0000

ALS Bottle#: 4

Method: TO15_ATMS6

Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm)



TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS6\20170828-47203.b\MS6082806.D

Injection Date: 28-Aug-2017 16:38:30

Instrument ID: ATMS6

Lims ID: 320-30918-A-1

Lab Sample ID: 320-30918-1

Client ID: 34000168

Operator ID: LHS

ALS Bottle#: 4 Worklist Smp#: 6

Purge Vol: 25.000 mL

Dil. Factor: 1.0000

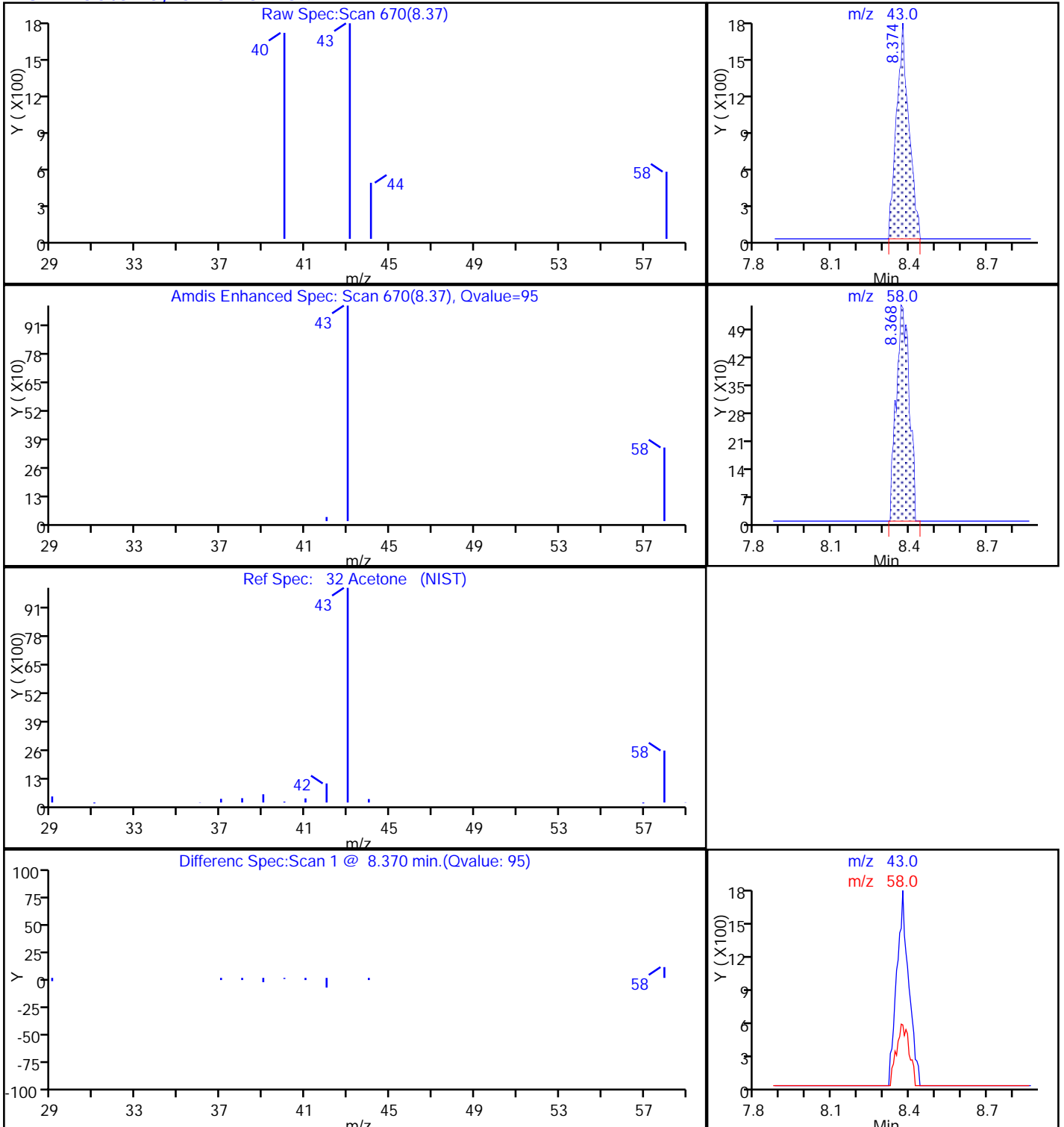
Method: TO15_ATMS6

Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm)

Detector: MS SCAN

32 Acetone, CAS: 67-64-1



TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS6\20170828-47203.b\MS6082806.D

Injection Date: 28-Aug-2017 16:38:30

Instrument ID: ATMS6

Lims ID: 320-30918-A-1

Lab Sample ID: 320-30918-1

Client ID: 34000168

Operator ID: LHS

ALS Bottle#: 4 Worklist Smp#: 6

Purge Vol: 25.000 mL

Dil. Factor: 1.0000

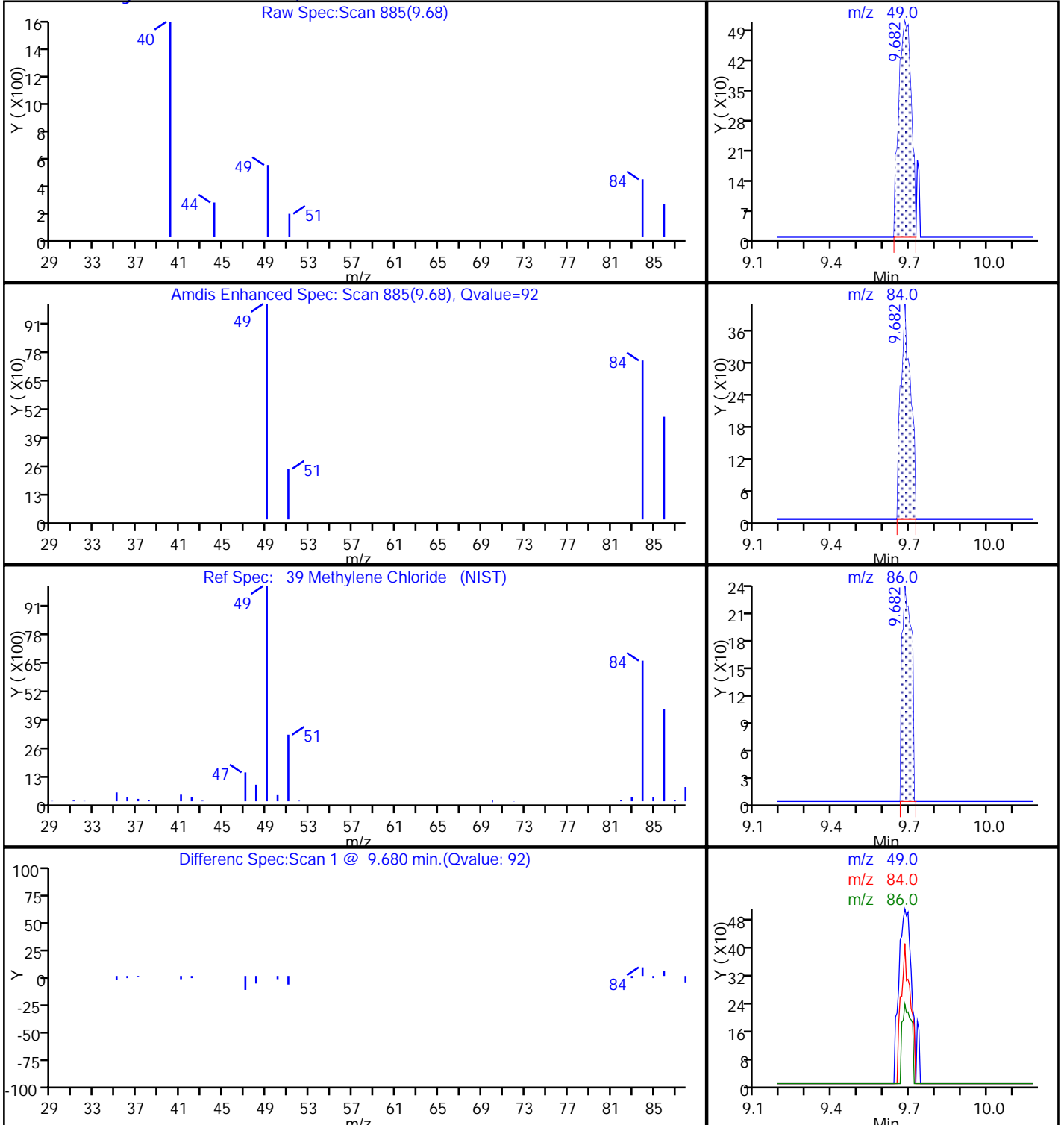
Method: TO15_ATMS6

Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm)

Detector: MS SCAN

39 Methylene Chloride, CAS: 75-09-2



TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS6\20170828-47203.b\MS6082806.D

Injection Date: 28-Aug-2017 16:38:30

Instrument ID: ATMS6

Lims ID: 320-30918-A-1

Lab Sample ID: 320-30918-1

Client ID: 34000168

Operator ID: LHS

ALS Bottle#: 4 Worklist Smp#: 6

Purge Vol: 25.000 mL

Dil. Factor: 1.0000

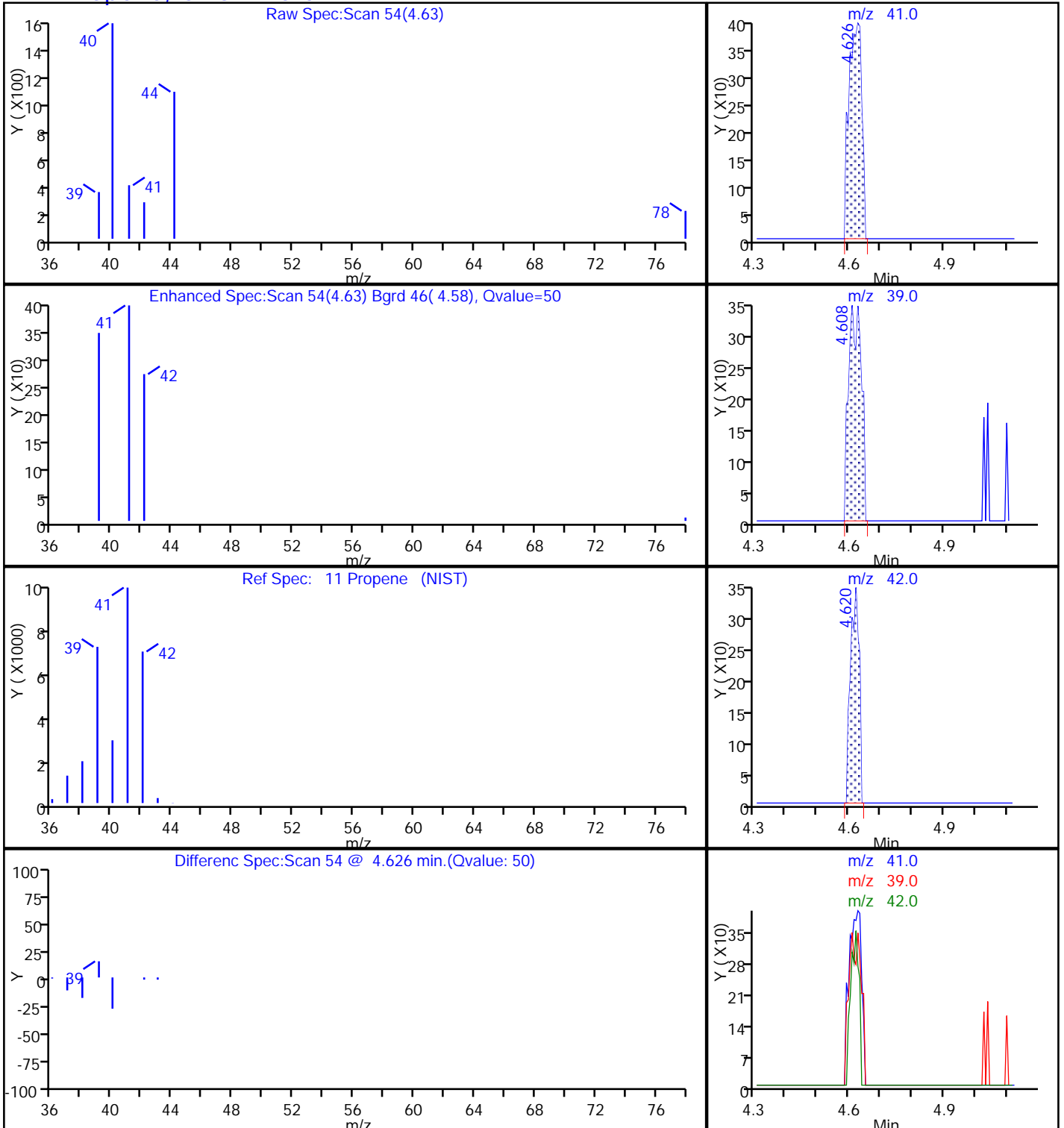
Method: TO15_ATMS6

Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm)

Detector: MS SCAN

11 Propene, CAS: 115-07-1



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

TestAmerica Job ID: 320-32763-1
Client Project/Site: NuStar Vapor Testing

For:
Apex Companies LLC
3015 SW 1st Avenue
Portland, Oregon 97201

Attn: Heather Gosack



Authorized for release by:
11/9/2017 4:37:47 PM

Cathy Gamble, Project Manager I
(253)922-2310
cathy.gamble@testamericainc.com

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32763-1

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32763-1

Job ID: 320-32763-1

Laboratory: TestAmerica Sacramento

Narrative

Receipt

The samples were received on 10/27/2017 10:10 AM; the samples arrived in good condition, properly preserved and, where required, on ice.

Air - GC/MS VOA

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

VOA Prep

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

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Detection Summary

Client: Apex Companies LLC
 Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32763-1

Client Sample ID: SVE_SOUTH_PRECARBON_102617

Lab Sample ID: 320-32763-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	12		9.8		ppb v/v	32.6		TO-15	Total/NA
cis-1,2-Dichloroethene	58		13		ppb v/v	32.6		TO-15	Total/NA
Tetrachloroethene	2000		13		ppb v/v	32.6		TO-15	Total/NA
Trichloroethene	130		13		ppb v/v	32.6		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	64		53		ug/m3 Air	32.6		TO-15	Total/NA
cis-1,2-Dichloroethene	230		52		ug/m3 Air	32.6		TO-15	Total/NA
Tetrachloroethene	13000		88		ug/m3 Air	32.6		TO-15	Total/NA
Trichloroethene	700		70		ug/m3 Air	32.6		TO-15	Total/NA

Client Sample ID: SVE_SOUTH_POSTCARBON_102617

Lab Sample ID: 320-32763-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	0.72		0.30		ppb v/v	1		TO-15	Total/NA
1,1-Dichloroethane	0.50		0.30		ppb v/v	1		TO-15	Total/NA
1,1-Dichloroethene	3.8		0.80		ppb v/v	1		TO-15	Total/NA
cis-1,2-Dichloroethene	25		0.40		ppb v/v	1		TO-15	Total/NA
Methylene Chloride	0.46		0.40		ppb v/v	1		TO-15	Total/NA
Tetrachloroethene	1.4		0.40		ppb v/v	1		TO-15	Total/NA
trans-1,2-Dichloroethene	0.54		0.40		ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.81		0.40		ppb v/v	1		TO-15	Total/NA
Vinyl chloride	0.58		0.40		ppb v/v	1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	3.9		1.6		ug/m3 Air	1		TO-15	Total/NA
1,1-Dichloroethane	2.0		1.2		ug/m3 Air	1		TO-15	Total/NA
1,1-Dichloroethene	15		3.2		ug/m3 Air	1		TO-15	Total/NA
cis-1,2-Dichloroethene	98		1.6		ug/m3 Air	1		TO-15	Total/NA
Methylene Chloride	1.6		1.4		ug/m3 Air	1		TO-15	Total/NA
Tetrachloroethene	9.7		2.7		ug/m3 Air	1		TO-15	Total/NA
trans-1,2-Dichloroethene	2.1		1.6		ug/m3 Air	1		TO-15	Total/NA
Trichlorofluoromethane	4.5		2.2		ug/m3 Air	1		TO-15	Total/NA
Vinyl chloride	1.5		1.0		ug/m3 Air	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

Client: Apex Companies LLC
 Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32763-1

Client Sample ID: SVE_SOUTH_PRECARBON_102617

Lab Sample ID: 320-32763-1

Date Collected: 10/26/17 08:20

Matrix: Air

Date Received: 10/27/17 10:10

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	12		9.8		ppb v/v			10/31/17 16:53	32.6
1,1,2,2-Tetrachloroethane	ND		13		ppb v/v			10/31/17 16:53	32.6
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		13		ppb v/v			10/31/17 16:53	32.6
1,1,2-Trichloroethane	ND		13		ppb v/v			10/31/17 16:53	32.6
1,1-Dichloroethane	ND		9.8		ppb v/v			10/31/17 16:53	32.6
1,1-Dichloroethene	ND		26		ppb v/v			10/31/17 16:53	32.6
1,2,4-Trichlorobenzene	ND		65		ppb v/v			10/31/17 16:53	32.6
1,2,4-Trimethylbenzene	ND		26		ppb v/v			10/31/17 16:53	32.6
1,2-Dibromoethane (EDB)	ND		26		ppb v/v			10/31/17 16:53	32.6
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		13		ppb v/v			10/31/17 16:53	32.6
1,2-Dichlorobenzene	ND		13		ppb v/v			10/31/17 16:53	32.6
1,2-Dichloroethane	ND		26		ppb v/v			10/31/17 16:53	32.6
1,2-Dichloropropane	ND		13		ppb v/v			10/31/17 16:53	32.6
1,3,5-Trimethylbenzene	ND		13		ppb v/v			10/31/17 16:53	32.6
1,3-Dichlorobenzene	ND		13		ppb v/v			10/31/17 16:53	32.6
1,4-Dichlorobenzene	ND		13		ppb v/v			10/31/17 16:53	32.6
2-Butanone (MEK)	ND		26		ppb v/v			10/31/17 16:53	32.6
2-Hexanone	ND		13		ppb v/v			10/31/17 16:53	32.6
4-Ethyltoluene	ND		13		ppb v/v			10/31/17 16:53	32.6
4-Methyl-2-pentanone (MIBK)	ND		13		ppb v/v			10/31/17 16:53	32.6
Acetone	ND		160		ppb v/v			10/31/17 16:53	32.6
Benzene	ND		13		ppb v/v			10/31/17 16:53	32.6
Benzyl chloride	ND		26		ppb v/v			10/31/17 16:53	32.6
Bromodichloromethane	ND		9.8		ppb v/v			10/31/17 16:53	32.6
Bromoform	ND		13		ppb v/v			10/31/17 16:53	32.6
Bromomethane	ND		26		ppb v/v			10/31/17 16:53	32.6
Carbon disulfide	ND		26		ppb v/v			10/31/17 16:53	32.6
Carbon tetrachloride	ND		26		ppb v/v			10/31/17 16:53	32.6
Chlorobenzene	ND		9.8		ppb v/v			10/31/17 16:53	32.6
Chloroethane	ND		26		ppb v/v			10/31/17 16:53	32.6
Chloroform	ND		9.8		ppb v/v			10/31/17 16:53	32.6
Chloromethane	ND		26		ppb v/v			10/31/17 16:53	32.6
cis-1,2-Dichloroethene	58		13		ppb v/v			10/31/17 16:53	32.6
cis-1,3-Dichloropropene	ND		13		ppb v/v			10/31/17 16:53	32.6
Dibromochloromethane	ND		13		ppb v/v			10/31/17 16:53	32.6
Dichlorodifluoromethane	ND		13		ppb v/v			10/31/17 16:53	32.6
Ethylbenzene	ND		13		ppb v/v			10/31/17 16:53	32.6
Hexachlorobutadiene	ND		65		ppb v/v			10/31/17 16:53	32.6
m,p-Xylene	ND		26		ppb v/v			10/31/17 16:53	32.6
Methylene Chloride	ND		13		ppb v/v			10/31/17 16:53	32.6
o-Xylene	ND		13		ppb v/v			10/31/17 16:53	32.6
Styrene	ND		13		ppb v/v			10/31/17 16:53	32.6
Tetrachloroethene	2000		13		ppb v/v			10/31/17 16:53	32.6
Toluene	ND		13		ppb v/v			10/31/17 16:53	32.6
trans-1,2-Dichloroethene	ND		13		ppb v/v			10/31/17 16:53	32.6
trans-1,3-Dichloropropene	ND		13		ppb v/v			10/31/17 16:53	32.6
Trichloroethene	130		13		ppb v/v			10/31/17 16:53	32.6
Trichlorofluoromethane	ND		13		ppb v/v			10/31/17 16:53	32.6

TestAmerica Sacramento

Client Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32763-1

Client Sample ID: SVE_SOUTH_PRECARBON_102617

Lab Sample ID: 320-32763-1

Date Collected: 10/26/17 08:20

Matrix: Air

Date Received: 10/27/17 10:10

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl acetate	ND		26		ppb v/v			10/31/17 16:53	32.6
Vinyl chloride	ND		13		ppb v/v			10/31/17 16:53	32.6
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	64		53		ug/m3 Air			10/31/17 16:53	32.6
1,1,2,2-Tetrachloroethane	ND		90		ug/m3 Air			10/31/17 16:53	32.6
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		100		ug/m3 Air			10/31/17 16:53	32.6
1,1,2-Trichloroethane	ND		71		ug/m3 Air			10/31/17 16:53	32.6
1,1-Dichloroethane	ND		40		ug/m3 Air			10/31/17 16:53	32.6
1,1-Dichloroethene	ND		100		ug/m3 Air			10/31/17 16:53	32.6
1,2,4-Trichlorobenzene	ND		480		ug/m3 Air			10/31/17 16:53	32.6
1,2,4-Trimethylbenzene	ND		130		ug/m3 Air			10/31/17 16:53	32.6
1,2-Dibromoethane (EDB)	ND		200		ug/m3 Air			10/31/17 16:53	32.6
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		91		ug/m3 Air			10/31/17 16:53	32.6
1,2-Dichlorobenzene	ND		78		ug/m3 Air			10/31/17 16:53	32.6
1,2-Dichloroethane	ND		110		ug/m3 Air			10/31/17 16:53	32.6
1,2-Dichloropropane	ND		60		ug/m3 Air			10/31/17 16:53	32.6
1,3,5-Trimethylbenzene	ND		64		ug/m3 Air			10/31/17 16:53	32.6
1,3-Dichlorobenzene	ND		78		ug/m3 Air			10/31/17 16:53	32.6
1,4-Dichlorobenzene	ND		78		ug/m3 Air			10/31/17 16:53	32.6
2-Butanone (MEK)	ND		77		ug/m3 Air			10/31/17 16:53	32.6
2-Hexanone	ND		53		ug/m3 Air			10/31/17 16:53	32.6
4-Ethyltoluene	ND		64		ug/m3 Air			10/31/17 16:53	32.6
4-Methyl-2-pentanone (MIBK)	ND		53		ug/m3 Air			10/31/17 16:53	32.6
Acetone	ND		390		ug/m3 Air			10/31/17 16:53	32.6
Benzene	ND		42		ug/m3 Air			10/31/17 16:53	32.6
Benzyl chloride	ND		140		ug/m3 Air			10/31/17 16:53	32.6
Bromodichloromethane	ND		66		ug/m3 Air			10/31/17 16:53	32.6
Bromoform	ND		130		ug/m3 Air			10/31/17 16:53	32.6
Bromomethane	ND		100		ug/m3 Air			10/31/17 16:53	32.6
Carbon disulfide	ND		81		ug/m3 Air			10/31/17 16:53	32.6
Carbon tetrachloride	ND		160		ug/m3 Air			10/31/17 16:53	32.6
Chlorobenzene	ND		45		ug/m3 Air			10/31/17 16:53	32.6
Chloroethane	ND		69		ug/m3 Air			10/31/17 16:53	32.6
Chloroform	ND		48		ug/m3 Air			10/31/17 16:53	32.6
Chloromethane	ND		54		ug/m3 Air			10/31/17 16:53	32.6
cis-1,2-Dichloroethene	230		52		ug/m3 Air			10/31/17 16:53	32.6
cis-1,3-Dichloropropene	ND		59		ug/m3 Air			10/31/17 16:53	32.6
Dibromochloromethane	ND		110		ug/m3 Air			10/31/17 16:53	32.6
Dichlorodifluoromethane	ND		64		ug/m3 Air			10/31/17 16:53	32.6
Ethylbenzene	ND		57		ug/m3 Air			10/31/17 16:53	32.6
Hexachlorobutadiene	ND		700		ug/m3 Air			10/31/17 16:53	32.6
m,p-Xylene	ND		110		ug/m3 Air			10/31/17 16:53	32.6
Methylene Chloride	ND		45		ug/m3 Air			10/31/17 16:53	32.6
o-Xylene	ND		57		ug/m3 Air			10/31/17 16:53	32.6
Styrene	ND		56		ug/m3 Air			10/31/17 16:53	32.6
Tetrachloroethene	13000		88		ug/m3 Air			10/31/17 16:53	32.6
Toluene	ND		49		ug/m3 Air			10/31/17 16:53	32.6
trans-1,2-Dichloroethene	ND		52		ug/m3 Air			10/31/17 16:53	32.6

TestAmerica Sacramento

Client Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32763-1

Client Sample ID: SVE_SOUTH_PRECARBON_102617

Lab Sample ID: 320-32763-1

Date Collected: 10/26/17 08:20

Matrix: Air

Date Received: 10/27/17 10:10

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
trans-1,3-Dichloropropene	ND		59		ug/m3 Air			10/31/17 16:53	32.6
Trichloroethene	700		70		ug/m3 Air			10/31/17 16:53	32.6
Trichlorofluoromethane	ND		73		ug/m3 Air			10/31/17 16:53	32.6
Vinyl acetate	ND		92		ug/m3 Air			10/31/17 16:53	32.6
Vinyl chloride	ND		33		ug/m3 Air			10/31/17 16:53	32.6
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	102		70 - 130					10/31/17 16:53	32.6
4-Bromofluorobenzene (Surr)	96		70 - 130					10/31/17 16:53	32.6
Toluene-d8 (Surr)	102		70 - 130					10/31/17 16:53	32.6

Client Sample ID: SVE_SOUTH_POSTCARBON_102617

Lab Sample ID: 320-32763-2

Date Collected: 10/26/17 08:22

Matrix: Air

Date Received: 10/27/17 10:10

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	0.72		0.30		ppb v/v			10/31/17 17:48	1
1,1,2,2-Tetrachloroethane	ND		0.40		ppb v/v			10/31/17 17:48	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40		ppb v/v			10/31/17 17:48	1
1,1,2-Trichloroethane	ND		0.40		ppb v/v			10/31/17 17:48	1
1,1-Dichloroethane	0.50		0.30		ppb v/v			10/31/17 17:48	1
1,1-Dichloroethene	3.8		0.80		ppb v/v			10/31/17 17:48	1
1,2,4-Trichlorobenzene	ND		2.0		ppb v/v			10/31/17 17:48	1
1,2,4-Trimethylbenzene	ND		0.80		ppb v/v			10/31/17 17:48	1
1,2-Dibromoethane (EDB)	ND		0.80		ppb v/v			10/31/17 17:48	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40		ppb v/v			10/31/17 17:48	1
1,2-Dichlorobenzene	ND		0.40		ppb v/v			10/31/17 17:48	1
1,2-Dichloroethane	ND		0.80		ppb v/v			10/31/17 17:48	1
1,2-Dichloropropane	ND		0.40		ppb v/v			10/31/17 17:48	1
1,3,5-Trimethylbenzene	ND		0.40		ppb v/v			10/31/17 17:48	1
1,3-Dichlorobenzene	ND		0.40		ppb v/v			10/31/17 17:48	1
1,4-Dichlorobenzene	ND		0.40		ppb v/v			10/31/17 17:48	1
2-Butanone (MEK)	ND		0.80		ppb v/v			10/31/17 17:48	1
2-Hexanone	ND		0.40		ppb v/v			10/31/17 17:48	1
4-Ethyltoluene	ND		0.40		ppb v/v			10/31/17 17:48	1
4-Methyl-2-pentanone (MIBK)	ND		0.40		ppb v/v			10/31/17 17:48	1
Acetone	ND		5.0		ppb v/v			10/31/17 17:48	1
Benzene	ND		0.40		ppb v/v			10/31/17 17:48	1
Benzyl chloride	ND		0.80		ppb v/v			10/31/17 17:48	1
Bromodichloromethane	ND		0.30		ppb v/v			10/31/17 17:48	1
Bromoform	ND		0.40		ppb v/v			10/31/17 17:48	1
Bromomethane	ND		0.80		ppb v/v			10/31/17 17:48	1
Carbon disulfide	ND		0.80		ppb v/v			10/31/17 17:48	1
Carbon tetrachloride	ND		0.80		ppb v/v			10/31/17 17:48	1
Chlorobenzene	ND		0.30		ppb v/v			10/31/17 17:48	1
Chloroethane	ND		0.80		ppb v/v			10/31/17 17:48	1
Chloroform	ND		0.30		ppb v/v			10/31/17 17:48	1

TestAmerica Sacramento

Client Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32763-1

Client Sample ID: SVE_SOUTH_POSTCARBON_102617

Lab Sample ID: 320-32763-2

Date Collected: 10/26/17 08:22

Matrix: Air

Date Received: 10/27/17 10:10

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloromethane	ND		0.80		ppb v/v			10/31/17 17:48	1
cis-1,2-Dichloroethene	25		0.40		ppb v/v			10/31/17 17:48	1
cis-1,3-Dichloropropene	ND		0.40		ppb v/v			10/31/17 17:48	1
Dibromochloromethane	ND		0.40		ppb v/v			10/31/17 17:48	1
Dichlorodifluoromethane	ND		0.40		ppb v/v			10/31/17 17:48	1
Ethylbenzene	ND		0.40		ppb v/v			10/31/17 17:48	1
Hexachlorobutadiene	ND		2.0		ppb v/v			10/31/17 17:48	1
m,p-Xylene	ND		0.80		ppb v/v			10/31/17 17:48	1
Methylene Chloride	0.46		0.40		ppb v/v			10/31/17 17:48	1
o-Xylene	ND		0.40		ppb v/v			10/31/17 17:48	1
Styrene	ND		0.40		ppb v/v			10/31/17 17:48	1
Tetrachloroethene	1.4		0.40		ppb v/v			10/31/17 17:48	1
Toluene	ND		0.40		ppb v/v			10/31/17 17:48	1
trans-1,2-Dichloroethene	0.54		0.40		ppb v/v			10/31/17 17:48	1
trans-1,3-Dichloropropene	ND		0.40		ppb v/v			10/31/17 17:48	1
Trichloroethene	ND		0.40		ppb v/v			10/31/17 17:48	1
Trichlorofluoromethane	0.81		0.40		ppb v/v			10/31/17 17:48	1
Vinyl acetate	ND		0.80		ppb v/v			10/31/17 17:48	1
Vinyl chloride	0.58		0.40		ppb v/v			10/31/17 17:48	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	3.9		1.6		ug/m3 Air			10/31/17 17:48	1
1,1,2,2-Tetrachloroethane	ND		2.7		ug/m3 Air			10/31/17 17:48	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1		ug/m3 Air			10/31/17 17:48	1
1,1,2-Trichloroethane	ND		2.2		ug/m3 Air			10/31/17 17:48	1
1,1-Dichloroethane	2.0		1.2		ug/m3 Air			10/31/17 17:48	1
1,1-Dichloroethane	15		3.2		ug/m3 Air			10/31/17 17:48	1
1,2,4-Trichlorobenzene	ND		15		ug/m3 Air			10/31/17 17:48	1
1,2,4-Trimethylbenzene	ND		3.9		ug/m3 Air			10/31/17 17:48	1
1,2-Dibromoethane (EDB)	ND		6.1		ug/m3 Air			10/31/17 17:48	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8		ug/m3 Air			10/31/17 17:48	1
1,2-Dichlorobenzene	ND		2.4		ug/m3 Air			10/31/17 17:48	1
1,2-Dichloroethane	ND		3.2		ug/m3 Air			10/31/17 17:48	1
1,2-Dichloropropane	ND		1.8		ug/m3 Air			10/31/17 17:48	1
1,3,5-Trimethylbenzene	ND		2.0		ug/m3 Air			10/31/17 17:48	1
1,3-Dichlorobenzene	ND		2.4		ug/m3 Air			10/31/17 17:48	1
1,4-Dichlorobenzene	ND		2.4		ug/m3 Air			10/31/17 17:48	1
2-Butanone (MEK)	ND		2.4		ug/m3 Air			10/31/17 17:48	1
2-Hexanone	ND		1.6		ug/m3 Air			10/31/17 17:48	1
4-Ethyltoluene	ND		2.0		ug/m3 Air			10/31/17 17:48	1
4-Methyl-2-pentanone (MIBK)	ND		1.6		ug/m3 Air			10/31/17 17:48	1
Acetone	ND		12		ug/m3 Air			10/31/17 17:48	1
Benzene	ND		1.3		ug/m3 Air			10/31/17 17:48	1
Benzyl chloride	ND		4.1		ug/m3 Air			10/31/17 17:48	1
Bromodichloromethane	ND		2.0		ug/m3 Air			10/31/17 17:48	1
Bromoform	ND		4.1		ug/m3 Air			10/31/17 17:48	1
Bromomethane	ND		3.1		ug/m3 Air			10/31/17 17:48	1
Carbon disulfide	ND		2.5		ug/m3 Air			10/31/17 17:48	1
Carbon tetrachloride	ND		5.0		ug/m3 Air			10/31/17 17:48	1

TestAmerica Sacramento

Client Sample Results

Client: Apex Companies LLC
 Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32763-1

Client Sample ID: SVE_SOUTH_POSTCARBON_102617

Lab Sample ID: 320-32763-2

Date Collected: 10/26/17 08:22

Matrix: Air

Date Received: 10/27/17 10:10

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorobenzene	ND		1.4		ug/m3 Air			10/31/17 17:48	1
Chloroethane	ND		2.1		ug/m3 Air			10/31/17 17:48	1
Chloroform	ND		1.5		ug/m3 Air			10/31/17 17:48	1
Chloromethane	ND		1.7		ug/m3 Air			10/31/17 17:48	1
cis-1,2-Dichloroethene	98		1.6		ug/m3 Air			10/31/17 17:48	1
cis-1,3-Dichloropropene	ND		1.8		ug/m3 Air			10/31/17 17:48	1
Dibromochloromethane	ND		3.4		ug/m3 Air			10/31/17 17:48	1
Dichlorodifluoromethane	ND		2.0		ug/m3 Air			10/31/17 17:48	1
Ethylbenzene	ND		1.7		ug/m3 Air			10/31/17 17:48	1
Hexachlorobutadiene	ND		21		ug/m3 Air			10/31/17 17:48	1
m,p-Xylene	ND		3.5		ug/m3 Air			10/31/17 17:48	1
Methylene Chloride	1.6		1.4		ug/m3 Air			10/31/17 17:48	1
o-Xylene	ND		1.7		ug/m3 Air			10/31/17 17:48	1
Styrene	ND		1.7		ug/m3 Air			10/31/17 17:48	1
Tetrachloroethene	9.7		2.7		ug/m3 Air			10/31/17 17:48	1
Toluene	ND		1.5		ug/m3 Air			10/31/17 17:48	1
trans-1,2-Dichloroethene	2.1		1.6		ug/m3 Air			10/31/17 17:48	1
trans-1,3-Dichloropropene	ND		1.8		ug/m3 Air			10/31/17 17:48	1
Trichloroethene	ND		2.1		ug/m3 Air			10/31/17 17:48	1
Trichlorofluoromethane	4.5		2.2		ug/m3 Air			10/31/17 17:48	1
Vinyl acetate	ND		2.8		ug/m3 Air			10/31/17 17:48	1
Vinyl chloride	1.5		1.0		ug/m3 Air			10/31/17 17:48	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	102		70 - 130					10/31/17 17:48	1
4-Bromofluorobenzene (Surr)	99		70 - 130					10/31/17 17:48	1
Toluene-d8 (Surr)	100		70 - 130					10/31/17 17:48	1

Surrogate Summary

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32763-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Matrix: Air

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	12DCE (70-130)	BFB (70-130)	TOL (70-130)
320-32763-1	SVE_SOUTH_PRECARBON_10	102	96	102
320-32763-2	SVE_SOUTH_POSTCARBON_02617	102	99	100
LCS 320-192086/3	Lab Control Sample	103	102	99
LCSD 320-192086/4	Lab Control Sample Dup	104	102	102
MB 320-192086/6	Method Blank	103	99	102

Surrogate Legend

12DCE = 1,2-Dichloroethane-d4 (Surr)

BFB = 4-Bromofluorobenzene (Surr)

TOL = Toluene-d8 (Surr)

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32763-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Lab Sample ID: MB 320-192086/6

Matrix: Air

Analysis Batch: 192086

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.30		ppb v/v			10/31/17 15:07	1
1,1,2,2-Tetrachloroethane	ND		0.40		ppb v/v			10/31/17 15:07	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40		ppb v/v			10/31/17 15:07	1
1,1,2-Trichloroethane	ND		0.40		ppb v/v			10/31/17 15:07	1
1,1-Dichloroethane	ND		0.30		ppb v/v			10/31/17 15:07	1
1,1-Dichloroethene	ND		0.80		ppb v/v			10/31/17 15:07	1
1,2,4-Trichlorobenzene	ND		2.0		ppb v/v			10/31/17 15:07	1
1,2,4-Trimethylbenzene	ND		0.80		ppb v/v			10/31/17 15:07	1
1,2-Dibromoethane (EDB)	ND		0.80		ppb v/v			10/31/17 15:07	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40		ppb v/v			10/31/17 15:07	1
1,2-Dichlorobenzene	ND		0.40		ppb v/v			10/31/17 15:07	1
1,2-Dichloroethane	ND		0.80		ppb v/v			10/31/17 15:07	1
1,2-Dichloropropane	ND		0.40		ppb v/v			10/31/17 15:07	1
1,3,5-Trimethylbenzene	ND		0.40		ppb v/v			10/31/17 15:07	1
1,3-Dichlorobenzene	ND		0.40		ppb v/v			10/31/17 15:07	1
1,4-Dichlorobenzene	ND		0.40		ppb v/v			10/31/17 15:07	1
2-Butanone (MEK)	ND		0.80		ppb v/v			10/31/17 15:07	1
2-Hexanone	ND		0.40		ppb v/v			10/31/17 15:07	1
4-Ethyltoluene	ND		0.40		ppb v/v			10/31/17 15:07	1
4-Methyl-2-pentanone (MIBK)	ND		0.40		ppb v/v			10/31/17 15:07	1
Acetone	ND		5.0		ppb v/v			10/31/17 15:07	1
Benzene	ND		0.40		ppb v/v			10/31/17 15:07	1
Benzyl chloride	ND		0.80		ppb v/v			10/31/17 15:07	1
Bromodichloromethane	ND		0.30		ppb v/v			10/31/17 15:07	1
Bromoform	ND		0.40		ppb v/v			10/31/17 15:07	1
Bromomethane	ND		0.80		ppb v/v			10/31/17 15:07	1
Carbon disulfide	ND		0.80		ppb v/v			10/31/17 15:07	1
Carbon tetrachloride	ND		0.80		ppb v/v			10/31/17 15:07	1
Chlorobenzene	ND		0.30		ppb v/v			10/31/17 15:07	1
Chloroethane	ND		0.80		ppb v/v			10/31/17 15:07	1
Chloroform	ND		0.30		ppb v/v			10/31/17 15:07	1
Chloromethane	ND		0.80		ppb v/v			10/31/17 15:07	1
cis-1,2-Dichloroethene	ND		0.40		ppb v/v			10/31/17 15:07	1
cis-1,3-Dichloropropene	ND		0.40		ppb v/v			10/31/17 15:07	1
Dibromochloromethane	ND		0.40		ppb v/v			10/31/17 15:07	1
Dichlorodifluoromethane	ND		0.40		ppb v/v			10/31/17 15:07	1
Ethylbenzene	ND		0.40		ppb v/v			10/31/17 15:07	1
Hexachlorobutadiene	ND		2.0		ppb v/v			10/31/17 15:07	1
m,p-Xylene	ND		0.80		ppb v/v			10/31/17 15:07	1
Methylene Chloride	ND		0.40		ppb v/v			10/31/17 15:07	1
o-Xylene	ND		0.40		ppb v/v			10/31/17 15:07	1
Styrene	ND		0.40		ppb v/v			10/31/17 15:07	1
Tetrachloroethene	ND		0.40		ppb v/v			10/31/17 15:07	1
Toluene	ND		0.40		ppb v/v			10/31/17 15:07	1
trans-1,2-Dichloroethene	ND		0.40		ppb v/v			10/31/17 15:07	1
trans-1,3-Dichloropropene	ND		0.40		ppb v/v			10/31/17 15:07	1
Trichloroethene	ND		0.40		ppb v/v			10/31/17 15:07	1
Trichlorofluoromethane	ND		0.40		ppb v/v			10/31/17 15:07	1

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
 Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32763-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 320-192086/6
Matrix: Air
Analysis Batch: 192086

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl acetate	ND		0.80		ppb v/v			10/31/17 15:07	1
Vinyl chloride	ND		0.40		ppb v/v			10/31/17 15:07	1
Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.6		ug/m3 Air			10/31/17 15:07	1
1,1,2,2-Tetrachloroethane	ND		2.7		ug/m3 Air			10/31/17 15:07	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1		ug/m3 Air			10/31/17 15:07	1
1,1,2-Trichloroethane	ND		2.2		ug/m3 Air			10/31/17 15:07	1
1,1-Dichloroethane	ND		1.2		ug/m3 Air			10/31/17 15:07	1
1,1-Dichloroethene	ND		3.2		ug/m3 Air			10/31/17 15:07	1
1,2,4-Trichlorobenzene	ND		15		ug/m3 Air			10/31/17 15:07	1
1,2,4-Trimethylbenzene	ND		3.9		ug/m3 Air			10/31/17 15:07	1
1,2-Dibromoethane (EDB)	ND		6.1		ug/m3 Air			10/31/17 15:07	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8		ug/m3 Air			10/31/17 15:07	1
1,2-Dichlorobenzene	ND		2.4		ug/m3 Air			10/31/17 15:07	1
1,2-Dichloroethane	ND		3.2		ug/m3 Air			10/31/17 15:07	1
1,2-Dichloropropane	ND		1.8		ug/m3 Air			10/31/17 15:07	1
1,3,5-Trimethylbenzene	ND		2.0		ug/m3 Air			10/31/17 15:07	1
1,3-Dichlorobenzene	ND		2.4		ug/m3 Air			10/31/17 15:07	1
1,4-Dichlorobenzene	ND		2.4		ug/m3 Air			10/31/17 15:07	1
2-Butanone (MEK)	ND		2.4		ug/m3 Air			10/31/17 15:07	1
2-Hexanone	ND		1.6		ug/m3 Air			10/31/17 15:07	1
4-Ethyltoluene	ND		2.0		ug/m3 Air			10/31/17 15:07	1
4-Methyl-2-pentanone (MIBK)	ND		1.6		ug/m3 Air			10/31/17 15:07	1
Acetone	ND		12		ug/m3 Air			10/31/17 15:07	1
Benzene	ND		1.3		ug/m3 Air			10/31/17 15:07	1
Benzyl chloride	ND		4.1		ug/m3 Air			10/31/17 15:07	1
Bromodichloromethane	ND		2.0		ug/m3 Air			10/31/17 15:07	1
Bromoform	ND		4.1		ug/m3 Air			10/31/17 15:07	1
Bromomethane	ND		3.1		ug/m3 Air			10/31/17 15:07	1
Carbon disulfide	ND		2.5		ug/m3 Air			10/31/17 15:07	1
Carbon tetrachloride	ND		5.0		ug/m3 Air			10/31/17 15:07	1
Chlorobenzene	ND		1.4		ug/m3 Air			10/31/17 15:07	1
Chloroethane	ND		2.1		ug/m3 Air			10/31/17 15:07	1
Chloroform	ND		1.5		ug/m3 Air			10/31/17 15:07	1
Chloromethane	ND		1.7		ug/m3 Air			10/31/17 15:07	1
cis-1,2-Dichloroethene	ND		1.6		ug/m3 Air			10/31/17 15:07	1
cis-1,3-Dichloropropene	ND		1.8		ug/m3 Air			10/31/17 15:07	1
Dibromochloromethane	ND		3.4		ug/m3 Air			10/31/17 15:07	1
Dichlorodifluoromethane	ND		2.0		ug/m3 Air			10/31/17 15:07	1
Ethylbenzene	ND		1.7		ug/m3 Air			10/31/17 15:07	1
Hexachlorobutadiene	ND		21		ug/m3 Air			10/31/17 15:07	1
m,p-Xylene	ND		3.5		ug/m3 Air			10/31/17 15:07	1
Methylene Chloride	ND		1.4		ug/m3 Air			10/31/17 15:07	1
o-Xylene	ND		1.7		ug/m3 Air			10/31/17 15:07	1
Styrene	ND		1.7		ug/m3 Air			10/31/17 15:07	1
Tetrachloroethene	ND		2.7		ug/m3 Air			10/31/17 15:07	1
Toluene	ND		1.5		ug/m3 Air			10/31/17 15:07	1

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32763-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 320-192086/6
Matrix: Air
Analysis Batch: 192086

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
trans-1,2-Dichloroethene	ND		1.6		ug/m3 Air			10/31/17 15:07	1
trans-1,3-Dichloropropene	ND		1.8		ug/m3 Air			10/31/17 15:07	1
Trichloroethene	ND		2.1		ug/m3 Air			10/31/17 15:07	1
Trichlorofluoromethane	ND		2.2		ug/m3 Air			10/31/17 15:07	1
Vinyl acetate	ND		2.8		ug/m3 Air			10/31/17 15:07	1
Vinyl chloride	ND		1.0		ug/m3 Air			10/31/17 15:07	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	103		70 - 130		10/31/17 15:07	1
4-Bromofluorobenzene (Surr)	99		70 - 130		10/31/17 15:07	1
Toluene-d8 (Surr)	102		70 - 130		10/31/17 15:07	1

Lab Sample ID: LCS 320-192086/3
Matrix: Air
Analysis Batch: 192086

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	20.0	19.6		ppb v/v		98	69 - 129
1,1,1,2-Tetrachloroethane	20.0	19.5		ppb v/v		98	64 - 124
1,1,1,2-Trichloro-1,2,2-trifluoroethane	20.0	19.5		ppb v/v		97	70 - 130
1,1,2-Trichloroethane	20.0	19.9		ppb v/v		99	64 - 124
1,1-Dichloroethane	20.0	20.0		ppb v/v		100	71 - 131
1,1-Dichloroethene	20.0	20.1		ppb v/v		100	72 - 132
1,2,4-Trichlorobenzene	20.0	19.5		ppb v/v		98	58 - 138
1,2,4-Trimethylbenzene	20.0	17.9		ppb v/v		90	60 - 132
1,2-Dibromoethane (EDB)	20.0	19.7		ppb v/v		98	64 - 124
1,2-Dichloro-1,1,1,2-tetrafluoroethane	20.0	19.6		ppb v/v		98	74 - 134
1,2-Dichlorobenzene	20.0	19.5		ppb v/v		98	62 - 126
1,2-Dichloroethane	20.0	19.8		ppb v/v		99	71 - 131
1,2-Dichloropropane	20.0	19.7		ppb v/v		99	72 - 132
1,3,5-Trimethylbenzene	20.0	19.8		ppb v/v		99	65 - 125
1,3-Dichlorobenzene	20.0	19.8		ppb v/v		99	59 - 130
1,4-Dichlorobenzene	20.0	19.8		ppb v/v		99	58 - 132
2-Butanone (MEK)	20.0	20.6		ppb v/v		103	73 - 133
2-Hexanone	20.0	19.1		ppb v/v		95	69 - 129
4-Ethyltoluene	20.0	18.6		ppb v/v		93	66 - 129
4-Methyl-2-pentanone (MIBK)	20.0	18.7		ppb v/v		93	74 - 134
Acetone	20.0	20.3		ppb v/v		101	65 - 125
Benzene	20.0	19.6		ppb v/v		98	68 - 128
Benzyl chloride	16.0	16.9		ppb v/v		106	67 - 127
Bromodichloromethane	20.0	19.7		ppb v/v		99	71 - 131
Bromoform	20.0	20.1		ppb v/v		100	66 - 126
Bromomethane	20.0	19.7		ppb v/v		98	73 - 134
Carbon disulfide	20.0	19.8		ppb v/v		99	71 - 131
Carbon tetrachloride	20.0	19.5		ppb v/v		98	63 - 126
Chlorobenzene	20.0	19.1		ppb v/v		96	63 - 123

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32763-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 320-192086/3

Matrix: Air

Analysis Batch: 192086

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloroethane	20.0	20.2		ppb v/v		101	73 - 133
Chloroform	20.0	19.7		ppb v/v		99	70 - 130
Chloromethane	20.0	19.1		ppb v/v		96	61 - 140
cis-1,2-Dichloroethene	20.0	20.2		ppb v/v		101	70 - 130
cis-1,3-Dichloropropene	20.0	19.7		ppb v/v		98	72 - 132
Dibromochloromethane	20.0	20.0		ppb v/v		100	66 - 126
Dichlorodifluoromethane	20.0	20.0		ppb v/v		100	69 - 129
Ethylbenzene	20.0	19.2		ppb v/v		96	64 - 124
Hexachlorobutadiene	20.0	19.1		ppb v/v		95	58 - 131
m,p-Xylene	40.0	38.5		ppb v/v		96	65 - 125
Methylene Chloride	20.0	20.3		ppb v/v		102	67 - 127
o-Xylene	20.0	19.4		ppb v/v		97	65 - 125
Styrene	20.0	19.9		ppb v/v		100	67 - 127
Tetrachloroethene	20.0	19.4		ppb v/v		97	63 - 123
Toluene	20.0	19.1		ppb v/v		95	68 - 128
trans-1,2-Dichloroethene	20.0	19.9		ppb v/v		100	72 - 132
trans-1,3-Dichloropropene	20.0	20.3		ppb v/v		101	66 - 126
Trichloroethene	20.0	19.5		ppb v/v		97	70 - 130
Trichlorofluoromethane	20.0	19.5		ppb v/v		98	71 - 131
Vinyl acetate	20.0	22.0		ppb v/v		110	65 - 134
Vinyl chloride	20.0	19.8		ppb v/v		99	59 - 152
Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	110	107		ug/m3 Air		98	69 - 129
1,1,1,2-Tetrachloroethane	140	134		ug/m3 Air		98	64 - 124
1,1,2-Trichloro-1,2,2-trifluoroethane	150	149		ug/m3 Air		97	70 - 130
1,1,2-Trichloroethane	110	108		ug/m3 Air		99	64 - 124
1,1-Dichloroethane	81	80.8		ug/m3 Air		100	71 - 131
1,1-Dichloroethene	79	79.7		ug/m3 Air		100	72 - 132
1,2,4-Trichlorobenzene	150	145		ug/m3 Air		98	58 - 138
1,2,4-Trimethylbenzene	98	88.0		ug/m3 Air		90	60 - 132
1,2-Dibromoethane (EDB)	150	151		ug/m3 Air		98	64 - 124
1,2-Dichloro-1,1,2,2-tetrafluoroethane	140	137		ug/m3 Air		98	74 - 134
1,2-Dichlorobenzene	120	117		ug/m3 Air		98	62 - 126
1,2-Dichloroethane	81	80.1		ug/m3 Air		99	71 - 131
1,2-Dichloropropane	92	91.0		ug/m3 Air		99	72 - 132
1,3,5-Trimethylbenzene	98	97.2		ug/m3 Air		99	65 - 125
1,3-Dichlorobenzene	120	119		ug/m3 Air		99	59 - 130
1,4-Dichlorobenzene	120	119		ug/m3 Air		99	58 - 132
2-Butanone (MEK)	59	60.7		ug/m3 Air		103	73 - 133
2-Hexanone	82	78.1		ug/m3 Air		95	69 - 129
4-Ethyltoluene	98	91.3		ug/m3 Air		93	66 - 129
4-Methyl-2-pentanone (MIBK)	82	76.4		ug/m3 Air		93	74 - 134
Acetone	48	48.2		ug/m3 Air		101	65 - 125
Benzene	64	62.6		ug/m3 Air		98	68 - 128
Benzyl chloride	83	87.4		ug/m3 Air		106	67 - 127
Bromodichloromethane	130	132		ug/m3 Air		99	71 - 131

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32763-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 320-192086/3

Matrix: Air

Analysis Batch: 192086

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Bromoform	210	207		ug/m3 Air		100	66 - 126
Bromomethane	78	76.4		ug/m3 Air		98	73 - 134
Carbon disulfide	62	61.5		ug/m3 Air		99	71 - 131
Carbon tetrachloride	130	123		ug/m3 Air		98	63 - 126
Chlorobenzene	92	88.0		ug/m3 Air		96	63 - 123
Chloroethane	53	53.4		ug/m3 Air		101	73 - 133
Chloroform	98	96.3		ug/m3 Air		99	70 - 130
Chloromethane	41	39.5		ug/m3 Air		96	61 - 140
cis-1,2-Dichloroethene	79	80.1		ug/m3 Air		101	70 - 130
cis-1,3-Dichloropropene	91	89.3		ug/m3 Air		98	72 - 132
Dibromochloromethane	170	171		ug/m3 Air		100	66 - 126
Dichlorodifluoromethane	99	98.7		ug/m3 Air		100	69 - 129
Ethylbenzene	87	83.4		ug/m3 Air		96	64 - 124
Hexachlorobutadiene	210	204		ug/m3 Air		95	58 - 131
m,p-Xylene	170	167		ug/m3 Air		96	65 - 125
Methylene Chloride	69	70.5		ug/m3 Air		102	67 - 127
o-Xylene	87	84.1		ug/m3 Air		97	65 - 125
Styrene	85	84.8		ug/m3 Air		100	67 - 127
Tetrachloroethene	140	131		ug/m3 Air		97	63 - 123
Toluene	75	71.8		ug/m3 Air		95	68 - 128
trans-1,2-Dichloroethene	79	78.9		ug/m3 Air		100	72 - 132
trans-1,3-Dichloropropene	91	92.1		ug/m3 Air		101	66 - 126
Trichloroethene	110	105		ug/m3 Air		97	70 - 130
Trichlorofluoromethane	110	110		ug/m3 Air		98	71 - 131
Vinyl acetate	70	77.5		ug/m3 Air		110	65 - 134
Vinyl chloride	51	50.6		ug/m3 Air		99	59 - 152

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	103		70 - 130
4-Bromofluorobenzene (Surr)	102		70 - 130
Toluene-d8 (Surr)	99		70 - 130

Lab Sample ID: LCSD 320-192086/4

Matrix: Air

Analysis Batch: 192086

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	20.0	19.5		ppb v/v		97	69 - 129	1	25
1,1,2,2-Tetrachloroethane	20.0	19.3		ppb v/v		97	64 - 124	1	25
1,1,2-Trichloro-1,2,2-trifluoroethane	20.0	19.4		ppb v/v		97	70 - 130	0	25
1,1,2-Trichloroethane	20.0	19.9		ppb v/v		99	64 - 124	0	25
1,1-Dichloroethane	20.0	20.0		ppb v/v		100	71 - 131	0	25
1,1-Dichloroethene	20.0	20.0		ppb v/v		100	72 - 132	0	25
1,2,4-Trichlorobenzene	20.0	19.4		ppb v/v		97	58 - 138	1	25
1,2,4-Trimethylbenzene	20.0	17.8		ppb v/v		89	60 - 132	1	25
1,2-Dibromoethane (EDB)	20.0	19.7		ppb v/v		99	64 - 124	0	25

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32763-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-192086/4

Client Sample ID: Lab Control Sample Dup

Matrix: Air

Prep Type: Total/NA

Analysis Batch: 192086

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2-Dichloro-1,1,2,2-tetrafluoroethane	20.0	19.7		ppb v/v		99	74 - 134	1	25
1,2-Dichlorobenzene	20.0	19.3		ppb v/v		96	62 - 126	1	25
1,2-Dichloroethane	20.0	19.7		ppb v/v		99	71 - 131	0	25
1,2-Dichloropropane	20.0	20.0		ppb v/v		100	72 - 132	2	25
1,3,5-Trimethylbenzene	20.0	19.6		ppb v/v		98	65 - 125	1	25
1,3-Dichlorobenzene	20.0	19.6		ppb v/v		98	59 - 130	1	25
1,4-Dichlorobenzene	20.0	19.7		ppb v/v		98	58 - 132	1	25
2-Butanone (MEK)	20.0	20.2		ppb v/v		101	73 - 133	2	25
2-Hexanone	20.0	19.1		ppb v/v		95	69 - 129	0	25
4-Ethyltoluene	20.0	18.4		ppb v/v		92	66 - 129	1	25
4-Methyl-2-pentanone (MIBK)	20.0	18.6		ppb v/v		93	74 - 134	1	25
Acetone	20.0	20.1		ppb v/v		100	65 - 125	1	25
Benzene	20.0	19.6		ppb v/v		98	68 - 128	0	25
Benzyl chloride	16.0	16.7		ppb v/v		104	67 - 127	1	25
Bromodichloromethane	20.0	19.7		ppb v/v		98	71 - 131	0	25
Bromoform	20.0	20.0		ppb v/v		100	66 - 126	1	25
Bromomethane	20.0	19.7		ppb v/v		98	73 - 134	0	25
Carbon disulfide	20.0	19.7		ppb v/v		98	71 - 131	0	25
Carbon tetrachloride	20.0	19.5		ppb v/v		97	63 - 126	0	25
Chlorobenzene	20.0	19.1		ppb v/v		95	63 - 123	0	25
Chloroethane	20.0	20.4		ppb v/v		102	73 - 133	1	25
Chloroform	20.0	19.6		ppb v/v		98	70 - 130	1	25
Chloromethane	20.0	18.9		ppb v/v		95	61 - 140	1	25
cis-1,2-Dichloroethene	20.0	20.0		ppb v/v		100	70 - 130	1	25
cis-1,3-Dichloropropene	20.0	19.7		ppb v/v		99	72 - 132	0	25
Dibromochloromethane	20.0	19.9		ppb v/v		99	66 - 126	1	25
Dichlorodifluoromethane	20.0	19.8		ppb v/v		99	69 - 129	1	25
Ethylbenzene	20.0	19.1		ppb v/v		95	64 - 124	1	25
Hexachlorobutadiene	20.0	18.9		ppb v/v		95	58 - 131	1	25
m,p-Xylene	40.0	38.4		ppb v/v		96	65 - 125	0	25
Methylene Chloride	20.0	20.1		ppb v/v		100	67 - 127	1	25
o-Xylene	20.0	19.3		ppb v/v		96	65 - 125	0	25
Styrene	20.0	19.9		ppb v/v		99	67 - 127	0	25
Tetrachloroethene	20.0	19.4		ppb v/v		97	63 - 123	0	25
Toluene	20.0	19.2		ppb v/v		96	68 - 128	1	25
trans-1,2-Dichloroethene	20.0	19.8		ppb v/v		99	72 - 132	1	25
trans-1,3-Dichloropropene	20.0	20.2		ppb v/v		101	66 - 126	0	25
Trichloroethene	20.0	19.6		ppb v/v		98	70 - 130	0	25
Trichlorofluoromethane	20.0	19.5		ppb v/v		98	71 - 131	0	25
Vinyl acetate	20.0	21.9		ppb v/v		109	65 - 134	1	25
Vinyl chloride	20.0	20.1		ppb v/v		100	59 - 152	1	25

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	110	106		ug/m3 Air		97	69 - 129	1	25
1,1,2,2-Tetrachloroethane	140	133		ug/m3 Air		97	64 - 124	1	25
1,1,2-Trichloro-1,2,2-trifluoroethane	150	149		ug/m3 Air		97	70 - 130	0	25
1,1,2-Trichloroethane	110	108		ug/m3 Air		99	64 - 124	0	25

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32763-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-192086/4

Client Sample ID: Lab Control Sample Dup

Matrix: Air

Prep Type: Total/NA

Analysis Batch: 192086

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1-Dichloroethane	81	81.1		ug/m3 Air		100	71 - 131	0	25
1,1-Dichloroethene	79	79.4		ug/m3 Air		100	72 - 132	0	25
1,2,4-Trichlorobenzene	150	144		ug/m3 Air		97	58 - 138	1	25
1,2,4-Trimethylbenzene	98	87.3		ug/m3 Air		89	60 - 132	1	25
1,2-Dibromoethane (EDB)	150	151		ug/m3 Air		99	64 - 124	0	25
1,2-Dichloro-1,1,2,2-tetrafluoroethane	140	138		ug/m3 Air		99	74 - 134	1	25
1,2-Dichlorobenzene	120	116		ug/m3 Air		96	62 - 126	1	25
1,2-Dichloroethane	81	79.8		ug/m3 Air		99	71 - 131	0	25
1,2-Dichloropropane	92	92.4		ug/m3 Air		100	72 - 132	2	25
1,3,5-Trimethylbenzene	98	96.6		ug/m3 Air		98	65 - 125	1	25
1,3-Dichlorobenzene	120	118		ug/m3 Air		98	59 - 130	1	25
1,4-Dichlorobenzene	120	118		ug/m3 Air		98	58 - 132	1	25
2-Butanone (MEK)	59	59.5		ug/m3 Air		101	73 - 133	2	25
2-Hexanone	82	78.1		ug/m3 Air		95	69 - 129	0	25
4-Ethyltoluene	98	90.3		ug/m3 Air		92	66 - 129	1	25
4-Methyl-2-pentanone (MIBK)	82	76.0		ug/m3 Air		93	74 - 134	1	25
Acetone	48	47.7		ug/m3 Air		100	65 - 125	1	25
Benzene	64	62.8		ug/m3 Air		98	68 - 128	0	25
Benzyl chloride	83	86.4		ug/m3 Air		104	67 - 127	1	25
Bromodichloromethane	130	132		ug/m3 Air		98	71 - 131	0	25
Bromoform	210	206		ug/m3 Air		100	66 - 126	1	25
Bromomethane	78	76.4		ug/m3 Air		98	73 - 134	0	25
Carbon disulfide	62	61.3		ug/m3 Air		98	71 - 131	0	25
Carbon tetrachloride	130	123		ug/m3 Air		97	63 - 126	0	25
Chlorobenzene	92	87.7		ug/m3 Air		95	63 - 123	0	25
Chloroethane	53	53.9		ug/m3 Air		102	73 - 133	1	25
Chloroform	98	95.7		ug/m3 Air		98	70 - 130	1	25
Chloromethane	41	39.1		ug/m3 Air		95	61 - 140	1	25
cis-1,2-Dichloroethene	79	79.4		ug/m3 Air		100	70 - 130	1	25
cis-1,3-Dichloropropene	91	89.5		ug/m3 Air		99	72 - 132	0	25
Dibromochloromethane	170	169		ug/m3 Air		99	66 - 126	1	25
Dichlorodifluoromethane	99	98.1		ug/m3 Air		99	69 - 129	1	25
Ethylbenzene	87	82.9		ug/m3 Air		95	64 - 124	1	25
Hexachlorobutadiene	210	202		ug/m3 Air		95	58 - 131	1	25
m,p-Xylene	170	167		ug/m3 Air		96	65 - 125	0	25
Methylene Chloride	69	69.6		ug/m3 Air		100	67 - 127	1	25
o-Xylene	87	83.7		ug/m3 Air		96	65 - 125	0	25
Styrene	85	84.6		ug/m3 Air		99	67 - 127	0	25
Tetrachloroethene	140	132		ug/m3 Air		97	63 - 123	0	25
Toluene	75	72.4		ug/m3 Air		96	68 - 128	1	25
trans-1,2-Dichloroethene	79	78.5		ug/m3 Air		99	72 - 132	1	25
trans-1,3-Dichloropropene	91	91.7		ug/m3 Air		101	66 - 126	0	25
Trichloroethene	110	105		ug/m3 Air		98	70 - 130	0	25
Trichlorofluoromethane	110	110		ug/m3 Air		98	71 - 131	0	25
Vinyl acetate	70	77.0		ug/m3 Air		109	65 - 134	1	25
Vinyl chloride	51	51.3		ug/m3 Air		100	59 - 152	1	25

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32763-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-192086/4

Matrix: Air

Analysis Batch: 192086

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Surrogate	LCSD		Limits
	%Recovery	Qualifier	
1,2-Dichloroethane-d4 (Surr)	104		70 - 130
4-Bromofluorobenzene (Surr)	102		70 - 130
Toluene-d8 (Surr)	102		70 - 130

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QC Association Summary

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32763-1

Air - GC/MS VOA

Analysis Batch: 192086

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-32763-1	SVE_SOUTH_PRECARBON_102617	Total/NA	Air	TO-15	
320-32763-2	SVE_SOUTH_POSTCARBON_102617	Total/NA	Air	TO-15	
MB 320-192086/6	Method Blank	Total/NA	Air	TO-15	
LCS 320-192086/3	Lab Control Sample	Total/NA	Air	TO-15	
LCSD 320-192086/4	Lab Control Sample Dup	Total/NA	Air	TO-15	

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Lab Chronicle

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32763-1

Client Sample ID: SVE_SOUTH_PRECARBON_102617

Lab Sample ID: 320-32763-1

Date Collected: 10/26/17 08:20

Matrix: Air

Date Received: 10/27/17 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		32.6	11.7 mL	250 mL	192086	10/31/17 16:53	HL1	TAL SAC

Client Sample ID: SVE_SOUTH_POSTCARBON_102617

Lab Sample ID: 320-32763-2

Date Collected: 10/26/17 08:22

Matrix: Air

Date Received: 10/27/17 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	370 mL	250 mL	192086	10/31/17 17:48	HL1	TAL SAC

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: Apex Companies LLC
 Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32763-1

Laboratory: TestAmerica Sacramento

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Alaska (UST)	State Program	10	UST-055	12-18-17
Arizona	State Program	9	AZ0708	08-11-18
Arkansas DEQ	State Program	6	88-0691	06-17-18
California	State Program	9	2897	01-31-18
Colorado	State Program	8	CA00044	08-31-18
Connecticut	State Program	1	PH-0691	06-30-19
Florida	NELAP	4	E87570	06-30-18
Georgia	State Program	4	N/A	01-28-19
Hawaii	State Program	9	N/A	01-29-18
Illinois	NELAP	5	200060	03-17-18
Kansas	NELAP	7	E-10375	10-31-17 *
L-A-B	DoD ELAP		L2468	01-20-18
Louisiana	NELAP	6	30612	06-30-18
Maine	State Program	1	CA0004	04-18-18
Michigan	State Program	5	9947	01-31-18
Nevada	State Program	9	CA00044	07-31-18
New Hampshire	NELAP	1	2997	04-18-18
New Jersey	NELAP	2	CA005	06-30-18
New York	NELAP	2	11666	04-01-18
Oregon	NELAP	10	4040	01-28-18
Pennsylvania	NELAP	3	68-01272	03-31-18
Texas	NELAP	6	T104704399	05-31-18
US Fish & Wildlife	Federal		LE148388-0	07-31-18
USDA	Federal		P330-11-00436	12-30-17
USEPA UCMR	Federal	1	CA00044	11-06-18
Utah	NELAP	8	CA00044	02-28-18
Virginia	NELAP	3	460278	03-14-18
Washington	State Program	10	C581	05-05-18
West Virginia (DW)	State Program	3	9930C	12-31-17
Wyoming	State Program	8	8TMS-L	01-28-19

Laboratory: TestAmerica Portland

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
N/A	N/A	N/A	None on record.	

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32763-1

Method	Method Description	Protocol	Laboratory
TO-15	Volatile Organic Compounds in Ambient Air	EPA	TAL SAC

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600



Sample Summary

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-32763-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-32763-1	SVE_SOUTH_PRECARBON_102617	Air	10/26/17 08:20	10/27/17 10:10
320-32763-2	SVE_SOUTH_POSTCARBON_102617	Air	10/26/17 08:22	10/27/17 10:10

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TestAmerica Sacramento
880 Riverside Parkway

West Sacramento, CA 95605
phone 916.374.4378 fax 916.372.1059

Canister Samples Chain of Custody Record

TestAmerica Laboratories, Inc. assumes no liability with respect to the collection and shipment of these samples.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Client Contact Information Company Name: Apex companies Address: 3015 SW 1st Ave City/State/Zip: Portland OR 97201 Phone: 503 924 4704 FAX: Project Name: Mustang Vancouver Site/Location: Vancouver WA P.O.#: 1126-20		Project Manager: Stephanie Salisbury Phone: 503 924 4704 Email: S.Salisbury@Apexcos.com Site Contact: TA Contact: Analysis Turnaround Time Standard (Specify): X Rush (Specify):		Project Manager: Kyle Kline Phone: 503 924 4704 Email: S.Salisbury@Apexcos.com Site Contact: TA Contact: Analysis Turnaround Time Standard (Specify): X Rush (Specify):		COG No.: _____ of _____ COCs For Lab Use Only: Walk-in Client: Lab Sampling: Job / SDG No.: (See below for Add'l Items)																			
Sample Identification	Sample Date(s)	Time Start	Time Stop	Canister Vacuum in Field, 'Hg (Start)	Canister Vacuum in Field, 'Hg (Stop)	Flow Controller ID	Canister ID	TO-15 (Med / Std / Low / SIM)		MA-APH	EPA 308	EPA 250 / 263	ASTM D-1946 / 1945 / 3588	EPA 15/16	TO-3	Other (Please specify in notes section)		Sample Type	Indoor Air	Ambient Air	Soil Gas	Landfill Gas	Other (Please specify in notes section)	Sample Specific Notes:	
								TO-15 (Med / Std / Low / SIM)	Canister ID																
SUE_South_Pre Carbon_102617	10/26/17	819	820	-30	-4	-	8156	X																	
SUE_South_Post Carbon_102617	10/26/17	821	822	-30	-4	-	8333	X																	
Temperature (Fahrenheit) Start Interior Ambient Stop Temperature (Fahrenheit) Start Interior Ambient Stop																									
Special Instructions/QC Requirements & Comments: Email Results to: S.Salisbury@Apexcos.com																									
Samples Shipped by: Kyle Kline Samples Relinquished by: [Signature]		Date Time: 10/26/17 0930 Date / Time:		Samples Received by: [Signature] Received by:		Date Time: 10/26/17 1145 Date / Time:																			
Relinquished by: [Signature] Lab Use Only:		Date Time: 10/26/17 1450 Date / Time:		Received by: [Signature] Condition:		Date Time: 10/27/17 1010 Date / Time:																			



320-32763 Chain of Custody



Login Sample Receipt Checklist

Client: Apex Companies LLC

Job Number: 320-32763-1

Login Number: 32763

List Source: TestAmerica Sacramento

List Number: 1

Creator: Nelson, Kym D

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	N/A	
Cooler Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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Certification Type TO-15 (SCANS)
 Date Cleaned/Batch ID 0091217 820-29838
 Date of QC 7/15/2017
 Data File Number C:\MSDCHEM\1\DATA\170715



→ MS7071521.d
CANISTER ID NUMBERS

<u>34000215</u>	<u>8333</u>	
<u>34000474</u>	<u>8156</u>	
<u>34002125</u>	<u>7856</u>	
<u>34001591</u>	<u>8245</u>	
<u>34001473</u>		
<u>34000202</u>		
<u>8186</u>		
<u>* 8126</u>		

The above canisters were cleaned as a batch. This certifies this batch contains no target analyte concentration greater than or equal to the method criteria for the "Certification Type" indicated above.

"*" INDICATES THE CAN OR CANS WHICH WERE SCREENED.

[Signature] 7/17/17
 1st level Reviewed By: Date:

 2nd level Reviewed By: Date:

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-29838-1
 SDG No.: _____
 Client Sample ID: 8126 Lab Sample ID: 320-29838-8
 Matrix: Air Lab File ID: MS7071521.D
 Analysis Method: TO-15 Date Collected: 07/12/2017 00:00
 Sample wt/vol: 500 (mL) Date Analyzed: 07/16/2017 04:40
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: RTX-Volatiles ID: 0.32 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 174300 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
67-64-1	Acetone	0.28	J	5.0	0.18
107-02-8	Acrolein	ND		2.0	0.22
107-13-1	Acrylonitrile	ND		2.0	0.19
107-05-1	Allyl chloride	ND		0.80	0.11
71-43-2	Benzene	ND		0.40	0.079
100-44-7	Benzyl chloride	ND		0.80	0.16
75-27-4	Bromodichloromethane	ND		0.30	0.066
75-25-2	Bromoform	ND		0.40	0.070
74-83-9	Bromomethane	ND		0.80	0.34
106-99-0	1,3-Butadiene	ND		0.80	0.15
106-97-8	n-Butane	ND		0.40	0.15
78-93-3	2-Butanone (MEK)	ND		0.80	0.20
75-65-0	tert-Butyl alcohol (TBA)	ND		2.0	0.11
104-51-8	n-Butylbenzene	ND		0.40	0.18
135-98-8	sec-Butylbenzene	ND		0.40	0.070
98-06-6	tert-Butylbenzene	ND		0.80	0.068
75-15-0	Carbon disulfide	ND		0.80	0.078
56-23-5	Carbon tetrachloride	ND		0.80	0.064
108-90-7	Chlorobenzene	ND		0.30	0.064
75-45-6	Chlorodifluoromethane	ND		0.80	0.27
75-00-3	Chloroethane	ND		0.80	0.31
67-66-3	Chloroform	ND		0.30	0.095
74-87-3	Chloromethane	ND		0.80	0.20
95-49-8	2-Chlorotoluene	ND		0.40	0.080
110-82-7	Cyclohexane	ND		0.40	0.084
124-48-1	Dibromochloromethane	ND		0.40	0.079
106-93-4	1,2-Dibromoethane (EDB)	ND		0.80	0.075
74-95-3	Dibromomethane	ND		0.40	0.057
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16
95-50-1	1,2-Dichlorobenzene	ND		0.40	0.13
541-73-1	1,3-Dichlorobenzene	ND		0.40	0.11
106-46-7	1,4-Dichlorobenzene	ND		0.40	0.15
75-71-8	Dichlorodifluoromethane	ND		0.40	0.15
75-34-3	1,1-Dichloroethane	ND		0.30	0.072
107-06-2	1,2-Dichloroethane	ND		0.80	0.088

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-29838-1
 SDG No.: _____
 Client Sample ID: 8126 Lab Sample ID: 320-29838-8
 Matrix: Air Lab File ID: MS7071521.D
 Analysis Method: TO-15 Date Collected: 07/12/2017 00:00
 Sample wt/vol: 500 (mL) Date Analyzed: 07/16/2017 04:40
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: RTX-Volatiles ID: 0.32 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 174300 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
75-35-4	1,1-Dichloroethene	ND		0.80	0.13
156-59-2	cis-1,2-Dichloroethene	ND		0.40	0.089
156-60-5	trans-1,2-Dichloroethene	ND		0.40	0.10
78-87-5	1,2-Dichloropropane	ND		0.40	0.24
10061-01-5	cis-1,3-Dichloropropene	ND		0.40	0.10
10061-02-6	trans-1,3-Dichloropropene	ND		0.40	0.088
123-91-1	1,4-Dioxane	ND		0.80	0.10
141-78-6	Ethyl acetate	ND		0.30	0.18
100-41-4	Ethylbenzene	ND		0.40	0.063
622-96-8	4-Ethyltoluene	ND		0.40	0.19
142-82-5	n-Heptane	ND		0.80	0.063
87-68-3	Hexachlorobutadiene	ND		2.0	0.43
110-54-3	n-Hexane	ND		0.80	0.075
591-78-6	2-Hexanone	ND		0.40	0.087
98-82-8	Isopropylbenzene	ND		0.80	0.10
99-87-6	4-Isopropyltoluene	ND		0.80	0.12
1634-04-4	Methyl-t-Butyl Ether (MTBE)	ND		0.80	0.12
80-62-6	Methyl methacrylate	ND		0.80	0.16
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14
75-09-2	Methylene Chloride	ND		0.40	0.072
98-83-9	alpha-Methylstyrene	ND		0.40	0.065
91-20-3	Naphthalene	ND		0.80	0.56
111-65-9	n-Octane	ND		0.40	0.055
109-66-0	n-Pentane	ND		0.80	0.26
115-07-1	Propylene	0.10	J	0.40	0.099
103-65-1	N-Propylbenzene	ND		0.40	0.059
100-42-5	Styrene	ND		0.40	0.059
79-34-5	1,1,2,2-Tetrachloroethane	ND		0.40	0.069
127-18-4	Tetrachloroethene	ND		0.40	0.051
109-99-9	Tetrahydrofuran	ND		0.80	0.21
108-88-3	Toluene	ND		0.40	0.051
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16
120-82-1	1,2,4-Trichlorobenzene	ND		2.0	0.43
71-55-6	1,1,1-Trichloroethane	ND		0.30	0.065
79-00-5	1,1,2-Trichloroethane	ND		0.40	0.067

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-29838-1
 SDG No.: _____
 Client Sample ID: 8126 Lab Sample ID: 320-29838-8
 Matrix: Air Lab File ID: MS7071521.D
 Analysis Method: TO-15 Date Collected: 07/12/2017 00:00
 Sample wt/vol: 500 (mL) Date Analyzed: 07/16/2017 04:40
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: RTX-Volatiles ID: 0.32 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 174300 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-01-6	Trichloroethene	ND		0.40	0.11
75-69-4	Trichlorofluoromethane	ND		0.40	0.20
96-18-4	1,2,3-Trichloropropane	ND		0.40	0.17
95-63-6	1,2,4-Trimethylbenzene	ND		0.80	0.16
108-67-8	1,3,5-Trimethylbenzene	ND		0.40	0.13
540-84-1	2,2,4-Trimethylpentane	ND		0.40	0.071
108-05-4	Vinyl acetate	ND		0.80	0.15
593-60-2	Vinyl bromide	ND		0.80	0.26
75-01-4	Vinyl chloride	ND		0.40	0.12
179601-23-1	m,p-Xylene	ND		0.80	0.10
95-47-6	o-Xylene	ND		0.40	0.054

CAS NO.	SURROGATE	%REC	Q	LIMITS
460-00-4	4-Bromofluorobenzene (Surr)	87		70-130
17060-07-0	1,2-Dichloroethane-d4 (Surr)	103		70-130
2037-26-5	Toluene-d8 (Surr)	96		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\ATMS7\20170715-45477.b\MS7071521.D
 Lims ID: 320-29838-A-8
 Client ID: 8126
 Sample Type: Client
 Inject. Date: 16-Jul-2017 04:40:30 ALS Bottle#: 1 Worklist Smp#: 21
 Purge Vol: 5.000 mL Dil. Factor: 1.0000
 Sample Info: 320-29838-A-8
 Misc. Info.: 500 mL CAN CERT
 Operator ID: LHS Instrument ID: ATMS7
 Method: \\ChromNA\Sacramento\ChromData\ATMS7\20170715-45477.b\TO15_ATMS7N.m
 Limit Group: MSA - TO15 - ICAL
 Last Update: 17-Jul-2017 16:25:14 Calib Date: 11-Jul-2017 13:10:30
 Integrator: RTE ID Type: Deconvolution ID
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\ATMS7\20170710-45257.b\MS7071026.D
 Column 1 : RTX Volatiles (0.32 mm) Det: MS SCAN
 Process Host: XAWRK020

First Level Reviewer: phanthasena Date: 17-Jul-2017 16:25:14

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ppb v/v	Flags
* 1 Chlorobromomethane (IS)	130	12.266	12.272	-0.006	92	24946	4.00	
* 2 1,4-Difluorobenzene	114	14.420	14.432	-0.012	97	109790	4.00	
* 3 Chlorobenzene-d5 (IS)	117	21.093	21.111	-0.018	94	94646	4.00	
\$ 4 1,2-Dichloroethane-d4 (Sur	65	13.464	13.483	-0.019	99	53097	4.11	
\$ 5 Toluene-d8 (Surr)	100	17.820	17.838	-0.018	96	67365	3.83	
\$ 6 4-Bromofluorobenzene (Surr	95	23.642	23.654	-0.012	82	56674	3.50	
11 Propene	41	3.859	3.858	0.000	50	546	0.1033	
16 Chloromethane	50	4.388	4.381	0.007	40	804	0.1598	
32 Acetone	43	7.405	7.338	0.067	47	3908	0.2836	

Reagents:

VAMIS20_00020 Amount Added: 50.00 Units: mL Run Reagent

Data File: \\ChromNA\Sacramento\ChromData\ATMS7\20170715-45477.b\MS7071521.D

Injection Date: 16-Jul-2017 04:40:30

Instrument ID: ATMS7

Operator ID: LHS

Lims ID: 320-29838-A-8

Lab Sample ID: 320-29838-8

Worklist Smp#: 21

Client ID: 8126

Purge Vol: 5.000 mL

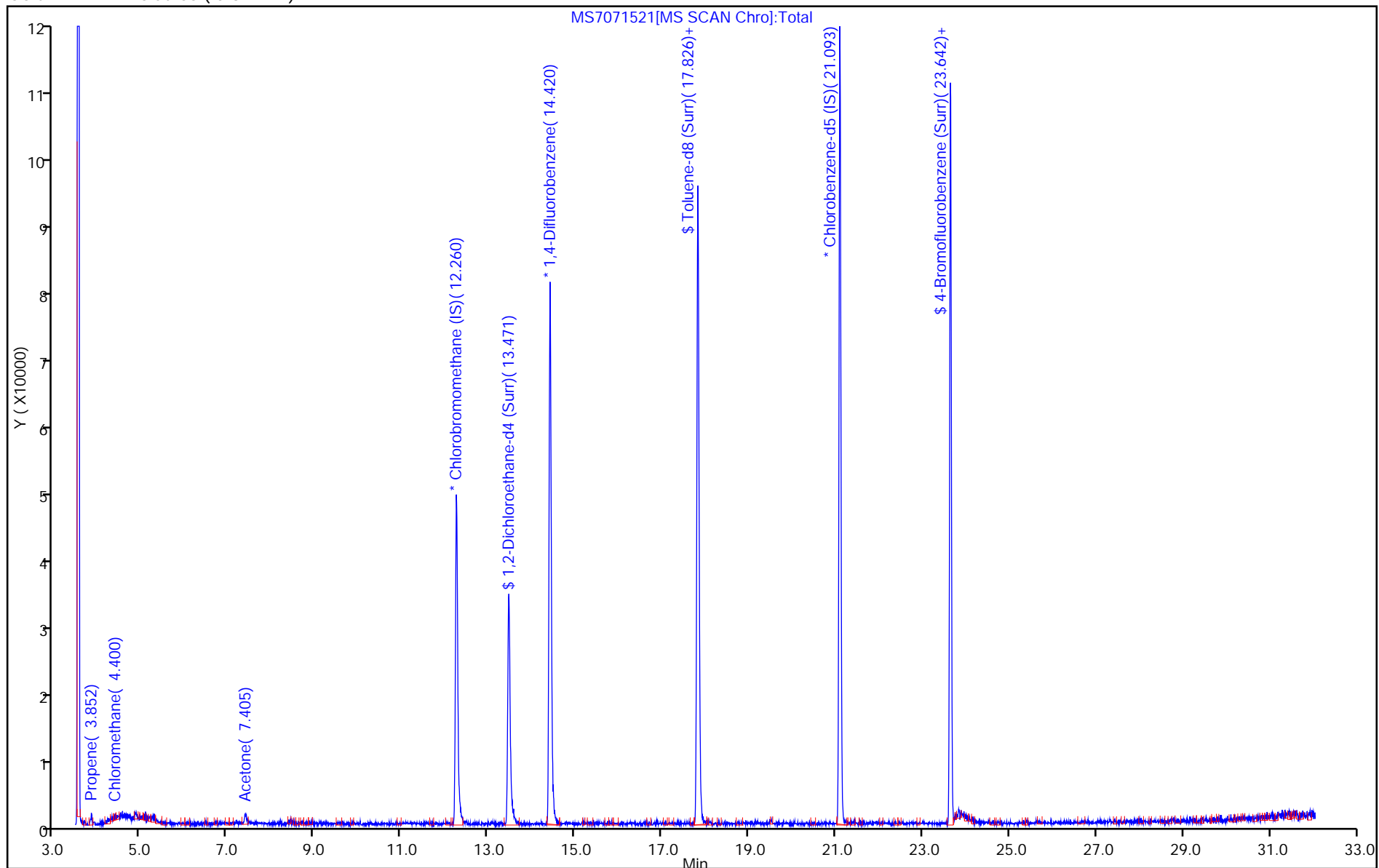
Dil. Factor: 1.0000

ALS Bottle#: 1

Method: TO15_ATMS7N

Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm)



TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS7\20170715-45477.b\MS7071521.D

Injection Date: 16-Jul-2017 04:40:30

Instrument ID: ATMS7

Lims ID: 320-29838-A-8

Lab Sample ID: 320-29838-8

Client ID: 8126

Operator ID: LHS

ALS Bottle#: 1 Worklist Smp#: 21

Purge Vol: 5.000 mL

Dil. Factor: 1.0000

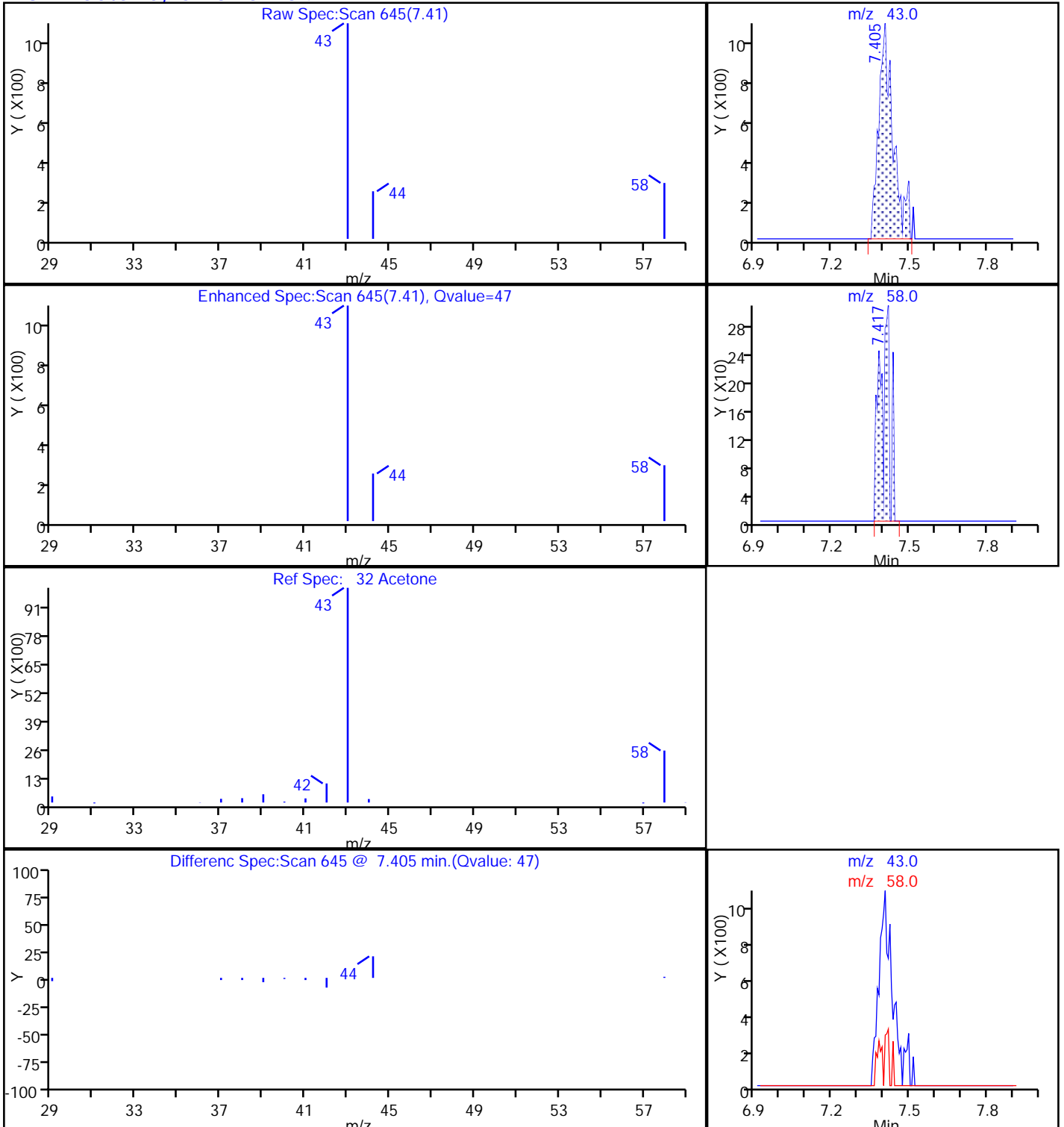
Method: TO15_ATMS7N

Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm)

Detector: MS SCAN

32 Acetone, CAS: 67-64-1



TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS7\20170715-45477.b\MS7071521.D

Injection Date: 16-Jul-2017 04:40:30

Instrument ID: ATMS7

Lims ID: 320-29838-A-8

Lab Sample ID: 320-29838-8

Client ID: 8126

Operator ID: LHS

ALS Bottle#: 1 Worklist Smp#: 21

Purge Vol: 5.000 mL

Dil. Factor: 1.0000

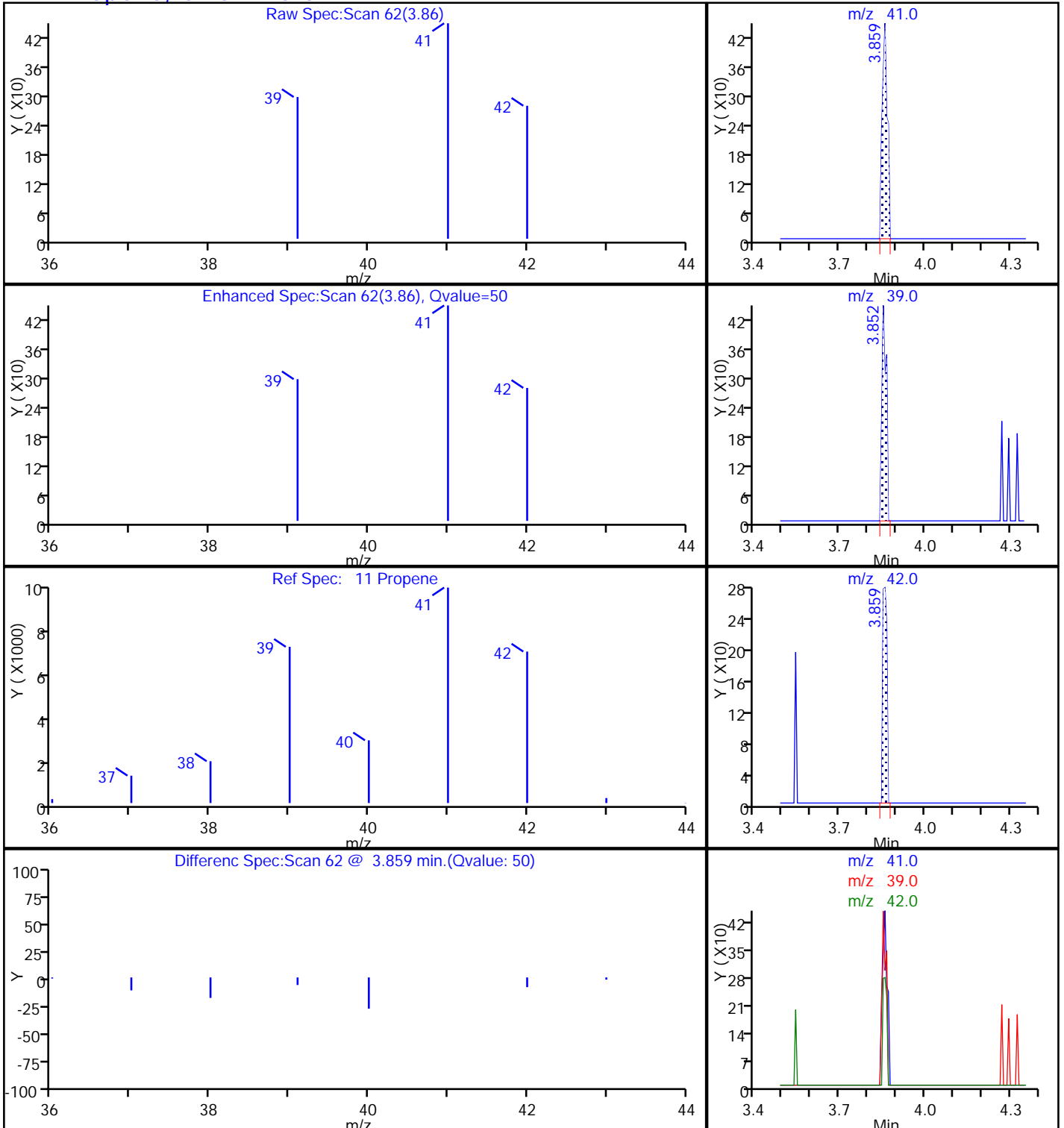
Method: TO15_ATMS7N

Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm)

Detector: MS SCAN

11 Propene, CAS: 115-07-1



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

TestAmerica Job ID: 320-33769-1
Client Project/Site: NuStar Vapor Testing

For:
Apex Companies LLC
3015 SW 1st Avenue
Portland, Oregon 97201

Attn: Heather Gosack



Authorized for release by:
12/8/2017 4:20:58 PM

Cathy Gamble, Project Manager I
(253)922-2310
cathy.gamble@testamericainc.com

LINKS

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-33769-1

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-33769-1

Job ID: 320-33769-1

Laboratory: TestAmerica Sacramento

Narrative

Receipt

The samples were received on 12/1/2017 9:45 AM; the samples arrived in good condition, properly preserved and, where required, on ice.

Air - GC/MS VOA

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

VOA Prep

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

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Detection Summary

Client: Apex Companies LLC
 Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-33769-1

Client Sample ID: SVE_South_Precarbon_112917

Lab Sample ID: 320-33769-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	71		46		ppb v/v	116		TO-15	Total/NA
Tetrachloroethene	3300		46		ppb v/v	116		TO-15	Total/NA
Trichloroethene	150		46		ppb v/v	116		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	280		180		ug/m3 Air	116		TO-15	Total/NA
Tetrachloroethene	22000		310		ug/m3 Air	116		TO-15	Total/NA
Trichloroethene	820		250		ug/m3 Air	116		TO-15	Total/NA

Client Sample ID: SVE_South_Postcarbon_112917

Lab Sample ID: 320-33769-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	2.1		0.44		ppb v/v	1.47		TO-15	Total/NA
1,1-Dichloroethane	0.95		0.44		ppb v/v	1.47		TO-15	Total/NA
1,1-Dichloroethene	2.1		1.2		ppb v/v	1.47		TO-15	Total/NA
cis-1,2-Dichloroethene	54		0.59		ppb v/v	1.47		TO-15	Total/NA
trans-1,2-Dichloroethene	1.0		0.59		ppb v/v	1.47		TO-15	Total/NA
Vinyl chloride	0.98		0.59		ppb v/v	1.47		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	12		2.4		ug/m3 Air	1.47		TO-15	Total/NA
1,1-Dichloroethane	3.8		1.8		ug/m3 Air	1.47		TO-15	Total/NA
1,1-Dichloroethene	8.5		4.7		ug/m3 Air	1.47		TO-15	Total/NA
cis-1,2-Dichloroethene	220		2.3		ug/m3 Air	1.47		TO-15	Total/NA
trans-1,2-Dichloroethene	4.0		2.3		ug/m3 Air	1.47		TO-15	Total/NA
Vinyl chloride	2.5		1.5		ug/m3 Air	1.47		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

Client: Apex Companies LLC
 Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-33769-1

Client Sample ID: SVE_South_Precarbon_112917

Lab Sample ID: 320-33769-1

Date Collected: 11/29/17 12:16

Matrix: Air

Date Received: 12/01/17 09:45

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		35		ppb v/v			12/07/17 02:59	116
1,1,2,2-Tetrachloroethane	ND		46		ppb v/v			12/07/17 02:59	116
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		46		ppb v/v			12/07/17 02:59	116
1,1,2-Trichloroethane	ND		46		ppb v/v			12/07/17 02:59	116
1,1-Dichloroethane	ND		35		ppb v/v			12/07/17 02:59	116
1,1-Dichloroethene	ND		93		ppb v/v			12/07/17 02:59	116
1,2,4-Trichlorobenzene	ND		230		ppb v/v			12/07/17 02:59	116
1,2,4-Trimethylbenzene	ND		93		ppb v/v			12/07/17 02:59	116
1,2-Dibromoethane (EDB)	ND		93		ppb v/v			12/07/17 02:59	116
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		46		ppb v/v			12/07/17 02:59	116
1,2-Dichlorobenzene	ND		46		ppb v/v			12/07/17 02:59	116
1,2-Dichloroethane	ND		93		ppb v/v			12/07/17 02:59	116
1,2-Dichloropropane	ND		46		ppb v/v			12/07/17 02:59	116
1,3,5-Trimethylbenzene	ND		46		ppb v/v			12/07/17 02:59	116
1,3-Dichlorobenzene	ND		46		ppb v/v			12/07/17 02:59	116
1,4-Dichlorobenzene	ND		46		ppb v/v			12/07/17 02:59	116
2-Butanone (MEK)	ND		93		ppb v/v			12/07/17 02:59	116
2-Hexanone	ND		46		ppb v/v			12/07/17 02:59	116
4-Ethyltoluene	ND		46		ppb v/v			12/07/17 02:59	116
4-Methyl-2-pentanone (MIBK)	ND		46		ppb v/v			12/07/17 02:59	116
Acetone	ND		580		ppb v/v			12/07/17 02:59	116
Benzene	ND		46		ppb v/v			12/07/17 02:59	116
Benzyl chloride	ND		93		ppb v/v			12/07/17 02:59	116
Bromodichloromethane	ND		35		ppb v/v			12/07/17 02:59	116
Bromoform	ND		46		ppb v/v			12/07/17 02:59	116
Bromomethane	ND		93		ppb v/v			12/07/17 02:59	116
Carbon disulfide	ND		93		ppb v/v			12/07/17 02:59	116
Carbon tetrachloride	ND		93		ppb v/v			12/07/17 02:59	116
Chlorobenzene	ND		35		ppb v/v			12/07/17 02:59	116
Chloroethane	ND		93		ppb v/v			12/07/17 02:59	116
Chloroform	ND		35		ppb v/v			12/07/17 02:59	116
Chloromethane	ND		93		ppb v/v			12/07/17 02:59	116
cis-1,2-Dichloroethene	71		46		ppb v/v			12/07/17 02:59	116
cis-1,3-Dichloropropene	ND		46		ppb v/v			12/07/17 02:59	116
Dibromochloromethane	ND		46		ppb v/v			12/07/17 02:59	116
Dichlorodifluoromethane	ND		46		ppb v/v			12/07/17 02:59	116
Ethylbenzene	ND		46		ppb v/v			12/07/17 02:59	116
Hexachlorobutadiene	ND		230		ppb v/v			12/07/17 02:59	116
m,p-Xylene	ND		93		ppb v/v			12/07/17 02:59	116
Methylene Chloride	ND		46		ppb v/v			12/07/17 02:59	116
o-Xylene	ND		46		ppb v/v			12/07/17 02:59	116
Styrene	ND		46		ppb v/v			12/07/17 02:59	116
Tetrachloroethene	3300		46		ppb v/v			12/07/17 02:59	116
Toluene	ND		46		ppb v/v			12/07/17 02:59	116
trans-1,2-Dichloroethene	ND		46		ppb v/v			12/07/17 02:59	116
trans-1,3-Dichloropropene	ND		46		ppb v/v			12/07/17 02:59	116
Trichloroethene	150		46		ppb v/v			12/07/17 02:59	116
Trichlorofluoromethane	ND		46		ppb v/v			12/07/17 02:59	116

TestAmerica Sacramento

Client Sample Results

Client: Apex Companies LLC
 Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-33769-1

Client Sample ID: SVE_South_Precarbon_112917

Lab Sample ID: 320-33769-1

Date Collected: 11/29/17 12:16

Matrix: Air

Date Received: 12/01/17 09:45

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl acetate	ND		93		ppb v/v			12/07/17 02:59	116
Vinyl chloride	ND		46		ppb v/v			12/07/17 02:59	116
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		190		ug/m3 Air			12/07/17 02:59	116
1,1,2,2-Tetrachloroethane	ND		320		ug/m3 Air			12/07/17 02:59	116
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		360		ug/m3 Air			12/07/17 02:59	116
1,1,2-Trichloroethane	ND		250		ug/m3 Air			12/07/17 02:59	116
1,1-Dichloroethane	ND		140		ug/m3 Air			12/07/17 02:59	116
1,1-Dichloroethene	ND		370		ug/m3 Air			12/07/17 02:59	116
1,2,4-Trichlorobenzene	ND		1700		ug/m3 Air			12/07/17 02:59	116
1,2,4-Trimethylbenzene	ND		460		ug/m3 Air			12/07/17 02:59	116
1,2-Dibromoethane (EDB)	ND		710		ug/m3 Air			12/07/17 02:59	116
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		320		ug/m3 Air			12/07/17 02:59	116
1,2-Dichlorobenzene	ND		280		ug/m3 Air			12/07/17 02:59	116
1,2-Dichloroethane	ND		380		ug/m3 Air			12/07/17 02:59	116
1,2-Dichloropropane	ND		210		ug/m3 Air			12/07/17 02:59	116
1,3,5-Trimethylbenzene	ND		230		ug/m3 Air			12/07/17 02:59	116
1,3-Dichlorobenzene	ND		280		ug/m3 Air			12/07/17 02:59	116
1,4-Dichlorobenzene	ND		280		ug/m3 Air			12/07/17 02:59	116
2-Butanone (MEK)	ND		270		ug/m3 Air			12/07/17 02:59	116
2-Hexanone	ND		190		ug/m3 Air			12/07/17 02:59	116
4-Ethyltoluene	ND		230		ug/m3 Air			12/07/17 02:59	116
4-Methyl-2-pentanone (MIBK)	ND		190		ug/m3 Air			12/07/17 02:59	116
Acetone	ND		1400		ug/m3 Air			12/07/17 02:59	116
Benzene	ND		150		ug/m3 Air			12/07/17 02:59	116
Benzyl chloride	ND		480		ug/m3 Air			12/07/17 02:59	116
Bromodichloromethane	ND		230		ug/m3 Air			12/07/17 02:59	116
Bromoform	ND		480		ug/m3 Air			12/07/17 02:59	116
Bromomethane	ND		360		ug/m3 Air			12/07/17 02:59	116
Carbon disulfide	ND		290		ug/m3 Air			12/07/17 02:59	116
Carbon tetrachloride	ND		580		ug/m3 Air			12/07/17 02:59	116
Chlorobenzene	ND		160		ug/m3 Air			12/07/17 02:59	116
Chloroethane	ND		240		ug/m3 Air			12/07/17 02:59	116
Chloroform	ND		170		ug/m3 Air			12/07/17 02:59	116
Chloromethane	ND		190		ug/m3 Air			12/07/17 02:59	116
cis-1,2-Dichloroethene	280		180		ug/m3 Air			12/07/17 02:59	116
cis-1,3-Dichloropropene	ND		210		ug/m3 Air			12/07/17 02:59	116
Dibromochloromethane	ND		400		ug/m3 Air			12/07/17 02:59	116
Dichlorodifluoromethane	ND		230		ug/m3 Air			12/07/17 02:59	116
Ethylbenzene	ND		200		ug/m3 Air			12/07/17 02:59	116
Hexachlorobutadiene	ND		2500		ug/m3 Air			12/07/17 02:59	116
m,p-Xylene	ND		400		ug/m3 Air			12/07/17 02:59	116
Methylene Chloride	ND		160		ug/m3 Air			12/07/17 02:59	116
o-Xylene	ND		200		ug/m3 Air			12/07/17 02:59	116
Styrene	ND		200		ug/m3 Air			12/07/17 02:59	116
Tetrachloroethene	22000		310		ug/m3 Air			12/07/17 02:59	116
Toluene	ND		170		ug/m3 Air			12/07/17 02:59	116
trans-1,2-Dichloroethene	ND		180		ug/m3 Air			12/07/17 02:59	116

TestAmerica Sacramento

Client Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-33769-1

Client Sample ID: SVE_South_Precarbon_112917

Lab Sample ID: 320-33769-1

Date Collected: 11/29/17 12:16

Matrix: Air

Date Received: 12/01/17 09:45

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
trans-1,3-Dichloropropene	ND		210		ug/m3 Air			12/07/17 02:59	116
Trichloroethene	820		250		ug/m3 Air			12/07/17 02:59	116
Trichlorofluoromethane	ND		260		ug/m3 Air			12/07/17 02:59	116
Vinyl acetate	ND		330		ug/m3 Air			12/07/17 02:59	116
Vinyl chloride	ND		120		ug/m3 Air			12/07/17 02:59	116
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	103		70 - 130					12/07/17 02:59	116
4-Bromofluorobenzene (Surr)	86		70 - 130					12/07/17 02:59	116
Toluene-d8 (Surr)	93		70 - 130					12/07/17 02:59	116

Client Sample ID: SVE_South_Postcarbon_112917

Lab Sample ID: 320-33769-2

Date Collected: 11/29/17 12:18

Matrix: Air

Date Received: 12/01/17 09:45

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	2.1		0.44		ppb v/v			12/07/17 03:53	1.47
1,1,2,2-Tetrachloroethane	ND		0.59		ppb v/v			12/07/17 03:53	1.47
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.59		ppb v/v			12/07/17 03:53	1.47
1,1,2-Trichloroethane	ND		0.59		ppb v/v			12/07/17 03:53	1.47
1,1-Dichloroethane	0.95		0.44		ppb v/v			12/07/17 03:53	1.47
1,1-Dichloroethene	2.1		1.2		ppb v/v			12/07/17 03:53	1.47
1,2,4-Trichlorobenzene	ND		2.9		ppb v/v			12/07/17 03:53	1.47
1,2,4-Trimethylbenzene	ND		1.2		ppb v/v			12/07/17 03:53	1.47
1,2-Dibromoethane (EDB)	ND		1.2		ppb v/v			12/07/17 03:53	1.47
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.59		ppb v/v			12/07/17 03:53	1.47
1,2-Dichlorobenzene	ND		0.59		ppb v/v			12/07/17 03:53	1.47
1,2-Dichloroethane	ND		1.2		ppb v/v			12/07/17 03:53	1.47
1,2-Dichloropropane	ND		0.59		ppb v/v			12/07/17 03:53	1.47
1,3,5-Trimethylbenzene	ND		0.59		ppb v/v			12/07/17 03:53	1.47
1,3-Dichlorobenzene	ND		0.59		ppb v/v			12/07/17 03:53	1.47
1,4-Dichlorobenzene	ND		0.59		ppb v/v			12/07/17 03:53	1.47
2-Butanone (MEK)	ND		1.2		ppb v/v			12/07/17 03:53	1.47
2-Hexanone	ND		0.59		ppb v/v			12/07/17 03:53	1.47
4-Ethyltoluene	ND		0.59		ppb v/v			12/07/17 03:53	1.47
4-Methyl-2-pentanone (MIBK)	ND		0.59		ppb v/v			12/07/17 03:53	1.47
Acetone	ND		7.4		ppb v/v			12/07/17 03:53	1.47
Benzene	ND		0.59		ppb v/v			12/07/17 03:53	1.47
Benzyl chloride	ND		1.2		ppb v/v			12/07/17 03:53	1.47
Bromodichloromethane	ND		0.44		ppb v/v			12/07/17 03:53	1.47
Bromoform	ND		0.59		ppb v/v			12/07/17 03:53	1.47
Bromomethane	ND		1.2		ppb v/v			12/07/17 03:53	1.47
Carbon disulfide	ND		1.2		ppb v/v			12/07/17 03:53	1.47
Carbon tetrachloride	ND		1.2		ppb v/v			12/07/17 03:53	1.47
Chlorobenzene	ND		0.44		ppb v/v			12/07/17 03:53	1.47
Chloroethane	ND		1.2		ppb v/v			12/07/17 03:53	1.47
Chloroform	ND		0.44		ppb v/v			12/07/17 03:53	1.47

TestAmerica Sacramento

Client Sample Results

Client: Apex Companies LLC
 Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-33769-1

Client Sample ID: SVE_South_Postcarbon_112917

Lab Sample ID: 320-33769-2

Date Collected: 11/29/17 12:18

Matrix: Air

Date Received: 12/01/17 09:45

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloromethane	ND		1.2		ppb v/v			12/07/17 03:53	1.47
cis-1,2-Dichloroethene	54		0.59		ppb v/v			12/07/17 03:53	1.47
cis-1,3-Dichloropropene	ND		0.59		ppb v/v			12/07/17 03:53	1.47
Dibromochloromethane	ND		0.59		ppb v/v			12/07/17 03:53	1.47
Dichlorodifluoromethane	ND		0.59		ppb v/v			12/07/17 03:53	1.47
Ethylbenzene	ND		0.59		ppb v/v			12/07/17 03:53	1.47
Hexachlorobutadiene	ND		2.9		ppb v/v			12/07/17 03:53	1.47
m,p-Xylene	ND		1.2		ppb v/v			12/07/17 03:53	1.47
Methylene Chloride	ND		0.59		ppb v/v			12/07/17 03:53	1.47
o-Xylene	ND		0.59		ppb v/v			12/07/17 03:53	1.47
Styrene	ND		0.59		ppb v/v			12/07/17 03:53	1.47
Tetrachloroethene	ND		0.59		ppb v/v			12/07/17 03:53	1.47
Toluene	ND		0.59		ppb v/v			12/07/17 03:53	1.47
trans-1,2-Dichloroethene	1.0		0.59		ppb v/v			12/07/17 03:53	1.47
trans-1,3-Dichloropropene	ND		0.59		ppb v/v			12/07/17 03:53	1.47
Trichloroethene	ND		0.59		ppb v/v			12/07/17 03:53	1.47
Trichlorofluoromethane	ND		0.59		ppb v/v			12/07/17 03:53	1.47
Vinyl acetate	ND		1.2		ppb v/v			12/07/17 03:53	1.47
Vinyl chloride	0.98		0.59		ppb v/v			12/07/17 03:53	1.47
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	12		2.4		ug/m3 Air			12/07/17 03:53	1.47
1,1,2,2-Tetrachloroethane	ND		4.0		ug/m3 Air			12/07/17 03:53	1.47
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		4.5		ug/m3 Air			12/07/17 03:53	1.47
1,1,2-Trichloroethane	ND		3.2		ug/m3 Air			12/07/17 03:53	1.47
1,1-Dichloroethane	3.8		1.8		ug/m3 Air			12/07/17 03:53	1.47
1,1-Dichloroethane	8.5		4.7		ug/m3 Air			12/07/17 03:53	1.47
1,2,4-Trichlorobenzene	ND		22		ug/m3 Air			12/07/17 03:53	1.47
1,2,4-Trimethylbenzene	ND		5.8		ug/m3 Air			12/07/17 03:53	1.47
1,2-Dibromoethane (EDB)	ND		9.0		ug/m3 Air			12/07/17 03:53	1.47
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		4.1		ug/m3 Air			12/07/17 03:53	1.47
1,2-Dichlorobenzene	ND		3.5		ug/m3 Air			12/07/17 03:53	1.47
1,2-Dichloroethane	ND		4.8		ug/m3 Air			12/07/17 03:53	1.47
1,2-Dichloropropane	ND		2.7		ug/m3 Air			12/07/17 03:53	1.47
1,3,5-Trimethylbenzene	ND		2.9		ug/m3 Air			12/07/17 03:53	1.47
1,3-Dichlorobenzene	ND		3.5		ug/m3 Air			12/07/17 03:53	1.47
1,4-Dichlorobenzene	ND		3.5		ug/m3 Air			12/07/17 03:53	1.47
2-Butanone (MEK)	ND		3.5		ug/m3 Air			12/07/17 03:53	1.47
2-Hexanone	ND		2.4		ug/m3 Air			12/07/17 03:53	1.47
4-Ethyltoluene	ND		2.9		ug/m3 Air			12/07/17 03:53	1.47
4-Methyl-2-pentanone (MIBK)	ND		2.4		ug/m3 Air			12/07/17 03:53	1.47
Acetone	ND		17		ug/m3 Air			12/07/17 03:53	1.47
Benzene	ND		1.9		ug/m3 Air			12/07/17 03:53	1.47
Benzyl chloride	ND		6.1		ug/m3 Air			12/07/17 03:53	1.47
Bromodichloromethane	ND		3.0		ug/m3 Air			12/07/17 03:53	1.47
Bromoform	ND		6.1		ug/m3 Air			12/07/17 03:53	1.47
Bromomethane	ND		4.6		ug/m3 Air			12/07/17 03:53	1.47
Carbon disulfide	ND		3.7		ug/m3 Air			12/07/17 03:53	1.47
Carbon tetrachloride	ND		7.4		ug/m3 Air			12/07/17 03:53	1.47

TestAmerica Sacramento

Client Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-33769-1

Client Sample ID: SVE_South_Postcarbon_112917

Lab Sample ID: 320-33769-2

Date Collected: 11/29/17 12:18

Matrix: Air

Date Received: 12/01/17 09:45

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorobenzene	ND		2.0		ug/m3 Air			12/07/17 03:53	1.47
Chloroethane	ND		3.1		ug/m3 Air			12/07/17 03:53	1.47
Chloroform	ND		2.2		ug/m3 Air			12/07/17 03:53	1.47
Chloromethane	ND		2.4		ug/m3 Air			12/07/17 03:53	1.47
cis-1,2-Dichloroethene	220		2.3		ug/m3 Air			12/07/17 03:53	1.47
cis-1,3-Dichloropropene	ND		2.7		ug/m3 Air			12/07/17 03:53	1.47
Dibromochloromethane	ND		5.0		ug/m3 Air			12/07/17 03:53	1.47
Dichlorodifluoromethane	ND		2.9		ug/m3 Air			12/07/17 03:53	1.47
Ethylbenzene	ND		2.6		ug/m3 Air			12/07/17 03:53	1.47
Hexachlorobutadiene	ND		31		ug/m3 Air			12/07/17 03:53	1.47
m,p-Xylene	ND		5.1		ug/m3 Air			12/07/17 03:53	1.47
Methylene Chloride	ND		2.0		ug/m3 Air			12/07/17 03:53	1.47
o-Xylene	ND		2.6		ug/m3 Air			12/07/17 03:53	1.47
Styrene	ND		2.5		ug/m3 Air			12/07/17 03:53	1.47
Tetrachloroethene	ND		4.0		ug/m3 Air			12/07/17 03:53	1.47
Toluene	ND		2.2		ug/m3 Air			12/07/17 03:53	1.47
trans-1,2-Dichloroethene	4.0		2.3		ug/m3 Air			12/07/17 03:53	1.47
trans-1,3-Dichloropropene	ND		2.7		ug/m3 Air			12/07/17 03:53	1.47
Trichloroethene	ND		3.2		ug/m3 Air			12/07/17 03:53	1.47
Trichlorofluoromethane	ND		3.3		ug/m3 Air			12/07/17 03:53	1.47
Vinyl acetate	ND		4.1		ug/m3 Air			12/07/17 03:53	1.47
Vinyl chloride	2.5		1.5		ug/m3 Air			12/07/17 03:53	1.47
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	103		70 - 130					12/07/17 03:53	1.47
4-Bromofluorobenzene (Surr)	87		70 - 130					12/07/17 03:53	1.47
Toluene-d8 (Surr)	97		70 - 130					12/07/17 03:53	1.47

Surrogate Summary

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-33769-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Matrix: Air

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	12DCE (70-130)	BFB (70-130)	TOL (70-130)
320-33769-1	SVE_South_Precarbon_112917	103	86	93
320-33769-2	SVE_South_Postcarbon_112917	103	87	97
LCS 320-198483/3	Lab Control Sample	107	93	99
LCSD 320-198483/4	Lab Control Sample Dup	100	97	98
MB 320-198483/6	Method Blank	103	91	98

Surrogate Legend

12DCE = 1,2-Dichloroethane-d4 (Surr)

BFB = 4-Bromofluorobenzene (Surr)

TOL = Toluene-d8 (Surr)

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-33769-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Lab Sample ID: MB 320-198483/6

Matrix: Air

Analysis Batch: 198483

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.30		ppb v/v			12/06/17 16:45	1
1,1,2,2-Tetrachloroethane	ND		0.40		ppb v/v			12/06/17 16:45	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40		ppb v/v			12/06/17 16:45	1
1,1,2-Trichloroethane	ND		0.40		ppb v/v			12/06/17 16:45	1
1,1-Dichloroethane	ND		0.30		ppb v/v			12/06/17 16:45	1
1,1-Dichloroethene	ND		0.80		ppb v/v			12/06/17 16:45	1
1,2,4-Trichlorobenzene	ND		2.0		ppb v/v			12/06/17 16:45	1
1,2,4-Trimethylbenzene	ND		0.80		ppb v/v			12/06/17 16:45	1
1,2-Dibromoethane (EDB)	ND		0.80		ppb v/v			12/06/17 16:45	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40		ppb v/v			12/06/17 16:45	1
1,2-Dichlorobenzene	ND		0.40		ppb v/v			12/06/17 16:45	1
1,2-Dichloroethane	ND		0.80		ppb v/v			12/06/17 16:45	1
1,2-Dichloropropane	ND		0.40		ppb v/v			12/06/17 16:45	1
1,3,5-Trimethylbenzene	ND		0.40		ppb v/v			12/06/17 16:45	1
1,3-Dichlorobenzene	ND		0.40		ppb v/v			12/06/17 16:45	1
1,4-Dichlorobenzene	ND		0.40		ppb v/v			12/06/17 16:45	1
2-Butanone (MEK)	ND		0.80		ppb v/v			12/06/17 16:45	1
2-Hexanone	ND		0.40		ppb v/v			12/06/17 16:45	1
4-Ethyltoluene	ND		0.40		ppb v/v			12/06/17 16:45	1
4-Methyl-2-pentanone (MIBK)	ND		0.40		ppb v/v			12/06/17 16:45	1
Acetone	ND		5.0		ppb v/v			12/06/17 16:45	1
Benzene	ND		0.40		ppb v/v			12/06/17 16:45	1
Benzyl chloride	ND		0.80		ppb v/v			12/06/17 16:45	1
Bromodichloromethane	ND		0.30		ppb v/v			12/06/17 16:45	1
Bromoform	ND		0.40		ppb v/v			12/06/17 16:45	1
Bromomethane	ND		0.80		ppb v/v			12/06/17 16:45	1
Carbon disulfide	ND		0.80		ppb v/v			12/06/17 16:45	1
Carbon tetrachloride	ND		0.80		ppb v/v			12/06/17 16:45	1
Chlorobenzene	ND		0.30		ppb v/v			12/06/17 16:45	1
Chloroethane	ND		0.80		ppb v/v			12/06/17 16:45	1
Chloroform	ND		0.30		ppb v/v			12/06/17 16:45	1
Chloromethane	ND		0.80		ppb v/v			12/06/17 16:45	1
cis-1,2-Dichloroethene	ND		0.40		ppb v/v			12/06/17 16:45	1
cis-1,3-Dichloropropene	ND		0.40		ppb v/v			12/06/17 16:45	1
Dibromochloromethane	ND		0.40		ppb v/v			12/06/17 16:45	1
Dichlorodifluoromethane	ND		0.40		ppb v/v			12/06/17 16:45	1
Ethylbenzene	ND		0.40		ppb v/v			12/06/17 16:45	1
Hexachlorobutadiene	ND		2.0		ppb v/v			12/06/17 16:45	1
m,p-Xylene	ND		0.80		ppb v/v			12/06/17 16:45	1
Methylene Chloride	ND		0.40		ppb v/v			12/06/17 16:45	1
o-Xylene	ND		0.40		ppb v/v			12/06/17 16:45	1
Styrene	ND		0.40		ppb v/v			12/06/17 16:45	1
Tetrachloroethene	ND		0.40		ppb v/v			12/06/17 16:45	1
Toluene	ND		0.40		ppb v/v			12/06/17 16:45	1
trans-1,2-Dichloroethene	ND		0.40		ppb v/v			12/06/17 16:45	1
trans-1,3-Dichloropropene	ND		0.40		ppb v/v			12/06/17 16:45	1
Trichloroethene	ND		0.40		ppb v/v			12/06/17 16:45	1
Trichlorofluoromethane	ND		0.40		ppb v/v			12/06/17 16:45	1

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
 Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-33769-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 320-198483/6
Matrix: Air
Analysis Batch: 198483

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl acetate	ND		0.80		ppb v/v			12/06/17 16:45	1
Vinyl chloride	ND		0.40		ppb v/v			12/06/17 16:45	1
Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.6		ug/m3 Air			12/06/17 16:45	1
1,1,2,2-Tetrachloroethane	ND		2.7		ug/m3 Air			12/06/17 16:45	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1		ug/m3 Air			12/06/17 16:45	1
1,1,2-Trichloroethane	ND		2.2		ug/m3 Air			12/06/17 16:45	1
1,1-Dichloroethane	ND		1.2		ug/m3 Air			12/06/17 16:45	1
1,1-Dichloroethene	ND		3.2		ug/m3 Air			12/06/17 16:45	1
1,2,4-Trichlorobenzene	ND		15		ug/m3 Air			12/06/17 16:45	1
1,2,4-Trimethylbenzene	ND		3.9		ug/m3 Air			12/06/17 16:45	1
1,2-Dibromoethane (EDB)	ND		6.1		ug/m3 Air			12/06/17 16:45	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8		ug/m3 Air			12/06/17 16:45	1
1,2-Dichlorobenzene	ND		2.4		ug/m3 Air			12/06/17 16:45	1
1,2-Dichloroethane	ND		3.2		ug/m3 Air			12/06/17 16:45	1
1,2-Dichloropropane	ND		1.8		ug/m3 Air			12/06/17 16:45	1
1,3,5-Trimethylbenzene	ND		2.0		ug/m3 Air			12/06/17 16:45	1
1,3-Dichlorobenzene	ND		2.4		ug/m3 Air			12/06/17 16:45	1
1,4-Dichlorobenzene	ND		2.4		ug/m3 Air			12/06/17 16:45	1
2-Butanone (MEK)	ND		2.4		ug/m3 Air			12/06/17 16:45	1
2-Hexanone	ND		1.6		ug/m3 Air			12/06/17 16:45	1
4-Ethyltoluene	ND		2.0		ug/m3 Air			12/06/17 16:45	1
4-Methyl-2-pentanone (MIBK)	ND		1.6		ug/m3 Air			12/06/17 16:45	1
Acetone	ND		12		ug/m3 Air			12/06/17 16:45	1
Benzene	ND		1.3		ug/m3 Air			12/06/17 16:45	1
Benzyl chloride	ND		4.1		ug/m3 Air			12/06/17 16:45	1
Bromodichloromethane	ND		2.0		ug/m3 Air			12/06/17 16:45	1
Bromoform	ND		4.1		ug/m3 Air			12/06/17 16:45	1
Bromomethane	ND		3.1		ug/m3 Air			12/06/17 16:45	1
Carbon disulfide	ND		2.5		ug/m3 Air			12/06/17 16:45	1
Carbon tetrachloride	ND		5.0		ug/m3 Air			12/06/17 16:45	1
Chlorobenzene	ND		1.4		ug/m3 Air			12/06/17 16:45	1
Chloroethane	ND		2.1		ug/m3 Air			12/06/17 16:45	1
Chloroform	ND		1.5		ug/m3 Air			12/06/17 16:45	1
Chloromethane	ND		1.7		ug/m3 Air			12/06/17 16:45	1
cis-1,2-Dichloroethene	ND		1.6		ug/m3 Air			12/06/17 16:45	1
cis-1,3-Dichloropropene	ND		1.8		ug/m3 Air			12/06/17 16:45	1
Dibromochloromethane	ND		3.4		ug/m3 Air			12/06/17 16:45	1
Dichlorodifluoromethane	ND		2.0		ug/m3 Air			12/06/17 16:45	1
Ethylbenzene	ND		1.7		ug/m3 Air			12/06/17 16:45	1
Hexachlorobutadiene	ND		21		ug/m3 Air			12/06/17 16:45	1
m,p-Xylene	ND		3.5		ug/m3 Air			12/06/17 16:45	1
Methylene Chloride	ND		1.4		ug/m3 Air			12/06/17 16:45	1
o-Xylene	ND		1.7		ug/m3 Air			12/06/17 16:45	1
Styrene	ND		1.7		ug/m3 Air			12/06/17 16:45	1
Tetrachloroethene	ND		2.7		ug/m3 Air			12/06/17 16:45	1
Toluene	ND		1.5		ug/m3 Air			12/06/17 16:45	1

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-33769-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 320-198483/6
Matrix: Air
Analysis Batch: 198483

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
trans-1,2-Dichloroethene	ND		1.6		ug/m3 Air			12/06/17 16:45	1
trans-1,3-Dichloropropene	ND		1.8		ug/m3 Air			12/06/17 16:45	1
Trichloroethene	ND		2.1		ug/m3 Air			12/06/17 16:45	1
Trichlorofluoromethane	ND		2.2		ug/m3 Air			12/06/17 16:45	1
Vinyl acetate	ND		2.8		ug/m3 Air			12/06/17 16:45	1
Vinyl chloride	ND		1.0		ug/m3 Air			12/06/17 16:45	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	103		70 - 130		12/06/17 16:45	1
4-Bromofluorobenzene (Surr)	91		70 - 130		12/06/17 16:45	1
Toluene-d8 (Surr)	98		70 - 130		12/06/17 16:45	1

Lab Sample ID: LCS 320-198483/3
Matrix: Air
Analysis Batch: 198483

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	20.0	21.1		ppb v/v		106	69 - 129
1,1,1,2-Tetrachloroethane	20.0	21.2		ppb v/v		106	64 - 124
1,1,2-Trichloro-1,2,2-trifluoroethane	20.0	21.0		ppb v/v		105	70 - 130
1,1,2-Trichloroethane	20.0	21.2		ppb v/v		106	64 - 124
1,1-Dichloroethane	20.0	22.1		ppb v/v		111	71 - 131
1,1-Dichloroethene	20.0	22.2		ppb v/v		111	72 - 132
1,2,4-Trichlorobenzene	20.0	18.1		ppb v/v		91	58 - 138
1,2,4-Trimethylbenzene	20.0	21.3		ppb v/v		106	60 - 132
1,2-Dibromoethane (EDB)	20.0	21.2		ppb v/v		106	64 - 124
1,2-Dichloro-1,1,2,2-tetrafluoroethane	20.0	21.4		ppb v/v		107	74 - 134
1,2-Dichlorobenzene	20.0	20.4		ppb v/v		102	62 - 126
1,2-Dichloroethane	20.0	21.7		ppb v/v		108	71 - 131
1,2-Dichloropropane	20.0	21.5		ppb v/v		107	72 - 132
1,3,5-Trimethylbenzene	20.0	20.3		ppb v/v		101	65 - 125
1,3-Dichlorobenzene	20.0	20.8		ppb v/v		104	59 - 130
1,4-Dichlorobenzene	20.0	20.8		ppb v/v		104	58 - 132
2-Butanone (MEK)	20.0	22.2		ppb v/v		111	73 - 133
2-Hexanone	20.0	21.2		ppb v/v		106	69 - 129
4-Ethyltoluene	20.0	20.7		ppb v/v		104	66 - 129
4-Methyl-2-pentanone (MIBK)	20.0	21.3		ppb v/v		106	74 - 134
Acetone	20.0	23.2		ppb v/v		116	65 - 125
Benzene	20.0	21.3		ppb v/v		107	68 - 128
Benzyl chloride	16.0	18.0		ppb v/v		112	67 - 127
Bromodichloromethane	20.0	21.2		ppb v/v		106	71 - 131
Bromoform	20.0	21.1		ppb v/v		105	66 - 126
Bromomethane	20.0	21.6		ppb v/v		108	73 - 134
Carbon disulfide	20.0	21.6		ppb v/v		108	71 - 131
Carbon tetrachloride	20.0	21.1		ppb v/v		106	63 - 126
Chlorobenzene	20.0	20.4		ppb v/v		102	63 - 123

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-33769-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 320-198483/3

Matrix: Air

Analysis Batch: 198483

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloroethane	20.0	22.7		ppb v/v		113	73 - 133
Chloroform	20.0	21.4		ppb v/v		107	70 - 130
Chloromethane	20.0	21.6		ppb v/v		108	61 - 140
cis-1,2-Dichloroethene	20.0	21.8		ppb v/v		109	70 - 130
cis-1,3-Dichloropropene	20.0	21.4		ppb v/v		107	72 - 132
Dibromochloromethane	20.0	21.2		ppb v/v		106	66 - 126
Dichlorodifluoromethane	20.0	22.5		ppb v/v		113	69 - 129
Ethylbenzene	20.0	20.8		ppb v/v		104	64 - 124
Hexachlorobutadiene	20.0	18.5		ppb v/v		92	58 - 131
m,p-Xylene	40.0	41.9		ppb v/v		105	65 - 125
Methylene Chloride	20.0	22.8		ppb v/v		114	67 - 127
o-Xylene	20.0	21.0		ppb v/v		105	65 - 125
Styrene	20.0	21.4		ppb v/v		107	67 - 127
Tetrachloroethene	20.0	20.2		ppb v/v		101	63 - 123
Toluene	20.0	20.6		ppb v/v		103	68 - 128
trans-1,2-Dichloroethene	20.0	21.8		ppb v/v		109	72 - 132
trans-1,3-Dichloropropene	20.0	22.1		ppb v/v		111	66 - 126
Trichloroethene	20.0	20.6		ppb v/v		103	70 - 130
Trichlorofluoromethane	20.0	21.2		ppb v/v		106	71 - 131
Vinyl acetate	20.0	24.4		ppb v/v		122	65 - 134
Vinyl chloride	20.0	22.8		ppb v/v		114	59 - 152
Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	110	115		ug/m3 Air		106	69 - 129
1,1,1,2-Tetrachloroethane	140	146		ug/m3 Air		106	64 - 124
1,1,2-Trichloro-1,2,2-trifluoroethane	150	161		ug/m3 Air		105	70 - 130
1,1,2-Trichloroethane	110	116		ug/m3 Air		106	64 - 124
1,1-Dichloroethane	81	89.6		ug/m3 Air		111	71 - 131
1,1-Dichloroethene	79	87.9		ug/m3 Air		111	72 - 132
1,2,4-Trichlorobenzene	150	135		ug/m3 Air		91	58 - 138
1,2,4-Trimethylbenzene	98	105		ug/m3 Air		106	60 - 132
1,2-Dibromoethane (EDB)	150	163		ug/m3 Air		106	64 - 124
1,2-Dichloro-1,1,2,2-tetrafluoroethane	140	150		ug/m3 Air		107	74 - 134
1,2-Dichlorobenzene	120	123		ug/m3 Air		102	62 - 126
1,2-Dichloroethane	81	87.8		ug/m3 Air		108	71 - 131
1,2-Dichloropropane	92	99.3		ug/m3 Air		107	72 - 132
1,3,5-Trimethylbenzene	98	99.7		ug/m3 Air		101	65 - 125
1,3-Dichlorobenzene	120	125		ug/m3 Air		104	59 - 130
1,4-Dichlorobenzene	120	125		ug/m3 Air		104	58 - 132
2-Butanone (MEK)	59	65.5		ug/m3 Air		111	73 - 133
2-Hexanone	82	86.7		ug/m3 Air		106	69 - 129
4-Ethyltoluene	98	102		ug/m3 Air		104	66 - 129
4-Methyl-2-pentanone (MIBK)	82	87.1		ug/m3 Air		106	74 - 134
Acetone	48	55.2		ug/m3 Air		116	65 - 125
Benzene	64	68.2		ug/m3 Air		107	68 - 128
Benzyl chloride	83	93.2		ug/m3 Air		112	67 - 127
Bromodichloromethane	130	142		ug/m3 Air		106	71 - 131

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-33769-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 320-198483/3

Matrix: Air

Analysis Batch: 198483

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Bromoform	210	218		ug/m3 Air		105	66 - 126
Bromomethane	78	83.8		ug/m3 Air		108	73 - 134
Carbon disulfide	62	67.4		ug/m3 Air		108	71 - 131
Carbon tetrachloride	130	133		ug/m3 Air		106	63 - 126
Chlorobenzene	92	94.1		ug/m3 Air		102	63 - 123
Chloroethane	53	59.9		ug/m3 Air		113	73 - 133
Chloroform	98	105		ug/m3 Air		107	70 - 130
Chloromethane	41	44.7		ug/m3 Air		108	61 - 140
cis-1,2-Dichloroethene	79	86.4		ug/m3 Air		109	70 - 130
cis-1,3-Dichloropropene	91	96.9		ug/m3 Air		107	72 - 132
Dibromochloromethane	170	181		ug/m3 Air		106	66 - 126
Dichlorodifluoromethane	99	111		ug/m3 Air		113	69 - 129
Ethylbenzene	87	90.3		ug/m3 Air		104	64 - 124
Hexachlorobutadiene	210	197		ug/m3 Air		92	58 - 131
m,p-Xylene	170	182		ug/m3 Air		105	65 - 125
Methylene Chloride	69	79.1		ug/m3 Air		114	67 - 127
o-Xylene	87	91.3		ug/m3 Air		105	65 - 125
Styrene	85	91.2		ug/m3 Air		107	67 - 127
Tetrachloroethene	140	137		ug/m3 Air		101	63 - 123
Toluene	75	77.5		ug/m3 Air		103	68 - 128
trans-1,2-Dichloroethene	79	86.4		ug/m3 Air		109	72 - 132
trans-1,3-Dichloropropene	91	100		ug/m3 Air		111	66 - 126
Trichloroethene	110	110		ug/m3 Air		103	70 - 130
Trichlorofluoromethane	110	119		ug/m3 Air		106	71 - 131
Vinyl acetate	70	85.9		ug/m3 Air		122	65 - 134
Vinyl chloride	51	58.3		ug/m3 Air		114	59 - 152

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	107		70 - 130
4-Bromofluorobenzene (Surr)	93		70 - 130
Toluene-d8 (Surr)	99		70 - 130

Lab Sample ID: LCSD 320-198483/4

Matrix: Air

Analysis Batch: 198483

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	20.0	20.3		ppb v/v		102	69 - 129	4	25
1,1,2,2-Tetrachloroethane	20.0	21.3		ppb v/v		107	64 - 124	1	25
1,1,2-Trichloro-1,2,2-trifluoroethane	20.0	20.1		ppb v/v		100	70 - 130	4	25
1,1,2-Trichloroethane	20.0	21.7		ppb v/v		109	64 - 124	2	25
1,1-Dichloroethane	20.0	21.2		ppb v/v		106	71 - 131	4	25
1,1-Dichloroethene	20.0	21.4		ppb v/v		107	72 - 132	4	25
1,2,4-Trichlorobenzene	20.0	18.4		ppb v/v		92	58 - 138	1	25
1,2,4-Trimethylbenzene	20.0	21.5		ppb v/v		107	60 - 132	1	25
1,2-Dibromoethane (EDB)	20.0	21.4		ppb v/v		107	64 - 124	1	25

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-33769-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-198483/4

Matrix: Air

Analysis Batch: 198483

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2-Dichloro-1,1,2,2-tetrafluoroethane	20.0	20.6		ppb v/v		103	74 - 134	4	25
1,2-Dichlorobenzene	20.0	20.6		ppb v/v		103	62 - 126	1	25
1,2-Dichloroethane	20.0	21.1		ppb v/v		106	71 - 131	3	25
1,2-Dichloropropane	20.0	21.2		ppb v/v		106	72 - 132	1	25
1,3,5-Trimethylbenzene	20.0	20.3		ppb v/v		102	65 - 125	0	25
1,3-Dichlorobenzene	20.0	21.1		ppb v/v		105	59 - 130	1	25
1,4-Dichlorobenzene	20.0	21.1		ppb v/v		105	58 - 132	1	25
2-Butanone (MEK)	20.0	21.3		ppb v/v		106	73 - 133	4	25
2-Hexanone	20.0	21.4		ppb v/v		107	69 - 129	1	25
4-Ethyltoluene	20.0	20.9		ppb v/v		104	66 - 129	1	25
4-Methyl-2-pentanone (MIBK)	20.0	20.7		ppb v/v		103	74 - 134	3	25
Acetone	20.0	21.9		ppb v/v		109	65 - 125	6	25
Benzene	20.0	21.1		ppb v/v		106	68 - 128	1	25
Benzyl chloride	16.0	18.2		ppb v/v		114	67 - 127	1	25
Bromodichloromethane	20.0	20.9		ppb v/v		105	71 - 131	2	25
Bromoform	20.0	21.4		ppb v/v		107	66 - 126	2	25
Bromomethane	20.0	21.0		ppb v/v		105	73 - 134	3	25
Carbon disulfide	20.0	20.9		ppb v/v		105	71 - 131	4	25
Carbon tetrachloride	20.0	20.5		ppb v/v		103	63 - 126	3	25
Chlorobenzene	20.0	20.8		ppb v/v		104	63 - 123	2	25
Chloroethane	20.0	21.5		ppb v/v		108	73 - 133	5	25
Chloroform	20.0	20.6		ppb v/v		103	70 - 130	4	25
Chloromethane	20.0	20.8		ppb v/v		104	61 - 140	4	25
cis-1,2-Dichloroethene	20.0	20.9		ppb v/v		105	70 - 130	4	25
cis-1,3-Dichloropropene	20.0	20.8		ppb v/v		104	72 - 132	3	25
Dibromochloromethane	20.0	21.5		ppb v/v		108	66 - 126	1	25
Dichlorodifluoromethane	20.0	21.6		ppb v/v		108	69 - 129	4	25
Ethylbenzene	20.0	21.0		ppb v/v		105	64 - 124	1	25
Hexachlorobutadiene	20.0	18.7		ppb v/v		93	58 - 131	1	25
m,p-Xylene	40.0	42.3		ppb v/v		106	65 - 125	1	25
Methylene Chloride	20.0	21.9		ppb v/v		110	67 - 127	4	25
o-Xylene	20.0	21.2		ppb v/v		106	65 - 125	1	25
Styrene	20.0	21.8		ppb v/v		109	67 - 127	2	25
Tetrachloroethene	20.0	20.8		ppb v/v		104	63 - 123	3	25
Toluene	20.0	20.2		ppb v/v		101	68 - 128	2	25
trans-1,2-Dichloroethene	20.0	20.9		ppb v/v		104	72 - 132	4	25
trans-1,3-Dichloropropene	20.0	22.3		ppb v/v		111	66 - 126	1	25
Trichloroethene	20.0	20.3		ppb v/v		101	70 - 130	1	25
Trichlorofluoromethane	20.0	20.2		ppb v/v		101	71 - 131	4	25
Vinyl acetate	20.0	23.4		ppb v/v		117	65 - 134	4	25
Vinyl chloride	20.0	21.6		ppb v/v		108	59 - 152	5	25

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	110	111		ug/m3 Air		102	69 - 129	4	25
1,1,2,2-Tetrachloroethane	140	146		ug/m3 Air		107	64 - 124	1	25
1,1,2-Trichloro-1,2,2-trifluoroethane	150	154		ug/m3 Air		100	70 - 130	4	25
1,1,2-Trichloroethane	110	118		ug/m3 Air		109	64 - 124	2	25

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
 Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-33769-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-198483/4

Client Sample ID: Lab Control Sample Dup

Matrix: Air

Prep Type: Total/NA

Analysis Batch: 198483

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1-Dichloroethane	81	85.8		ug/m3 Air		106	71 - 131	4	25
1,1-Dichloroethene	79	84.7		ug/m3 Air		107	72 - 132	4	25
1,2,4-Trichlorobenzene	150	136		ug/m3 Air		92	58 - 138	1	25
1,2,4-Trimethylbenzene	98	105		ug/m3 Air		107	60 - 132	1	25
1,2-Dibromoethane (EDB)	150	164		ug/m3 Air		107	64 - 124	1	25
1,2-Dichloro-1,1,2,2-tetrafluoroethane	140	144		ug/m3 Air		103	74 - 134	4	25
1,2-Dichlorobenzene	120	124		ug/m3 Air		103	62 - 126	1	25
1,2-Dichloroethane	81	85.6		ug/m3 Air		106	71 - 131	3	25
1,2-Dichloropropane	92	97.9		ug/m3 Air		106	72 - 132	1	25
1,3,5-Trimethylbenzene	98	99.9		ug/m3 Air		102	65 - 125	0	25
1,3-Dichlorobenzene	120	127		ug/m3 Air		105	59 - 130	1	25
1,4-Dichlorobenzene	120	127		ug/m3 Air		105	58 - 132	1	25
2-Butanone (MEK)	59	62.7		ug/m3 Air		106	73 - 133	4	25
2-Hexanone	82	87.8		ug/m3 Air		107	69 - 129	1	25
4-Ethyltoluene	98	103		ug/m3 Air		104	66 - 129	1	25
4-Methyl-2-pentanone (MIBK)	82	84.7		ug/m3 Air		103	74 - 134	3	25
Acetone	48	52.0		ug/m3 Air		109	65 - 125	6	25
Benzene	64	67.5		ug/m3 Air		106	68 - 128	1	25
Benzyl chloride	83	94.1		ug/m3 Air		114	67 - 127	1	25
Bromodichloromethane	130	140		ug/m3 Air		105	71 - 131	2	25
Bromoform	210	221		ug/m3 Air		107	66 - 126	2	25
Bromomethane	78	81.4		ug/m3 Air		105	73 - 134	3	25
Carbon disulfide	62	65.1		ug/m3 Air		105	71 - 131	4	25
Carbon tetrachloride	130	129		ug/m3 Air		103	63 - 126	3	25
Chlorobenzene	92	95.5		ug/m3 Air		104	63 - 123	2	25
Chloroethane	53	56.7		ug/m3 Air		108	73 - 133	5	25
Chloroform	98	101		ug/m3 Air		103	70 - 130	4	25
Chloromethane	41	42.9		ug/m3 Air		104	61 - 140	4	25
cis-1,2-Dichloroethene	79	83.0		ug/m3 Air		105	70 - 130	4	25
cis-1,3-Dichloropropene	91	94.3		ug/m3 Air		104	72 - 132	3	25
Dibromochloromethane	170	183		ug/m3 Air		108	66 - 126	1	25
Dichlorodifluoromethane	99	107		ug/m3 Air		108	69 - 129	4	25
Ethylbenzene	87	91.4		ug/m3 Air		105	64 - 124	1	25
Hexachlorobutadiene	210	199		ug/m3 Air		93	58 - 131	1	25
m,p-Xylene	170	184		ug/m3 Air		106	65 - 125	1	25
Methylene Chloride	69	76.1		ug/m3 Air		110	67 - 127	4	25
o-Xylene	87	92.2		ug/m3 Air		106	65 - 125	1	25
Styrene	85	92.9		ug/m3 Air		109	67 - 127	2	25
Tetrachloroethene	140	141		ug/m3 Air		104	63 - 123	3	25
Toluene	75	76.2		ug/m3 Air		101	68 - 128	2	25
trans-1,2-Dichloroethene	79	82.8		ug/m3 Air		104	72 - 132	4	25
trans-1,3-Dichloropropene	91	101		ug/m3 Air		111	66 - 126	1	25
Trichloroethene	110	109		ug/m3 Air		101	70 - 130	1	25
Trichlorofluoromethane	110	114		ug/m3 Air		101	71 - 131	4	25
Vinyl acetate	70	82.3		ug/m3 Air		117	65 - 134	4	25
Vinyl chloride	51	55.2		ug/m3 Air		108	59 - 152	5	25

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-33769-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-198483/4

Matrix: Air

Analysis Batch: 198483

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Surrogate	LCSD		Limits
	%Recovery	Qualifier	
1,2-Dichloroethane-d4 (Surr)	100		70 - 130
4-Bromofluorobenzene (Surr)	97		70 - 130
Toluene-d8 (Surr)	98		70 - 130

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QC Association Summary

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-33769-1

Air - GC/MS VOA

Analysis Batch: 198483

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-33769-1	SVE_South_Precarbon_112917	Total/NA	Air	TO-15	
320-33769-2	SVE_South_Postcarbon_112917	Total/NA	Air	TO-15	
MB 320-198483/6	Method Blank	Total/NA	Air	TO-15	
LCS 320-198483/3	Lab Control Sample	Total/NA	Air	TO-15	
LCSD 320-198483/4	Lab Control Sample Dup	Total/NA	Air	TO-15	

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Lab Chronicle

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-33769-1

Client Sample ID: SVE_South_Precarbon_112917

Lab Sample ID: 320-33769-1

Date Collected: 11/29/17 12:16

Matrix: Air

Date Received: 12/01/17 09:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		116	3.22 mL	250 mL	198483	12/07/17 02:59	AP1	TAL SAC

Client Sample ID: SVE_South_Postcarbon_112917

Lab Sample ID: 320-33769-2

Date Collected: 11/29/17 12:18

Matrix: Air

Date Received: 12/01/17 09:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1.47	281 mL	250 mL	198483	12/07/17 03:53	AP1	TAL SAC

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: Apex Companies LLC
 Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-33769-1

Laboratory: TestAmerica Sacramento

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Alaska (UST)	State Program	10	UST-055	12-18-17
Arizona	State Program	9	AZ0708	08-11-18
Arkansas DEQ	State Program	6	88-0691	06-17-18
California	State Program	9	2897	01-31-18
Colorado	State Program	8	CA00044	08-31-18
Connecticut	State Program	1	PH-0691	06-30-19
Florida	NELAP	4	E87570	06-30-18
Georgia	State Program	4	N/A	01-28-19
Hawaii	State Program	9	N/A	01-29-18
Illinois	NELAP	5	200060	03-17-18
Kansas	NELAP	7	E-10375	12-31-17
L-A-B	DoD ELAP		L2468	01-20-18
Louisiana	NELAP	6	30612	06-30-18
Maine	State Program	1	CA0004	04-18-18
Michigan	State Program	5	9947	01-31-18
Nevada	State Program	9	CA00044	07-31-18
New Hampshire	NELAP	1	2997	04-18-18
New Jersey	NELAP	2	CA005	06-30-18
New York	NELAP	2	11666	04-01-18
Oregon	NELAP	10	4040	01-28-18
Pennsylvania	NELAP	3	68-01272	03-31-18
Texas	NELAP	6	T104704399	05-31-18
US Fish & Wildlife	Federal		LE148388-0	07-31-18
USDA	Federal		P330-11-00436	12-30-17
USEPA UCMR	Federal	1	CA00044	11-06-18
Utah	NELAP	8	CA00044	02-28-18
Virginia	NELAP	3	460278	03-14-18
Washington	State Program	10	C581	05-05-18
West Virginia (DW)	State Program	3	9930C	12-31-17
Wyoming	State Program	8	8TMS-L	01-28-19

Laboratory: TestAmerica Portland

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
N/A	N/A	N/A	None on record.	

Method Summary

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-33769-1

Method	Method Description	Protocol	Laboratory
TO-15	Volatile Organic Compounds in Ambient Air	EPA	TAL SAC

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

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Sample Summary

Client: Apex Companies LLC
Project/Site: NuStar Vapor Testing

TestAmerica Job ID: 320-33769-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-33769-1	SVE_South_Precarbon_112917	Air	11/29/17 12:16	12/01/17 09:45
320-33769-2	SVE_South_Postcarbon_112917	Air	11/29/17 12:18	12/01/17 09:45

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TestAmerica Sacramento
880 Riverside Parkway

West Sacramento, CA 95605
phone 916.374.4378 fax 916.372.1059

Client Contact Information
Company Name: Apex Companies
Address: 3015 SW 1st Ave.
City/State/Zip: Portland OR 97201
Phone: 503-924-4704
FAX:
Project Name: Nustar Vancouver
Site/Location: Vancouver WA
P.O.#: 1126-20

Project Manager: Stephanie Salisbury
Phone: 503 924-4704
Email: S.Salisbury@ApexCOS.com
Site Contact:
TA Contact:
Analysis Turnaround Time
Standard (Specify): X
Rush (Specify):

TestAmerica Laboratories, Inc.
COC No. _____ of _____ COCs

For Lab Use Only:
Walk-in Client:
Lab Sampling:
Job / SDG No.:
(See below for Add'l Items)

Canister Samples Chain of Custody Record

TestAmerica Laboratories, Inc. assumes no liability with respect to the collection and shipment of these samples.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Sample Identification	Sample Date(s)	Time Start	Time Stop	Canister Vacuum in Field, 'Hg (Start)	Canister Vacuum in Field, 'Hg (Stop)	Flow Controller ID	Canister ID	TO-15 (Mod / Std / Low / SIM)		MA-APH	EPA 3C	EPA 25C / 25.3	ASTM D-1945 / 1945 / 3588	EPA 15/16	TO-3	Other (Please specify in notes section)	Sample Type	Indoor Air	Ambient Air	Soil Gas	Landfill Gas	Other (Please specify in notes section)	Sample Specific Notes:	
								X																
SVE_South_Prc Carbon - 11/30/17	11/30/17	1215	1216	-29	-1		34000397	X																
SVE_South_Post Carbon - 11/30/17	11/30/17	1217	1218	-29	-2		34001195	X																



320-33769 Chain of Custody

Special Instructions/QC Requirements & Comments:
Email Results to: S.Salisbury@ApexCOS.com

Samples Shipped by: Kyle Kline	Date / Time: 11/30/17 1430	Samples Received by: [Signature]	Date / Time: 11/30/17 1740
Samples Relinquished by: [Signature]	Date / Time: 11/30/17 1335	Received by: [Signature]	Date / Time: 11/30/17 1355
Relinquished by: [Signature]	Date / Time: 11/30/17 1335	Received by: [Signature]	Date / Time: 11/30/17 1700
Lab Use Only: [Signature]	Shipper Name:	Condition:	

Opened by: Emily James #12/1/17 09:45

Form No. CA-C-WI-003, Rev. 1, dated 05/10/2013

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Login Sample Receipt Checklist

Client: Apex Companies LLC

Job Number: 320-33769-1

Login Number: 33769

List Source: TestAmerica Sacramento

List Number: 1

Creator: James, Emily M

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	245671
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	N/A	
Cooler Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Certification Type TO-15 SCAN
 Date Cleaned/Batch ID 10-2-17 320-32051
 Date of QC 10-03-2017/MS9100309.D 602
 Data File Number MS9100309.D



CANISTER ID NUMBERS

<u>7530 *</u>	<u>34001083</u>	_____
<u>34001583</u>	<u>34000589</u>	_____
<u>34001124</u>	<u>34002048</u>	_____
<u>34001195</u>	<u>8427</u>	_____
<u>8342</u>	_____	_____
<u>34000543</u>	_____	_____
<u>34000844</u>	_____	_____
<u>7799</u>	_____	_____

The above canisters were cleaned as a batch. This certifies this batch contains no target analyte concentration greater than or equal to the method criteria for the "Certification Type" indicated above.

"*" INDICATES THE CAN OR CANS WHICH WERE SCREENED.

Gabriela Iliov for ATP
1st level Reviewed By:

10-03-2017
Date:

[Signature]
2nd level Reviewed By:

10/4/17
Date:



FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-32051-1
 SDG No.: _____
 Client Sample ID: 7530 Lab Sample ID: 320-32051-1
 Matrix: Air Lab File ID: MS9100309.D
 Analysis Method: TO-15 Date Collected: 10/02/2017 00:00
 Sample wt/vol: 500 (mL) Date Analyzed: 10/03/2017 18:58
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: RTX-Volatiles ID: 0.32 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 187446 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
67-64-1	Acetone	ND		5.0	0.18
107-02-8	Acrolein	ND		2.0	0.22
107-13-1	Acrylonitrile	ND		2.0	0.19
107-05-1	Allyl chloride	ND		0.80	0.11
71-43-2	Benzene	ND		0.40	0.079
100-44-7	Benzyl chloride	ND		0.80	0.16
75-27-4	Bromodichloromethane	ND		0.30	0.066
75-25-2	Bromoform	ND		0.40	0.070
74-83-9	Bromomethane	ND		0.80	0.34
106-99-0	1,3-Butadiene	ND		0.80	0.15
106-97-8	n-Butane	ND		0.40	0.15
78-93-3	2-Butanone (MEK)	ND		0.80	0.20
75-65-0	tert-Butyl alcohol (TBA)	ND		2.0	0.11
104-51-8	n-Butylbenzene	ND		0.40	0.18
135-98-8	sec-Butylbenzene	ND		0.40	0.070
98-06-6	tert-Butylbenzene	ND		0.80	0.068
75-15-0	Carbon disulfide	ND		0.80	0.078
56-23-5	Carbon tetrachloride	ND		0.80	0.064
108-90-7	Chlorobenzene	ND		0.30	0.064
75-45-6	Chlorodifluoromethane	ND		0.80	0.27
75-00-3	Chloroethane	ND		0.80	0.31
67-66-3	Chloroform	ND		0.30	0.095
74-87-3	Chloromethane	ND		0.80	0.20
95-49-8	2-Chlorotoluene	ND		0.40	0.080
110-82-7	Cyclohexane	ND		0.40	0.084
124-48-1	Dibromochloromethane	ND		0.40	0.079
106-93-4	1,2-Dibromoethane (EDB)	ND		0.80	0.075
74-95-3	Dibromomethane	ND		0.40	0.057
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16
95-50-1	1,2-Dichlorobenzene	ND		0.40	0.13
541-73-1	1,3-Dichlorobenzene	ND		0.40	0.11
106-46-7	1,4-Dichlorobenzene	ND		0.40	0.15
75-71-8	Dichlorodifluoromethane	ND		0.40	0.15
75-34-3	1,1-Dichloroethane	ND		0.30	0.072
107-06-2	1,2-Dichloroethane	ND		0.80	0.088

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-32051-1
 SDG No.: _____
 Client Sample ID: 7530 Lab Sample ID: 320-32051-1
 Matrix: Air Lab File ID: MS9100309.D
 Analysis Method: TO-15 Date Collected: 10/02/2017 00:00
 Sample wt/vol: 500 (mL) Date Analyzed: 10/03/2017 18:58
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: RTX-Volatiles ID: 0.32 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 187446 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
75-35-4	1,1-Dichloroethene	ND		0.80	0.13
156-59-2	cis-1,2-Dichloroethene	ND		0.40	0.089
156-60-5	trans-1,2-Dichloroethene	ND		0.40	0.10
78-87-5	1,2-Dichloropropane	ND		0.40	0.24
10061-01-5	cis-1,3-Dichloropropene	ND		0.40	0.10
10061-02-6	trans-1,3-Dichloropropene	ND		0.40	0.088
123-91-1	1,4-Dioxane	ND		0.80	0.10
141-78-6	Ethyl acetate	ND		0.30	0.18
100-41-4	Ethylbenzene	ND		0.40	0.063
622-96-8	4-Ethyltoluene	ND		0.40	0.19
142-82-5	n-Heptane	ND		0.80	0.063
87-68-3	Hexachlorobutadiene	ND		2.0	0.43
110-54-3	n-Hexane	ND		0.80	0.075
591-78-6	2-Hexanone	ND		0.40	0.087
98-82-8	Isopropylbenzene	ND		0.80	0.10
99-87-6	4-Isopropyltoluene	ND		0.80	0.12
1634-04-4	Methyl-t-Butyl Ether (MTBE)	ND		0.80	0.12
80-62-6	Methyl methacrylate	ND		0.80	0.16
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14
75-09-2	Methylene Chloride	ND		0.40	0.072
98-83-9	alpha-Methylstyrene	ND		0.40	0.065
91-20-3	Naphthalene	ND		0.80	0.56
111-65-9	n-Octane	ND		0.40	0.055
109-66-0	n-Pentane	ND		0.80	0.26
115-07-1	Propylene	ND		0.40	0.099
103-65-1	N-Propylbenzene	ND		0.40	0.059
100-42-5	Styrene	ND		0.40	0.059
79-34-5	1,1,2,2-Tetrachloroethane	ND		0.40	0.069
127-18-4	Tetrachloroethene	ND		0.40	0.051
109-99-9	Tetrahydrofuran	ND		0.80	0.21
108-88-3	Toluene	ND		0.40	0.051
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16
120-82-1	1,2,4-Trichlorobenzene	ND		2.0	0.43
71-55-6	1,1,1-Trichloroethane	ND		0.30	0.065
79-00-5	1,1,2-Trichloroethane	ND		0.40	0.067

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-32051-1
 SDG No.: _____
 Client Sample ID: 7530 Lab Sample ID: 320-32051-1
 Matrix: Air Lab File ID: MS9100309.D
 Analysis Method: TO-15 Date Collected: 10/02/2017 00:00
 Sample wt/vol: 500 (mL) Date Analyzed: 10/03/2017 18:58
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: RTX-Volatiles ID: 0.32 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 187446 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-01-6	Trichloroethene	ND		0.40	0.11
75-69-4	Trichlorofluoromethane	ND		0.40	0.20
96-18-4	1,2,3-Trichloropropane	ND		0.40	0.17
95-63-6	1,2,4-Trimethylbenzene	ND		0.80	0.16
108-67-8	1,3,5-Trimethylbenzene	ND		0.40	0.13
540-84-1	2,2,4-Trimethylpentane	ND		0.40	0.071
108-05-4	Vinyl acetate	ND		0.80	0.15
593-60-2	Vinyl bromide	ND		0.80	0.26
75-01-4	Vinyl chloride	ND		0.40	0.12
179601-23-1	m,p-Xylene	ND		0.80	0.10
95-47-6	o-Xylene	ND		0.40	0.054

CAS NO.	SURROGATE	%REC	Q	LIMITS
460-00-4	4-Bromofluorobenzene (Surr)	89		70-130
17060-07-0	1,2-Dichloroethane-d4 (Surr)	98		70-130
2037-26-5	Toluene-d8 (Surr)	104		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20171003-48685.b\MS9100309.D
 Lims ID: 320-32051-A-1
 Client ID: 7530
 Sample Type: Client
 Inject. Date: 03-Oct-2017 18:58:30 ALS Bottle#: 5 Worklist Smp#: 9
 Purge Vol: 5.000 mL Dil. Factor: 1.0000
 Sample Info: 320-32051-A-1
 Misc. Info.: 500
 Operator ID: GKI Instrument ID: ATMS9
 Method: \\ChromNA\Sacramento\ChromData\ATMS9\20171003-48685.b\TO15_ATMS9N.m
 Limit Group: MSA - TO15 - ICAL
 Last Update: 04-Oct-2017 14:54:17 Calib Date: 10-Aug-2017 02:27:30
 Integrator: RTE ID Type: Deconvolution ID
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\ATMS9\20170809-46489.b\MS9080913.D
 Column 1 : RTX Volatiles (0.32 mm) Det: MS SCAN
 Process Host: XAWRK012

First Level Reviewer: phanthasena

Date: 04-Oct-2017 14:54:17

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ppb v/v	Flags
* 1 Chlorobromomethane (IS)	130	12.337	12.337	0.000	94	41491	4.00	
* 2 1,4-Difluorobenzene	114	14.429	14.429	0.000	96	172339	4.00	
* 3 Chlorobenzene-d5 (IS)	117	20.343	20.343	0.000	89	105895	4.00	
\$ 4 1,2-Dichloroethane-d4 (Sur	65	13.505	13.505	0.000	98	62138	3.91	
\$ 5 Toluene-d8 (Surr)	100	17.581	17.587	-0.006	98	81728	4.17	
\$ 6 4-Bromofluorobenzene (Surr	174	22.271	22.271	0.000	87	45691	3.56	
14 Propene	41	4.288	4.264	0.024	0	404	0.0407	
98 m-Xylene & p-Xylene	91	20.671	20.677	-0.006	1	592	0.0126	
117 1,3-Dichlorobenzene	146	23.871	23.865	0.006	1	529	0.0153	
120 1,4-Dichlorobenzene	146	23.993	23.999	-0.006	1	518	0.0149	
123 n-Butylbenzene	92	24.303	24.309	-0.006	91	394	0.0123	
122 1,2-Dichlorobenzene	146	24.473	24.486	-0.013	1	459	0.0142	
126 1,2,4-Trichlorobenzene	180	26.712	26.712	0.000	84	1440	0.0565	
127 Naphthalene	128	27.077	27.083	-0.006	98	4234	0.0675	

Reagents:

VAMSIS20_00037 Amount Added: 50.00 Units: mL Run Reagent

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20171003-48685.b\MS9100309.D

Injection Date: 03-Oct-2017 18:58:30

Instrument ID: ATMS9

Operator ID: GKI

Lims ID: 320-32051-A-1

Lab Sample ID: 320-32051-1

Worklist Smp#: 9

Client ID: 7530

Purge Vol: 5.000 mL

Dil. Factor: 1.0000

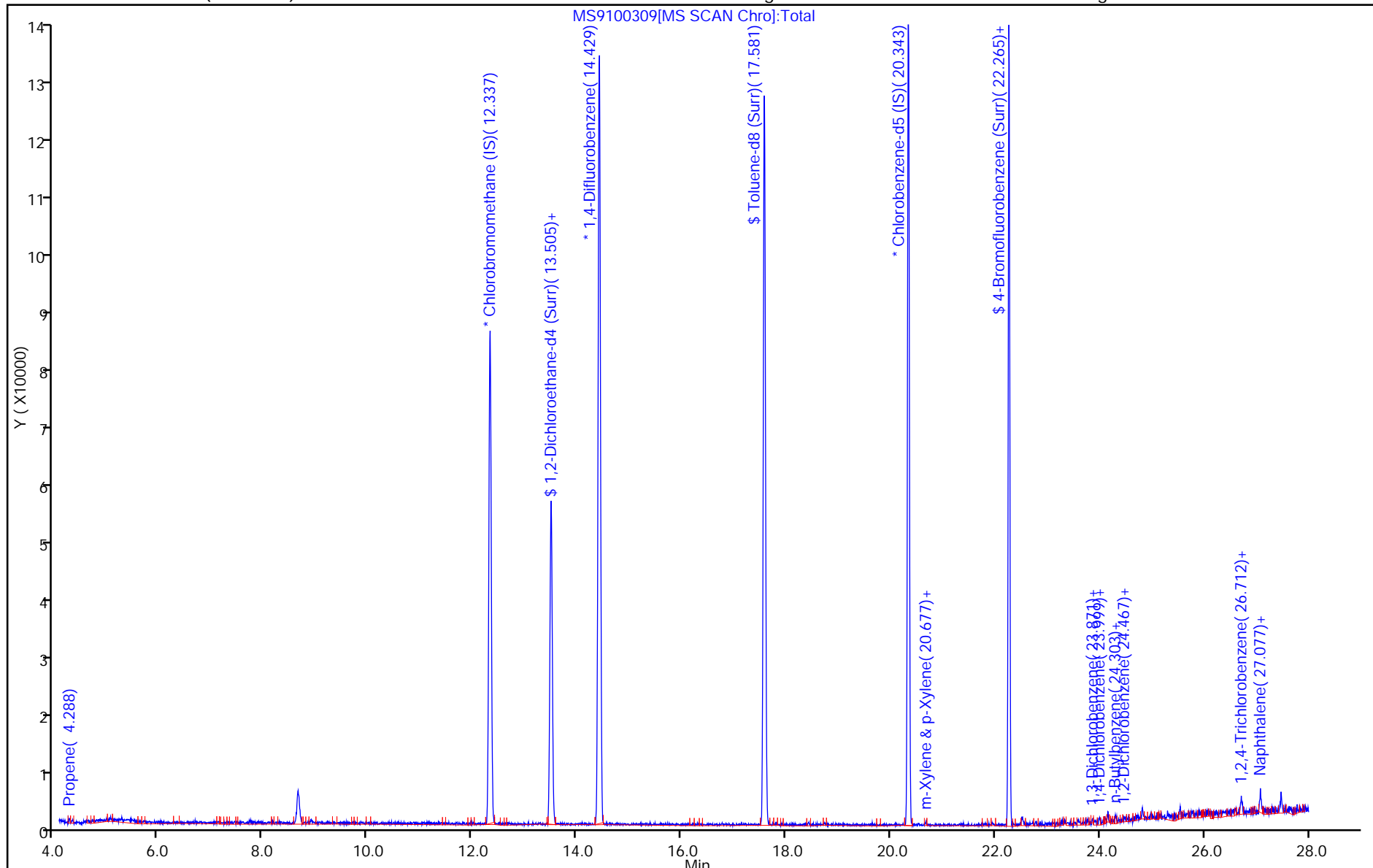
ALS Bottle#: 5

Method: TO15_ATMS9N

Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm)

Y Scaling: Method Defined: Scale to the Nth Largest Peak: 2



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

TestAmerica Job ID: 320-34715-1
Client Project/Site: NuStar Vancouver

For:
Apex Companies LLC
3015 SW 1st Avenue
Portland, Oregon 97201

Attn: Heather Gosack



Authorized for release by:
1/15/2018 5:05:56 PM
Kim Presley, Project Management Assistant I
(253)922-2310
kim.presley@testamericainc.com

Designee for
Cathy Gamble, Project Manager I
(253)922-2310
cathy.gamble@testamericainc.com

LINKS

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Apex Companies LLC
Project/Site: NuStar Vancouver

TestAmerica Job ID: 320-34715-1

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Apex Companies LLC
Project/Site: NuStar Vancouver

TestAmerica Job ID: 320-34715-1

Job ID: 320-34715-1

Laboratory: TestAmerica Sacramento

Narrative

Receipt

The sample was received on 12/27/2017 8:15 AM; the sample arrived in good condition, properly preserved and, where required, on ice.

Receipt Exceptions

The container label for the following sample did not match the information listed on the Chain-of-Custody (COC):
SVE_South_PostCarbon_122117 (320-34715-1).

The container label lists the canister ID as 34000201, while the COC lists the canister ID as 1058.

Air - GC/MS VOA

Method(s) TO-15: The closing continuing calibration verification (CCVC) associated with batch 320-203729 recovered above the upper control limit for Dichlorodifluoromethane. The samples associated with this CCV were non-detect above the reporting limit for the affected analytes; therefore, the data have been reported.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

VOA Prep

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.



Detection Summary

Client: Apex Companies LLC
 Project/Site: NuStar Vancouver

TestAmerica Job ID: 320-34715-1

Client Sample ID: SVE_South_PostCarbon_122117

Lab Sample ID: 320-34715-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	3.7		0.30		ppb v/v	1		TO-15	Total/NA
1,1-Dichloroethane	1.1		0.30		ppb v/v	1		TO-15	Total/NA
1,1-Dichloroethene	1.2		0.80		ppb v/v	1		TO-15	Total/NA
1,3-Dichlorobenzene	2.3		0.40		ppb v/v	1		TO-15	Total/NA
cis-1,2-Dichloroethene	74		0.40		ppb v/v	1		TO-15	Total/NA
Methylene Chloride	0.49		0.40		ppb v/v	1		TO-15	Total/NA
trans-1,2-Dichloroethene	1.3		0.40		ppb v/v	1		TO-15	Total/NA
Trichloroethene	1.3		0.40		ppb v/v	1		TO-15	Total/NA
Vinyl chloride	0.69		0.40		ppb v/v	1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	20		1.6		ug/m3 Air	1		TO-15	Total/NA
1,1-Dichloroethane	4.6		1.2		ug/m3 Air	1		TO-15	Total/NA
1,1-Dichloroethene	4.9		3.2		ug/m3 Air	1		TO-15	Total/NA
1,3-Dichlorobenzene	14		2.4		ug/m3 Air	1		TO-15	Total/NA
cis-1,2-Dichloroethene	300		1.6		ug/m3 Air	1		TO-15	Total/NA
Methylene Chloride	1.7		1.4		ug/m3 Air	1		TO-15	Total/NA
trans-1,2-Dichloroethene	5.2		1.6		ug/m3 Air	1		TO-15	Total/NA
Trichloroethene	7.2		2.1		ug/m3 Air	1		TO-15	Total/NA
Vinyl chloride	1.8		1.0		ug/m3 Air	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vancouver

TestAmerica Job ID: 320-34715-1

Client Sample ID: SVE_South_PostCarbon_122117

Lab Sample ID: 320-34715-1

Date Collected: 12/21/17 09:23

Matrix: Air

Date Received: 12/27/17 08:15

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	3.7		0.30		ppb v/v			01/13/18 01:54	1
1,1,2,2-Tetrachloroethane	ND		0.40		ppb v/v			01/13/18 01:54	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40		ppb v/v			01/13/18 01:54	1
1,1,2-Trichloroethane	ND		0.40		ppb v/v			01/13/18 01:54	1
1,1-Dichloroethane	1.1		0.30		ppb v/v			01/13/18 01:54	1
1,1-Dichloroethene	1.2		0.80		ppb v/v			01/13/18 01:54	1
1,2,4-Trichlorobenzene	ND		2.0		ppb v/v			01/13/18 01:54	1
1,2,4-Trimethylbenzene	ND		0.80		ppb v/v			01/13/18 01:54	1
1,2-Dibromoethane (EDB)	ND		0.80		ppb v/v			01/13/18 01:54	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40		ppb v/v			01/13/18 01:54	1
1,2-Dichlorobenzene	ND		0.40		ppb v/v			01/13/18 01:54	1
1,2-Dichloroethane	ND		0.80		ppb v/v			01/13/18 01:54	1
1,2-Dichloropropane	ND		0.40		ppb v/v			01/13/18 01:54	1
1,3,5-Trimethylbenzene	ND		0.40		ppb v/v			01/13/18 01:54	1
1,3-Dichlorobenzene	2.3		0.40		ppb v/v			01/13/18 01:54	1
1,4-Dichlorobenzene	ND		0.40		ppb v/v			01/13/18 01:54	1
2-Butanone (MEK)	ND		0.80		ppb v/v			01/13/18 01:54	1
2-Hexanone	ND		0.40		ppb v/v			01/13/18 01:54	1
4-Ethyltoluene	ND		0.40		ppb v/v			01/13/18 01:54	1
4-Methyl-2-pentanone (MIBK)	ND		0.40		ppb v/v			01/13/18 01:54	1
Acetone	ND		5.0		ppb v/v			01/13/18 01:54	1
Benzene	ND		0.40		ppb v/v			01/13/18 01:54	1
Benzyl chloride	ND		0.80		ppb v/v			01/13/18 01:54	1
Bromodichloromethane	ND		0.30		ppb v/v			01/13/18 01:54	1
Bromoform	ND		0.40		ppb v/v			01/13/18 01:54	1
Bromomethane	ND		0.80		ppb v/v			01/13/18 01:54	1
Carbon disulfide	ND		0.80		ppb v/v			01/13/18 01:54	1
Carbon tetrachloride	ND		0.80		ppb v/v			01/13/18 01:54	1
Chlorobenzene	ND		0.30		ppb v/v			01/13/18 01:54	1
Chloroethane	ND		0.80		ppb v/v			01/13/18 01:54	1
Chloroform	ND		0.30		ppb v/v			01/13/18 01:54	1
Chloromethane	ND		0.80		ppb v/v			01/13/18 01:54	1
cis-1,2-Dichloroethene	74		0.40		ppb v/v			01/13/18 01:54	1
cis-1,3-Dichloropropene	ND		0.40		ppb v/v			01/13/18 01:54	1
Dibromochloromethane	ND		0.40		ppb v/v			01/13/18 01:54	1
Dichlorodifluoromethane	ND		0.40		ppb v/v			01/13/18 01:54	1
Ethylbenzene	ND		0.40		ppb v/v			01/13/18 01:54	1
Hexachlorobutadiene	ND		2.0		ppb v/v			01/13/18 01:54	1
m,p-Xylene	ND		0.80		ppb v/v			01/13/18 01:54	1
Methylene Chloride	0.49		0.40		ppb v/v			01/13/18 01:54	1
o-Xylene	ND		0.40		ppb v/v			01/13/18 01:54	1
Styrene	ND		0.40		ppb v/v			01/13/18 01:54	1
Tetrachloroethene	ND		0.40		ppb v/v			01/13/18 01:54	1
Toluene	ND		0.40		ppb v/v			01/13/18 01:54	1
trans-1,2-Dichloroethene	1.3		0.40		ppb v/v			01/13/18 01:54	1
trans-1,3-Dichloropropene	ND		0.40		ppb v/v			01/13/18 01:54	1
Trichloroethene	1.3		0.40		ppb v/v			01/13/18 01:54	1
Trichlorofluoromethane	ND		0.40		ppb v/v			01/13/18 01:54	1

TestAmerica Sacramento

Client Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vancouver

TestAmerica Job ID: 320-34715-1

Client Sample ID: SVE_South_PostCarbon_122117

Lab Sample ID: 320-34715-1

Date Collected: 12/21/17 09:23

Matrix: Air

Date Received: 12/27/17 08:15

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl acetate	ND		0.80		ppb v/v			01/13/18 01:54	1
Vinyl chloride	0.69		0.40		ppb v/v			01/13/18 01:54	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	20		1.6		ug/m3 Air			01/13/18 01:54	1
1,1,2,2-Tetrachloroethane	ND		2.7		ug/m3 Air			01/13/18 01:54	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1		ug/m3 Air			01/13/18 01:54	1
1,1,2-Trichloroethane	ND		2.2		ug/m3 Air			01/13/18 01:54	1
1,1-Dichloroethane	4.6		1.2		ug/m3 Air			01/13/18 01:54	1
1,1-Dichloroethene	4.9		3.2		ug/m3 Air			01/13/18 01:54	1
1,2,4-Trichlorobenzene	ND		15		ug/m3 Air			01/13/18 01:54	1
1,2,4-Trimethylbenzene	ND		3.9		ug/m3 Air			01/13/18 01:54	1
1,2-Dibromoethane (EDB)	ND		6.1		ug/m3 Air			01/13/18 01:54	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8		ug/m3 Air			01/13/18 01:54	1
1,2-Dichlorobenzene	ND		2.4		ug/m3 Air			01/13/18 01:54	1
1,2-Dichloroethane	ND		3.2		ug/m3 Air			01/13/18 01:54	1
1,2-Dichloropropane	ND		1.8		ug/m3 Air			01/13/18 01:54	1
1,3,5-Trimethylbenzene	ND		2.0		ug/m3 Air			01/13/18 01:54	1
1,3-Dichlorobenzene	14		2.4		ug/m3 Air			01/13/18 01:54	1
1,4-Dichlorobenzene	ND		2.4		ug/m3 Air			01/13/18 01:54	1
2-Butanone (MEK)	ND		2.4		ug/m3 Air			01/13/18 01:54	1
2-Hexanone	ND		1.6		ug/m3 Air			01/13/18 01:54	1
4-Ethyltoluene	ND		2.0		ug/m3 Air			01/13/18 01:54	1
4-Methyl-2-pentanone (MIBK)	ND		1.6		ug/m3 Air			01/13/18 01:54	1
Acetone	ND		12		ug/m3 Air			01/13/18 01:54	1
Benzene	ND		1.3		ug/m3 Air			01/13/18 01:54	1
Benzyl chloride	ND		4.1		ug/m3 Air			01/13/18 01:54	1
Bromodichloromethane	ND		2.0		ug/m3 Air			01/13/18 01:54	1
Bromoform	ND		4.1		ug/m3 Air			01/13/18 01:54	1
Bromomethane	ND		3.1		ug/m3 Air			01/13/18 01:54	1
Carbon disulfide	ND		2.5		ug/m3 Air			01/13/18 01:54	1
Carbon tetrachloride	ND		5.0		ug/m3 Air			01/13/18 01:54	1
Chlorobenzene	ND		1.4		ug/m3 Air			01/13/18 01:54	1
Chloroethane	ND		2.1		ug/m3 Air			01/13/18 01:54	1
Chloroform	ND		1.5		ug/m3 Air			01/13/18 01:54	1
Chloromethane	ND		1.7		ug/m3 Air			01/13/18 01:54	1
cis-1,2-Dichloroethene	300		1.6		ug/m3 Air			01/13/18 01:54	1
cis-1,3-Dichloropropene	ND		1.8		ug/m3 Air			01/13/18 01:54	1
Dibromochloromethane	ND		3.4		ug/m3 Air			01/13/18 01:54	1
Dichlorodifluoromethane	ND		2.0		ug/m3 Air			01/13/18 01:54	1
Ethylbenzene	ND		1.7		ug/m3 Air			01/13/18 01:54	1
Hexachlorobutadiene	ND		21		ug/m3 Air			01/13/18 01:54	1
m,p-Xylene	ND		3.5		ug/m3 Air			01/13/18 01:54	1
Methylene Chloride	1.7		1.4		ug/m3 Air			01/13/18 01:54	1
o-Xylene	ND		1.7		ug/m3 Air			01/13/18 01:54	1
Styrene	ND		1.7		ug/m3 Air			01/13/18 01:54	1
Tetrachloroethene	ND		2.7		ug/m3 Air			01/13/18 01:54	1
Toluene	ND		1.5		ug/m3 Air			01/13/18 01:54	1
trans-1,2-Dichloroethene	5.2		1.6		ug/m3 Air			01/13/18 01:54	1

TestAmerica Sacramento

Client Sample Results

Client: Apex Companies LLC
 Project/Site: NuStar Vancouver

TestAmerica Job ID: 320-34715-1

Client Sample ID: SVE_South_PostCarbon_122117

Lab Sample ID: 320-34715-1

Date Collected: 12/21/17 09:23

Matrix: Air

Date Received: 12/27/17 08:15

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
trans-1,3-Dichloropropene	ND		1.8		ug/m3 Air			01/13/18 01:54	1
Trichloroethene	7.2		2.1		ug/m3 Air			01/13/18 01:54	1
Trichlorofluoromethane	ND		2.2		ug/m3 Air			01/13/18 01:54	1
Vinyl acetate	ND		2.8		ug/m3 Air			01/13/18 01:54	1
Vinyl chloride	1.8		1.0		ug/m3 Air			01/13/18 01:54	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	96		70 - 130					01/13/18 01:54	1
4-Bromofluorobenzene (Surr)	96		70 - 130					01/13/18 01:54	1
Toluene-d8 (Surr)	105		70 - 130					01/13/18 01:54	1

Surrogate Summary

Client: Apex Companies LLC
Project/Site: NuStar Vancouver

TestAmerica Job ID: 320-34715-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Matrix: Air

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DCA (70-130)	BFB (70-130)	TOL (70-130)
320-34715-1	SVE_South_PostCarbon_12211	96	96	105
LCS 320-203729/3	Lab Control Sample	97	104	108
LCSD 320-203729/4	Lab Control Sample Dup	99	100	103
MB 320-203729/6	Method Blank	93	99	104

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)

BFB = 4-Bromofluorobenzene (Surr)

TOL = Toluene-d8 (Surr)

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vancouver

TestAmerica Job ID: 320-34715-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Lab Sample ID: MB 320-203729/6

Matrix: Air

Analysis Batch: 203729

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.30		ppb v/v			01/12/18 19:46	1
1,1,2,2-Tetrachloroethane	ND		0.40		ppb v/v			01/12/18 19:46	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40		ppb v/v			01/12/18 19:46	1
1,1,2-Trichloroethane	ND		0.40		ppb v/v			01/12/18 19:46	1
1,1-Dichloroethane	ND		0.30		ppb v/v			01/12/18 19:46	1
1,1-Dichloroethene	ND		0.80		ppb v/v			01/12/18 19:46	1
1,2,4-Trichlorobenzene	ND		2.0		ppb v/v			01/12/18 19:46	1
1,2,4-Trimethylbenzene	ND		0.80		ppb v/v			01/12/18 19:46	1
1,2-Dibromoethane (EDB)	ND		0.80		ppb v/v			01/12/18 19:46	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40		ppb v/v			01/12/18 19:46	1
1,2-Dichlorobenzene	ND		0.40		ppb v/v			01/12/18 19:46	1
1,2-Dichloroethane	ND		0.80		ppb v/v			01/12/18 19:46	1
1,2-Dichloropropane	ND		0.40		ppb v/v			01/12/18 19:46	1
1,3,5-Trimethylbenzene	ND		0.40		ppb v/v			01/12/18 19:46	1
1,3-Dichlorobenzene	ND		0.40		ppb v/v			01/12/18 19:46	1
1,4-Dichlorobenzene	ND		0.40		ppb v/v			01/12/18 19:46	1
2-Butanone (MEK)	ND		0.80		ppb v/v			01/12/18 19:46	1
2-Hexanone	ND		0.40		ppb v/v			01/12/18 19:46	1
4-Ethyltoluene	ND		0.40		ppb v/v			01/12/18 19:46	1
4-Methyl-2-pentanone (MIBK)	ND		0.40		ppb v/v			01/12/18 19:46	1
Acetone	ND		5.0		ppb v/v			01/12/18 19:46	1
Benzene	ND		0.40		ppb v/v			01/12/18 19:46	1
Benzyl chloride	ND		0.80		ppb v/v			01/12/18 19:46	1
Bromodichloromethane	ND		0.30		ppb v/v			01/12/18 19:46	1
Bromoform	ND		0.40		ppb v/v			01/12/18 19:46	1
Bromomethane	ND		0.80		ppb v/v			01/12/18 19:46	1
Carbon disulfide	ND		0.80		ppb v/v			01/12/18 19:46	1
Carbon tetrachloride	ND		0.80		ppb v/v			01/12/18 19:46	1
Chlorobenzene	ND		0.30		ppb v/v			01/12/18 19:46	1
Chloroethane	ND		0.80		ppb v/v			01/12/18 19:46	1
Chloroform	ND		0.30		ppb v/v			01/12/18 19:46	1
Chloromethane	ND		0.80		ppb v/v			01/12/18 19:46	1
cis-1,2-Dichloroethene	ND		0.40		ppb v/v			01/12/18 19:46	1
cis-1,3-Dichloropropene	ND		0.40		ppb v/v			01/12/18 19:46	1
Dibromochloromethane	ND		0.40		ppb v/v			01/12/18 19:46	1
Dichlorodifluoromethane	ND		0.40		ppb v/v			01/12/18 19:46	1
Ethylbenzene	ND		0.40		ppb v/v			01/12/18 19:46	1
Hexachlorobutadiene	ND		2.0		ppb v/v			01/12/18 19:46	1
m,p-Xylene	ND		0.80		ppb v/v			01/12/18 19:46	1
Methylene Chloride	ND		0.40		ppb v/v			01/12/18 19:46	1
o-Xylene	ND		0.40		ppb v/v			01/12/18 19:46	1
Styrene	ND		0.40		ppb v/v			01/12/18 19:46	1
Tetrachloroethene	ND		0.40		ppb v/v			01/12/18 19:46	1
Toluene	ND		0.40		ppb v/v			01/12/18 19:46	1
trans-1,2-Dichloroethene	ND		0.40		ppb v/v			01/12/18 19:46	1
trans-1,3-Dichloropropene	ND		0.40		ppb v/v			01/12/18 19:46	1
Trichloroethene	ND		0.40		ppb v/v			01/12/18 19:46	1
Trichlorofluoromethane	ND		0.40		ppb v/v			01/12/18 19:46	1

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vancouver

TestAmerica Job ID: 320-34715-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 320-203729/6

Matrix: Air

Analysis Batch: 203729

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl acetate	ND		0.80		ppb v/v			01/12/18 19:46	1
Vinyl chloride	ND		0.40		ppb v/v			01/12/18 19:46	1
Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.6		ug/m3 Air			01/12/18 19:46	1
1,1,2,2-Tetrachloroethane	ND		2.7		ug/m3 Air			01/12/18 19:46	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1		ug/m3 Air			01/12/18 19:46	1
1,1,2-Trichloroethane	ND		2.2		ug/m3 Air			01/12/18 19:46	1
1,1-Dichloroethane	ND		1.2		ug/m3 Air			01/12/18 19:46	1
1,1-Dichloroethene	ND		3.2		ug/m3 Air			01/12/18 19:46	1
1,2,4-Trichlorobenzene	ND		15		ug/m3 Air			01/12/18 19:46	1
1,2,4-Trimethylbenzene	ND		3.9		ug/m3 Air			01/12/18 19:46	1
1,2-Dibromoethane (EDB)	ND		6.1		ug/m3 Air			01/12/18 19:46	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8		ug/m3 Air			01/12/18 19:46	1
1,2-Dichlorobenzene	ND		2.4		ug/m3 Air			01/12/18 19:46	1
1,2-Dichloroethane	ND		3.2		ug/m3 Air			01/12/18 19:46	1
1,2-Dichloropropane	ND		1.8		ug/m3 Air			01/12/18 19:46	1
1,3,5-Trimethylbenzene	ND		2.0		ug/m3 Air			01/12/18 19:46	1
1,3-Dichlorobenzene	ND		2.4		ug/m3 Air			01/12/18 19:46	1
1,4-Dichlorobenzene	ND		2.4		ug/m3 Air			01/12/18 19:46	1
2-Butanone (MEK)	ND		2.4		ug/m3 Air			01/12/18 19:46	1
2-Hexanone	ND		1.6		ug/m3 Air			01/12/18 19:46	1
4-Ethyltoluene	ND		2.0		ug/m3 Air			01/12/18 19:46	1
4-Methyl-2-pentanone (MIBK)	ND		1.6		ug/m3 Air			01/12/18 19:46	1
Acetone	ND		12		ug/m3 Air			01/12/18 19:46	1
Benzene	ND		1.3		ug/m3 Air			01/12/18 19:46	1
Benzyl chloride	ND		4.1		ug/m3 Air			01/12/18 19:46	1
Bromodichloromethane	ND		2.0		ug/m3 Air			01/12/18 19:46	1
Bromoform	ND		4.1		ug/m3 Air			01/12/18 19:46	1
Bromomethane	ND		3.1		ug/m3 Air			01/12/18 19:46	1
Carbon disulfide	ND		2.5		ug/m3 Air			01/12/18 19:46	1
Carbon tetrachloride	ND		5.0		ug/m3 Air			01/12/18 19:46	1
Chlorobenzene	ND		1.4		ug/m3 Air			01/12/18 19:46	1
Chloroethane	ND		2.1		ug/m3 Air			01/12/18 19:46	1
Chloroform	ND		1.5		ug/m3 Air			01/12/18 19:46	1
Chloromethane	ND		1.7		ug/m3 Air			01/12/18 19:46	1
cis-1,2-Dichloroethene	ND		1.6		ug/m3 Air			01/12/18 19:46	1
cis-1,3-Dichloropropene	ND		1.8		ug/m3 Air			01/12/18 19:46	1
Dibromochloromethane	ND		3.4		ug/m3 Air			01/12/18 19:46	1
Dichlorodifluoromethane	ND		2.0		ug/m3 Air			01/12/18 19:46	1
Ethylbenzene	ND		1.7		ug/m3 Air			01/12/18 19:46	1
Hexachlorobutadiene	ND		21		ug/m3 Air			01/12/18 19:46	1
m,p-Xylene	ND		3.5		ug/m3 Air			01/12/18 19:46	1
Methylene Chloride	ND		1.4		ug/m3 Air			01/12/18 19:46	1
o-Xylene	ND		1.7		ug/m3 Air			01/12/18 19:46	1
Styrene	ND		1.7		ug/m3 Air			01/12/18 19:46	1
Tetrachloroethene	ND		2.7		ug/m3 Air			01/12/18 19:46	1
Toluene	ND		1.5		ug/m3 Air			01/12/18 19:46	1

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vancouver

TestAmerica Job ID: 320-34715-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 320-203729/6

Matrix: Air

Analysis Batch: 203729

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
trans-1,2-Dichloroethene	ND		1.6		ug/m3 Air			01/12/18 19:46	1
trans-1,3-Dichloropropene	ND		1.8		ug/m3 Air			01/12/18 19:46	1
Trichloroethene	ND		2.1		ug/m3 Air			01/12/18 19:46	1
Trichlorofluoromethane	ND		2.2		ug/m3 Air			01/12/18 19:46	1
Vinyl acetate	ND		2.8		ug/m3 Air			01/12/18 19:46	1
Vinyl chloride	ND		1.0		ug/m3 Air			01/12/18 19:46	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	93		70 - 130		01/12/18 19:46	1
4-Bromofluorobenzene (Surr)	99		70 - 130		01/12/18 19:46	1
Toluene-d8 (Surr)	104		70 - 130		01/12/18 19:46	1

Lab Sample ID: LCS 320-203729/3

Matrix: Air

Analysis Batch: 203729

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	20.0	21.8		ppb v/v		109	69 - 129
1,1,1,2-Tetrachloroethane	20.0	21.4		ppb v/v		107	64 - 124
1,1,1,2-Trichloro-1,2,2-trifluoroethane	20.0	22.6		ppb v/v		113	70 - 130
1,1,2-Trichloroethane	20.0	21.0		ppb v/v		105	64 - 124
1,1-Dichloroethane	20.0	22.8		ppb v/v		114	71 - 131
1,1-Dichloroethene	20.0	22.6		ppb v/v		113	72 - 132
1,2,4-Trichlorobenzene	20.0	22.3		ppb v/v		111	58 - 138
1,2,4-Trimethylbenzene	20.0	21.0		ppb v/v		105	60 - 132
1,2-Dibromoethane (EDB)	20.0	20.7		ppb v/v		104	64 - 124
1,2-Dichloro-1,1,2,2-tetrafluoroethane	20.0	20.4		ppb v/v		102	74 - 134
1,2-Dichlorobenzene	20.0	20.7		ppb v/v		103	62 - 126
1,2-Dichloroethane	20.0	21.8		ppb v/v		109	71 - 131
1,2-Dichloropropane	20.0	21.8		ppb v/v		109	72 - 132
1,3,5-Trimethylbenzene	20.0	20.9		ppb v/v		104	65 - 125
1,3-Dichlorobenzene	20.0	20.8		ppb v/v		104	59 - 130
1,4-Dichlorobenzene	20.0	21.0		ppb v/v		105	58 - 132
2-Butanone (MEK)	20.0	23.0		ppb v/v		115	73 - 133
2-Hexanone	20.0	20.5		ppb v/v		102	69 - 129
4-Ethyltoluene	20.0	20.6		ppb v/v		103	66 - 129
4-Methyl-2-pentanone (MIBK)	20.0	21.5		ppb v/v		107	74 - 134
Acetone	20.0	21.9		ppb v/v		110	65 - 125
Benzene	20.0	22.7		ppb v/v		114	68 - 128
Benzyl chloride	16.0	16.7		ppb v/v		104	67 - 127
Bromodichloromethane	20.0	22.2		ppb v/v		111	71 - 131
Bromoform	20.0	21.2		ppb v/v		106	66 - 126
Bromomethane	20.0	21.7		ppb v/v		108	73 - 134
Carbon disulfide	20.0	22.8		ppb v/v		114	71 - 131
Carbon tetrachloride	20.0	21.5		ppb v/v		107	63 - 126
Chlorobenzene	20.0	20.9		ppb v/v		105	63 - 123

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vancouver

TestAmerica Job ID: 320-34715-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 320-203729/3

Matrix: Air

Analysis Batch: 203729

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloroethane	20.0	23.1		ppb v/v		116	73 - 133
Chloroform	20.0	22.9		ppb v/v		114	70 - 130
Chloromethane	20.0	19.9		ppb v/v		100	61 - 140
cis-1,2-Dichloroethene	20.0	23.0		ppb v/v		115	70 - 130
cis-1,3-Dichloropropene	20.0	22.2		ppb v/v		111	72 - 132
Dibromochloromethane	20.0	20.7		ppb v/v		104	66 - 126
Dichlorodifluoromethane	20.0	22.2		ppb v/v		111	69 - 129
Ethylbenzene	20.0	20.5		ppb v/v		103	64 - 124
Hexachlorobutadiene	20.0	21.1		ppb v/v		105	58 - 131
m,p-Xylene	40.0	41.2		ppb v/v		103	65 - 125
Methylene Chloride	20.0	22.3		ppb v/v		112	67 - 127
o-Xylene	20.0	20.6		ppb v/v		103	65 - 125
Styrene	20.0	20.9		ppb v/v		105	67 - 127
Tetrachloroethene	20.0	20.3		ppb v/v		101	63 - 123
Toluene	20.0	22.2		ppb v/v		111	68 - 128
trans-1,2-Dichloroethene	20.0	23.1		ppb v/v		115	72 - 132
trans-1,3-Dichloropropene	20.0	20.6		ppb v/v		103	66 - 126
Trichloroethene	20.0	22.0		ppb v/v		110	70 - 130
Trichlorofluoromethane	20.0	21.6		ppb v/v		108	71 - 131
Vinyl acetate	20.0	23.2		ppb v/v		116	65 - 134
Vinyl chloride	20.0	19.9		ppb v/v		100	59 - 152
Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	110	119		ug/m3 Air		109	69 - 129
1,1,1,2-Tetrachloroethane	140	147		ug/m3 Air		107	64 - 124
1,1,2-Trichloro-1,2,2-trifluoroethane	150	173		ug/m3 Air		113	70 - 130
1,1,2-Trichloroethane	110	115		ug/m3 Air		105	64 - 124
1,1-Dichloroethane	81	92.2		ug/m3 Air		114	71 - 131
1,1-Dichloroethene	79	89.6		ug/m3 Air		113	72 - 132
1,2,4-Trichlorobenzene	150	165		ug/m3 Air		111	58 - 138
1,2,4-Trimethylbenzene	98	103		ug/m3 Air		105	60 - 132
1,2-Dibromoethane (EDB)	150	159		ug/m3 Air		104	64 - 124
1,2-Dichloro-1,1,2,2-tetrafluoroethane	140	142		ug/m3 Air		102	74 - 134
1,2-Dichlorobenzene	120	124		ug/m3 Air		103	62 - 126
1,2-Dichloroethane	81	88.4		ug/m3 Air		109	71 - 131
1,2-Dichloropropane	92	101		ug/m3 Air		109	72 - 132
1,3,5-Trimethylbenzene	98	103		ug/m3 Air		104	65 - 125
1,3-Dichlorobenzene	120	125		ug/m3 Air		104	59 - 130
1,4-Dichlorobenzene	120	126		ug/m3 Air		105	58 - 132
2-Butanone (MEK)	59	68.0		ug/m3 Air		115	73 - 133
2-Hexanone	82	83.8		ug/m3 Air		102	69 - 129
4-Ethyltoluene	98	101		ug/m3 Air		103	66 - 129
4-Methyl-2-pentanone (MIBK)	82	88.1		ug/m3 Air		107	74 - 134
Acetone	48	52.1		ug/m3 Air		110	65 - 125
Benzene	64	72.5		ug/m3 Air		114	68 - 128
Benzyl chloride	83	86.2		ug/m3 Air		104	67 - 127
Bromodichloromethane	130	149		ug/m3 Air		111	71 - 131

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vancouver

TestAmerica Job ID: 320-34715-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 320-203729/3

Matrix: Air

Analysis Batch: 203729

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Bromoform	210	219		ug/m3 Air		106	66 - 126
Bromomethane	78	84.1		ug/m3 Air		108	73 - 134
Carbon disulfide	62	70.9		ug/m3 Air		114	71 - 131
Carbon tetrachloride	130	135		ug/m3 Air		107	63 - 126
Chlorobenzene	92	96.4		ug/m3 Air		105	63 - 123
Chloroethane	53	61.0		ug/m3 Air		116	73 - 133
Chloroform	98	112		ug/m3 Air		114	70 - 130
Chloromethane	41	41.1		ug/m3 Air		100	61 - 140
cis-1,2-Dichloroethene	79	91.0		ug/m3 Air		115	70 - 130
cis-1,3-Dichloropropene	91	101		ug/m3 Air		111	72 - 132
Dibromochloromethane	170	176		ug/m3 Air		104	66 - 126
Dichlorodifluoromethane	99	110		ug/m3 Air		111	69 - 129
Ethylbenzene	87	89.2		ug/m3 Air		103	64 - 124
Hexachlorobutadiene	210	225		ug/m3 Air		105	58 - 131
m,p-Xylene	170	179		ug/m3 Air		103	65 - 125
Methylene Chloride	69	77.5		ug/m3 Air		112	67 - 127
o-Xylene	87	89.5		ug/m3 Air		103	65 - 125
Styrene	85	89.2		ug/m3 Air		105	67 - 127
Tetrachloroethene	140	137		ug/m3 Air		101	63 - 123
Toluene	75	83.5		ug/m3 Air		111	68 - 128
trans-1,2-Dichloroethene	79	91.5		ug/m3 Air		115	72 - 132
trans-1,3-Dichloropropene	91	93.3		ug/m3 Air		103	66 - 126
Trichloroethene	110	118		ug/m3 Air		110	70 - 130
Trichlorofluoromethane	110	122		ug/m3 Air		108	71 - 131
Vinyl acetate	70	81.7		ug/m3 Air		116	65 - 134
Vinyl chloride	51	50.9		ug/m3 Air		100	59 - 152

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	97		70 - 130
4-Bromofluorobenzene (Surr)	104		70 - 130
Toluene-d8 (Surr)	108		70 - 130

Lab Sample ID: LCSD 320-203729/4

Matrix: Air

Analysis Batch: 203729

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	20.0	23.2		ppb v/v		116	69 - 129	6	25
1,1,2,2-Tetrachloroethane	20.0	21.8		ppb v/v		109	64 - 124	2	25
1,1,2-Trichloro-1,2,2-trifluoroethane	20.0	23.6		ppb v/v		118	70 - 130	5	25
1,1,2-Trichloroethane	20.0	21.5		ppb v/v		107	64 - 124	2	25
1,1-Dichloroethane	20.0	23.6		ppb v/v		118	71 - 131	3	25
1,1-Dichloroethene	20.0	23.5		ppb v/v		118	72 - 132	4	25
1,2,4-Trichlorobenzene	20.0	23.6		ppb v/v		118	58 - 138	6	25
1,2,4-Trimethylbenzene	20.0	21.5		ppb v/v		107	60 - 132	2	25
1,2-Dibromoethane (EDB)	20.0	21.3		ppb v/v		106	64 - 124	3	25

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vancouver

TestAmerica Job ID: 320-34715-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-203729/4

Client Sample ID: Lab Control Sample Dup

Matrix: Air

Prep Type: Total/NA

Analysis Batch: 203729

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2-Dichloro-1,1,2,2-tetrafluoroethane	20.0	21.2		ppb v/v		106	74 - 134	4	25
1,2-Dichlorobenzene	20.0	21.6		ppb v/v		108	62 - 126	4	25
1,2-Dichloroethane	20.0	21.7		ppb v/v		108	71 - 131	1	25
1,2-Dichloropropane	20.0	22.6		ppb v/v		113	72 - 132	4	25
1,3,5-Trimethylbenzene	20.0	20.8		ppb v/v		104	65 - 125	0	25
1,3-Dichlorobenzene	20.0	21.8		ppb v/v		109	59 - 130	5	25
1,4-Dichlorobenzene	20.0	22.0		ppb v/v		110	58 - 132	4	25
2-Butanone (MEK)	20.0	24.2		ppb v/v		121	73 - 133	5	25
2-Hexanone	20.0	21.3		ppb v/v		106	69 - 129	4	25
4-Ethyltoluene	20.0	21.3		ppb v/v		106	66 - 129	3	25
4-Methyl-2-pentanone (MIBK)	20.0	21.8		ppb v/v		109	74 - 134	1	25
Acetone	20.0	22.8		ppb v/v		114	65 - 125	4	25
Benzene	20.0	23.0		ppb v/v		115	68 - 128	1	25
Benzyl chloride	16.0	17.9		ppb v/v		112	67 - 127	7	25
Bromodichloromethane	20.0	22.8		ppb v/v		114	71 - 131	2	25
Bromoform	20.0	21.8		ppb v/v		109	66 - 126	3	25
Bromomethane	20.0	22.7		ppb v/v		114	73 - 134	5	25
Carbon disulfide	20.0	23.2		ppb v/v		116	71 - 131	2	25
Carbon tetrachloride	20.0	21.7		ppb v/v		109	63 - 126	1	25
Chlorobenzene	20.0	21.6		ppb v/v		108	63 - 123	3	25
Chloroethane	20.0	23.9		ppb v/v		119	73 - 133	3	25
Chloroform	20.0	23.8		ppb v/v		119	70 - 130	4	25
Chloromethane	20.0	20.2		ppb v/v		101	61 - 140	2	25
cis-1,2-Dichloroethene	20.0	23.6		ppb v/v		118	70 - 130	3	25
cis-1,3-Dichloropropene	20.0	22.6		ppb v/v		113	72 - 132	1	25
Dibromochloromethane	20.0	21.4		ppb v/v		107	66 - 126	3	25
Dichlorodifluoromethane	20.0	23.0		ppb v/v		115	69 - 129	4	25
Ethylbenzene	20.0	21.4		ppb v/v		107	64 - 124	4	25
Hexachlorobutadiene	20.0	22.0		ppb v/v		110	58 - 131	5	25
m,p-Xylene	40.0	43.1		ppb v/v		108	65 - 125	5	25
Methylene Chloride	20.0	22.6		ppb v/v		113	67 - 127	1	25
o-Xylene	20.0	21.0		ppb v/v		105	65 - 125	2	25
Styrene	20.0	21.7		ppb v/v		108	67 - 127	3	25
Tetrachloroethene	20.0	20.8		ppb v/v		104	63 - 123	3	25
Toluene	20.0	22.8		ppb v/v		114	68 - 128	3	25
trans-1,2-Dichloroethene	20.0	24.2		ppb v/v		121	72 - 132	5	25
trans-1,3-Dichloropropene	20.0	21.1		ppb v/v		106	66 - 126	3	25
Trichloroethene	20.0	22.1		ppb v/v		111	70 - 130	0	25
Trichlorofluoromethane	20.0	22.8		ppb v/v		114	71 - 131	5	25
Vinyl acetate	20.0	24.0		ppb v/v		120	65 - 134	3	25
Vinyl chloride	20.0	20.5		ppb v/v		102	59 - 152	3	25

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	110	127		ug/m3 Air		116	69 - 129	6	25
1,1,2,2-Tetrachloroethane	140	150		ug/m3 Air		109	64 - 124	2	25
1,1,2-Trichloro-1,2,2-trifluoroethane	150	181		ug/m3 Air		118	70 - 130	5	25
1,1,2-Trichloroethane	110	117		ug/m3 Air		107	64 - 124	2	25

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vancouver

TestAmerica Job ID: 320-34715-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-203729/4

Matrix: Air

Analysis Batch: 203729

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1-Dichloroethane	81	95.3		ug/m3 Air		118	71 - 131	3	25
1,1-Dichloroethene	79	93.3		ug/m3 Air		118	72 - 132	4	25
1,2,4-Trichlorobenzene	150	175		ug/m3 Air		118	58 - 138	6	25
1,2,4-Trimethylbenzene	98	105		ug/m3 Air		107	60 - 132	2	25
1,2-Dibromoethane (EDB)	150	164		ug/m3 Air		106	64 - 124	3	25
1,2-Dichloro-1,1,2,2-tetrafluoroethane	140	149		ug/m3 Air		106	74 - 134	4	25
1,2-Dichlorobenzene	120	130		ug/m3 Air		108	62 - 126	4	25
1,2-Dichloroethane	81	87.8		ug/m3 Air		108	71 - 131	1	25
1,2-Dichloropropane	92	105		ug/m3 Air		113	72 - 132	4	25
1,3,5-Trimethylbenzene	98	102		ug/m3 Air		104	65 - 125	0	25
1,3-Dichlorobenzene	120	131		ug/m3 Air		109	59 - 130	5	25
1,4-Dichlorobenzene	120	132		ug/m3 Air		110	58 - 132	4	25
2-Butanone (MEK)	59	71.2		ug/m3 Air		121	73 - 133	5	25
2-Hexanone	82	87.2		ug/m3 Air		106	69 - 129	4	25
4-Ethyltoluene	98	105		ug/m3 Air		106	66 - 129	3	25
4-Methyl-2-pentanone (MIBK)	82	89.3		ug/m3 Air		109	74 - 134	1	25
Acetone	48	54.0		ug/m3 Air		114	65 - 125	4	25
Benzene	64	73.5		ug/m3 Air		115	68 - 128	1	25
Benzyl chloride	83	92.6		ug/m3 Air		112	67 - 127	7	25
Bromodichloromethane	130	152		ug/m3 Air		114	71 - 131	2	25
Bromoform	210	225		ug/m3 Air		109	66 - 126	3	25
Bromomethane	78	88.3		ug/m3 Air		114	73 - 134	5	25
Carbon disulfide	62	72.2		ug/m3 Air		116	71 - 131	2	25
Carbon tetrachloride	130	137		ug/m3 Air		109	63 - 126	1	25
Chlorobenzene	92	99.4		ug/m3 Air		108	63 - 123	3	25
Chloroethane	53	63.0		ug/m3 Air		119	73 - 133	3	25
Chloroform	98	116		ug/m3 Air		119	70 - 130	4	25
Chloromethane	41	41.8		ug/m3 Air		101	61 - 140	2	25
cis-1,2-Dichloroethene	79	93.7		ug/m3 Air		118	70 - 130	3	25
cis-1,3-Dichloropropene	91	102		ug/m3 Air		113	72 - 132	1	25
Dibromochloromethane	170	182		ug/m3 Air		107	66 - 126	3	25
Dichlorodifluoromethane	99	114		ug/m3 Air		115	69 - 129	4	25
Ethylbenzene	87	93.0		ug/m3 Air		107	64 - 124	4	25
Hexachlorobutadiene	210	235		ug/m3 Air		110	58 - 131	5	25
m,p-Xylene	170	187		ug/m3 Air		108	65 - 125	5	25
Methylene Chloride	69	78.6		ug/m3 Air		113	67 - 127	1	25
o-Xylene	87	91.4		ug/m3 Air		105	65 - 125	2	25
Styrene	85	92.3		ug/m3 Air		108	67 - 127	3	25
Tetrachloroethene	140	141		ug/m3 Air		104	63 - 123	3	25
Toluene	75	85.9		ug/m3 Air		114	68 - 128	3	25
trans-1,2-Dichloroethene	79	96.1		ug/m3 Air		121	72 - 132	5	25
trans-1,3-Dichloropropene	91	95.9		ug/m3 Air		106	66 - 126	3	25
Trichloroethene	110	119		ug/m3 Air		111	70 - 130	0	25
Trichlorofluoromethane	110	128		ug/m3 Air		114	71 - 131	5	25
Vinyl acetate	70	84.4		ug/m3 Air		120	65 - 134	3	25
Vinyl chloride	51	52.3		ug/m3 Air		102	59 - 152	3	25

TestAmerica Sacramento

QC Sample Results

Client: Apex Companies LLC
Project/Site: NuStar Vancouver

TestAmerica Job ID: 320-34715-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-203729/4

Matrix: Air

Analysis Batch: 203729

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Surrogate	LCSD		Limits
	%Recovery	Qualifier	
1,2-Dichloroethane-d4 (Surr)	99		70 - 130
4-Bromofluorobenzene (Surr)	100		70 - 130
Toluene-d8 (Surr)	103		70 - 130

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QC Association Summary

Client: Apex Companies LLC
Project/Site: NuStar Vancouver

TestAmerica Job ID: 320-34715-1

Air - GC/MS VOA

Analysis Batch: 203729

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-34715-1	SVE_South_PostCarbon_122117	Total/NA	Air	TO-15	
MB 320-203729/6	Method Blank	Total/NA	Air	TO-15	
LCS 320-203729/3	Lab Control Sample	Total/NA	Air	TO-15	
LCSD 320-203729/4	Lab Control Sample Dup	Total/NA	Air	TO-15	

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Lab Chronicle

Client: Apex Companies LLC
Project/Site: NuStar Vancouver

TestAmerica Job ID: 320-34715-1

Client Sample ID: SVE_South_PostCarbon_122117

Lab Sample ID: 320-34715-1

Date Collected: 12/21/17 09:23

Matrix: Air

Date Received: 12/27/17 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	372 mL	250 mL	203729	01/13/18 01:54	AP1	TAL SAC

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: Apex Companies LLC
 Project/Site: NuStar Vancouver

TestAmerica Job ID: 320-34715-1

Laboratory: TestAmerica Sacramento

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Alaska (UST)	State Program	10	UST-055	01-31-18
Arizona	State Program	9	AZ0708	08-11-18
Arkansas DEQ	State Program	6	88-0691	06-17-18
California	State Program	9	2897	01-31-18
Colorado	State Program	8	CA00044	08-31-18
Connecticut	State Program	1	PH-0691	06-30-19
Florida	NELAP	4	E87570	06-30-18
Georgia	State Program	4	N/A	01-28-19
Hawaii	State Program	9	N/A	01-29-18
Illinois	NELAP	5	200060	03-17-18
Kansas	NELAP	7	E-10375	12-31-17 *
L-A-B	DoD ELAP		L2468	01-20-18
Louisiana	NELAP	6	30612	06-30-18
Maine	State Program	1	CA0004	04-18-18
Michigan	State Program	5	9947	01-31-18
Nevada	State Program	9	CA00044	07-31-18
New Hampshire	NELAP	1	2997	04-18-18
New Jersey	NELAP	2	CA005	06-30-18
New York	NELAP	2	11666	04-01-18
Oregon	NELAP	10	4040	01-29-20
Pennsylvania	NELAP	3	68-01272	03-31-18
Texas	NELAP	6	T104704399	05-31-18
US Fish & Wildlife	Federal		LE148388-0	07-31-18
USDA	Federal		P330-11-00436	12-30-17 *
USEPA UCMR	Federal	1	CA00044	11-06-18
Utah	NELAP	8	CA00044	02-28-18
Virginia	NELAP	3	460278	03-14-18
Washington	State Program	10	C581	05-05-18
Wyoming	State Program	8	8TMS-L	01-28-19

Laboratory: TestAmerica Portland

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
N/A	N/A	N/A	None on record.	

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: Apex Companies LLC
Project/Site: NuStar Vancouver

TestAmerica Job ID: 320-34715-1

Method	Method Description	Protocol	Laboratory
TO-15	Volatile Organic Compounds in Ambient Air	EPA	TAL SAC

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

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Sample Summary

Client: Apex Companies LLC
Project/Site: NuStar Vancouver

TestAmerica Job ID: 320-34715-1


Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-34715-1	SVE_South_PostCarbon_122117	Air	12/21/17 09:23	12/27/17 08:15

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Canister Samples Chain of Custody Record

TestAmerica Laboratories, Inc. assumes no liability with respect to the collection and shipment of these samples.

TestAmerica Laboratories, Inc.

Client Contact Information Company Name: Apex Companies Address: 3015 SW 1st Ave City/State/Zip: Portland OR 97201 Phone: 503 924 4704 FAX: _____		Project Manager: Stephanie Salisbury Phone: 503 924 4704 Email: S.Salisbury@ApexCos.com		Samples Collected By: Kyle Kline		COC No: _____ of _____ COCs	
Site Contact: TA Contact: _____ Analysis Turnaround Time: _____ Standard (Specific): X Rush (Specify): _____		Sample Identification Sample Date(s): 12/17/17 Sample ID: 1058 X		Other (Please specify in notes section) Landfill Gas Soil Gas Ambient Air Indoor Air Sample Type		For Lab Use Only: Walk-in Client: _____ Lab Sampling: _____ Job / SDG No.: _____ (See below for Add'l Items)	
Sample Date(s) 12/17/17		Time Start 9:22		Time Stop 9:33		Canister Vacuum in Field, 'Hg (Start) -30	
Canister Vacuum in Field, 'Hg (Stop) -3		Flow Controller ID -		Canister ID 1058		Other (Please specify in notes section) TO-15 (Med / Std / Low / SIM)	
MA-APH		EPA 3C		EPA 25C / 25.3		ASTM D-1946 / 1945 / 3588	
EPA 15/16		TO-3		Other (Please specify in notes section)		Sample Specific Notes:	
Temperature (Fahrenheit) Start Interior Stop Ambient		Temperature (Fahrenheit) Start Interior Stop Ambient				320-34715 Chain of Custody	
Special Instructions/QC Requirements & Comments: Canister ID is 34000201 Email Results To: S.Salisbury@ApexCos.com Date / Time: 12/17/17 11:30 Date / Time: 12/26/17 1:10 Date / Time: 12/27/17 13:10							
Samples Shipped by: Kyle Kline		Samples Relinquished by: Kyle Kline		Relinquished by: _____		Lab Use Only: _____	
Samples Received by: _____		Received by: _____		Condition: _____		Shipper Name: _____	



Login Sample Receipt Checklist

Client: Apex Companies LLC

Job Number: 320-34715-1

Login Number: 34715

List Source: TestAmerica Sacramento

List Number: 1

Creator: James, Emily M

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	N/A	
Cooler Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	False	Canister ID on COC doesn't match canister rec'd
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Date Cleaned/Batch ID TD-15 SCAN
 Date of QC 11.17.17 320-33523
 Data File Number 11/28/2017
C:\MSDCALC\DATA\711281
MS9112812.d
 (File ID for certification analysis of canister designated below)



CANISTER ID NUMBERS

*	34000278
	34000201
	34001659
	34002075
	34001276
	8012

	34000178
	34001418
	34000164
	34001445
	34001155
	8312

The above canisters were cleaned as a batch. This certifies this batch contains no target analyte concentration greater than or equal to the method criteria for the "Certification Type" indicated above.

"*" INDICATES THE CAN OR CANS WHICH WERE SCREENED.

[Signature]
1st level Reviewed By:

11/29/17
Date:

[Signature]
2nd level Reviewed By:

11/29/17
Date:

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-33523-1
 SDG No.: _____
 Client Sample ID: 34000278 Lab Sample ID: 320-33523-1
 Matrix: Air Lab File ID: MS9112812.D
 Analysis Method: TO-15 Date Collected: 11/17/2017 00:00
 Sample wt/vol: 500 (mL) Date Analyzed: 11/28/2017 21:58
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: RTX-Volatiles ID: 0.32 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 197023 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
67-64-1	Acetone	1.8	J	5.0	0.18
107-02-8	Acrolein	ND		2.0	0.22
107-13-1	Acrylonitrile	ND		2.0	0.19
107-05-1	Allyl chloride	ND		0.80	0.11
71-43-2	Benzene	ND		0.40	0.079
100-44-7	Benzyl chloride	ND		0.80	0.16
75-27-4	Bromodichloromethane	ND		0.30	0.066
75-25-2	Bromoform	ND		0.40	0.070
74-83-9	Bromomethane	ND		0.80	0.34
106-99-0	1,3-Butadiene	ND		0.80	0.15
106-97-8	n-Butane	ND		0.40	0.15
78-93-3	2-Butanone (MEK)	ND		0.80	0.20
75-65-0	tert-Butyl alcohol (TBA)	ND		2.0	0.11
104-51-8	n-Butylbenzene	ND		0.40	0.18
135-98-8	sec-Butylbenzene	ND		0.40	0.070
98-06-6	tert-Butylbenzene	ND		0.80	0.068
75-15-0	Carbon disulfide	0.17	J	0.80	0.078
56-23-5	Carbon tetrachloride	ND		0.80	0.064
108-90-7	Chlorobenzene	ND		0.30	0.064
75-45-6	Chlorodifluoromethane	ND		0.80	0.27
75-00-3	Chloroethane	ND		0.80	0.31
67-66-3	Chloroform	ND		0.30	0.095
74-87-3	Chloromethane	ND		0.80	0.20
95-49-8	2-Chlorotoluene	ND		0.40	0.080
110-82-7	Cyclohexane	ND		0.40	0.084
124-48-1	Dibromochloromethane	ND		0.40	0.079
106-93-4	1,2-Dibromoethane (EDB)	ND		0.80	0.075
74-95-3	Dibromomethane	ND		0.40	0.057
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16
95-50-1	1,2-Dichlorobenzene	ND		0.40	0.13
541-73-1	1,3-Dichlorobenzene	ND		0.40	0.11
106-46-7	1,4-Dichlorobenzene	ND		0.40	0.15
75-71-8	Dichlorodifluoromethane	ND		0.40	0.15
75-34-3	1,1-Dichloroethane	ND		0.30	0.072
107-06-2	1,2-Dichloroethane	ND		0.80	0.088

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-33523-1
 SDG No.: _____
 Client Sample ID: 34000278 Lab Sample ID: 320-33523-1
 Matrix: Air Lab File ID: MS9112812.D
 Analysis Method: TO-15 Date Collected: 11/17/2017 00:00
 Sample wt/vol: 500 (mL) Date Analyzed: 11/28/2017 21:58
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: RTX-Volatiles ID: 0.32 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 197023 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
75-35-4	1,1-Dichloroethene	ND		0.80	0.13
156-59-2	cis-1,2-Dichloroethene	ND		0.40	0.089
156-60-5	trans-1,2-Dichloroethene	ND		0.40	0.10
78-87-5	1,2-Dichloropropane	ND		0.40	0.24
10061-01-5	cis-1,3-Dichloropropene	ND		0.40	0.10
10061-02-6	trans-1,3-Dichloropropene	ND		0.40	0.088
123-91-1	1,4-Dioxane	ND		0.80	0.10
141-78-6	Ethyl acetate	ND		0.30	0.18
100-41-4	Ethylbenzene	ND		0.40	0.063
622-96-8	4-Ethyltoluene	ND		0.40	0.19
142-82-5	n-Heptane	ND		0.80	0.063
87-68-3	Hexachlorobutadiene	ND		2.0	0.43
110-54-3	n-Hexane	ND		0.80	0.075
591-78-6	2-Hexanone	ND		0.40	0.087
98-82-8	Isopropylbenzene	ND		0.80	0.10
99-87-6	4-Isopropyltoluene	ND		0.80	0.12
1634-04-4	Methyl-t-Butyl Ether (MTBE)	ND		0.80	0.12
80-62-6	Methyl methacrylate	ND		0.80	0.16
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14
75-09-2	Methylene Chloride	0.19	J B	0.40	0.072
98-83-9	alpha-Methylstyrene	ND		0.40	0.065
91-20-3	Naphthalene	ND		0.80	0.56
111-65-9	n-Octane	ND		0.40	0.055
109-66-0	n-Pentane	ND		0.80	0.26
115-07-1	Propylene	0.29	J B	0.40	0.099
103-65-1	N-Propylbenzene	ND		0.40	0.059
100-42-5	Styrene	ND		0.40	0.059
79-34-5	1,1,2,2-Tetrachloroethane	ND		0.40	0.069
127-18-4	Tetrachloroethene	ND		0.40	0.051
109-99-9	Tetrahydrofuran	ND		0.80	0.21
108-88-3	Toluene	ND		0.40	0.051
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16
120-82-1	1,2,4-Trichlorobenzene	ND		2.0	0.43
71-55-6	1,1,1-Trichloroethane	ND		0.30	0.065
79-00-5	1,1,2-Trichloroethane	ND		0.40	0.067

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-33523-1
 SDG No.: _____
 Client Sample ID: 34000278 Lab Sample ID: 320-33523-1
 Matrix: Air Lab File ID: MS9112812.D
 Analysis Method: TO-15 Date Collected: 11/17/2017 00:00
 Sample wt/vol: 500 (mL) Date Analyzed: 11/28/2017 21:58
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: RTX-Volatiles ID: 0.32 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 197023 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-01-6	Trichloroethene	ND		0.40	0.11
75-69-4	Trichlorofluoromethane	ND		0.40	0.20
96-18-4	1,2,3-Trichloropropane	ND		0.40	0.17
95-63-6	1,2,4-Trimethylbenzene	ND		0.80	0.16
108-67-8	1,3,5-Trimethylbenzene	ND		0.40	0.13
540-84-1	2,2,4-Trimethylpentane	ND		0.40	0.071
108-05-4	Vinyl acetate	ND		0.80	0.15
593-60-2	Vinyl bromide	ND		0.80	0.26
75-01-4	Vinyl chloride	ND		0.40	0.12
179601-23-1	m,p-Xylene	ND		0.80	0.10
95-47-6	o-Xylene	ND		0.40	0.054

CAS NO.	SURROGATE	%REC	Q	LIMITS
460-00-4	4-Bromofluorobenzene (Surr)	109		70-130
17060-07-0	1,2-Dichloroethane-d4 (Surr)	108		70-130
2037-26-5	Toluene-d8 (Surr)	120		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20171128-51014.b\MS9112812.D
 Lims ID: 320-33523-A-1
 Client ID: 34000278
 Sample Type: Client
 Inject. Date: 28-Nov-2017 21:58:30 ALS Bottle#: 9 Worklist Smp#: 16
 Purge Vol: 5.000 mL Dil. Factor: 1.0000
 Sample Info: 320-33523-A-1
 Misc. Info.: 500mL
 Operator ID: GKI Instrument ID: ATMS9
 Method: \\ChromNA\Sacramento\ChromData\ATMS9\20171128-51014.b\TO15_ATMS9N.m
 Limit Group: MSA - TO15 - ICAL
 Last Update: 29-Nov-2017 08:18:45 Calib Date: 27-Oct-2017 12:09:30
 Integrator: RTE ID Type: Deconvolution ID
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\ATMS9\20171026-49584.b\MS9102628.D
 Column 1 : RTX Volatiles (0.32 mm) Det: MS SCAN
 Process Host: XAWRK021

First Level Reviewer: leeh

Date:

29-Nov-2017 08:16:56

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ppb v/v	Flags
* 1 Chlorobromomethane (IS)	130	12.331	12.343	-0.012	91	36599	4.00	
* 2 1,4-Difluorobenzene	114	14.417	14.423	-0.006	97	159543	4.00	
* 3 Chlorobenzene-d5 (IS)	117	20.337	20.336	0.001	92	126336	4.00	
\$ 4 1,2-Dichloroethane-d4 (Sur	65	13.499	13.505	-0.006	97	62207	4.32	
\$ 5 Toluene-d8 (Surr)	100	17.581	17.581	0.000	97	97952	4.82	
\$ 6 4-Bromofluorobenzene (Surr	174	22.265	22.265	0.000	82	62153	4.38	
14 Propene	41	4.282	4.276	0.006	94	3081	0.2856	
15 Dichlorodifluoromethane	85	4.343	4.343	0.000	93	2387	0.1021	
31 Acetone	43	7.707	7.652	0.055	96	37837	1.81	
47 Methylene Chloride	49	8.906	8.918	-0.012	92	3114	0.1856	
48 Carbon disulfide	76	8.948	8.966	-0.018	99	4882	0.1733	
74 Isooctane	57	13.407	13.438	-0.031	86	1964	0.0233	
75 n-Heptane	43	13.955	13.949	0.006	78	1299	0.0385	
85 Toluene	91	17.727	17.733	-0.006	93	1524	0.0348	
87 2-Hexanone	58	18.408	18.378	0.030	83	826	0.0320	
97 Ethylbenzene	91	20.531	20.531	0.000	1	1309	0.0190	
98 m-Xylene & p-Xylene	91	20.671	20.671	0.000	0	2156	0.0414	
101 o-Xylene	91	21.365	21.371	-0.006	88	1096	0.0205	
100 Styrene	104	21.389	21.389	0.000	77	748	0.0189	
103 1,1,2,2-Tetrachloroethane	83	22.089	22.095	-0.006	1	534	0.0141	
110 4-Ethyltoluene	120	22.782	22.709	0.073	62	210	0.008774	
117 1,3-Dichlorobenzene	146	23.859	23.859	0.000	89	773	0.0209	
120 1,4-Dichlorobenzene	146	23.993	23.993	0.000	90	1080	0.0291	
123 n-Butylbenzene	92	24.309	24.303	0.006	1	503	0.0122	
122 1,2-Dichlorobenzene	146	24.473	24.473	0.000	87	794	0.0226	
127 Naphthalene	128	27.071	27.071	0.000	97	5325	0.2048	

Reagents:

VAMSIS20_00062

Amount Added: 50.00

Units: mL

Run Reagent

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20171128-51014.b\MS9112812.D

Injection Date: 28-Nov-2017 21:58:30

Instrument ID: ATMS9

Operator ID: GKI

Lims ID: 320-33523-A-1

Lab Sample ID: 320-33523-1

Worklist Smp#: 16

Client ID: 34000278

Purge Vol: 5.000 mL

Dil. Factor: 1.0000

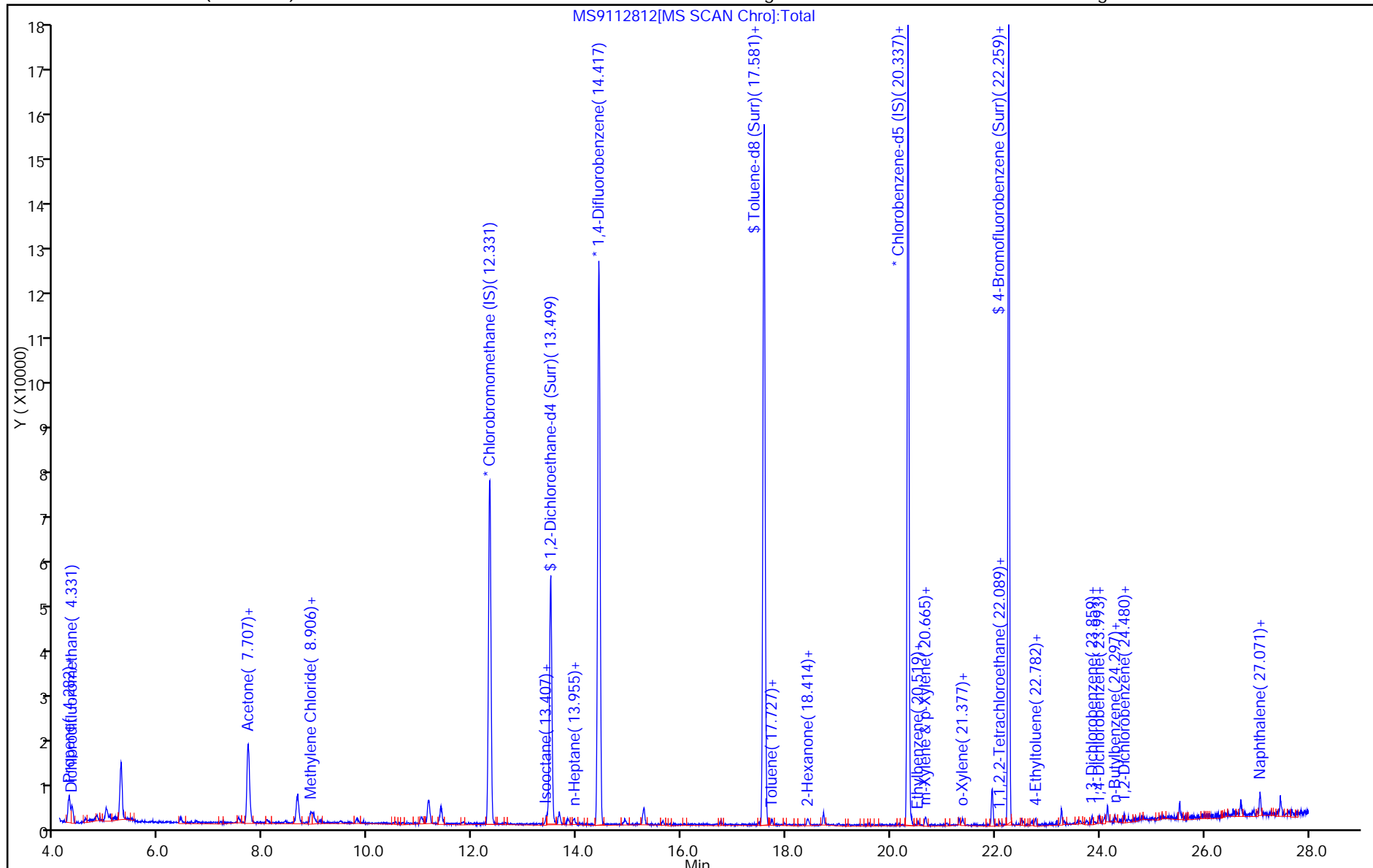
ALS Bottle#: 9

Method: TO15_ATMS9N

Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm)

Y Scaling: Method Defined: Scale to the Nth Largest Peak: 2



TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20171128-51014.b\MS9112812.D

Injection Date: 28-Nov-2017 21:58:30

Instrument ID: ATMS9

Lims ID: 320-33523-A-1

Lab Sample ID: 320-33523-1

Client ID: 34000278

Operator ID: GKI

ALS Bottle#: 9 Worklist Smp#: 16

Purge Vol: 5.000 mL

Dil. Factor: 1.0000

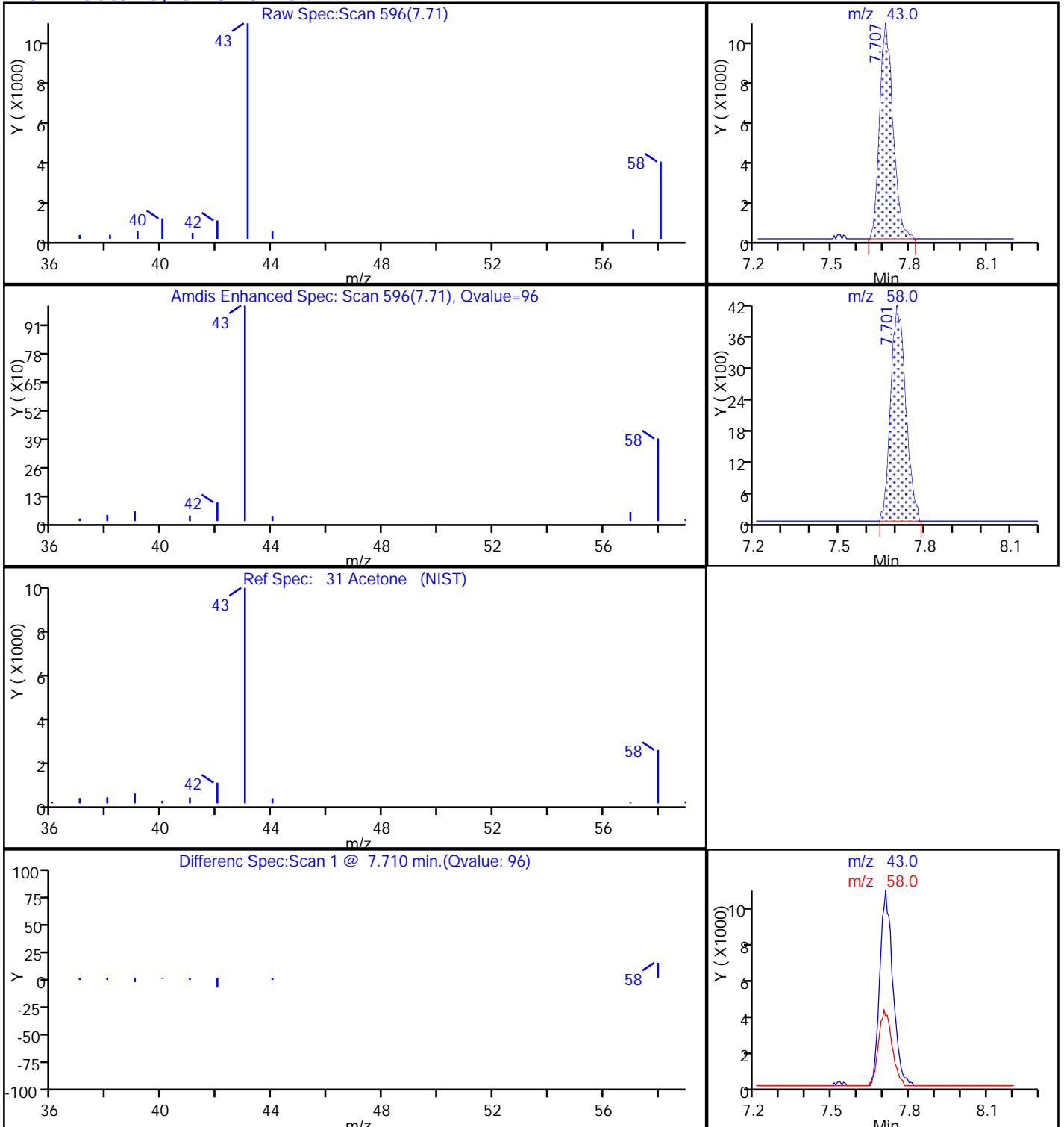
Method: TO15_ATMS9N

Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm)

Detector: MS SCAN

31 Acetone, CAS: 67-64-1



TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20171128-51014.b\MS9112812.D

Injection Date: 28-Nov-2017 21:58:30

Instrument ID: ATMS9

Lims ID: 320-33523-A-1

Lab Sample ID: 320-33523-1

Client ID: 34000278

Operator ID: GKI

ALS Bottle#: 9 Worklist Smp#: 16

Purge Vol: 5.000 mL

Dil. Factor: 1.0000

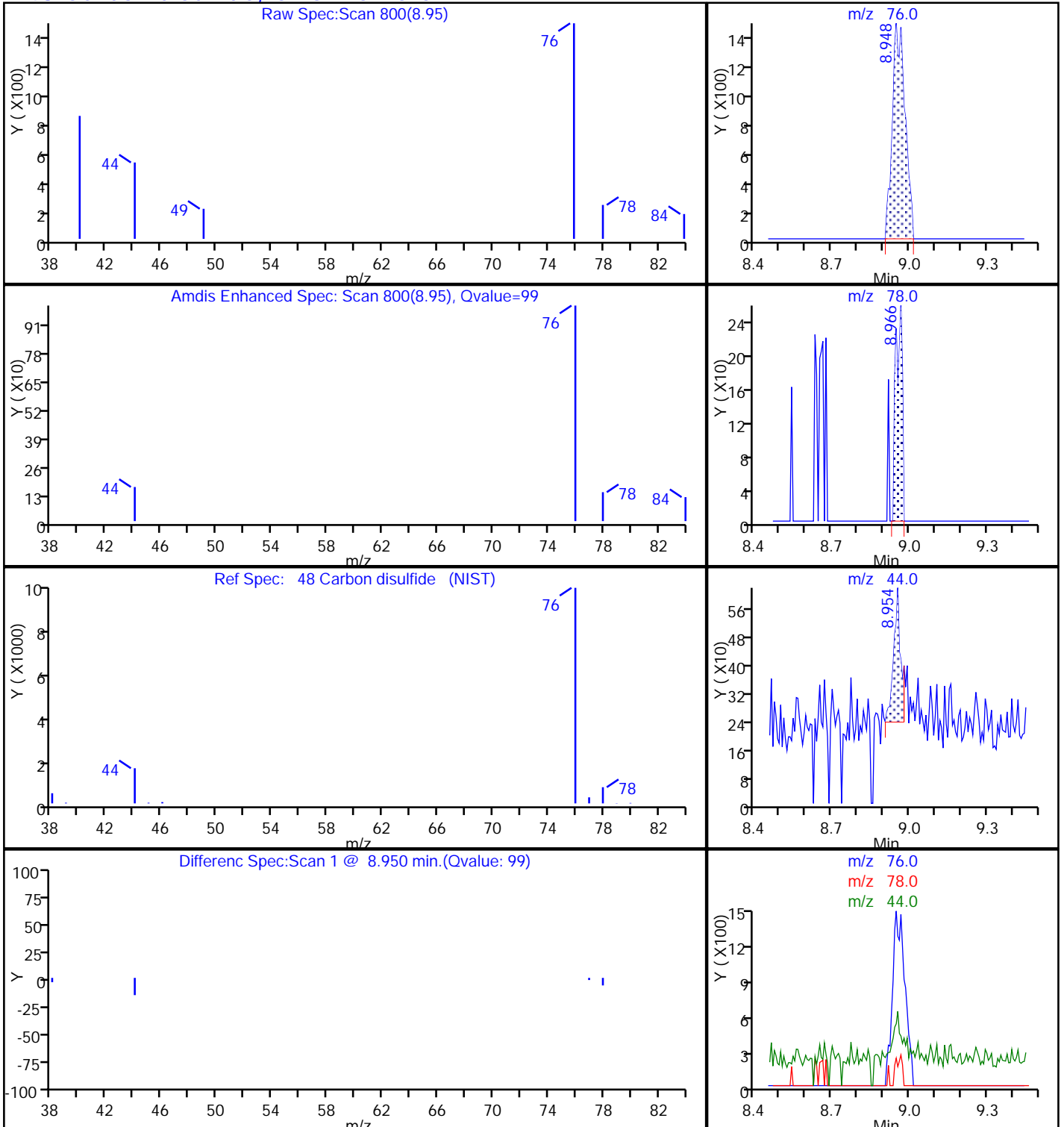
Method: TO15_ATMS9N

Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm)

Detector: MS SCAN

48 Carbon disulfide, CAS: 75-15-0



TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20171128-51014.b\MS9112812.D

Injection Date: 28-Nov-2017 21:58:30

Instrument ID: ATMS9

Lims ID: 320-33523-A-1

Lab Sample ID: 320-33523-1

Client ID: 34000278

Operator ID: GKI

ALS Bottle#: 9 Worklist Smp#: 16

Purge Vol: 5.000 mL

Dil. Factor: 1.0000

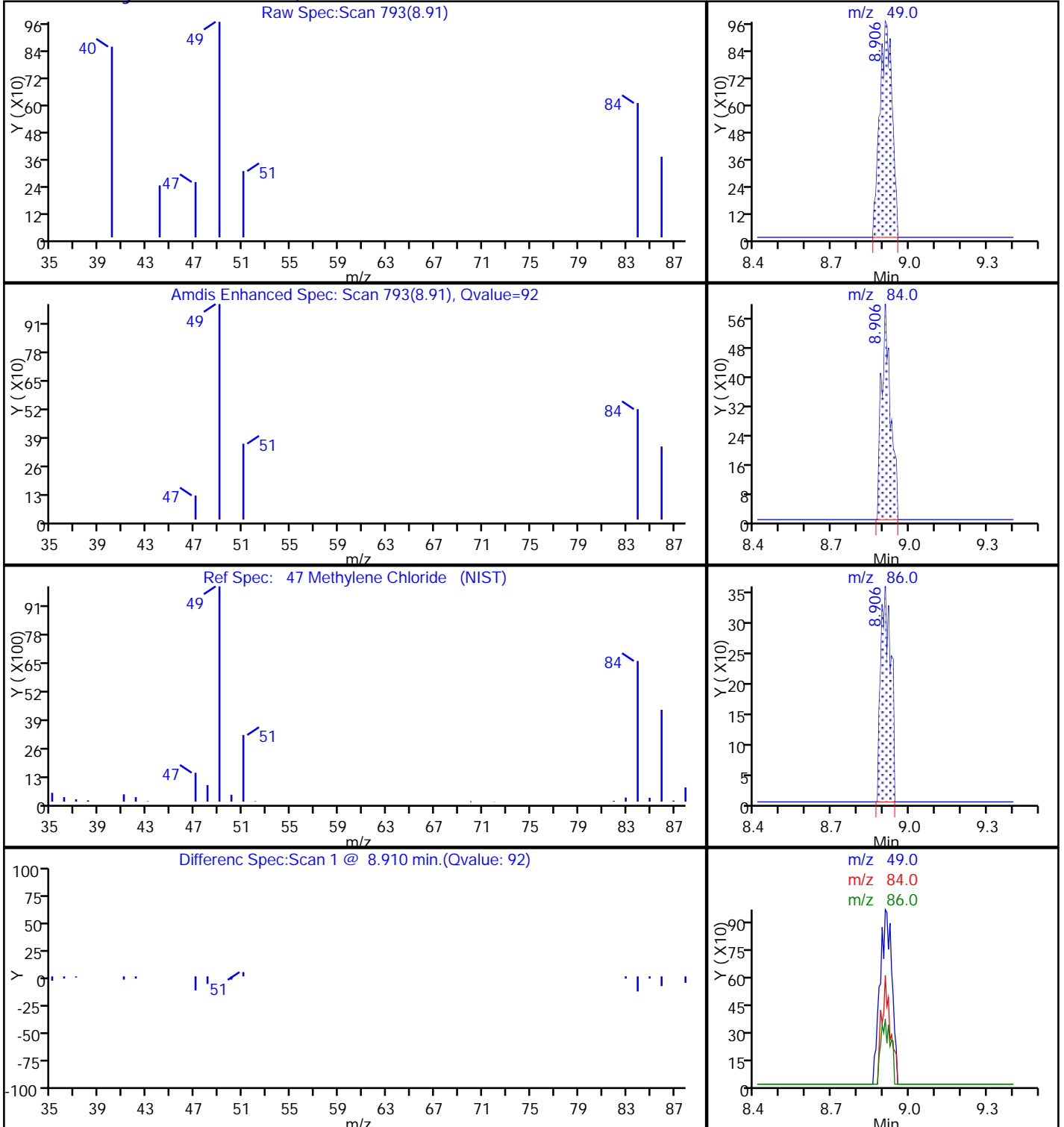
Method: TO15_ATMS9N

Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm)

Detector: MS SCAN

47 Methylene Chloride, CAS: 75-09-2



TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20171128-51014.b\MS9112812.D

Injection Date: 28-Nov-2017 21:58:30

Instrument ID: ATMS9

Lims ID: 320-33523-A-1

Lab Sample ID: 320-33523-1

Client ID: 34000278

Operator ID: GKI

ALS Bottle#: 9 Worklist Smp#: 16

Purge Vol: 5.000 mL

Dil. Factor: 1.0000

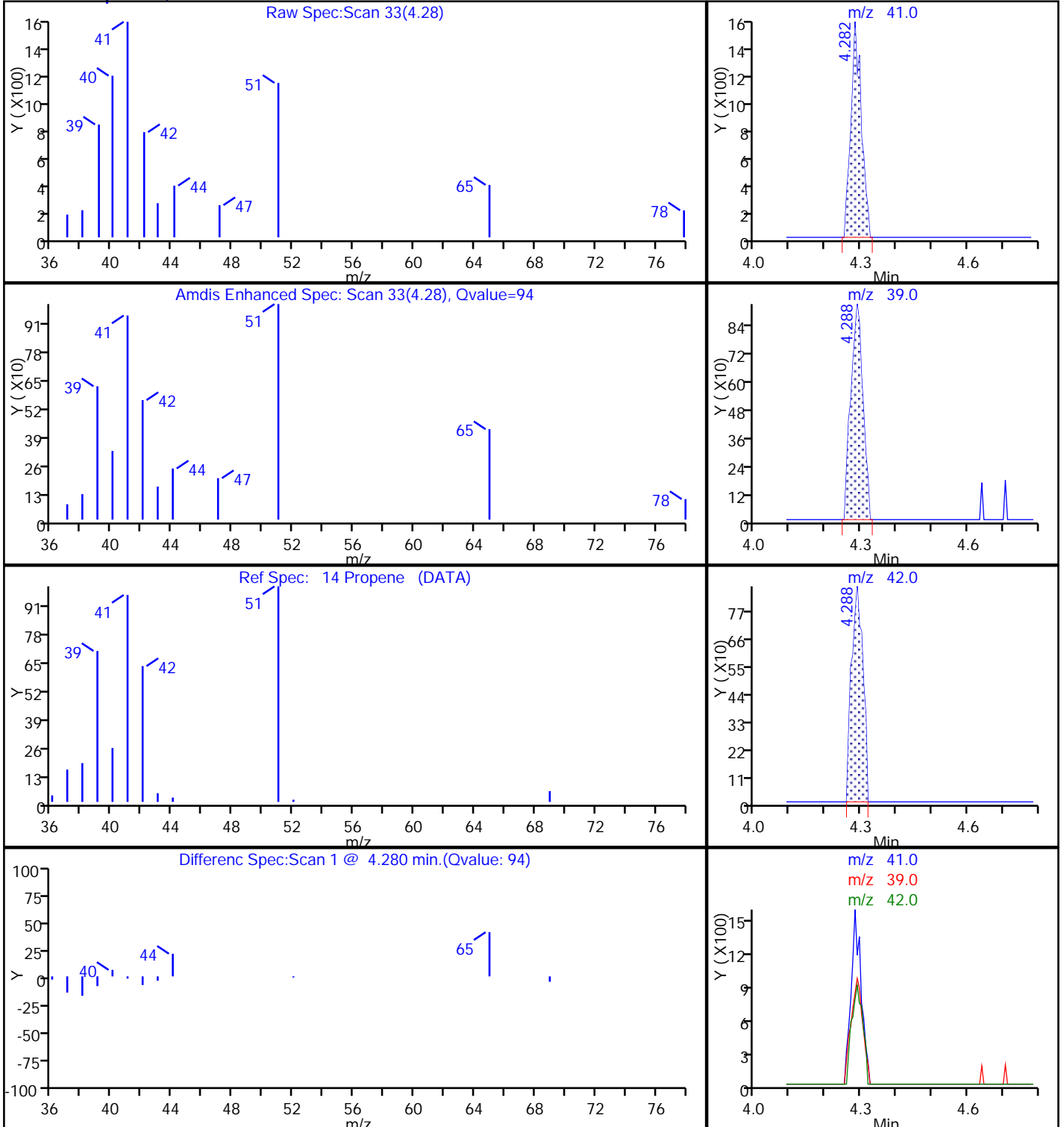
Method: TO15_ATMS9N

Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm)

Detector: MS SCAN

14 Propene, CAS: 115-07-1





ALS Environmental
ALS Group USA, Corp
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November 28, 2017

Analytical Report for Service Request No: K1712068

Stephanie Salisbury
Apex Companies, LLC
3015 SW First Avenue
Portland, OR 97201-4707

RE: NuStar Vancouver / 1126-20

Dear Stephanie,

Enclosed are the results of the sample(s) submitted to our laboratory November 07, 2017
For your reference, these analyses have been assigned our service request number **K1712068**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3376. You may also contact me via email at Mark.Harris@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Mark Harris
Project Manager



ALS Environmental
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Table of Contents

Acronyms

Qualifiers

State Certifications, Accreditations, And Licenses

Chain of Custody

General Chemistry

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.

i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses**

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
Louisiana DEQ	http://www.deq.louisiana.gov/page/la-lab-accreditation	03016
Maine DHS	http://www.maine.gov/dhhs/	WA01276
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/enforcement/oqa.html	WA005
New York - DOH	https://www.wadsworth.org/regulatory/elap	12060
North Carolina DEQ	https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/EnvironmentalLabCertification/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wyoming (EPA Region 8)	https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



Chain of Custody

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com



CHAIN OF CUSTODY

84498

001

SR# 2112068
 COC Set 1 of 1
 COC# _____

1317 South 13th Ave, Kelso, WA 98626 Phone (360) 577-7222 / 800-695-7222 / FAX (360) 636-1068
 www.alsglobal.com

Project Name <u>Nuster Vancouver</u>		Project Number: <u>1126-20</u>		NUMBER OF CONTAINERS	48H	28D	300.0 / NO2	300.0 / NO3	350.1 / Ammonia T	1	2	3	4	5	6	Remarks
Project Manager <u>S. Busze Salisbury</u>																
Company <u>APEX COMPANIES</u>																
Address <u>3015 SW 1st Ave PDX, OR</u>																
Phone # <u>503 924-4704</u>		email <u>SSalisbury@Apexcos.com</u>														
Sampler Signature <u>[Signature]</u>		Sampler Printed Name <u>Megan Masterson</u>														
CLIENT SAMPLE ID	LABID	SAMPLING Date	Time	Matrix												
1. MW-24d		11-6-17	1030	W	2	X	X	X								
2. MW-8			1112	W	2	X	X	X								
3. MW-16			1153	W	2	X	X	X								
4. MW-2			1239	W	2	X	X	X								
5. MW-10			1330	W	2	X	X	X								
6. MW-15			1631	W	2	X	X	X								
7. MW-9		11-7-17	0819	W	2	X	X	X								
8. MW-7			0910	W	2	X	X	X								
9. MW-5			1015	W	2	X	X	X								
10.																

Report Requirements <input type="checkbox"/> I. Routine Report: Method Blank, Surrogate, as required <input type="checkbox"/> II. Report Dup., MS, MSD as required <input type="checkbox"/> III. CLP Like Summary (no raw data) <input type="checkbox"/> IV. Data Validation Report <input type="checkbox"/> V. EDD	Invoice Information P.O.# <u>1126-20</u> Bill To: _____	Circle which metals are to be analyzed Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg	
	Turnaround Requirements <input checked="" type="checkbox"/> 24 hr <input checked="" type="checkbox"/> 5 Day Standard <input type="checkbox"/> 48 hr <u>[Signature]</u>	Special Instructions/Comments: <u>Please email results to: SSalisbury@Apexcos.com</u>	
	*Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other _____ (Circle One)		

Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
<u>Megan Masterson</u>	<u>[Signature]</u>				
Signature	Signature	Signature	Signature	Signature	Signature
<u>Megan Masterson</u>	<u>[Signature]</u>				
Printed Name	Printed Name	Printed Name	Printed Name	Printed Name	Printed Name
<u>Apex Cos</u>	<u>[Signature]</u>				
Firm	Firm	Firm	Firm	Firm	Firm
Date/Time <u>11/7/17 1030</u>	Date/Time <u>11/7/17 1400</u>	Date/Time	Date/Time	Date/Time	Date/Time



PC MH

Cooler Receipt and Preservation Form

Client Apex Service Request K17 12068
 Received: 11/7/17 Opened: 11/7/17 By: [Signature] Unloaded: 11/7/17 By: [Signature]

- Samples were received via? USPS Fed Ex UPS DHL PDX Courier Hand Delivered
- Samples were received in: (circle) Cooler Box Envelope Other NA
- Were custody seals on coolers? NA Y N If yes, how many and where? one, front
 If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID NA	Tracking Number NA	Filed
1.7	1.6	2.8	2.7	-0.1	382			

- Packing material: Inserts Baggies Bubble Wrap Gel Packs Wet Ice Dry Ice Sleeves
- Were custody papers properly filled out (ink, signed, etc.)? NA Y N
- Were samples received in good condition (temperature, unbroken)? *Indicate in the table below.* NA Y N
 If applicable, tissue samples were received: Frozen Partially Thawed Thawed
- Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N
- Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA Y N
- Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
- Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y N
- Were VOA vials received without headspace? *Indicate in the table below.* NA Y N
- Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: _____

SHORT HOLD TIME



General Chemistry

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1317 South 13th Avenue, Kelso, WA 98626
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ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water
Analysis Method: 300.0
Prep Method: None

Service Request: K1712068
Date Collected: 11/06/17 - 11/07/17
Date Received: 11/7/17
Units: mg/L
Basis: NA

Nitrite as Nitrogen

Sample Name	Lab Code	Result	MRL	Dil.	Date Analyzed	Q
MW-24d	K1712068-001	ND U	0.10	2	11/07/17 22:37	
MW-8	K1712068-002	ND U	0.10	2	11/07/17 21:54	
MW-16	K1712068-003	ND U	0.10	2	11/07/17 22:48	
MW-2	K1712068-004	ND U	0.10	2	11/07/17 22:58	
MW-10	K1712068-005	0.27	0.10	2	11/07/17 23:09	
MW-15	K1712068-006	ND U	0.10	2	11/07/17 23:19	
MW-9	K1712068-007	ND U	0.10	2	11/07/17 23:30	
MW-7	K1712068-008	ND U	0.10	2	11/08/17 21:41	
MW-5	K1712068-009	ND U	0.10	2	11/08/17 21:51	
Method Blank	K1712068-MB1	ND U	0.050	1	11/07/17 16:45	
Method Blank	K1712068-MB2	ND U	0.050	1	11/08/17 13:26	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water
Analysis Method: 300.0
Prep Method: None

Service Request: K1712068
Date Collected: 11/06/17
Date Received: 11/07/17

Units: mg/L
Basis: NA

Replicate Sample Summary

Nitrite as Nitrogen

Sample Name:	Lab Code:	MRL	Sample Result	Duplicate Result	Average	RPD	RPD Limit	Date Analyzed
MW-24d	K1712068-001DUP	0.10	ND U	ND U	NC	NC	20	11/08/17
Batch QC	KQ1716881-12DUP	0.10	ND U	ND U	NC	NC	20	11/09/17

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712068
Date Collected: N/A
Date Received: N/A
Date Analyzed: 11/9/17
Date Extracted: NA

Duplicate Matrix Spike Summary
Nitrite as Nitrogen

Sample Name: Batch QC **Units:** mg/L
Lab Code: KQ1716881-12 **Basis:** NA
Analysis Method: 300.0
Prep Method: None

Analyte Name	Sample Result	Result	Matrix Spike KQ1716881-12MS		Duplicate Matrix Spike KQ1716881-12DMS		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
Nitrite as Nitrogen	ND U	7.39	8.00	92	7.44	8.00	93	90-110	<1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712068
Date Collected: 11/06/17
Date Received: 11/07/17
Date Analyzed: 11/8/17
Date Extracted: NA

Duplicate Matrix Spike Summary
Nitrite as Nitrogen

Sample Name: MW-24d
Lab Code: K1712068-001
Analysis Method: 300.0
Prep Method: None

Units: mg/L
Basis: NA

Analyte Name	Sample Result	Result	Matrix Spike K1712068-001MS		Duplicate Matrix Spike K1712068-001DMS		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
Nitrite as Nitrogen	ND U	7.30	8.00	91	7.35	8.00	92	90-110	<1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712068
Date Analyzed: 11/07/17
Date Extracted: NA

Lab Control Sample Summary
Nitrite as Nitrogen

Analysis Method: 300.0
Prep Method: None

Units: mg/L
Basis: NA
Analysis Lot: 569249

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1712068-LCS1	2.31	2.50	92	90-110

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712068
Date Analyzed: 11/08/17
Date Extracted: NA

Lab Control Sample Summary
Nitrite as Nitrogen

Analysis Method: 300.0
Prep Method: None

Units: mg/L
Basis: NA
Analysis Lot: 569333

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1712068-LCS2	2.35	2.50	94	90-110

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water
Analysis Method: 300.0
Prep Method: None

Service Request: K1712068
Date Collected: 11/06/17 - 11/07/17
Date Received: 11/7/17
Units: mg/L
Basis: NA

Nitrate as Nitrogen

Sample Name	Lab Code	Result	MRL	Dil.	Date Analyzed	Q
MW-24d	K1712068-001	ND U	0.10	2	11/07/17 22:37	
MW-8	K1712068-002	207	5.0	100	11/08/17 10:10	
MW-16	K1712068-003	9.95	0.25	5	11/08/17 10:21	
MW-2	K1712068-004	0.26	0.10	2	11/07/17 22:58	
MW-10	K1712068-005	333	2.5	50	11/08/17 10:32	
MW-15	K1712068-006	9.78	0.10	2	11/07/17 23:19	
MW-9	K1712068-007	559	5.0	100	11/08/17 10:43	
MW-7	K1712068-008	ND U	0.10	2	11/08/17 21:41	
MW-5	K1712068-009	ND U	0.10	2	11/08/17 21:51	
Method Blank	K1712068-MB1	ND U	0.050	1	11/07/17 16:45	
Method Blank	K1712068-MB2	ND U	0.050	1	11/08/17 13:26	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water
Analysis Method: 300.0
Prep Method: None

Service Request: K1712068
Date Collected: 11/06/17
Date Received: 11/07/17

Units: mg/L
Basis: NA

Replicate Sample Summary

Nitrate as Nitrogen

Sample Name:	Lab Code:	MRL	Sample Result	Duplicate Result	Average	RPD	RPD Limit	Date Analyzed
MW-24d	K1712068-001DUP	0.10	ND U	ND U	NC	NC	20	11/08/17
Batch QC	K1712087-001DUP	0.25	4.76	4.65	4.71	2	20	11/08/17
Batch QC	K1712134-011DUP	0.10	3.82	3.75	3.78	2	20	11/09/17

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712068
Date Collected: N/A
Date Received: N/A
Date Analyzed: 11/9/17
Date Extracted: NA

Duplicate Matrix Spike Summary
Nitrate as Nitrogen

Sample Name: Batch QC **Units:** mg/L
Lab Code: K1712134-011 **Basis:** NA
Analysis Method: 300.0
Prep Method: None

Analyte Name	Sample Result	Result	Matrix Spike K1712134-011MS		Duplicate Matrix Spike K1712134-011DMS		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
Nitrate as Nitrogen	3.82	11.6	8.00	97	11.6	8.00	98	90-110	<1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712068
Date Collected: N/A
Date Received: N/A
Date Analyzed: 11/8/17
Date Extracted: NA

Duplicate Matrix Spike Summary
Nitrate as Nitrogen

Sample Name: Batch QC
Lab Code: K1712087-001
Analysis Method: 300.0
Prep Method: None

Units: mg/L
Basis: NA

Analyte Name	Sample Result	Result	Matrix Spike K1712087-001MS		Duplicate Matrix Spike K1712087-001DMS		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
Nitrate as Nitrogen	4.76	23.6	20.0	94	23.7	20.0	95	90-110	<1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712068
Date Collected: 11/06/17
Date Received: 11/07/17
Date Analyzed: 11/8/17
Date Extracted: NA

Duplicate Matrix Spike Summary
Nitrate as Nitrogen

Sample Name: MW-24d
Lab Code: K1712068-001
Analysis Method: 300.0
Prep Method: None

Units: mg/L
Basis: NA

Analyte Name	Sample Result	Result	Matrix Spike K1712068-001MS		Duplicate Matrix Spike K1712068-001DMS		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
Nitrate as Nitrogen	ND U	7.62	8.00	95	7.55	8.00	94	90-110	1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
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QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712068
Date Analyzed: 11/07/17
Date Extracted: NA

Lab Control Sample Summary
Nitrate as Nitrogen

Analysis Method: 300.0
Prep Method: None

Units: mg/L
Basis: NA
Analysis Lot: 569249

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1712068-LCS1	2.37	2.50	95	90-110

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712068
Date Analyzed: 11/08/17
Date Extracted: NA

Lab Control Sample Summary
Nitrate as Nitrogen

Analysis Method: 300.0
Prep Method: None

Units: mg/L
Basis: NA
Analysis Lot: 569333

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1712068-LCS2	2.34	2.50	93	90-110

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water
Analysis Method: 350.1
Prep Method: Method

Service Request: K1712068
Date Collected: 11/06/17 - 11/07/17
Date Received: 11/7/17
Units: mg/L
Basis: NA

Ammonia as Nitrogen

Sample Name	Lab Code	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
MW-24d	K1712068-001	0.153	0.050	1	11/21/17 10:22	11/17/17	
MW-8	K1712068-002	ND U	0.050	1	11/21/17 10:22	11/17/17	
MW-16	K1712068-003	ND U	0.050	1	11/21/17 10:22	11/17/17	
MW-2	K1712068-004	6.34	0.50	10	11/21/17 10:22	11/17/17	
MW-10	K1712068-005	35.6	1.3	25	11/21/17 10:22	11/17/17	
MW-15	K1712068-006	ND U	0.050	1	11/21/17 10:22	11/17/17	
MW-9	K1712068-007	17.4	1.3	25	11/21/17 10:22	11/17/17	
MW-7	K1712068-008	9.09	0.50	10	11/21/17 10:22	11/17/17	
MW-5	K1712068-009	2.86	0.25	5	11/21/17 10:22	11/17/17	
Method Blank	K1712068-MB1	ND U	0.050	1	11/21/17 10:22	11/17/17	

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water
Analysis Method: 350.1
Prep Method: Method

Service Request: K1712068
Date Collected: 11/06/17
Date Received: 11/07/17

Units: mg/L
Basis: NA

Replicate Sample Summary
Ammonia as Nitrogen

Sample Name:	Lab Code:	MRL	Sample Result	Duplicate Result	Average	RPD	RPD Limit	Date Analyzed
MW-24d	K1712068-001DUP	0.050	0.153	0.157	0.155	3	20	11/21/17
Batch QC	K1712125-001DUP	10	217	218	218	<1	20	11/21/17

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712068
Date Collected: 11/06/17
Date Received: 11/07/17
Date Analyzed: 11/21/17
Date Extracted: 11/17/17

Duplicate Matrix Spike Summary
Ammonia as Nitrogen

Sample Name: MW-24d
Lab Code: K1712068-001
Analysis Method: 350.1
Prep Method: Method

Units: mg/L
Basis: NA

Analyte Name	Sample Result	Result	Matrix Spike K1712068-001MS		Duplicate Matrix Spike K1712068-001DMS		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
Ammonia as Nitrogen	0.153	1.20	1.00	104	1.21	1.00	106	75-125	1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712068
Date Collected: N/A
Date Received: N/A
Date Analyzed: 11/21/17
Date Extracted: 11/17/17

Duplicate Matrix Spike Summary
Ammonia as Nitrogen

Sample Name: Batch QC
Lab Code: K1712125-001
Analysis Method: 350.1
Prep Method: Method

Units: mg/L
Basis: NA

Analyte Name	Sample Result	Result	Matrix Spike K1712125-001MS		Duplicate Matrix Spike K1712125-001DMS		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
Ammonia as Nitrogen	217	769	500	110	785	500	114	75-125	2	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712068
Date Analyzed: 11/21/17
Date Extracted: 11/17/17

Lab Control Sample Summary
Ammonia as Nitrogen

Analysis Method: 350.1
Prep Method: Method

Units: mg/L
Basis: NA
Analysis Lot: 570952

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1712068-LCS1	9.76	10.2	96	85-115



ALS Environmental
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November 22, 2017

Analytical Report for Service Request No: K1712125

Stephanie Salisbury
Apex Companies, LLC
3015 SW First Avenue
Portland, OR 97201-4707

RE: NuStar Vancouver / 1126-20

Dear Stephanie,

Enclosed are the results of the sample(s) submitted to our laboratory November 08, 2017
For your reference, these analyses have been assigned our service request number **K1712125**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3376. You may also contact me via email at Mark.Harris@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Mark Harris
Project Manager



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Table of Contents

Acronyms

Qualifiers

State Certifications, Accreditations, And Licenses

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Chain of Custody

General Chemistry

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
 - i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses**

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
Louisiana DEQ	http://www.deq.louisiana.gov/page/la-lab-accreditation	03016
Maine DHS	http://www.maine.gov/dhhs/	WA01276
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/enforcement/oqa.html	WA005
New York - DOH	https://www.wadsworth.org/regulatory/elap	12060
North Carolina DEQ	https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/EnvironmentalLabCertification/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wyoming (EPA Region 8)	https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



Case Narrative

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

Client: Apex Companies, LLC
Project: NuStar Vancouver
Sample Matrix: Water

Service Request: K1712125
Date Received: 11/08/2017

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Surrogate recoveries have been reported for all applicable organic analyses. Additional quality control analyses reported herein include: Laboratory Duplicate (DUP), Matrix Spike (MS), Matrix/Duplicate Matrix Spike (MS/DMS), Laboratory Control Sample (LCS), and Laboratory/Duplicate Laboratory Control Sample (LCS/DLCS).

Sample Receipt:

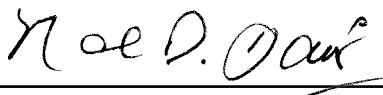
Nine water samples were received for analysis at ALS Environmental on 11/08/2017. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

General Chemistry:

The detection limit for Nitrite as Nitrogen was elevated in samples MGMS1-43, MW-22i and MW-17. The samples MRL were elevated due to sample matrix. The matrix interference prevented adequate resolution of the target compound at the normal limit. The results were flagged to indicate the matrix interference.

The detection limit for Nitrate as Nitrogen was elevated in sample MW-22i. The sample MRL was elevated due to sample matrix. The matrix interference prevented adequate resolution of the target compound at the normal limit. The result was flagged to indicate the matrix interference.

Approved by



Date

11/22/2017



Chain of Custody

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com



CHAIN OF CUSTODY

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001

SR# K1712125
 COC Set 1 of 1
 COC# _____

1317 South 13th Ave, Kelso, WA 98626 Phone (360) 577-7222 / 800-695-7222 / FAX (360) 636-1068
 www.alsglobal.com

Project Name <u>NuStar VAN</u>		Project Number <u>1126-20</u>		NUMBER OF CONTAINERS	48H	28D	300.0 / NO2	300.0 / NO3	350.1 / Ammonia T	1	2	3	4	5	Remarks
Project Manager <u>S. SALSBURY</u>															
Company <u>APEX</u>															
Address <u>3015 SW 1st AVE</u>															
Phone # <u>503 924-4704</u>		email <u>SSALSBURY@APEXCO</u>													
Sampler Signature <u>Megan</u>		Sampler Printed Name <u>Megan Masterson</u>													
CLIENT SAMPLE ID	LABID	SAMPLING Date	Time	Matrix											
1. <u>MGMSI-43</u>		<u>11-7-17</u>	<u>1626</u>	<u>W</u>	<u>2</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	
2. <u>MGMSI-110</u>			<u>1658</u>			<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	
3. <u>MW-6</u>			<u>1343</u>			<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	
4. <u>MW-20i</u>			<u>1251</u>			<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	
5. <u>MW-18i</u>			<u>1213</u>			<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	
6. <u>MW-22i</u>			<u>1102</u>			<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	
7. <u>MW-13</u>			<u>1425</u>			<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	
8. <u>MGMSI-60</u>			<u>1541</u>			<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	
9. <u>MW-17</u>		<u>11-8-17</u>	<u>0808</u>	<u>↓</u>	<u>↓</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	
10.															

Report Requirements <input type="checkbox"/> I. Routine Report: Method Blank, Surrogate, as required <input type="checkbox"/> II. Report Dup., MS, MSD as required <input type="checkbox"/> III. CLP Like Summary (no raw data) <input type="checkbox"/> IV. Data Validation Report <input type="checkbox"/> V. EDD	Invoice Information P.O.# <u>1126-17</u> Bill To: _____ _____ _____	Circle which metals are to be analyzed Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg	
	Turnaround Requirements <input checked="" type="checkbox"/> 24 hr <input checked="" type="checkbox"/> 5 Day Standard <input type="checkbox"/> 48 hr.	Special Instructions/Comments: _____ *Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other _____ (Circle One)	
	Requested Report Date _____		

Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature <u>Megan Masterson</u>	Signature <u>ALV</u>	Signature _____	Signature _____	Signature _____	Signature _____
Printed Name <u>Megan Masterson</u>	Printed Name <u>ALV</u>	Printed Name _____	Printed Name _____	Printed Name _____	Printed Name _____
Firm <u>APEX</u>	Firm <u>11/8/17 12:10</u>	Firm _____	Firm _____	Firm _____	Firm _____
Date/Time <u>11-8-17 0840</u>	Date/Time _____	Date/Time _____	Date/Time _____	Date/Time _____	Date/Time _____



PC MH

Cooler Receipt and Preservation Form

Client Apex Service Request K17 12125
 Received: 11/8/17 Opened: 11/8/17 By: BR Unloaded: 11/8/17 By: BR

- Samples were received via? USPS Fed Ex UPS DHL PDX Courier Hand Delivered
- Samples were received in: (circle) Cooler Box Envelope Other NA
- Were custody seals on coolers? NA Y N If yes, how many and where? 1 front
 If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	NA	Filed
1.7	1.7	5.2	5.2	0.0	385	NA		NA	

- Packing material: Inserts Baggies Bubble Wrap Gel Packs Wet Ice Dry Ice Sleeves
- Were custody papers properly filled out (ink, signed, etc.)? NA Y N
- Were samples received in good condition (temperature, unbroken)? *Indicate in the table below.* NA Y N
 If applicable, tissue samples were received: Frozen Partially Thawed Thawed
- Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N
- Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA Y N
- Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
- Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y N
- Were VOA vials received without headspace? *Indicate in the table below.* NA Y N
- Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions:

SHORT HOLD TIME

RUSH



General Chemistry

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water
Analysis Method: 300.0
Prep Method: None

Service Request: K1712125
Date Collected: 11/07/17 - 11/08/17
Date Received: 11/8/17
Units: mg/L
Basis: NA

Nitrite as Nitrogen

Sample Name	Lab Code	Result	MRL	Dil.	Date Analyzed	Q
MGMS1-43	K1712125-001	ND Ui	1.0	20	11/08/17 17:13	
MGMS1-110	K1712125-002	ND U	0.10	2	11/08/17 19:20	
MW-6	K1712125-003	ND U	0.10	2	11/08/17 20:03	
MW-20i	K1712125-004	ND U	0.10	2	11/08/17 20:13	
MW-18i	K1712125-005	ND U	0.10	2	11/08/17 20:24	
MW-22i	K1712125-006	ND Ui	1.0	20	11/08/17 18:06	
MW-13	K1712125-007	ND U	0.10	2	11/08/17 20:46	
MGMS1-60	K1712125-008	ND U	0.10	2	11/08/17 20:57	
MW-17	K1712125-009	ND Ui	1.0	20	11/08/17 18:38	
Method Blank	K1712125-MB1	ND U	0.050	1	11/08/17 16:41	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712125
Date Collected: 11/07/17
Date Received: 11/08/17
Date Analyzed: 11/08/17

Replicate Sample Summary
General Chemistry Parameters

Sample Name: MGMS1-110
Lab Code: K1712125-002

Units: mg/L
Basis: NA

Analyte Name	Analysis Method	MRL	Sample Result	Duplicate Sample	Average	RPD	RPD Limit
				K1712125-002DUP Result			
Nitrite as Nitrogen	300.0	0.10	ND U	ND U	NC	NC	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712125
Date Collected: 11/07/17
Date Received: 11/08/17
Date Analyzed: 11/8/17
Date Extracted: NA

Duplicate Matrix Spike Summary
Nitrite as Nitrogen

Sample Name: MGMS1-110
Lab Code: K1712125-002
Analysis Method: 300.0
Prep Method: None

Units: mg/L
Basis: NA

Analyte Name	Sample Result	Result	Matrix Spike K1712125-002MS		Duplicate Matrix Spike K1712125-002DMS		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
Nitrite as Nitrogen	ND U	7.33	8.00	92	7.36	8.00	92	90-110	<1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

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ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712125
Date Analyzed: 11/08/17
Date Extracted: NA

Lab Control Sample Summary
Nitrite as Nitrogen

Analysis Method: 300.0
Prep Method: None

Units: mg/L
Basis: NA
Analysis Lot: 569334

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1712125-LCS1	2.32	2.50	93	90-110

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water
Analysis Method: 300.0
Prep Method: None

Service Request: K1712125
Date Collected: 11/07/17 - 11/08/17
Date Received: 11/8/17
Units: mg/L
Basis: NA

Nitrate as Nitrogen

Sample Name	Lab Code	Result	MRL	Dil.	Date Analyzed	Q
MGMS1-43	K1712125-001	120	2.5	50	11/08/17 18:48	
MGMS1-110	K1712125-002	0.73	0.10	2	11/08/17 19:20	
MW-6	K1712125-003	0.35	0.10	2	11/08/17 20:03	
MW-20i	K1712125-004	0.28	0.10	2	11/08/17 20:13	
MW-18i	K1712125-005	1.07	0.10	2	11/08/17 20:24	
MW-22i	K1712125-006	ND Ui	1.0	20	11/08/17 18:06	
MW-13	K1712125-007	0.52	0.10	2	11/08/17 20:46	
MGMS1-60	K1712125-008	1.91	0.10	2	11/08/17 20:57	
MW-17	K1712125-009	43.4	1.0	20	11/08/17 18:38	
Method Blank	K1712125-MB1	ND U	0.050	1	11/08/17 16:41	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water
Analysis Method: 300.0
Prep Method: None

Service Request: K1712125
Date Collected: 11/07/17
Date Received: 11/08/17

Units: mg/L
Basis: NA

Replicate Sample Summary

Nitrate as Nitrogen

Sample Name:	Lab Code:	MRL	Sample Result	Duplicate Result	Average	RPD	RPD Limit	Date Analyzed
Batch QC	K1712124-001DUP	0.10	ND U	ND U	NC	NC	20	11/08/17
MGMS1-110	K1712125-002DUP	0.10	0.73	0.74	0.737	<1	20	11/08/17

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ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712125
Date Collected: N/A
Date Received: N/A
Date Analyzed: 11/8/17
Date Extracted: NA

Duplicate Matrix Spike Summary
Nitrate as Nitrogen

Sample Name: Batch QC
Lab Code: K1712124-001
Analysis Method: 300.0
Prep Method: None

Units: mg/L
Basis: NA

Analyte Name	Sample Result	Result	Matrix Spike K1712124-001MS		Duplicate Matrix Spike K1712124-001DMS		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
Nitrate as Nitrogen	ND U	7.81	8.00	98	7.87	8.00	98	90-110	<1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712125
Date Collected: 11/07/17
Date Received: 11/08/17
Date Analyzed: 11/8/17
Date Extracted: NA

Duplicate Matrix Spike Summary
Nitrate as Nitrogen

Sample Name: MGMS1-110
Lab Code: K1712125-002
Analysis Method: 300.0
Prep Method: None

Units: mg/L
Basis: NA

Analyte Name	Sample Result	Result	Matrix Spike K1712125-002MS		Result	Duplicate Matrix Spike K1712125-002DMS		% Rec Limits	RPD	RPD Limit
			Spike Amount	% Rec		Spike Amount	% Rec			
Nitrate as Nitrogen	0.73	8.41	8.00	96	8.51	8.00	97	90-110	1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712125
Date Analyzed: 11/08/17
Date Extracted: NA

Lab Control Sample Summary
Nitrate as Nitrogen

Analysis Method: 300.0
Prep Method: None

Units: mg/L
Basis: NA
Analysis Lot: 569334

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1712125-LCS1	2.38	2.50	95	90-110

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water
Analysis Method: 350.1
Prep Method: Method

Service Request: K1712125
Date Collected: 11/07/17 - 11/08/17
Date Received: 11/8/17
Units: mg/L
Basis: NA

Ammonia as Nitrogen

Sample Name	Lab Code	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
MGMS1-43	K1712125-001	217	10	200	11/21/17 10:22	11/17/17	
MGMS1-110	K1712125-002	0.822	0.050	1	11/21/17 10:22	11/17/17	
MW-6	K1712125-003	0.608	0.050	1	11/21/17 10:22	11/17/17	
MW-20i	K1712125-004	0.125	0.050	1	11/21/17 10:22	11/17/17	
MW-18i	K1712125-005	ND U	0.050	1	11/21/17 10:22	11/17/17	
MW-22i	K1712125-006	0.354	0.050	1	11/21/17 10:22	11/17/17	
MW-13	K1712125-007	35.0	2.5	50	11/21/17 10:22	11/17/17	
MGMS1-60	K1712125-008	ND U	0.050	1	11/21/17 10:22	11/17/17	
MW-17	K1712125-009	0.634	0.050	1	11/21/17 10:22	11/17/17	
Method Blank	K1712125-MB1	ND U	0.050	1	11/21/17 10:22	11/17/17	
Method Blank	K1712125-MB2	ND U	0.050	1	11/21/17 10:22	11/17/17	

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712125
Date Collected: 11/07/17
Date Received: 11/08/17

Analysis Method: 350.1
Prep Method: Method

Units: mg/L
Basis: NA

Replicate Sample Summary
Ammonia as Nitrogen

Sample Name:	Lab Code:	MRL	Sample Result	Duplicate Result	Average	RPD	RPD Limit	Date Analyzed
Batch QC	K1712068-001DUP	0.050	0.153	0.157	0.155	3	20	11/21/17
MGMS1-43	K1712125-001DUP	10	217	218	218	<1	20	11/21/17
Batch QC	K1712221-001DUP	2.5	34.1	34.5	34.3	1	20	11/21/17

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Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712125
Date Collected: N/A
Date Received: N/A
Date Analyzed: 11/21/17
Date Extracted: 11/17/17

Duplicate Matrix Spike Summary
Ammonia as Nitrogen

Sample Name: Batch QC **Units:** mg/L
Lab Code: K1712068-001 **Basis:** NA
Analysis Method: 350.1
Prep Method: Method

Analyte Name	Sample Result	Result	Matrix Spike K1712068-001MS		Duplicate Matrix Spike K1712068-001DMS		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
Ammonia as Nitrogen	0.153	1.20	1.00	104	1.21	1.00	106	75-125	1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712125
Date Collected: 11/07/17
Date Received: 11/08/17
Date Analyzed: 11/21/17
Date Extracted: 11/17/17

Duplicate Matrix Spike Summary
Ammonia as Nitrogen

Sample Name: MGMS1-43
Lab Code: K1712125-001
Analysis Method: 350.1
Prep Method: Method

Units: mg/L
Basis: NA

Analyte Name	Sample Result	Result	Matrix Spike K1712125-001MS		Duplicate Matrix Spike K1712125-001DMS		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
Ammonia as Nitrogen	217	769	500	110	785	500	114	75-125	2	20

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Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712125
Date Collected: N/A
Date Received: N/A
Date Analyzed: 11/21/17
Date Extracted: 11/17/17

Duplicate Matrix Spike Summary
Ammonia as Nitrogen

Sample Name: Batch QC
Lab Code: K1712221-001
Analysis Method: 350.1
Prep Method: Method

Units: mg/L
Basis: NA

Analyte Name	Sample Result	Result	Matrix Spike K1712221-001MS		Duplicate Matrix Spike K1712221-001DMS		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
Ammonia as Nitrogen	34.1	139	100	105	142	100	108	75-125	3	20

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Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712125
Date Analyzed: 11/21/17
Date Extracted: 11/17/17

Lab Control Sample Summary
Ammonia as Nitrogen

Analysis Method: 350.1
Prep Method: Method

Units: mg/L
Basis: NA
Analysis Lot: 570952

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1712125-LCS1	9.76	10.2	96	85-115
Lab Control Sample	K1712125-LCS2	9.52	10.2	93	85-115



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November 22, 2017

Analytical Report for Service Request No: K1712221

Stephanie Salisbury
Apex Companies, LLC
3015 SW First Avenue
Portland, OR 97201-4707

RE: NuStar Vancouver / 1126-20

Dear Stephanie,

Enclosed are the results of the sample(s) submitted to our laboratory November 10, 2017
For your reference, these analyses have been assigned our service request number **K1712221**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3376. You may also contact me via email at Mark.Harris@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Mark Harris
Project Manager



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Table of Contents

Acronyms

Qualifiers

State Certifications, Accreditations, And Licenses

Case Narrative

Chain of Custody

General Chemistry

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.

i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses**

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
Louisiana DEQ	http://www.deq.louisiana.gov/page/la-lab-accreditation	03016
Maine DHS	http://www.maine.gov/dhhs/	WA01276
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/enforcement/oqa.html	WA005
New York - DOH	https://www.wadsworth.org/regulatory/elap	12060
North Carolina DEQ	https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/EnvironmentalLabCertification/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wyoming (EPA Region 8)	https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



Case Narrative

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

Client: Apex Companies, LLC
Project: NuStar Vancouver
Sample Matrix: Water

Service Request: K1712221
Date Received: 11/10/2017

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Surrogate recoveries have been reported for all applicable organic analyses. Additional quality control analyses reported herein include: Laboratory Duplicate (DUP), Matrix Spike (MS), Matrix/Duplicate Matrix Spike (MS/DMS), Laboratory Control Sample (LCS), and Laboratory/Duplicate Laboratory Control Sample (LCS/DLCS).

Sample Receipt:

Ten water samples were received for analysis at ALS Environmental on 11/10/2017. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

General Chemistry:

The detection limit for Nitrite as Nitrogen was elevated in samples MW-26, MW-25i and MW-14. The samples MRL were elevated due to sample matrix. The matrix interference prevented adequate resolution of the target compound at the normal limit. The results were flagged to indicate the matrix interference.

Approved by *Noel D. Davis* Date 11/22/17
Page 7 of 28



Chain of Custody

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com



CHAIN OF CUSTODY

84498

001

SR# 1712221
 COC Set 1 of
 COC#

1317 South 13th Ave, Kelso, WA 98626 Phone (360) 577-7222 / 800-695-7222 / FAX (360) 636-1068
 www.alsglobal.com

Project Name Nootka Vancouver		Project Number 1126-20		NUMBER OF CONTAINERS	48H	28D									Remarks
Project Manager B. SALISBURY					300.0 / NO2	300.0 / NO3	350.1 / Ammonia T	1	2	3	4	5	6		
Company APEX															
Address 2015 SW 1st Ave PDX OR															
Phone # 503-924-4704		email SSALISBURY@APEXICS.COM													
Sampler Signature 		Sampler Printed Name Megan Masterson													
CLIENT SAMPLE ID	LABID	SAMPLING Date	Time	Matrix											
1. MW-26		11-8-17	1307	W	2	X	X	X							
2. MW-25i			1228		1	X	X	X							
3. S-2			1127			X	X	X							
4. S-1			1053			X	X	X							
5. MW-14			0950			X	X	X							
6. MW-23i			0907			X	X	X							
7. MW-19i			1604			X	X	X							
8. MW-3			1645			X	X	X							
9. MW-21i-105			1430			X	X	X							
10. MW-21i-40			1510			X	X	X							

Report Requirements <input type="checkbox"/> I. Routine Report: Method Blank, Surrogate, as required <input type="checkbox"/> II. Report Dup., MS, MSD as required <input type="checkbox"/> III. CLP Like Summary (no raw data) <input type="checkbox"/> IV. Data Validation Report <input type="checkbox"/> V. EDD	Invoice Information P.O.# <u>1126-20</u> Bill To: _____ _____ _____	Circle which metals are to be analyzed Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg	
	Turnaround Requirements <input checked="" type="checkbox"/> 5 Day Standard <input type="checkbox"/> 48 hr.	Special Instructions/Comments: _____ *Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other _____ (Circle One)	
	Requested Report Date _____		

Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature 	Signature 	Signature	Signature	Signature	Signature
Printed Name Megan Masterson	Printed Name AS	Printed Name	Printed Name	Printed Name	Printed Name
Firm APEX	Firm 11/10/17 0800	Firm	Firm	Firm	Firm
Date/Time 11-9-17	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

1620



PC Mark

Cooler Receipt and Preservation Form

Client Apex Service Request K17 12121
 Received: 11/9/17 Opened: 11/10/17 By: [Signature] Unloaded: 11/10/17 By: [Signature]

- Samples were received via? USPS Fed Ex UPS DHL PDX Courier Hand Delivered
- Samples were received in: (circle) Cooler Box Envelope Other NA
- Were custody seals on coolers? NA Y N If yes, how many and where? one, front
 If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	NA	Filed
5.0	5.0	1.0	1.0	0	308	NA			

- Packing material: Inserts Baggies Bubble Wrap Gel Packs Wet Ice Dry Ice Sleeves
- Were custody papers properly filled out (ink, signed, etc.)? NA Y N
- Were samples received in good condition (temperature, unbroken)? Indicate in the table below. NA Y N
 If applicable, tissue samples were received: Frozen Partially Thawed Thawed
- Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N
- Did all sample labels and tags agree with custody papers? Indicate major discrepancies in the table on page 2. NA Y N
- Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
- Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? Indicate in the table below NA Y N
- Were VOA vials received without headspace? Indicate in the table below. NA Y N
- Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

RUSH

Notes, Discrepancies, & Resolutions: SHORT HOLD TIME



General Chemistry

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water
Analysis Method: 300.0
Prep Method: None

Service Request: K1712221
Date Collected: 11/8/17
Date Received: 11/10/17
Units: mg/L
Basis: NA

Nitrite as Nitrogen

Sample Name	Lab Code	Result	MRL	Dil.	Date Analyzed	Q
MW-26	K1712221-001	ND Ui	2.5	50	11/10/17 11:01	
MW-25i	K1712221-002	ND Ui	0.25	5	11/10/17 11:33	
S-2	K1712221-003	ND U	0.10	2	11/10/17 10:31	
S-1	K1712221-004	ND U	0.10	2	11/10/17 10:21	
MW-14	K1712221-005	ND Ui	1.0	20	11/10/17 12:16	
MW-23i	K1712221-006	ND U	0.10	2	11/10/17 13:41	
MW-19i	K1712221-007	ND U	0.10	2	11/10/17 12:58	
MW-3	K1712221-008	ND U	1.0	20	11/10/17 11:44	
MW-21i-105	K1712221-009	ND U	1.0	20	11/10/17 11:54	
MW21i-40	K1712221-010	ND U	1.0	20	11/10/17 12:05	
Method Blank	K1712221-MB1	ND U	0.050	1	11/10/17 09:49	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water
Analysis Method: 300.0
Prep Method: None

Service Request: K1712221
Date Collected: 11/08/17
Date Received: 11/10/17

Units: mg/L
Basis: NA

Replicate Sample Summary

Nitrite as Nitrogen

Sample Name:	Lab Code:	MRL	Sample Result	Duplicate Result	Average	RPD	RPD Limit	Date Analyzed
MW-19i	K1712221-007DUP	0.10	ND U	ND U	NC	NC	20	11/10/17
Batch QC	K1712244-002DUP	0.10	ND U	ND U	NC	NC	20	11/10/17

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712221
Date Collected: N/A
Date Received: N/A
Date Analyzed: 11/10/17
Date Extracted: NA

Duplicate Matrix Spike Summary
Nitrite as Nitrogen

Sample Name: Batch QC
Lab Code: K1712244-002
Analysis Method: 300.0
Prep Method: None

Units: mg/L
Basis: NA

Analyte Name	Sample Result	Result	Matrix Spike K1712244-002MS		Duplicate Matrix Spike K1712244-002DMS		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
Nitrite as Nitrogen	ND U	7.53	8.00	94	7.50	8.00	94	90-110	<1	20

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ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712221
Date Collected: 11/08/17
Date Received: 11/10/17
Date Analyzed: 11/10/17
Date Extracted: NA

Duplicate Matrix Spike Summary
Nitrite as Nitrogen

Sample Name: MW-19i
Lab Code: K1712221-007
Analysis Method: 300.0
Prep Method: None

Units: mg/L
Basis: NA

Analyte Name	Sample Result	Result	Matrix Spike		Duplicate Matrix Spike		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
Nitrite as Nitrogen	ND U	7.49	8.00	94	7.57	8.00	95	90-110	1	20

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Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712221
Date Analyzed: 11/10/17
Date Extracted: NA

Lab Control Sample Summary
Nitrite as Nitrogen

Analysis Method: 300.0
Prep Method: None

Units: mg/L
Basis: NA
Analysis Lot: 569872

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1712221-LCS1	2.33	2.50	93	90-110

ALS Group USA, Corp.
 dba ALS Environmental

Analytical Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water
Analysis Method: 300.0
Prep Method: None

Service Request: K1712221
Date Collected: 11/8/17
Date Received: 11/10/17
Units: mg/L
Basis: NA

Nitrate as Nitrogen

Sample Name	Lab Code	Result	MRL	Dil.	Date Analyzed	Q
MW-26	K1712221-001	101	2.5	50	11/10/17 11:01	
MW-25i	K1712221-002	0.53	0.25	5	11/10/17 11:33	
S-2	K1712221-003	1.05	0.10	2	11/10/17 10:31	
S-1	K1712221-004	4.14	0.10	2	11/10/17 10:21	
MW-14	K1712221-005	50.3	1.0	20	11/10/17 12:16	
MW-23i	K1712221-006	0.78	0.10	2	11/10/17 13:41	
MW-19i	K1712221-007	ND U	0.10	2	11/10/17 12:58	
MW-3	K1712221-008	2.7	1.0	20	11/10/17 11:44	
MW-21i-105	K1712221-009	1.6	1.0	20	11/10/17 11:54	
MW21i-40	K1712221-010	1.9	1.0	20	11/10/17 12:05	
Method Blank	K1712221-MB1	ND U	0.050	1	11/10/17 09:49	

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water
Analysis Method: 300.0
Prep Method: None

Service Request: K1712221
Date Collected: 11/08/17
Date Received: 11/10/17

Units: mg/L
Basis: NA

Replicate Sample Summary
Nitrate as Nitrogen

Sample Name:	Lab Code:	MRL	Sample Result	Duplicate Result	Average	RPD	RPD Limit	Date Analyzed
MW-19i	K1712221-007DUP	0.10	ND U	ND U	NC	NC	20	11/10/17
Batch QC	K1712244-002DUP	0.10	1.71	1.70	1.70	<1	20	11/10/17

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Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712221
Date Collected: N/A
Date Received: N/A
Date Analyzed: 11/10/17
Date Extracted: NA

Duplicate Matrix Spike Summary
Nitrate as Nitrogen

Sample Name: Batch QC
Lab Code: K1712244-002
Analysis Method: 300.0
Prep Method: None

Units: mg/L
Basis: NA

Analyte Name	Sample Result	Result	Matrix Spike K1712244-002MS		Duplicate Matrix Spike K1712244-002DMS		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
Nitrate as Nitrogen	1.71	9.52	8.00	98	9.51	8.00	98	90-110	<1	20

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ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712221
Date Collected: 11/08/17
Date Received: 11/10/17
Date Analyzed: 11/10/17
Date Extracted: NA

Duplicate Matrix Spike Summary
Nitrate as Nitrogen

Sample Name: MW-19i **Units:** mg/L
Lab Code: K1712221-007 **Basis:** NA
Analysis Method: 300.0
Prep Method: None

Analyte Name	Sample Result	Result	Matrix Spike K1712221-007MS		Duplicate Matrix Spike K1712221-007DMS		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
Nitrate as Nitrogen	ND U	7.65	8.00	96	7.76	8.00	97	90-110	1	20

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ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712221
Date Analyzed: 11/10/17
Date Extracted: NA

Lab Control Sample Summary
Nitrate as Nitrogen

Analysis Method: 300.0
Prep Method: None

Units: mg/L
Basis: NA
Analysis Lot: 569872

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1712221-LCS1	2.45	2.50	98	90-110

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water
Analysis Method: 350.1
Prep Method: Method

Service Request: K1712221
Date Collected: 11/8/17
Date Received: 11/10/17
Units: mg/L
Basis: NA

Ammonia as Nitrogen

Sample Name	Lab Code	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
MW-26	K1712221-001	34.1	2.5	50	11/21/17 10:22	11/17/17	
MW-25i	K1712221-002	0.138	0.050	1	11/21/17 10:22	11/17/17	
S-2	K1712221-003	5.64	0.25	5	11/20/17 10:06	11/20/17	
S-1	K1712221-004	7.13	0.50	10	11/20/17 10:06	11/20/17	
MW-14	K1712221-005	34.7	2.5	50	11/20/17 10:06	11/20/17	
MW-23i	K1712221-006	ND U	0.050	1	11/20/17 10:06	11/20/17	
MW-19i	K1712221-007	0.236	0.050	1	11/21/17 10:22	11/17/17	
MW-3	K1712221-008	1.68	0.050	1	11/20/17 10:06	11/20/17	
MW-21i-105	K1712221-009	ND U	0.050	1	11/20/17 10:06	11/20/17	
MW21i-40	K1712221-010	ND U	0.050	1	11/20/17 10:06	11/20/17	
Method Blank	K1712221-MB1	ND U	0.050	1	11/20/17 10:06	11/20/17	
Method Blank	K1712221-MB2	ND U	0.050	1	11/21/17 10:22	11/17/17	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712221
Date Collected: 11/08/17
Date Received: 11/10/17

Analysis Method: 350.1
Prep Method: Method

Units: mg/L
Basis: NA

Replicate Sample Summary

Ammonia as Nitrogen

Sample Name:	Lab Code:	MRL	Sample Result	Duplicate Result	Average	RPD	RPD Limit	Date Analyzed
MW-26	K1712221-001DUP	2.5	34.1	34.5	34.3	1	20	11/21/17
Batch QC	K1712223-005DUP	0.050	ND U	ND U	NC	NC	20	11/20/17
Batch QC	K1712276-001DUP	0.050	ND U	ND U	NC	NC	20	11/20/17

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

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ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712221
Date Collected: 11/08/17
Date Received: 11/10/17
Date Analyzed: 11/21/17
Date Extracted: 11/17/17

Duplicate Matrix Spike Summary
Ammonia as Nitrogen

Sample Name: MW-26
Lab Code: K1712221-001
Analysis Method: 350.1
Prep Method: Method

Units: mg/L
Basis: NA

Analyte Name	Sample Result	Result	Matrix Spike K1712221-001MS		Duplicate Matrix Spike K1712221-001DMS		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
Ammonia as Nitrogen	34.1	139	100	105	142	100	108	75-125	3	20

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Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712221
Date Collected: N/A
Date Received: N/A
Date Analyzed: 11/20/17
Date Extracted: 11/20/17

Duplicate Matrix Spike Summary
Ammonia as Nitrogen

Sample Name: Batch QC
Lab Code: K1712223-005
Analysis Method: 350.1
Prep Method: Method

Units: mg/L
Basis: NA

Analyte Name	Sample Result	Result	Matrix Spike K1712223-005MS		Duplicate Matrix Spike K1712223-005DMS		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
Ammonia as Nitrogen	ND U	1.07	1.00	107	1.01	1.00	101	75-125	6	20

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Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712221
Date Collected: N/A
Date Received: N/A
Date Analyzed: 11/20/17
Date Extracted: 11/20/17

Duplicate Matrix Spike Summary
Ammonia as Nitrogen

Sample Name: Batch QC
Lab Code: K1712276-001
Analysis Method: 350.1
Prep Method: Method

Units: mg/L
Basis: NA

Analyte Name	Sample Result	Result	Matrix Spike		Duplicate Matrix Spike		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
Ammonia as Nitrogen	ND U	1.04	1.00	104	1.05	1.00	105	75-125	1	20

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ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712221
Date Analyzed: 11/20/17
Date Extracted: 11/20/17

Lab Control Sample Summary
Ammonia as Nitrogen

Analysis Method: 350.1
Prep Method: Method

Units: mg/L
Basis: NA
Analysis Lot: 570999

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1712221-LCS1	9.85	10.2	97	85-115

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712221
Date Analyzed: 11/21/17
Date Extracted: 11/17/17

Lab Control Sample Summary
Ammonia as Nitrogen

Analysis Method: 350.1
Prep Method: Method

Units: mg/L
Basis: NA
Analysis Lot: 570952

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1712221-LCS2	9.52	10.2	93	85-115



ALS Environmental
ALS Group USA, Corp
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November 22, 2017

Analytical Report for Service Request No: K1712223

Stephanie Salisbury
Apex Companies, LLC
3015 SW First Avenue
Portland, OR 97201-4707

RE: NuStar Vancouver / 1126-2c

Dear Stephanie,

Enclosed are the results of the sample(s) submitted to our laboratory November 10, 2017
For your reference, these analyses have been assigned our service request number **K1712223**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3376. You may also contact me via email at Mark.Harris@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Mark Harris
Project Manager



ALS Environmental
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General Chemistry

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
 - i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
 - i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses**

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
Louisiana DEQ	http://www.deq.louisiana.gov/page/la-lab-accreditation	03016
Maine DHS	http://www.maine.gov/dhhs/	WA01276
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/enforcement/oqa.html	WA005
New York - DOH	https://www.wadsworth.org/regulatory/elap	12060
North Carolina DEQ	https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/EnvironmentalLabCertification/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wyoming (EPA Region 8)	https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



Case Narrative

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

Client: Apex Companies, LLC
Project: NuStar Vancouver
Sample Matrix: Water

Service Request: K1712223
Date Received: 11/10/2017

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Surrogate recoveries have been reported for all applicable organic analyses. Additional quality control analyses reported herein include: Laboratory Duplicate (DUP), Matrix Spike (MS), Matrix/Duplicate Matrix Spike (MS/DMS), Laboratory Control Sample (LCS), and Laboratory/Duplicate Laboratory Control Sample (LCS/DLCS).

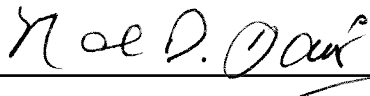
Sample Receipt:

Six water samples were received for analysis at ALS Environmental on 11/10/2017. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

General Chemistry:

The detection limit for Nitrite as Nitrogen was elevated in samples MW-19, MW-12, MW-1 and MP-1. The samples MRL were elevated due to sample matrix. The matrix interference prevented adequate resolution of the target compound at the normal limit. The results were flagged to indicate the matrix interference.

Approved by



Date

11/22/2017



Chain of Custody

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
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CHAIN OF CUSTODY
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001

SR# 112223
COC Set 1 of 1
COC# _____

1317 South 13th Ave, Kelso, WA 98626 Phone (360) 577-7222 / 800-695-7222 / FAX (360) 636-1068
www.alsglobal.com

Project Name Nuster Vancouver		Project Number 1126-20		NUMBER OF CONTAINERS	48H	28D	300.0 / NO2	300.0 / NO3	350.1 / Ammonia T	1	2	3	4	5	Remarks
Project Manager S SAUSBURY															
Company APEX															
Address 3015 SW 1st AVE PDX OR															
Phone # 503 924 4709	Email SSAUSBURY@APEX.COS.COM														
Sampler Signature 		Sampler Printed Name Megan Masterson													
CLIENT SAMPLE ID	LABID	SAMPLING Date Time	Matrix												
1. MW-19		11-9-17 1236	W	2	X	X	X								
2. MW-12		0800			X	X	X								
3. MW-1		1009			X	X	X								
4. EW-1		0915			X	X	X								
5. MW-24i		1149			X	X	X								
3. MP-1		1043			X	X	X								
7.															
3.															
3.															
10.															

Report Requirements <input type="checkbox"/> I. Routine Report: Method Blank, Surrogate, as required <input type="checkbox"/> II. Report Dup., MS, MSD as required <input type="checkbox"/> III. CLP Like Summary (no raw data) <input type="checkbox"/> IV. Data Validation Report <input type="checkbox"/> V. EDD	Invoice Information P.O.# <u>1126-20</u> Bill To: _____ _____ _____	Circle which metals are to be analyzed Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg	
	Turnaround Requirements <input checked="" type="checkbox"/> 24 hr. <input type="checkbox"/> 5 Day Standard <input type="checkbox"/> _____ 48 hr.	Special Instructions/Comments: _____ *Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other _____ (Circle One)	
	Requested Report Date		

Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature 	Signature 	Signature	Signature	Signature	Signature
Printed Name Megan Masterson	Printed Name ALS	Printed Name	Printed Name	Printed Name	Printed Name
Firm APEX	Firm ALS	Firm	Firm	Firm	Firm
Date/Time 11-9-17 1620	Date/Time 11/10/17 0800	Date/Time	Date/Time	Date/Time	Date/Time



PC MH

Cooler Receipt and Preservation Form

Client Apex Service Request K17 12223
 Received: 11/8/17 Opened: 11/10/17 By: [Signature] Unloaded: 11/10/17 By: [Signature]

- Samples were received via? USPS Fed Ex UPS DHL PDX Courier Hand Delivered
- Samples were received in: (circle) Cooler Box Envelope Other NA
- Were custody seals on coolers? NA (Y) N If yes, how many and where? one, front
 If present, were custody seals intact? (Y) N If present, were they signed and dated? (Y) N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	Filed
0.3	0.3	-	-	0	360	NA	NA	

- Packing material: Inserts Baggies Bubble Wrap Gel Packs Wet Ice Dry Ice Sleeves
- Were custody papers properly filled out (ink, signed, etc.)? NA (Y) N
- Were samples received in good condition (temperature, unbroken)? Indicate in the table below. NA (Y) N
 If applicable, tissue samples were received: Frozen Partially Thawed Thawed
- Were all sample labels complete (i.e analysis, preservation, etc.)? NA (Y) N
- Did all sample labels and tags agree with custody papers? Indicate major discrepancies in the table on page 2. NA (Y) N
- Were appropriate bottles/containers and volumes received for the tests indicated? NA (Y) N
- Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? Indicate in the table below NA (Y) N
- Were VOA vials received without headspace? Indicate in the table below. (NA) (Y) N
- Was C12/Res negative? (NA) (Y) N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

RUSH

SHORT HOLD TIME

Notes, Discrepancies, & Resolutions:



General Chemistry

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-2c
Sample Matrix: Water
Analysis Method: 300.0
Prep Method: None

Service Request: K1712223
Date Collected: 11/9/17
Date Received: 11/10/17
Units: mg/L
Basis: NA

Nitrite as Nitrogen

Sample Name	Lab Code	Result	MRL	Dil.	Date Analyzed	Q
MW-19	K1712223-001	ND Ui	1.0	20	11/10/17 13:51	
MW-12	K1712223-002	ND Ui	0.25	5	11/10/17 15:59	
MW-1	K1712223-003	ND Ui	1.0	20	11/10/17 16:10	
EW-1	K1712223-004	ND U	0.10	2	11/10/17 16:20	
MW-24i	K1712223-005	ND U	0.10	2	11/10/17 16:31	
MP-1	K1712223-006	ND Ui	0.50	10	11/10/17 17:03	
Method Blank	K1712223-MB	ND U	0.050	1	11/10/17 09:49	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-2c
Sample Matrix: Water
Analysis Method: 300.0
Prep Method: None

Service Request:K1712223
Date Collected:NA
Date Received:NA

Units:mg/L
Basis:NA

Replicate Sample Summary

Nitrite as Nitrogen

Sample Name:	Lab Code:	MRL	Sample Result	Duplicate Result	Average	RPD	RPD Limit	Date Analyzed
Batch QC	K1712221-007DUP	0.10	ND U	ND U	NC	NC	20	11/10/17
Batch QC	K1712244-002DUP	0.10	ND U	ND U	NC	NC	20	11/10/17

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-2c
Sample Matrix: Water

Service Request: K1712223
Date Collected: N/A
Date Received: N/A
Date Analyzed: 11/10/17
Date Extracted: NA

Duplicate Matrix Spike Summary
Nitrite as Nitrogen

Sample Name: Batch QC
Lab Code: K1712244-002
Analysis Method: 300.0
Prep Method: None

Units: mg/L
Basis: NA

Analyte Name	Sample Result	Result	Matrix Spike K1712244-002MS		Duplicate Matrix Spike K1712244-002DMS		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
Nitrite as Nitrogen	ND U	7.53	8.00	94	7.50	8.00	94	90-110	<1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-2c
Sample Matrix: Water

Service Request: K1712223
Date Collected: N/A
Date Received: N/A
Date Analyzed: 11/10/17
Date Extracted: NA

Duplicate Matrix Spike Summary
Nitrite as Nitrogen

Sample Name: Batch QC
Lab Code: K1712221-007
Analysis Method: 300.0
Prep Method: None

Units: mg/L
Basis: NA

Analyte Name	Sample Result	Result	Matrix Spike K1712221-007MS		Duplicate Matrix Spike K1712221-007DMS		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
Nitrite as Nitrogen	ND U	7.49	8.00	94	7.57	8.00	95	90-110	1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-2c
Sample Matrix: Water

Service Request: K1712223
Date Analyzed: 11/10/17
Date Extracted: NA

Lab Control Sample Summary
Nitrite as Nitrogen

Analysis Method: 300.0
Prep Method: None

Units: mg/L
Basis: NA
Analysis Lot: 569872

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1712223-LCS	2.33	2.50	93	90-110

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-2c
Sample Matrix: Water
Analysis Method: 300.0
Prep Method: None

Service Request: K1712223
Date Collected: 11/9/17
Date Received: 11/10/17
Units: mg/L
Basis: NA

Nitrate as Nitrogen

Sample Name	Lab Code	Result	MRL	Dil.	Date Analyzed	Q
MW-19	K1712223-001	41.0	1.0	20	11/10/17 13:51	
MW-12	K1712223-002	0.57	0.25	5	11/10/17 15:59	
MW-1	K1712223-003	46.4	1.0	20	11/10/17 16:10	
EW-1	K1712223-004	0.50	0.10	2	11/10/17 16:20	
MW-24i	K1712223-005	3.09	0.10	2	11/10/17 16:31	
MP-1	K1712223-006	23.0	0.50	10	11/10/17 17:03	
Method Blank	K1712223-MB	ND U	0.050	1	11/10/17 09:49	

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-2c
Sample Matrix: Water
Analysis Method: 300.0
Prep Method: None

Service Request: K1712223
Date Collected: NA
Date Received: NA

Units: mg/L
Basis: NA

Replicate Sample Summary
Nitrate as Nitrogen

Sample Name:	Lab Code:	MRL	Sample Result	Duplicate Result	Average	RPD	RPD Limit	Date Analyzed
Batch QC	K1712221-007DUP	0.10	ND U	ND U	NC	NC	20	11/10/17
Batch QC	K1712244-002DUP	0.10	1.71	1.70	1.70	<1	20	11/10/17

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-2c
Sample Matrix: Water

Service Request: K1712223
Date Collected: N/A
Date Received: N/A
Date Analyzed: 11/10/17
Date Extracted: NA

Duplicate Matrix Spike Summary
Nitrate as Nitrogen

Sample Name: Batch QC
Lab Code: K1712244-002
Analysis Method: 300.0
Prep Method: None

Units: mg/L
Basis: NA

Analyte Name	Sample Result	Result	Matrix Spike K1712244-002MS		Duplicate Matrix Spike K1712244-002DMS		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
Nitrate as Nitrogen	1.71	9.52	8.00	98	9.51	8.00	98	90-110	<1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-2c
Sample Matrix: Water

Service Request: K1712223
Date Collected: N/A
Date Received: N/A
Date Analyzed: 11/10/17
Date Extracted: NA

Duplicate Matrix Spike Summary
Nitrate as Nitrogen

Sample Name: Batch QC
Lab Code: K1712221-007
Analysis Method: 300.0
Prep Method: None

Units: mg/L
Basis: NA

Analyte Name	Sample Result	Result	Matrix Spike K1712221-007MS		Duplicate Matrix Spike K1712221-007DMS		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
Nitrate as Nitrogen	ND U	7.65	8.00	96	7.76	8.00	97	90-110	1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-2c
Sample Matrix: Water

Service Request: K1712223
Date Analyzed: 11/10/17
Date Extracted: NA

Lab Control Sample Summary
Nitrate as Nitrogen

Analysis Method: 300.0
Prep Method: None

Units: mg/L
Basis: NA
Analysis Lot: 569872

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1712223-LCS	2.45	2.50	98	90-110

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-2c
Sample Matrix: Water
Analysis Method: 350.1
Prep Method: Method

Service Request: K1712223
Date Collected: 11/9/17
Date Received: 11/10/17
Units: mg/L
Basis: NA

Ammonia as Nitrogen

Sample Name	Lab Code	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
MW-19	K1712223-001	80.0	2.5	50	11/20/17 10:06	11/20/17	
MW-12	K1712223-002	55.4	2.5	50	11/20/17 10:06	11/20/17	
MW-1	K1712223-003	3.96	0.25	5	11/20/17 10:06	11/20/17	
EW-1	K1712223-004	ND U	0.050	1	11/20/17 10:06	11/20/17	
MW-24i	K1712223-005	ND U	0.050	1	11/20/17 10:06	11/20/17	
MP-1	K1712223-006	12.2	0.50	10	11/20/17 10:06	11/20/17	
Method Blank	K1712223-MB	ND U	0.050	1	11/20/17 10:06	11/20/17	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-2c
Sample Matrix: Water
Analysis Method: 350.1
Prep Method: Method

Service Request: K1712223
Date Collected: 11/09/17
Date Received: 11/10/17

Units: mg/L
Basis: NA

Replicate Sample Summary

Ammonia as Nitrogen

Sample Name:	Lab Code:	MRL	Sample Result	Duplicate Result	Average	RPD	RPD Limit	Date Analyzed
MW-24i	K1712223-005DUP	0.050	ND U	ND U	NC	NC	20	11/20/17
Batch QC	K1712276-001DUP	0.050	ND U	ND U	NC	NC	20	11/20/17

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-2c
Sample Matrix: Water

Service Request: K1712223
Date Collected: 11/09/17
Date Received: 11/10/17
Date Analyzed: 11/20/17
Date Extracted: 11/20/17

Duplicate Matrix Spike Summary
Ammonia as Nitrogen

Sample Name: MW-24i
Lab Code: K1712223-005
Analysis Method: 350.1
Prep Method: Method

Units: mg/L
Basis: NA

Analyte Name	Sample Result	Result	Matrix Spike K1712223-005MS		Duplicate Matrix Spike K1712223-005DMS		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
Ammonia as Nitrogen	ND U	1.07	1.00	107	1.01	1.00	101	75-125	6	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-2c
Sample Matrix: Water

Service Request: K1712223
Date Collected: N/A
Date Received: N/A
Date Analyzed: 11/20/17
Date Extracted: 11/20/17

Duplicate Matrix Spike Summary
Ammonia as Nitrogen

Sample Name: Batch QC
Lab Code: K1712276-001
Analysis Method: 350.1
Prep Method: Method

Units: mg/L
Basis: NA

Analyte Name	Sample Result	Result	Matrix Spike K1712276-001MS		Duplicate Matrix Spike K1712276-001DMS		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
Ammonia as Nitrogen	ND U	1.04	1.00	104	1.05	1.00	105	75-125	1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-2c
Sample Matrix: Water

Service Request: K1712223
Date Analyzed: 11/20/17
Date Extracted: 11/20/17

Lab Control Sample Summary
Ammonia as Nitrogen

Analysis Method: 350.1
Prep Method: Method

Units: mg/L
Basis: NA
Analysis Lot: 570999

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1712223-LCS	9.85	10.2	97	85-115



ALS Environmental
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November 22, 2017

Analytical Report for Service Request No: K1712276

Stephanie Salisbury
Apex Companies, LLC
3015 SW First Avenue
Portland, OR 97201-4707

RE: NuStar Vancouver / 1126-20

Dear Stephanie,

Enclosed are the results of the sample(s) submitted to our laboratory November 10, 2017
For your reference, these analyses have been assigned our service request number **K1712276**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3376. You may also contact me via email at Mark.Harris@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Mark Harris
Project Manager



ALS Environmental
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Table of Contents

Acronyms

Qualifiers

State Certifications, Accreditations, And Licenses

Chain of Custody

General Chemistry

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.

i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses**

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
Louisiana DEQ	http://www.deq.louisiana.gov/page/la-lab-accreditation	03016
Maine DHS	http://www.maine.gov/dhhs/	WA01276
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/enforcement/oqa.html	WA005
New York - DOH	https://www.wadsworth.org/regulatory/elap	12060
North Carolina DEQ	https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/EnvironmentalLabCertification/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wyoming (EPA Region 8)	https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



Chain of Custody

ALS Environmental—Kelso Laboratory
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CHAIN OF CUSTODY

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SR# 112276
 COC Set 1 of 1
 COC# _____

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 www.alsglobal.com

Project Name <u>NuStar Vancouver</u>		Project Number <u>1126-20</u>		NUMBER OF CONTAINERS	48H	28D	300.0 / NO2	300.0 / NO3	350.1 / Ammonia T	1	2	3	4	5	Remarks
Project Manager <u>S. Salisbury</u>		Company <u>Apex Companies</u>													
Address <u>3015 SW 1st Ave POX 02</u>		Phone # <u>503-924-4704</u>													
Sampler Signature 		email <u>S.SALISBURY@ApexCOs.com</u>													
Sampler Printed Name <u>Megan Masterson</u>		Sampler Printed Name <u>Megan Masterson</u>													
CLIENT SAMPLE ID	LABID	SAMPLING Date	Time	Matrix											
1. MGMS2-132		11-9-17	1430	W	2	X	X	X							
2. MGMS2-110			1504			X	X	X							
3. MGMS2-60D			1539			X	X	X							
4. MGMS2-40			1602			X	X	X							
5. MGMS3-132		11-10-17	1036			X	X	X							
6. MW-32s			0911			X	X	X							
7. MW-32i			0832			X	X	X							
8. MGMS3-60			1152			X	X	X							
9. MGMS3-110			1126			X	X	X							
10. MGMS3-40			1225			X	X	X							

Report Requirements <input type="checkbox"/> I. Routine Report: Method Blank, Surrogate, as required <input type="checkbox"/> II. Report Dup., MS, MSD as required <input type="checkbox"/> III. CLP Like Summary (no raw data) <input type="checkbox"/> IV. Data Validation Report <input type="checkbox"/> V. EDD	Invoice Information P.O.# <u>1126-20</u> Bill To: _____ _____	Circle which metals are to be analyzed Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg	
	Turnaround Requirements <input checked="" type="checkbox"/> 24 hr. Standard <input type="checkbox"/> 5 Day <input type="checkbox"/> 48 hr.	Special Instructions/Comments: _____	*Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other _____ (Circle One)
	Requested Report Date _____		

Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature	Signature	Signature	Signature	Signature	Signature
Printed Name <u>Megan Masterson</u>	Printed Name <u>ALS</u>	Printed Name	Printed Name	Printed Name	Printed Name
Firm <u>APEX COMPANIES</u>	Firm <u>11/10/17 1450</u>	Firm	Firm	Firm	Firm
Date/Time <u>11-10-17 / 1400</u>	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time



PC MH

Cooler Receipt and Preservation Form

Client Apex Service Request K17 12276
 Received: 11/10/17 Opened: 11/10/17 By: [Signature] Unloaded: 11/10/17 By: [Signature]

- Samples were received via? USPS Fed Ex UPS DHL PDX Courier Hand Delivered
- Samples were received in: (circle) Cooler Box Envelope Other NA
- Were custody seals on coolers? NA Y N If yes, how many and where? _____
 If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	Filed
<u>7.0</u>	<u>6.7</u>	<u>5.9</u>	<u>5.8</u>	<u>-0.1</u>	<u>392</u>	<u>NA</u>	<u>NA</u>	

- Packing material: Inserts Baggies Bubble Wrap Gel Packs Wet Ice Dry Ice Sleeves
- Were custody papers properly filled out (ink, signed, etc.)? NA Y N
- Were samples received in good condition (temperature, unbroken)? Indicate in the table below. NA Y N
 If applicable, tissue samples were received: Frozen Partially Thawed Thawed
- Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N
- Did all sample labels and tags agree with custody papers? Indicate major discrepancies in the table on page 2. NA Y N
- Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
- Were the pH-preserved bottles (see SMO GEN SOP) received at the appropriate pH? Indicate in the table below NA Y N
- Were VOA vials received without headspace? Indicate in the table below. NA Y N
- Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: SHORT HOLD TIME



General Chemistry

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water
Analysis Method: 300.0
Prep Method: None

Service Request: K1712276
Date Collected: 11/09/17 - 11/10/17
Date Received: 11/10/17
Units: mg/L
Basis: NA

Nitrite as Nitrogen

Sample Name	Lab Code	Result	MRL	Dil.	Date Analyzed	Q
MGMS2-132	K1712276-001	ND U	0.10	2	11/10/17 16:23	
MGMS2-110	K1712276-002	ND U	0.10	2	11/10/17 16:34	
MGMS2-60	K1712276-003	ND U	0.10	2	11/10/17 16:44	
MGMS2-40	K1712276-004	ND U	0.10	2	11/10/17 16:54	
MGMS3-132	K1712276-005	ND U	0.10	2	11/10/17 17:04	
MW-32s	K1712276-006	ND U	0.10	2	11/10/17 17:14	
MW-32i	K1712276-007	ND U	0.10	2	11/10/17 17:24	
MGMS3-60	K1712276-008	ND U	0.10	2	11/10/17 17:55	
MGMS3-110	K1712276-009	ND U	0.10	2	11/10/17 18:05	
MGMS3-40	K1712276-010	ND U	0.10	2	11/10/17 18:15	
Method Blank	K1712276-MB1	ND U	0.050	1	11/10/17 13:22	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712276
Date Collected: 11/09/17
Date Received: 11/10/17
Date Analyzed: 11/10/17

Replicate Sample Summary
General Chemistry Parameters

Sample Name: MGMS2-110
Lab Code: K1712276-002

Units: mg/L
Basis: NA

Analyte Name	Analysis Method	MRL	Sample Result	Duplicate Sample	Average	RPD	RPD Limit
				K1712276-002DUP Result			
Nitrite as Nitrogen	300.0	0.10	ND U	ND U	NC	NC	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712276
Date Collected: 11/09/17
Date Received: 11/10/17
Date Analyzed: 11/10/17
Date Extracted: NA

Duplicate Matrix Spike Summary
Nitrite as Nitrogen

Sample Name: MGMS2-110
Lab Code: K1712276-002
Analysis Method: 300.0
Prep Method: None

Units: mg/L
Basis: NA

Analyte Name	Sample Result	Result	Matrix Spike		Duplicate Matrix Spike		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
Nitrite as Nitrogen	ND U	7.58	8.00	95	7.64	8.00	95	90-110	<1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712276
Date Analyzed: 11/10/17
Date Extracted: NA

Lab Control Sample Summary
Nitrite as Nitrogen

Analysis Method: 300.0
Prep Method: None

Units: mg/L
Basis: NA
Analysis Lot: 569871

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1712276-LCS1	2.36	2.50	94	90-110

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water
Analysis Method: 300.0
Prep Method: None

Service Request: K1712276
Date Collected: 11/09/17 - 11/10/17
Date Received: 11/10/17
Units: mg/L
Basis: NA

Nitrate as Nitrogen

Sample Name	Lab Code	Result	MRL	Dil.	Date Analyzed	Q
MGMS2-132	K1712276-001	ND U	0.10	2	11/10/17 16:23	
MGMS2-110	K1712276-002	0.37	0.10	2	11/10/17 16:34	
MGMS2-60	K1712276-003	0.12	0.10	2	11/10/17 16:44	
MGMS2-40	K1712276-004	ND U	0.10	2	11/10/17 16:54	
MGMS3-132	K1712276-005	0.52	0.10	2	11/10/17 17:04	
MW-32s	K1712276-006	0.58	0.10	2	11/10/17 17:14	
MW-32i	K1712276-007	1.33	0.10	2	11/10/17 17:24	
MGMS3-60	K1712276-008	ND U	0.10	2	11/10/17 17:55	
MGMS3-110	K1712276-009	0.48	0.10	2	11/10/17 18:05	
MGMS3-40	K1712276-010	ND U	0.10	2	11/10/17 18:15	
Method Blank	K1712276-MB1	ND U	0.050	1	11/10/17 13:22	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water
Analysis Method: 300.0
Prep Method: None

Service Request: K1712276
Date Collected: 11/09/17
Date Received: 11/10/17

Units: mg/L
Basis: NA

Replicate Sample Summary

Nitrate as Nitrogen

Sample Name:	Lab Code:	MRL	Sample Result	Duplicate Result	Average	RPD	RPD Limit	Date Analyzed
Batch QC	K1712253-008DUP	0.10	2.21	2.20	2.21	<1	20	11/10/17
MGMS2-110	K1712276-002DUP	0.10	0.37	0.38	0.375	4	20	11/10/17

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Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712276
Date Collected: N/A
Date Received: N/A
Date Analyzed: 11/10/17
Date Extracted: NA

Duplicate Matrix Spike Summary
Nitrate as Nitrogen

Sample Name: Batch QC
Lab Code: K1712253-008
Analysis Method: 300.0
Prep Method: None

Units: mg/L
Basis: NA

Analyte Name	Sample Result	Result	Matrix Spike K1712253-008MS		Duplicate Matrix Spike K1712253-008DMS		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
Nitrate as Nitrogen	2.21	10.0	8.00	98	10.0	8.00	98	90-110	<1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712276
Date Collected: 11/09/17
Date Received: 11/10/17
Date Analyzed: 11/10/17
Date Extracted: NA

Duplicate Matrix Spike Summary
Nitrate as Nitrogen

Sample Name: MGMS2-110
Lab Code: K1712276-002
Analysis Method: 300.0
Prep Method: None

Units: mg/L
Basis: NA

Analyte Name	Sample Result	Result	Matrix Spike K1712276-002MS		Duplicate Matrix Spike K1712276-002DMS		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
Nitrate as Nitrogen	0.37	8.05	8.00	96	8.11	8.00	97	90-110	<1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712276
Date Analyzed: 11/10/17
Date Extracted: NA

Lab Control Sample Summary
Nitrate as Nitrogen

Analysis Method: 300.0
Prep Method: None

Units: mg/L
Basis: NA
Analysis Lot: 569871

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1712276-LCS1	2.38	2.50	95	90-110

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water
Analysis Method: 350.1
Prep Method: Method

Service Request: K1712276
Date Collected: 11/09/17 - 11/10/17
Date Received: 11/10/17
Units: mg/L
Basis: NA

Ammonia as Nitrogen

Sample Name	Lab Code	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
MGMS2-132	K1712276-001	ND U	0.050	1	11/20/17 10:06	11/20/17	
MGMS2-110	K1712276-002	ND U	0.050	1	11/20/17 10:06	11/20/17	
MGMS2-60	K1712276-003	1.03	0.050	1	11/20/17 10:06	11/20/17	
MGMS2-40	K1712276-004	87.1	2.5	50	11/20/17 10:06	11/20/17	
MGMS3-132	K1712276-005	ND U	0.050	1	11/20/17 10:06	11/20/17	
MW-32s	K1712276-006	0.235	0.050	1	11/20/17 10:06	11/20/17	
MW-32i	K1712276-007	ND U	0.050	1	11/20/17 10:06	11/20/17	
MGMS3-60	K1712276-008	ND U	0.050	1	11/20/17 10:06	11/20/17	
MGMS3-110	K1712276-009	ND U	0.050	1	11/20/17 10:06	11/20/17	
MGMS3-40	K1712276-010	1.71	0.050	1	11/20/17 10:06	11/20/17	
Method Blank	K1712276-MB1	ND U	0.050	1	11/20/17 10:06	11/20/17	
Method Blank	K1712276-MB2	ND U	0.050	1	11/20/17 10:06	11/20/17	

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water
Analysis Method: 350.1
Prep Method: Method

Service Request: K1712276
Date Collected: 11/09/17
Date Received: 11/10/17

Units: mg/L
Basis: NA

Replicate Sample Summary
Ammonia as Nitrogen

Sample Name:	Lab Code:	MRL	Sample Result	Duplicate Result	Average	RPD	RPD Limit	Date Analyzed
Batch QC	K1712223-005DUP	0.050	ND U	ND U	NC	NC	20	11/20/17
MGMS2-132	K1712276-001DUP	0.050	ND U	ND U	NC	NC	20	11/20/17

Results flagged with an asterisk (*) indicate values outside control criteria.

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Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712276
Date Collected: N/A
Date Received: N/A
Date Analyzed: 11/20/17
Date Extracted: 11/20/17

Duplicate Matrix Spike Summary
Ammonia as Nitrogen

Sample Name: Batch QC
Lab Code: K1712223-005
Analysis Method: 350.1
Prep Method: Method

Units: mg/L
Basis: NA

Analyte Name	Sample Result	Result	Matrix Spike K1712223-005MS		Duplicate Matrix Spike K1712223-005DMS		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
Ammonia as Nitrogen	ND U	1.07	1.00	107	1.01	1.00	101	75-125	6	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712276
Date Collected: 11/09/17
Date Received: 11/10/17
Date Analyzed: 11/20/17
Date Extracted: 11/20/17

Duplicate Matrix Spike Summary
Ammonia as Nitrogen

Sample Name: MGMS2-132
Lab Code: K1712276-001
Analysis Method: 350.1
Prep Method: Method

Units: mg/L
Basis: NA

Analyte Name	Sample Result	Result	Matrix Spike K1712276-001MS		Duplicate Matrix Spike K1712276-001DMS		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
Ammonia as Nitrogen	ND U	1.04	1.00	104	1.05	1.00	105	75-125	1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Apex Companies, LLC
Project: NuStar Vancouver/1126-20
Sample Matrix: Water

Service Request: K1712276
Date Analyzed: 11/20/17
Date Extracted: 11/20/17

Lab Control Sample Summary
Ammonia as Nitrogen

Analysis Method: 350.1
Prep Method: Method

Units: mg/L
Basis: NA
Analysis Lot: 570999

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1712276-LCS1	9.85	10.2	97	85-115
Lab Control Sample	K1712276-LCS2	9.65	10.2	95	85-115

January 31, 2018

Stephanie Bosze-Salisbury
Apex Companies, LLC
3015 SW First Avenue
Portland, OR 97201

RE: Project: NuStar Vancouver GWM-Revised
Pace Project No.: 1297909

Dear Stephanie Bosze-Salisbury:

Enclosed are the analytical results for sample(s) received by the laboratory between October 02, 2017 and October 03, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

This report was revised on 1/31/18 to update the MS/MSD recoveries for PCE in batch 127528. Due to an IT error the incorrect run was being pulled into the batch for the MS/MSD.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Julie Bowser for
Scott M Forbes
scott.forbes@pacelabs.com
(530) 297-4800
Project Manager

Enclosures

cc: Kelsi Evans, Apex Companies, LLC
Megan Masterson, Apex Companies, LLC



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 1297909

Minnesota Certification IDs

1700 Elm Street SE, Suite 200, Minneapolis, MN 55414-2485
A2LA Certification #: 2926.01
Alabama Certification #: 40770
Alaska Contaminated Sites Certification #: 17-009
Alaska DW Certification #: MN00064
Arizona Certification #: AZ0014
Arkansas Certification #: 88-0680
California Certification #: 2929
CNMI Saipan Certification #: MP0003
Colorado Certification #: MN00064
Connecticut Certification #: PH-0256
EPA Region 8+Wyoming DW Certification #: via MN 027-053-137
Florida Certification #: E87605
Georgia Certification #: 959
Guam EPA Certification #: MN00064
Hawaii Certification #: MN00064
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification #: C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky DW Certification #: 90062
Kentucky WW Certification #: 90062
Louisiana DEQ Certification #: 03086
Louisiana DW Certification #: MN00064
Maine Certification #: MN00064
Maryland Certification #: 322
Massachusetts Certification #: M-MN064

Michigan Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: MN00064
Montana Certification #: CERT0092
Nebraska Certification #: NE-OS-18-06
Nevada Certification #: MN00064
New Hampshire Certification #: 2081
New Jersey Certification #: MN002
New York Certification #: 11647
North Carolina DW Certification #: 27700
North Carolina WW Certification #: 530
North Dakota Certification #: R-036
Ohio DW Certification #: 41244
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon NwTPH Certification #: MN300001
Oregon Secondary Certification #: MN200001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification #: MN00064
South Carolina Certification #: 74003001
Tennessee Certification #: TN02818
Texas Certification #: T104704192
Utah Certification #: MN00064
Virginia Certification #: 460163
Washington Certification #: C486
West Virginia DW Certification #: 9952 C
West Virginia DEP Certification #: 382
Wisconsin Certification #: 999407970

Davis Certification IDs

2795 Second Street Suite 300 Davis, CA 95618
North Dakota Certification #: R-214
Oregon Certification #: CA300002
Washington Certification #: C926-15a

California Certification #: 08263CA
Minnesota Department of Health Certification #: 006-999-465

New Orleans Certification IDs

California Env. Lab Accreditation Program Branch: 11277CA
Florida Department of Health (NELAC): E87595
Illinois Environmental Protection Agency: 0025721
Kansas Department of Health and Environment (NELAC): E-10266
Louisiana Dept. of Environmental Quality (NELAC/LELAP): 02006

Pennsylvania Dept. of Env Protection (NELAC): 68-04202
Texas Commission on Env. Quality (NELAC): T104704405-09-TX
U.S. Dept. of Agriculture Foreign Soil Import: P330-10-00119
Commonwealth of Virginia (TNI): 480246

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

Lab ID	Sample ID	Matrix	Date Collected	Date Received
1297909001	EW-1	Water	09/28/17 11:06	10/03/17 09:55
1297909002	EX	Water	09/26/17 09:24	10/03/17 09:55
1297909003	MGMS1-43	Water	09/29/17 11:10	10/03/17 09:55
1297909004	MGMS1-60	Water	09/29/17 12:26	10/03/17 09:55
1297909005	MGMS1-110	Water	09/29/17 12:05	10/03/17 09:55
1297909006	MGMS2-40	Water	09/29/17 10:14	10/03/17 09:55
1297909007	MGMS2-60	Water	09/29/17 08:40	10/03/17 09:55
1297909008	MGMS2-110	Water	09/29/17 09:10	10/03/17 09:55
1297909009	MGMS2-132	Water	09/29/17 09:38	10/03/17 09:55
1297909010	MGMS3-40	Water	09/26/17 14:30	10/03/17 09:55
1297909011	MGMS3-40 DUP	Water	09/26/17 14:30	10/03/17 09:55
1297909012	MGMS3-60	Water	09/26/17 15:14	10/03/17 09:55
1297909013	MGMS3-101	Water	09/26/17 16:15	10/03/17 09:55
1297909014	MGMS3-132	Water	09/26/17 15:45	10/03/17 09:55
1297909015	MP-1	Water	09/26/17 10:39	10/03/17 09:55
1297909016	MW-1	Water	09/26/17 13:30	10/03/17 09:55
1297909017	MW-2	Water	09/25/17 16:42	10/03/17 09:55
1297909018	MW-3	Water	09/25/17 17:17	10/03/17 09:55
1297909019	MW-5	Water	09/27/17 09:55	10/03/17 09:55
1297909020	MW-6	Water	09/28/17 10:35	10/03/17 09:55
1297909021	MW-7	Water	09/27/17 08:55	10/03/17 09:55
1297909022	MW-7 DUP	Water	09/27/17 08:55	10/03/17 09:55
1297909023	MW-8	Water	09/25/17 14:04	10/03/17 09:55
1297909024	MW-9	Water	09/27/17 08:20	10/03/17 09:55
1297909025	MW-10	Water	09/27/17 12:08	10/03/17 09:55
1297909026	MW-12	Water	09/28/17 13:30	10/03/17 09:55
1297909027	MW-12 DUP	Water	09/28/17 13:30	10/03/17 09:55
1297909028	MW-13	Water	09/27/17 12:36	10/03/17 09:55
1297909029	MW-14	Water	09/26/17 12:12	10/03/17 09:55
1297909030	MW-15	Water	09/28/17 09:33	10/03/17 09:55
1297909031	MW-16	Water	09/25/17 13:35	10/03/17 09:55
1297909032	MW-17	Water	09/29/17 13:05	10/03/17 09:55
1297909033	MW-18i	Water	09/27/17 16:13	10/03/17 09:55
1297909034	MW-19	Water	09/26/17 08:24	10/03/17 09:55
1297909035	MW-19 DUP	Water	09/26/17 08:24	10/03/17 09:55
1297909036	MW-19i	Water	09/28/17 08:57	10/03/17 09:55
1297909037	MW-20i	Water	09/27/17 15:45	10/03/17 09:55

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 1297909

Lab ID	Sample ID	Matrix	Date Collected	Date Received
1297909038	MW-21i-40	Water	09/27/17 14:04	10/03/17 09:55
1297909039	MW-21i-105	Water	09/27/17 14:50	10/03/17 09:55
1297909040	MW-22i	Water	09/27/17 11:33	10/03/17 09:55
1297909041	MW-23i	Water	09/26/17 12:41	10/03/17 09:55
1297909042	MW-24i	Water	09/26/17 09:57	10/03/17 09:55
1297909043	MW-24d	Water	09/25/17 14:43	10/03/17 09:55
1297909044	MW-25i	Water	09/27/17 10:46	10/03/17 09:55
1297909045	MW-26	Water	09/26/17 11:33	10/03/17 09:55
1297909046	S-1	Water	09/28/17 12:32	10/03/17 09:55
1297909047	S-2	Water	09/28/17 12:13	10/03/17 09:55
1297909048	Field Blank	Water	09/25/17 15:30	10/03/17 09:55
1297909049	Field Blank	Water	09/26/17 08:30	10/03/17 09:55
1297909050	Field Blank	Water	09/27/17 07:30	10/03/17 09:55
1297909051	Field Blank	Water	09/28/17 07:45	10/03/17 09:55
1297909052	Equipment Blank	Water	09/28/17 07:40	10/03/17 09:55
1297909053	Fieldblank	Water	09/29/17 07:30	10/03/17 09:55
1297909054	Trip Blank	Water	09/26/17 00:00	10/03/17 09:55
1297909055	X Containers	Water	09/28/17 00:00	10/02/17 09:55

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 1297909

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
1297909001	EW-1	EPA 8260B	JCP	31	PASI-DAV
1297909002	EX	RSK 175	MJL	3	PASI-M
		EPA 8260B	JCP	31	PASI-DAV
		SM 5310B	KWS	1	PASI-N
1297909003	MGMS1-43	RSK 175	MJL	3	PASI-M
		EPA 8260B	JCP, PP1	31	PASI-DAV
		SM 5310B	KWS	1	PASI-N
1297909004	MGMS1-60	EPA 8260B	JCP	31	PASI-DAV
1297909005	MGMS1-110	EPA 8260B	JCP	31	PASI-DAV
1297909006	MGMS2-40	RSK 175	MJL	3	PASI-M
		EPA 8260B	JCP, PP1	31	PASI-DAV
		SM 5310B	KWS	1	PASI-N
1297909007	MGMS2-60	EPA 8260B	JCP	31	PASI-DAV
1297909008	MGMS2-110	EPA 8260B	JCP	31	PASI-DAV
1297909009	MGMS2-132	EPA 8260B	JCP	31	PASI-DAV
1297909010	MGMS3-40	RSK 175	MJL	3	PASI-M
		EPA 8260B	JCP	31	PASI-DAV
		SM 5310B	KWS	1	PASI-N
1297909011	MGMS3-40 DUP	EPA 8260B	JCP	31	PASI-DAV
1297909012	MGMS3-60	EPA 8260B	JCP	31	PASI-DAV
1297909013	MGMS3-101	EPA 8260B	JCP	31	PASI-DAV
1297909014	MGMS3-132	EPA 8260B	JCP	31	PASI-DAV
1297909015	MP-1	RSK 175	MJL	3	PASI-M
		EPA 8260B	JCP, PP1	31	PASI-DAV
		SM 5310B	KWS	1	PASI-N
1297909016	MW-1	EPA 8260B	JCP	31	PASI-DAV
1297909017	MW-2	EPA 8260B	JCP	31	PASI-DAV
1297909018	MW-3	EPA 8260B	JCP	31	PASI-DAV
1297909019	MW-5	EPA 8260B	JCP	31	PASI-DAV
1297909020	MW-6	EPA 8260B	JCP	31	PASI-DAV
1297909021	MW-7	RSK 175	MJL	3	PASI-M
		EPA 8260B	JCP	31	PASI-DAV
		SM 5310B	KWS	1	PASI-N
1297909022	MW-7 DUP	EPA 8260B	JCP	31	PASI-DAV
1297909023	MW-8	EPA 8260B	JCP	31	PASI-DAV
1297909024	MW-9	EPA 8260B	JCP, PP1	31	PASI-DAV
1297909025	MW-10	EPA 8260B	JCP	31	PASI-DAV

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
1297909026	MW-12	RSK 175	MJL	3	PASI-M
		EPA 8260B	JCP	31	PASI-DAV
		SM 5310B	KWS	1	PASI-N
1297909027	MW-12 DUP	EPA 8260B	PP1	31	PASI-DAV
1297909028	MW-13	RSK 175	MJL	3	PASI-M
		EPA 8260B	JCP, PP1	31	PASI-DAV
		SM 5310B	KWS	1	PASI-N
1297909029	MW-14	RSK 175	MJL	3	PASI-M
		EPA 8260B	PP1	31	PASI-DAV
		SM 5310B	KWS	1	PASI-N
1297909030	MW-15	EPA 8260B	JCP	31	PASI-DAV
1297909031	MW-16	EPA 8260B	JCP	31	PASI-DAV
1297909032	MW-17	EPA 8260B	JCP	31	PASI-DAV
1297909033	MW-18i	EPA 8260B	JCP	31	PASI-DAV
1297909034	MW-19	RSK 175	MJL	3	PASI-M
		EPA 8260B	JCP, PP1	31	PASI-DAV
		SM 5310B	KWS	1	PASI-N
1297909035	MW-19 DUP	EPA 8260B	JCP, PP1	31	PASI-DAV
1297909036	MW-19i	EPA 8260B	JCP	31	PASI-DAV
1297909037	MW-20i	EPA 8260B	JCP	31	PASI-DAV
1297909038	MW-21i-40	EPA 8260B	JCP	31	PASI-DAV
1297909039	MW-21i-105	EPA 8260B	JCP	31	PASI-DAV
1297909040	MW-22i	EPA 8260B	JCP	31	PASI-DAV
1297909041	MW-23i	EPA 8260B	JCP	31	PASI-DAV
1297909042	MW-24i	RSK 175	MJL	3	PASI-M
		EPA 8260B	JCP	31	PASI-DAV
		SM 5310B	KWS	1	PASI-N
1297909043	MW-24d	EPA 8260B	JCP	31	PASI-DAV
1297909044	MW-25i	EPA 8260B	JCP	31	PASI-DAV
1297909045	MW-26	RSK 175	MJL	3	PASI-M
		EPA 8260B	JCP, PP1	31	PASI-DAV
		SM 5310B	KWS	1	PASI-N
1297909046	S-1	EPA 8260B	JCP	31	PASI-DAV
1297909047	S-2	EPA 8260B	JCP	31	PASI-DAV
1297909048	Field Blank	EPA 8260B	JCP	31	PASI-DAV
1297909049	Field Blank	EPA 8260B	JCP	31	PASI-DAV
1297909050	Field Blank	EPA 8260B	JCP	31	PASI-DAV

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
1297909051	Field Blank	EPA 8260B	JCP	31	PASI-DAV
1297909052	Equipment Blank	EPA 8260B	JCP	31	PASI-DAV
1297909053	Fieldblank	EPA 8260B	JCP	31	PASI-DAV
1297909054	Trip Blank	EPA 8260B	JCP	31	PASI-DAV

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

Sample: EW-1	Lab ID: 1297909001	Collected: 09/28/17 11:06	Received: 10/03/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		10/05/17 15:19	75-27-4	
Bromoform	ND	ug/L	2.0	1		10/05/17 15:19	75-25-2	
Bromomethane	ND	ug/L	20.0	1		10/05/17 15:19	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		10/05/17 15:19	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		10/05/17 15:19	108-90-7	
Chloroethane	ND	ug/L	2.0	1		10/05/17 15:19	75-00-3	
Chloroform	2.4	ug/L	0.50	1		10/05/17 15:19	67-66-3	
Chloromethane	ND	ug/L	0.50	1		10/05/17 15:19	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		10/05/17 15:19	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 15:19	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 15:19	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 15:19	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		10/05/17 15:19	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	1		10/05/17 15:19	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		10/05/17 15:19	75-35-4	
cis-1,2-Dichloroethene	1.8	ug/L	0.50	1		10/05/17 15:19	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		10/05/17 15:19	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		10/05/17 15:19	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 15:19	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 15:19	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		10/05/17 15:19	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		10/05/17 15:19	79-34-5	
Tetrachloroethene	32.4	ug/L	0.50	1		10/05/17 15:19	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		10/05/17 15:19	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/05/17 15:19	79-00-5	
Trichloroethene	7.2	ug/L	0.50	1		10/05/17 15:19	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		10/05/17 15:19	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		10/05/17 15:19	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	111	%	75-125	1		10/05/17 15:19	17060-07-0	
Toluene-d8 (S)	100	%	75-125	1		10/05/17 15:19	2037-26-5	
4-Bromofluorobenzene (S)	85	%	75-125	1		10/05/17 15:19	460-00-4	

Sample: EX	Lab ID: 1297909002	Collected: 09/26/17 09:24	Received: 10/03/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175						
Ethane	54.4	ug/L	10.0	1		10/08/17 11:28	74-84-0	
Ethene	17.5	ug/L	10.0	1		10/08/17 11:28	74-85-1	
Methane	4490	ug/L	10.0	1		10/08/17 11:28	74-82-8	
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		10/04/17 19:06	75-27-4	
Bromoform	ND	ug/L	2.0	1		10/04/17 19:06	75-25-2	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

Sample: EX	Lab ID: 1297909002	Collected: 09/26/17 09:24	Received: 10/03/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual

8260 MSV Med Water

Analytical Method: EPA 8260B

Bromomethane	ND	ug/L	20.0	1		10/04/17 19:06	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		10/04/17 19:06	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		10/04/17 19:06	108-90-7	
Chloroethane	3.4	ug/L	2.0	1		10/04/17 19:06	75-00-3	
Chloroform	ND	ug/L	0.50	1		10/04/17 19:06	67-66-3	
Chloromethane	ND	ug/L	0.50	1		10/04/17 19:06	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		10/04/17 19:06	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 19:06	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 19:06	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 19:06	106-46-7	
1,1-Dichloroethane	8.8	ug/L	0.50	1		10/04/17 19:06	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	1		10/04/17 19:06	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		10/04/17 19:06	75-35-4	
cis-1,2-Dichloroethene	6.9	ug/L	0.50	1		10/04/17 19:06	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		10/04/17 19:06	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		10/04/17 19:06	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/04/17 19:06	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/04/17 19:06	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		10/04/17 19:06	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		10/04/17 19:06	79-34-5	
Tetrachloroethene	0.82	ug/L	0.50	1		10/04/17 19:06	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		10/04/17 19:06	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/04/17 19:06	79-00-5	
Trichloroethene	0.63	ug/L	0.50	1		10/04/17 19:06	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		10/04/17 19:06	75-69-4	
Vinyl chloride	10.1	ug/L	0.50	1		10/04/17 19:06	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	111	%	75-125	1		10/04/17 19:06	17060-07-0	
Toluene-d8 (S)	86	%	75-125	1		10/04/17 19:06	2037-26-5	
4-Bromofluorobenzene (S)	93	%	75-125	1		10/04/17 19:06	460-00-4	

5310B TOC

Analytical Method: SM 5310B

Total Organic Carbon	25.5	mg/L	1.0	1		10/09/17 12:47	7440-44-0	
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Sample: MGMS1-43

Lab ID: 1297909003

Collected: 09/29/17 11:10

Received: 10/03/17 09:55

Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
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RSK 175 AIR Headspace

Analytical Method: RSK 175

Ethane	ND	ug/L	10.0	1		10/08/17 13:48	74-84-0	
Ethene	ND	ug/L	10.0	1		10/08/17 13:48	74-85-1	
Methane	1990	ug/L	10.0	1		10/08/17 13:48	74-82-8	

8260 MSV Med Water

Analytical Method: EPA 8260B

Bromodichloromethane	ND	ug/L	2.5	5		10/06/17 18:10	75-27-4	
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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 1297909

Sample: MGMS1-43		Lab ID: 1297909003	Collected: 09/29/17 11:10	Received: 10/03/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromoform	ND	ug/L	2.5	5		10/06/17 18:10	75-25-2	
Bromomethane	ND	ug/L	100	5		10/06/17 18:10	74-83-9	
Carbon tetrachloride	ND	ug/L	2.5	5		10/06/17 18:10	56-23-5	
Chlorobenzene	ND	ug/L	2.5	5		10/06/17 18:10	108-90-7	
Chloroethane	ND	ug/L	10.0	5		10/06/17 18:10	75-00-3	
Chloroform	ND	ug/L	2.5	5		10/06/17 18:10	67-66-3	
Chloromethane	ND	ug/L	10.0	5		10/06/17 18:10	74-87-3	
Dibromochloromethane	ND	ug/L	2.5	5		10/06/17 18:10	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	2.5	5		10/06/17 18:10	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	2.5	5		10/06/17 18:10	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	2.5	5		10/06/17 18:10	106-46-7	
1,1-Dichloroethane	60.1	ug/L	2.5	5		10/06/17 18:10	75-34-3	
1,2-Dichloroethane	ND	ug/L	2.5	5		10/06/17 18:10	107-06-2	
1,1-Dichloroethene	6.9	ug/L	2.5	5		10/06/17 18:10	75-35-4	
cis-1,2-Dichloroethene	901	ug/L	8.4	16.7		10/06/17 03:55	156-59-2	
trans-1,2-Dichloroethene	12.9	ug/L	2.5	5		10/06/17 18:10	156-60-5	
1,2-Dichloropropane	ND	ug/L	2.5	5		10/06/17 18:10	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	2.5	5		10/06/17 18:10	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	2.5	5		10/06/17 18:10	10061-02-6	
Methylene Chloride	ND	ug/L	25.0	5		10/06/17 18:10	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	2.5	5		10/06/17 18:10	79-34-5	
Tetrachloroethene	70.7	ug/L	2.5	5		10/06/17 18:10	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	2.5	5		10/06/17 18:10	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	2.5	5		10/06/17 18:10	79-00-5	
Trichloroethene	126	ug/L	2.5	5		10/06/17 18:10	79-01-6	
Trichlorofluoromethane	ND	ug/L	2.5	5		10/06/17 18:10	75-69-4	
Vinyl chloride	117	ug/L	2.5	5		10/06/17 18:10	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	96	%	75-125	5		10/06/17 18:10	17060-07-0	
Toluene-d8 (S)	99	%	75-125	5		10/06/17 18:10	2037-26-5	
4-Bromofluorobenzene (S)	96	%	75-125	5		10/06/17 18:10	460-00-4	
5310B TOC		Analytical Method: SM 5310B						
Total Organic Carbon	6.1	mg/L	1.0	1		10/09/17 13:06	7440-44-0	

Sample: MGMS1-60		Lab ID: 1297909004	Collected: 09/29/17 12:26	Received: 10/03/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		10/05/17 15:38	75-27-4	
Bromoform	ND	ug/L	2.0	1		10/05/17 15:38	75-25-2	
Bromomethane	ND	ug/L	20.0	1		10/05/17 15:38	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		10/05/17 15:38	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		10/05/17 15:38	108-90-7	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

Sample: MGMS1-60	Lab ID: 1297909004	Collected: 09/29/17 12:26	Received: 10/03/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Chloroethane	ND	ug/L	2.0	1		10/05/17 15:38	75-00-3	
Chloroform	ND	ug/L	0.50	1		10/05/17 15:38	67-66-3	
Chloromethane	ND	ug/L	0.50	1		10/05/17 15:38	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		10/05/17 15:38	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 15:38	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 15:38	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 15:38	106-46-7	
1,1-Dichloroethane	2.0	ug/L	0.50	1		10/05/17 15:38	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	1		10/05/17 15:38	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		10/05/17 15:38	75-35-4	
cis-1,2-Dichloroethene	18.3	ug/L	0.50	1		10/05/17 15:38	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		10/05/17 15:38	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		10/05/17 15:38	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 15:38	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 15:38	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		10/05/17 15:38	75-09-2	
1,1,1,2-Tetrachloroethane	ND	ug/L	0.50	1		10/05/17 15:38	79-34-5	
Tetrachloroethene	18.3	ug/L	0.50	1		10/05/17 15:38	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		10/05/17 15:38	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/05/17 15:38	79-00-5	
Trichloroethene	13.4	ug/L	0.50	1		10/05/17 15:38	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		10/05/17 15:38	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		10/05/17 15:38	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	109	%.	75-125	1		10/05/17 15:38	17060-07-0	
Toluene-d8 (S)	99	%.	75-125	1		10/05/17 15:38	2037-26-5	
4-Bromofluorobenzene (S)	88	%.	75-125	1		10/05/17 15:38	460-00-4	

Sample: MGMS1-110	Lab ID: 1297909005	Collected: 09/29/17 12:05	Received: 10/03/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		10/05/17 15:57	75-27-4	
Bromoform	ND	ug/L	2.0	1		10/05/17 15:57	75-25-2	
Bromomethane	ND	ug/L	20.0	1		10/05/17 15:57	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		10/05/17 15:57	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		10/05/17 15:57	108-90-7	
Chloroethane	ND	ug/L	2.0	1		10/05/17 15:57	75-00-3	
Chloroform	ND	ug/L	0.50	1		10/05/17 15:57	67-66-3	
Chloromethane	ND	ug/L	0.50	1		10/05/17 15:57	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		10/05/17 15:57	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 15:57	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 15:57	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 15:57	106-46-7	
1,1-Dichloroethane	5.9	ug/L	0.50	1		10/05/17 15:57	75-34-3	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 1297909

Sample: MGMS1-110		Lab ID: 1297909005	Collected: 09/29/17 12:05	Received: 10/03/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
1,2-Dichloroethane	ND	ug/L	1.0	1		10/05/17 15:57	107-06-2	
1,1-Dichloroethene	0.54	ug/L	0.50	1		10/05/17 15:57	75-35-4	
cis-1,2-Dichloroethene	173	ug/L	0.50	1		10/05/17 15:57	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		10/05/17 15:57	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		10/05/17 15:57	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 15:57	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 15:57	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		10/05/17 15:57	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		10/05/17 15:57	79-34-5	
Tetrachloroethene	9.0	ug/L	0.50	1		10/05/17 15:57	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		10/05/17 15:57	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/05/17 15:57	79-00-5	
Trichloroethene	32.8	ug/L	0.50	1		10/05/17 15:57	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		10/05/17 15:57	75-69-4	
Vinyl chloride	0.56	ug/L	0.50	1		10/05/17 15:57	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	110	%	75-125	1		10/05/17 15:57	17060-07-0	
Toluene-d8 (S)	99	%	75-125	1		10/05/17 15:57	2037-26-5	
4-Bromofluorobenzene (S)	87	%	75-125	1		10/05/17 15:57	460-00-4	

Sample: MGMS2-40		Lab ID: 1297909006	Collected: 09/29/17 10:14	Received: 10/03/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175						
Ethane	44.4	ug/L	10.0	1		10/08/17 13:55	74-84-0	
Ethene	47.4	ug/L	10.0	1		10/08/17 13:55	74-85-1	
Methane	1140	ug/L	10.0	1		10/08/17 13:55	74-82-8	
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		10/05/17 16:16	75-27-4	
Bromoform	ND	ug/L	2.0	1		10/05/17 16:16	75-25-2	
Bromomethane	ND	ug/L	20.0	1		10/05/17 16:16	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		10/05/17 16:16	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		10/05/17 16:16	108-90-7	
Chloroethane	ND	ug/L	2.0	1		10/05/17 16:16	75-00-3	
Chloroform	ND	ug/L	0.50	1		10/05/17 16:16	67-66-3	
Chloromethane	ND	ug/L	0.50	1		10/05/17 16:16	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		10/05/17 16:16	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 16:16	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 16:16	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 16:16	106-46-7	
1,1-Dichloroethane	21.7	ug/L	0.50	1		10/05/17 16:16	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	1		10/05/17 16:16	107-06-2	
1,1-Dichloroethene	6.8	ug/L	0.50	1		10/05/17 16:16	75-35-4	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

Sample: MGMS2-40	Lab ID: 1297909006	Collected: 09/29/17 10:14	Received: 10/03/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
cis-1,2-Dichloroethene	195	ug/L	5.0	10		10/06/17 18:30	156-59-2	
trans-1,2-Dichloroethene	0.74	ug/L	0.50	1		10/05/17 16:16	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		10/05/17 16:16	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 16:16	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 16:16	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		10/05/17 16:16	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		10/05/17 16:16	79-34-5	
Tetrachloroethene	41.5	ug/L	0.50	1		10/05/17 16:16	127-18-4	
1,1,1-Trichloroethane	0.67	ug/L	0.50	1		10/05/17 16:16	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/05/17 16:16	79-00-5	
Trichloroethene	31.3	ug/L	0.50	1		10/05/17 16:16	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		10/05/17 16:16	75-69-4	
Vinyl chloride	428	ug/L	5.0	10		10/06/17 18:30	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	109	%.	75-125	1		10/05/17 16:16	17060-07-0	
Toluene-d8 (S)	98	%.	75-125	1		10/05/17 16:16	2037-26-5	
4-Bromofluorobenzene (S)	86	%.	75-125	1		10/05/17 16:16	460-00-4	
5310B TOC		Analytical Method: SM 5310B						
Total Organic Carbon	6.4	mg/L	1.0	1		10/09/17 13:25	7440-44-0	

Sample: MGMS2-60	Lab ID: 1297909007	Collected: 09/29/17 08:40	Received: 10/03/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		10/05/17 16:35	75-27-4	
Bromoform	ND	ug/L	2.0	1		10/05/17 16:35	75-25-2	
Bromomethane	ND	ug/L	20.0	1		10/05/17 16:35	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		10/05/17 16:35	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		10/05/17 16:35	108-90-7	
Chloroethane	ND	ug/L	2.0	1		10/05/17 16:35	75-00-3	
Chloroform	ND	ug/L	0.50	1		10/05/17 16:35	67-66-3	
Chloromethane	ND	ug/L	0.50	1		10/05/17 16:35	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		10/05/17 16:35	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 16:35	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 16:35	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 16:35	106-46-7	
1,1-Dichloroethane	2.3	ug/L	0.50	1		10/05/17 16:35	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	1		10/05/17 16:35	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		10/05/17 16:35	75-35-4	
cis-1,2-Dichloroethene	30.4	ug/L	0.50	1		10/05/17 16:35	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		10/05/17 16:35	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		10/05/17 16:35	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 16:35	10061-01-5	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

Sample: MGMS2-60		Lab ID: 1297909007	Collected: 09/29/17 08:40	Received: 10/03/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 16:35	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		10/05/17 16:35	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		10/05/17 16:35	79-34-5	
Tetrachloroethene	17.5	ug/L	0.50	1		10/05/17 16:35	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		10/05/17 16:35	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/05/17 16:35	79-00-5	
Trichloroethene	12.0	ug/L	0.50	1		10/05/17 16:35	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		10/05/17 16:35	75-69-4	
Vinyl chloride	6.7	ug/L	0.50	1		10/05/17 16:35	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	110	%.	75-125	1		10/05/17 16:35	17060-07-0	
Toluene-d8 (S)	99	%.	75-125	1		10/05/17 16:35	2037-26-5	
4-Bromofluorobenzene (S)	87	%.	75-125	1		10/05/17 16:35	460-00-4	

Sample: MGMS2-110		Lab ID: 1297909008	Collected: 09/29/17 09:10	Received: 10/03/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		10/05/17 16:55	75-27-4	
Bromoform	ND	ug/L	2.0	1		10/05/17 16:55	75-25-2	
Bromomethane	ND	ug/L	20.0	1		10/05/17 16:55	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		10/05/17 16:55	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		10/05/17 16:55	108-90-7	
Chloroethane	ND	ug/L	2.0	1		10/05/17 16:55	75-00-3	
Chloroform	ND	ug/L	0.50	1		10/05/17 16:55	67-66-3	
Chloromethane	ND	ug/L	0.50	1		10/05/17 16:55	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		10/05/17 16:55	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 16:55	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 16:55	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 16:55	106-46-7	
1,1-Dichloroethane	2.8	ug/L	0.50	1		10/05/17 16:55	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	1		10/05/17 16:55	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		10/05/17 16:55	75-35-4	
cis-1,2-Dichloroethene	63.5	ug/L	0.50	1		10/05/17 16:55	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		10/05/17 16:55	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		10/05/17 16:55	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 16:55	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 16:55	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		10/05/17 16:55	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		10/05/17 16:55	79-34-5	
Tetrachloroethene	2.2	ug/L	0.50	1		10/05/17 16:55	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		10/05/17 16:55	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/05/17 16:55	79-00-5	
Trichloroethene	5.3	ug/L	0.50	1		10/05/17 16:55	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		10/05/17 16:55	75-69-4	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

Sample: MGMS2-110		Lab ID: 1297909008		Collected: 09/29/17 09:10	Received: 10/03/17 09:55	Matrix: Water		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Vinyl chloride	25.0	ug/L	0.50	1		10/05/17 16:55	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	109	%.	75-125	1		10/05/17 16:55	17060-07-0	
Toluene-d8 (S)	98	%.	75-125	1		10/05/17 16:55	2037-26-5	
4-Bromofluorobenzene (S)	85	%.	75-125	1		10/05/17 16:55	460-00-4	

Sample: MGMS2-132		Lab ID: 1297909009		Collected: 09/29/17 09:38	Received: 10/03/17 09:55	Matrix: Water		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		10/05/17 21:36	75-27-4	
Bromoform	ND	ug/L	2.0	1		10/05/17 21:36	75-25-2	
Bromomethane	ND	ug/L	20.0	1		10/05/17 21:36	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		10/05/17 21:36	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		10/05/17 21:36	108-90-7	
Chloroethane	ND	ug/L	2.0	1		10/05/17 21:36	75-00-3	
Chloroform	ND	ug/L	0.50	1		10/05/17 21:36	67-66-3	
Chloromethane	ND	ug/L	0.50	1		10/05/17 21:36	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		10/05/17 21:36	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 21:36	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 21:36	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 21:36	106-46-7	
1,1-Dichloroethane	2.2	ug/L	0.50	1		10/05/17 21:36	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	1		10/05/17 21:36	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		10/05/17 21:36	75-35-4	
cis-1,2-Dichloroethene	64.9	ug/L	0.50	1		10/05/17 21:36	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		10/05/17 21:36	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		10/05/17 21:36	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 21:36	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 21:36	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		10/05/17 21:36	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		10/05/17 21:36	79-34-5	
Tetrachloroethene	2.4	ug/L	0.50	1		10/05/17 21:36	127-18-4	
1,1,1-Trichloroethane	0.59	ug/L	0.50	1		10/05/17 21:36	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/05/17 21:36	79-00-5	
Trichloroethene	6.3	ug/L	0.50	1		10/05/17 21:36	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		10/05/17 21:36	75-69-4	
Vinyl chloride	19.4	ug/L	0.50	1		10/05/17 21:36	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	110	%.	75-125	1		10/05/17 21:36	17060-07-0	
Toluene-d8 (S)	99	%.	75-125	1		10/05/17 21:36	2037-26-5	
4-Bromofluorobenzene (S)	84	%.	75-125	1		10/05/17 21:36	460-00-4	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 1297909

Sample: MGMS3-40	Lab ID: 1297909010	Collected: 09/26/17 14:30	Received: 10/03/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175						
Ethane	31.4	ug/L	10.0	1		10/08/17 11:43	74-84-0	
Ethene	22.8	ug/L	10.0	1		10/08/17 11:43	74-85-1	
Methane	5900	ug/L	10.0	1		10/08/17 11:43	74-82-8	
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		10/04/17 13:12	75-27-4	
Bromoform	ND	ug/L	2.0	1		10/04/17 13:12	75-25-2	
Bromomethane	ND	ug/L	20.0	1		10/04/17 13:12	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		10/04/17 13:12	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		10/04/17 13:12	108-90-7	
Chloroethane	ND	ug/L	2.0	1		10/04/17 13:12	75-00-3	
Chloroform	ND	ug/L	0.50	1		10/04/17 13:12	67-66-3	
Chloromethane	ND	ug/L	0.50	1		10/04/17 13:12	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		10/04/17 13:12	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 13:12	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 13:12	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 13:12	106-46-7	
1,1-Dichloroethane	1.1	ug/L	0.50	1		10/04/17 13:12	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	1		10/04/17 13:12	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		10/04/17 13:12	75-35-4	
cis-1,2-Dichloroethene	0.69	ug/L	0.50	1		10/04/17 13:12	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		10/04/17 13:12	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		10/04/17 13:12	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/04/17 13:12	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/04/17 13:12	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		10/04/17 13:12	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		10/04/17 13:12	79-34-5	
Tetrachloroethene	0.79	ug/L	0.50	1		10/04/17 13:12	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		10/04/17 13:12	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/04/17 13:12	79-00-5	
Trichloroethene	ND	ug/L	0.50	1		10/04/17 13:12	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		10/04/17 13:12	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		10/04/17 13:12	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	106	%	75-125	1		10/04/17 13:12	17060-07-0	
Toluene-d8 (S)	82	%	75-125	1		10/04/17 13:12	2037-26-5	
4-Bromofluorobenzene (S)	92	%	75-125	1		10/04/17 13:12	460-00-4	
5310B TOC		Analytical Method: SM 5310B						
Total Organic Carbon	3.8	mg/L	1.0	1		10/09/17 13:44	7440-44-0	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

Sample: MGMS3-40 DUP		Lab ID: 1297909011	Collected: 09/26/17 14:30	Received: 10/03/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		10/05/17 18:43	75-27-4	
Bromoform	ND	ug/L	2.0	1		10/05/17 18:43	75-25-2	
Bromomethane	ND	ug/L	20.0	1		10/05/17 18:43	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		10/05/17 18:43	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		10/05/17 18:43	108-90-7	
Chloroethane	ND	ug/L	2.0	1		10/05/17 18:43	75-00-3	
Chloroform	ND	ug/L	0.50	1		10/05/17 18:43	67-66-3	
Chloromethane	ND	ug/L	0.50	1		10/05/17 18:43	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		10/05/17 18:43	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 18:43	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 18:43	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 18:43	106-46-7	
1,1-Dichloroethane	1.1	ug/L	0.50	1		10/05/17 18:43	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	1		10/05/17 18:43	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		10/05/17 18:43	75-35-4	
cis-1,2-Dichloroethene	0.82	ug/L	0.50	1		10/05/17 18:43	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		10/05/17 18:43	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		10/05/17 18:43	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 18:43	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 18:43	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		10/05/17 18:43	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		10/05/17 18:43	79-34-5	
Tetrachloroethene	0.86	ug/L	0.50	1		10/05/17 18:43	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		10/05/17 18:43	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/05/17 18:43	79-00-5	
Trichloroethene	ND	ug/L	0.50	1		10/05/17 18:43	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		10/05/17 18:43	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		10/05/17 18:43	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	111	%	75-125	1		10/05/17 18:43	17060-07-0	
Toluene-d8 (S)	99	%	75-125	1		10/05/17 18:43	2037-26-5	
4-Bromofluorobenzene (S)	86	%	75-125	1		10/05/17 18:43	460-00-4	

Sample: MGMS3-60		Lab ID: 1297909012	Collected: 09/26/17 15:14	Received: 10/03/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		10/05/17 21:55	75-27-4	
Bromoform	ND	ug/L	2.0	1		10/05/17 21:55	75-25-2	
Bromomethane	ND	ug/L	20.0	1		10/05/17 21:55	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		10/05/17 21:55	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		10/05/17 21:55	108-90-7	
Chloroethane	ND	ug/L	2.0	1		10/05/17 21:55	75-00-3	
Chloroform	ND	ug/L	0.50	1		10/05/17 21:55	67-66-3	
Chloromethane	ND	ug/L	0.50	1		10/05/17 21:55	74-87-3	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

Sample: MGMS3-60		Lab ID: 1297909012		Collected: 09/26/17 15:14	Received: 10/03/17 09:55	Matrix: Water		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Dibromochloromethane	ND	ug/L	0.50	1		10/05/17 21:55	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 21:55	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 21:55	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 21:55	106-46-7	
1,1-Dichloroethane	1.2	ug/L	0.50	1		10/05/17 21:55	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	1		10/05/17 21:55	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		10/05/17 21:55	75-35-4	
cis-1,2-Dichloroethene	34.2	ug/L	0.50	1		10/05/17 21:55	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		10/05/17 21:55	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		10/05/17 21:55	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 21:55	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 21:55	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		10/05/17 21:55	75-09-2	
1,1,1,2-Tetrachloroethane	ND	ug/L	0.50	1		10/05/17 21:55	79-34-5	
Tetrachloroethene	8.6	ug/L	0.50	1		10/05/17 21:55	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		10/05/17 21:55	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/05/17 21:55	79-00-5	
Trichloroethene	7.8	ug/L	0.50	1		10/05/17 21:55	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		10/05/17 21:55	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		10/05/17 21:55	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	110	%	75-125	1		10/05/17 21:55	17060-07-0	
Toluene-d8 (S)	99	%	75-125	1		10/05/17 21:55	2037-26-5	
4-Bromofluorobenzene (S)	85	%	75-125	1		10/05/17 21:55	460-00-4	

Sample: MGMS3-101		Lab ID: 1297909013		Collected: 09/26/17 16:15	Received: 10/03/17 09:55	Matrix: Water		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		10/05/17 22:15	75-27-4	
Bromoform	ND	ug/L	2.0	1		10/05/17 22:15	75-25-2	
Bromomethane	ND	ug/L	20.0	1		10/05/17 22:15	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		10/05/17 22:15	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		10/05/17 22:15	108-90-7	
Chloroethane	ND	ug/L	2.0	1		10/05/17 22:15	75-00-3	
Chloroform	ND	ug/L	0.50	1		10/05/17 22:15	67-66-3	
Chloromethane	ND	ug/L	0.50	1		10/05/17 22:15	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		10/05/17 22:15	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 22:15	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 22:15	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 22:15	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		10/05/17 22:15	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	1		10/05/17 22:15	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		10/05/17 22:15	75-35-4	
cis-1,2-Dichloroethene	4.8	ug/L	0.50	1		10/05/17 22:15	156-59-2	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

Sample: MGMS3-101		Lab ID: 1297909013		Collected: 09/26/17 16:15	Received: 10/03/17 09:55	Matrix: Water		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		10/05/17 22:15	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		10/05/17 22:15	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 22:15	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 22:15	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		10/05/17 22:15	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		10/05/17 22:15	79-34-5	
Tetrachloroethene	0.96	ug/L	0.50	1		10/05/17 22:15	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		10/05/17 22:15	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/05/17 22:15	79-00-5	
Trichloroethene	0.80	ug/L	0.50	1		10/05/17 22:15	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		10/05/17 22:15	75-69-4	
Vinyl chloride	0.92	ug/L	0.50	1		10/05/17 22:15	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	109	%	75-125	1		10/05/17 22:15	17060-07-0	
Toluene-d8 (S)	99	%	75-125	1		10/05/17 22:15	2037-26-5	
4-Bromofluorobenzene (S)	88	%	75-125	1		10/05/17 22:15	460-00-4	

Sample: MGMS3-132		Lab ID: 1297909014		Collected: 09/26/17 15:45	Received: 10/03/17 09:55	Matrix: Water		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		10/05/17 22:34	75-27-4	
Bromoform	ND	ug/L	2.0	1		10/05/17 22:34	75-25-2	
Bromomethane	ND	ug/L	20.0	1		10/05/17 22:34	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		10/05/17 22:34	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		10/05/17 22:34	108-90-7	
Chloroethane	ND	ug/L	2.0	1		10/05/17 22:34	75-00-3	
Chloroform	ND	ug/L	0.50	1		10/05/17 22:34	67-66-3	
Chloromethane	ND	ug/L	0.50	1		10/05/17 22:34	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		10/05/17 22:34	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 22:34	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 22:34	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 22:34	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		10/05/17 22:34	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	1		10/05/17 22:34	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		10/05/17 22:34	75-35-4	
cis-1,2-Dichloroethene	3.4	ug/L	0.50	1		10/05/17 22:34	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		10/05/17 22:34	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		10/05/17 22:34	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 22:34	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 22:34	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		10/05/17 22:34	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		10/05/17 22:34	79-34-5	
Tetrachloroethene	3.0	ug/L	0.50	1		10/05/17 22:34	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		10/05/17 22:34	71-55-6	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

Sample: MGMS3-132		Lab ID: 1297909014	Collected: 09/26/17 15:45	Received: 10/03/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/05/17 22:34	79-00-5	
Trichloroethene	2.8	ug/L	0.50	1		10/05/17 22:34	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		10/05/17 22:34	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		10/05/17 22:34	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	110	%	75-125	1		10/05/17 22:34	17060-07-0	
Toluene-d8 (S)	100	%	75-125	1		10/05/17 22:34	2037-26-5	
4-Bromofluorobenzene (S)	86	%	75-125	1		10/05/17 22:34	460-00-4	

Sample: MP-1		Lab ID: 1297909015	Collected: 09/26/17 10:39	Received: 10/03/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175						
Ethane	ND	ug/L	10.0	1		10/08/17 11:50	74-84-0	
Ethene	ND	ug/L	10.0	1		10/08/17 11:50	74-85-1	
Methane	3110	ug/L	10.0	1		10/08/17 11:50	74-82-8	
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		10/04/17 18:29	75-27-4	
Bromoform	ND	ug/L	2.0	1		10/04/17 18:29	75-25-2	
Bromomethane	ND	ug/L	20.0	1		10/04/17 18:29	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		10/04/17 18:29	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		10/04/17 18:29	108-90-7	
Chloroethane	ND	ug/L	2.0	1		10/04/17 18:29	75-00-3	
Chloroform	ND	ug/L	0.50	1		10/04/17 18:29	67-66-3	
Chloromethane	ND	ug/L	0.50	1		10/04/17 18:29	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		10/04/17 18:29	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 18:29	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 18:29	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 18:29	106-46-7	
1,1-Dichloroethane	3.4	ug/L	0.50	1		10/04/17 18:29	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		10/04/17 18:29	107-06-2	
1,1-Dichloroethene	4.5	ug/L	0.50	1		10/04/17 18:29	75-35-4	
cis-1,2-Dichloroethene	83.0	ug/L	0.50	1		10/04/17 18:29	156-59-2	
trans-1,2-Dichloroethene	0.83	ug/L	0.50	1		10/04/17 18:29	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		10/04/17 18:29	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/04/17 18:29	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/04/17 18:29	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		10/04/17 18:29	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		10/04/17 18:29	79-34-5	
Tetrachloroethene	307	ug/L	5.0	10		10/06/17 18:50	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		10/04/17 18:29	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/04/17 18:29	79-00-5	
Trichloroethene	65.9	ug/L	0.50	1		10/04/17 18:29	79-01-6	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

Sample: MP-1		Lab ID: 1297909015		Collected: 09/26/17 10:39		Received: 10/03/17 09:55		Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual	
8260 MSV Med Water		Analytical Method: EPA 8260B							
Trichlorofluoromethane	ND	ug/L	0.50	1		10/04/17 18:29	75-69-4		
Vinyl chloride	2.3	ug/L	0.50	1		10/04/17 18:29	75-01-4		
Surrogates									
1,2-Dichloroethane-d4 (S)	108	%	75-125	1		10/04/17 18:29	17060-07-0		
Toluene-d8 (S)	99	%	75-125	1		10/04/17 18:29	2037-26-5		
4-Bromofluorobenzene (S)	88	%	75-125	1		10/04/17 18:29	460-00-4		
5310B TOC		Analytical Method: SM 5310B							
Total Organic Carbon	4.3	mg/L	1.0	1		10/09/17 14:03	7440-44-0		

Sample: MW-1		Lab ID: 1297909016		Collected: 09/26/17 13:30		Received: 10/03/17 09:55		Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual	
8260 MSV Med Water		Analytical Method: EPA 8260B							
Bromodichloromethane	ND	ug/L	0.50	1		10/05/17 23:13	75-27-4		
Bromoform	ND	ug/L	2.0	1		10/05/17 23:13	75-25-2		
Bromomethane	ND	ug/L	20.0	1		10/05/17 23:13	74-83-9		
Carbon tetrachloride	ND	ug/L	0.50	1		10/05/17 23:13	56-23-5		
Chlorobenzene	ND	ug/L	0.50	1		10/05/17 23:13	108-90-7		
Chloroethane	ND	ug/L	2.0	1		10/05/17 23:13	75-00-3		
Chloroform	ND	ug/L	0.50	1		10/05/17 23:13	67-66-3		
Chloromethane	ND	ug/L	0.50	1		10/05/17 23:13	74-87-3		
Dibromochloromethane	ND	ug/L	0.50	1		10/05/17 23:13	124-48-1		
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 23:13	95-50-1		
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 23:13	541-73-1		
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 23:13	106-46-7		
1,1-Dichloroethane	6.8	ug/L	0.50	1		10/05/17 23:13	75-34-3		
1,2-Dichloroethane	ND	ug/L	1.0	1		10/05/17 23:13	107-06-2		
1,1-Dichloroethene	ND	ug/L	0.50	1		10/05/17 23:13	75-35-4		
cis-1,2-Dichloroethene	6.7	ug/L	0.50	1		10/05/17 23:13	156-59-2		
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		10/05/17 23:13	156-60-5		
1,2-Dichloropropane	ND	ug/L	0.50	1		10/05/17 23:13	78-87-5		
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 23:13	10061-01-5		
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 23:13	10061-02-6		
Methylene Chloride	ND	ug/L	5.0	1		10/05/17 23:13	75-09-2		
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		10/05/17 23:13	79-34-5		
Tetrachloroethene	1.5	ug/L	0.50	1		10/05/17 23:13	127-18-4		
1,1,1-Trichloroethane	ND	ug/L	0.50	1		10/05/17 23:13	71-55-6		
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/05/17 23:13	79-00-5		
Trichloroethene	1.6	ug/L	0.50	1		10/05/17 23:13	79-01-6		
Trichlorofluoromethane	ND	ug/L	0.50	1		10/05/17 23:13	75-69-4		
Vinyl chloride	22.6	ug/L	0.50	1		10/05/17 23:13	75-01-4		
Surrogates									
1,2-Dichloroethane-d4 (S)	110	%	75-125	1		10/05/17 23:13	17060-07-0		
Toluene-d8 (S)	99	%	75-125	1		10/05/17 23:13	2037-26-5		

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

Sample: MW-1		Lab ID: 1297909016	Collected: 09/26/17 13:30	Received: 10/03/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Surrogates								
4-Bromofluorobenzene (S)	85	%	75-125	1		10/05/17 23:13	460-00-4	

Sample: MW-2		Lab ID: 1297909017	Collected: 09/25/17 16:42	Received: 10/03/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		10/04/17 17:00	75-27-4	
Bromoform	ND	ug/L	2.0	1		10/04/17 17:00	75-25-2	
Bromomethane	ND	ug/L	20.0	1		10/04/17 17:00	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		10/04/17 17:00	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		10/04/17 17:00	108-90-7	
Chloroethane	ND	ug/L	2.0	1		10/04/17 17:00	75-00-3	
Chloroform	ND	ug/L	0.50	1		10/04/17 17:00	67-66-3	
Chloromethane	ND	ug/L	0.50	1		10/04/17 17:00	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		10/04/17 17:00	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 17:00	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 17:00	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 17:00	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		10/04/17 17:00	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	1		10/04/17 17:00	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		10/04/17 17:00	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	0.50	1		10/04/17 17:00	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		10/04/17 17:00	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		10/04/17 17:00	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/04/17 17:00	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/04/17 17:00	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		10/04/17 17:00	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		10/04/17 17:00	79-34-5	
Tetrachloroethene	ND	ug/L	0.50	1		10/04/17 17:00	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		10/04/17 17:00	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/04/17 17:00	79-00-5	
Trichloroethene	ND	ug/L	0.50	1		10/04/17 17:00	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		10/04/17 17:00	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		10/04/17 17:00	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	111	%	75-125	1		10/04/17 17:00	17060-07-0	
Toluene-d8 (S)	79	%	75-125	1		10/04/17 17:00	2037-26-5	
4-Bromofluorobenzene (S)	93	%	75-125	1		10/04/17 17:00	460-00-4	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

Sample: MW-3		Lab ID: 1297909018		Collected: 09/25/17 17:17		Received: 10/03/17 09:55		Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual	
8260 MSV Med Water		Analytical Method: EPA 8260B							
Bromodichloromethane	ND	ug/L	0.50	1		10/04/17 17:25	75-27-4		
Bromoform	ND	ug/L	2.0	1		10/04/17 17:25	75-25-2		
Bromomethane	ND	ug/L	20.0	1		10/04/17 17:25	74-83-9		
Carbon tetrachloride	ND	ug/L	0.50	1		10/04/17 17:25	56-23-5		
Chlorobenzene	ND	ug/L	0.50	1		10/04/17 17:25	108-90-7		
Chloroethane	ND	ug/L	2.0	1		10/04/17 17:25	75-00-3		
Chloroform	ND	ug/L	0.50	1		10/04/17 17:25	67-66-3		
Chloromethane	ND	ug/L	0.50	1		10/04/17 17:25	74-87-3		
Dibromochloromethane	ND	ug/L	0.50	1		10/04/17 17:25	124-48-1		
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 17:25	95-50-1		
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 17:25	541-73-1		
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 17:25	106-46-7		
1,1-Dichloroethane	5.6	ug/L	0.50	1		10/04/17 17:25	75-34-3		
1,2-Dichloroethane	ND	ug/L	1.0	1		10/04/17 17:25	107-06-2		
1,1-Dichloroethene	ND	ug/L	0.50	1		10/04/17 17:25	75-35-4		
cis-1,2-Dichloroethene	73.3	ug/L	0.50	1		10/04/17 17:25	156-59-2		
trans-1,2-Dichloroethene	1.3	ug/L	0.50	1		10/04/17 17:25	156-60-5		
1,2-Dichloropropane	ND	ug/L	0.50	1		10/04/17 17:25	78-87-5		
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/04/17 17:25	10061-01-5		
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/04/17 17:25	10061-02-6		
Methylene Chloride	ND	ug/L	5.0	1		10/04/17 17:25	75-09-2		
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		10/04/17 17:25	79-34-5		
Tetrachloroethene	127	ug/L	0.50	1		10/04/17 17:25	127-18-4		
1,1,1-Trichloroethane	1.5	ug/L	0.50	1		10/04/17 17:25	71-55-6		
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/04/17 17:25	79-00-5		
Trichloroethene	29.5	ug/L	0.50	1		10/04/17 17:25	79-01-6		
Trichlorofluoromethane	ND	ug/L	0.50	1		10/04/17 17:25	75-69-4		
Vinyl chloride	ND	ug/L	0.50	1		10/04/17 17:25	75-01-4		
Surrogates									
1,2-Dichloroethane-d4 (S)	103	%	75-125	1		10/04/17 17:25	17060-07-0		
Toluene-d8 (S)	94	%	75-125	1		10/04/17 17:25	2037-26-5		
4-Bromofluorobenzene (S)	94	%	75-125	1		10/04/17 17:25	460-00-4		

Sample: MW-5		Lab ID: 1297909019		Collected: 09/27/17 09:55		Received: 10/03/17 09:55		Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual	
8260 MSV Med Water		Analytical Method: EPA 8260B							
Bromodichloromethane	ND	ug/L	0.50	1		10/04/17 22:40	75-27-4		
Bromoform	ND	ug/L	2.0	1		10/04/17 22:40	75-25-2		
Bromomethane	ND	ug/L	20.0	1		10/04/17 22:40	74-83-9		
Carbon tetrachloride	ND	ug/L	0.50	1		10/04/17 22:40	56-23-5		
Chlorobenzene	ND	ug/L	0.50	1		10/04/17 22:40	108-90-7		
Chloroethane	ND	ug/L	2.0	1		10/04/17 22:40	75-00-3		
Chloroform	ND	ug/L	0.50	1		10/04/17 22:40	67-66-3		
Chloromethane	ND	ug/L	0.50	1		10/04/17 22:40	74-87-3		

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

Sample: MW-5	Lab ID: 1297909019	Collected: 09/27/17 09:55	Received: 10/03/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Dibromochloromethane	ND	ug/L	0.50	1		10/04/17 22:40	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 22:40	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 22:40	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 22:40	106-46-7	
1,1-Dichloroethane	1.6	ug/L	0.50	1		10/04/17 22:40	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		10/04/17 22:40	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		10/04/17 22:40	75-35-4	
cis-1,2-Dichloroethene	15.6	ug/L	0.50	1		10/04/17 22:40	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		10/04/17 22:40	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		10/04/17 22:40	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/04/17 22:40	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/04/17 22:40	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		10/04/17 22:40	75-09-2	
1,1,1,2-Tetrachloroethane	ND	ug/L	0.50	1		10/04/17 22:40	79-34-5	
Tetrachloroethene	26.7	ug/L	0.50	1		10/04/17 22:40	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		10/04/17 22:40	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/04/17 22:40	79-00-5	
Trichloroethene	15.6	ug/L	0.50	1		10/04/17 22:40	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		10/04/17 22:40	75-69-4	
Vinyl chloride	0.64	ug/L	0.50	1		10/04/17 22:40	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	110	%	75-125	1		10/04/17 22:40	17060-07-0	
Toluene-d8 (S)	99	%	75-125	1		10/04/17 22:40	2037-26-5	
4-Bromofluorobenzene (S)	87	%	75-125	1		10/04/17 22:40	460-00-4	

Sample: MW-6	Lab ID: 1297909020	Collected: 09/28/17 10:35	Received: 10/03/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		10/05/17 22:53	75-27-4	
Bromoform	ND	ug/L	2.0	1		10/05/17 22:53	75-25-2	
Bromomethane	ND	ug/L	20.0	1		10/05/17 22:53	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		10/05/17 22:53	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		10/05/17 22:53	108-90-7	
Chloroethane	ND	ug/L	2.0	1		10/05/17 22:53	75-00-3	
Chloroform	ND	ug/L	0.50	1		10/05/17 22:53	67-66-3	
Chloromethane	ND	ug/L	0.50	1		10/05/17 22:53	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		10/05/17 22:53	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 22:53	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 22:53	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 22:53	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		10/05/17 22:53	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	1		10/05/17 22:53	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		10/05/17 22:53	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	0.50	1		10/05/17 22:53	156-59-2	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

Sample: MW-6		Lab ID: 1297909020		Collected: 09/28/17 10:35		Received: 10/03/17 09:55		Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual	
8260 MSV Med Water		Analytical Method: EPA 8260B							
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		10/05/17 22:53	156-60-5		
1,2-Dichloropropane	ND	ug/L	0.50	1		10/05/17 22:53	78-87-5		
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 22:53	10061-01-5		
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 22:53	10061-02-6		
Methylene Chloride	ND	ug/L	5.0	1		10/05/17 22:53	75-09-2		
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		10/05/17 22:53	79-34-5		
Tetrachloroethene	ND	ug/L	0.50	1		10/05/17 22:53	127-18-4		
1,1,1-Trichloroethane	ND	ug/L	0.50	1		10/05/17 22:53	71-55-6		
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/05/17 22:53	79-00-5		
Trichloroethene	ND	ug/L	0.50	1		10/05/17 22:53	79-01-6		
Trichlorofluoromethane	ND	ug/L	0.50	1		10/05/17 22:53	75-69-4		
Vinyl chloride	ND	ug/L	0.50	1		10/05/17 22:53	75-01-4		
Surrogates									
1,2-Dichloroethane-d4 (S)	110	%	75-125	1		10/05/17 22:53	17060-07-0		
Toluene-d8 (S)	100	%	75-125	1		10/05/17 22:53	2037-26-5		
4-Bromofluorobenzene (S)	87	%	75-125	1		10/05/17 22:53	460-00-4		

Sample: MW-7		Lab ID: 1297909021		Collected: 09/27/17 08:55		Received: 10/03/17 09:55		Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual	
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Ethane	ND	ug/L	10.0	1		10/08/17 12:26	74-84-0		
Ethene	ND	ug/L	10.0	1		10/08/17 12:26	74-85-1		
Methane	4600	ug/L	10.0	1		10/08/17 12:26	74-82-8		
8260 MSV Med Water		Analytical Method: EPA 8260B							
Bromodichloromethane	ND	ug/L	0.50	1		10/04/17 22:59	75-27-4		
Bromoform	ND	ug/L	2.0	1		10/04/17 22:59	75-25-2		
Bromomethane	ND	ug/L	20.0	1		10/04/17 22:59	74-83-9		
Carbon tetrachloride	ND	ug/L	0.50	1		10/04/17 22:59	56-23-5		
Chlorobenzene	ND	ug/L	0.50	1		10/04/17 22:59	108-90-7		
Chloroethane	ND	ug/L	2.0	1		10/04/17 22:59	75-00-3		
Chloroform	ND	ug/L	0.50	1		10/04/17 22:59	67-66-3		
Chloromethane	ND	ug/L	0.50	1		10/04/17 22:59	74-87-3		
Dibromochloromethane	ND	ug/L	0.50	1		10/04/17 22:59	124-48-1		
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 22:59	95-50-1		
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 22:59	541-73-1		
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 22:59	106-46-7		
1,1-Dichloroethane	ND	ug/L	0.50	1		10/04/17 22:59	75-34-3		
1,2-Dichloroethane	ND	ug/L	0.50	1		10/04/17 22:59	107-06-2		
1,1-Dichloroethene	ND	ug/L	0.50	1		10/04/17 22:59	75-35-4		
cis-1,2-Dichloroethene	1.7	ug/L	0.50	1		10/04/17 22:59	156-59-2		
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		10/04/17 22:59	156-60-5		
1,2-Dichloropropane	ND	ug/L	0.50	1		10/04/17 22:59	78-87-5		

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 1297909

Sample: MW-7		Lab ID: 1297909021		Collected: 09/27/17 08:55		Received: 10/03/17 09:55		Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual	
8260 MSV Med Water		Analytical Method: EPA 8260B							
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/04/17 22:59	10061-01-5		
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/04/17 22:59	10061-02-6		
Methylene Chloride	ND	ug/L	5.0	1		10/04/17 22:59	75-09-2		
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		10/04/17 22:59	79-34-5		
Tetrachloroethene	2.6	ug/L	0.50	1		10/04/17 22:59	127-18-4		
1,1,1-Trichloroethane	ND	ug/L	0.50	1		10/04/17 22:59	71-55-6		
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/04/17 22:59	79-00-5		
Trichloroethene	1.6	ug/L	0.50	1		10/04/17 22:59	79-01-6		
Trichlorofluoromethane	ND	ug/L	0.50	1		10/04/17 22:59	75-69-4		
Vinyl chloride	1.6	ug/L	0.50	1		10/04/17 22:59	75-01-4		
Surrogates									
1,2-Dichloroethane-d4 (S)	110	%	75-125	1		10/04/17 22:59	17060-07-0		
Toluene-d8 (S)	99	%	75-125	1		10/04/17 22:59	2037-26-5		
4-Bromofluorobenzene (S)	87	%	75-125	1		10/04/17 22:59	460-00-4		
5310B TOC		Analytical Method: SM 5310B							
Total Organic Carbon	7.8	mg/L	1.0	1		10/09/17 14:21	7440-44-0		

Sample: MW-7 DUP		Lab ID: 1297909022		Collected: 09/27/17 08:55		Received: 10/03/17 09:55		Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual	
8260 MSV Med Water		Analytical Method: EPA 8260B							
Bromodichloromethane	ND	ug/L	0.50	1		10/04/17 23:18	75-27-4		
Bromoform	ND	ug/L	2.0	1		10/04/17 23:18	75-25-2		
Bromomethane	ND	ug/L	20.0	1		10/04/17 23:18	74-83-9		
Carbon tetrachloride	ND	ug/L	0.50	1		10/04/17 23:18	56-23-5		
Chlorobenzene	ND	ug/L	0.50	1		10/04/17 23:18	108-90-7		
Chloroethane	ND	ug/L	2.0	1		10/04/17 23:18	75-00-3		
Chloroform	ND	ug/L	0.50	1		10/04/17 23:18	67-66-3		
Chloromethane	ND	ug/L	0.50	1		10/04/17 23:18	74-87-3		
Dibromochloromethane	ND	ug/L	0.50	1		10/04/17 23:18	124-48-1		
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 23:18	95-50-1		
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 23:18	541-73-1		
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 23:18	106-46-7		
1,1-Dichloroethane	ND	ug/L	0.50	1		10/04/17 23:18	75-34-3		
1,2-Dichloroethane	ND	ug/L	0.50	1		10/04/17 23:18	107-06-2		
1,1-Dichloroethene	ND	ug/L	0.50	1		10/04/17 23:18	75-35-4		
cis-1,2-Dichloroethene	1.7	ug/L	0.50	1		10/04/17 23:18	156-59-2		
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		10/04/17 23:18	156-60-5		
1,2-Dichloropropane	ND	ug/L	0.50	1		10/04/17 23:18	78-87-5		
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/04/17 23:18	10061-01-5		
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/04/17 23:18	10061-02-6		
Methylene Chloride	ND	ug/L	5.0	1		10/04/17 23:18	75-09-2		
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		10/04/17 23:18	79-34-5		

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

Sample: MW-7 DUP		Lab ID: 1297909022	Collected: 09/27/17 08:55	Received: 10/03/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Tetrachloroethene	2.6	ug/L	0.50	1		10/04/17 23:18	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		10/04/17 23:18	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/04/17 23:18	79-00-5	
Trichloroethene	1.6	ug/L	0.50	1		10/04/17 23:18	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		10/04/17 23:18	75-69-4	
Vinyl chloride	1.7	ug/L	0.50	1		10/04/17 23:18	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	110	%	75-125	1		10/04/17 23:18	17060-07-0	
Toluene-d8 (S)	99	%	75-125	1		10/04/17 23:18	2037-26-5	
4-Bromofluorobenzene (S)	86	%	75-125	1		10/04/17 23:18	460-00-4	

Sample: MW-8		Lab ID: 1297909023	Collected: 09/25/17 14:04	Received: 10/03/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		10/04/17 17:50	75-27-4	
Bromoform	ND	ug/L	2.0	1		10/04/17 17:50	75-25-2	
Bromomethane	ND	ug/L	20.0	1		10/04/17 17:50	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		10/04/17 17:50	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		10/04/17 17:50	108-90-7	
Chloroethane	ND	ug/L	2.0	1		10/04/17 17:50	75-00-3	
Chloroform	ND	ug/L	0.50	1		10/04/17 17:50	67-66-3	
Chloromethane	ND	ug/L	0.50	1		10/04/17 17:50	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		10/04/17 17:50	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 17:50	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 17:50	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 17:50	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		10/04/17 17:50	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	1		10/04/17 17:50	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		10/04/17 17:50	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	0.50	1		10/04/17 17:50	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		10/04/17 17:50	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		10/04/17 17:50	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/04/17 17:50	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/04/17 17:50	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		10/04/17 17:50	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		10/04/17 17:50	79-34-5	
Tetrachloroethene	4.3	ug/L	0.50	1		10/04/17 17:50	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		10/04/17 17:50	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/04/17 17:50	79-00-5	
Trichloroethene	ND	ug/L	0.50	1		10/04/17 17:50	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		10/04/17 17:50	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		10/04/17 17:50	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	97	%	75-125	1		10/04/17 17:50	17060-07-0	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

Sample: MW-8	Lab ID: 1297909023	Collected: 09/25/17 14:04	Received: 10/03/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual

8260 MSV Med Water Analytical Method: EPA 8260B

Surrogates

Toluene-d8 (S)	94	%	75-125	1		10/04/17 17:50	2037-26-5	
4-Bromofluorobenzene (S)	93	%	75-125	1		10/04/17 17:50	460-00-4	

Sample: MW-9	Lab ID: 1297909024	Collected: 09/27/17 08:20	Received: 10/03/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual

8260 MSV Med Water Analytical Method: EPA 8260B

Bromodichloromethane	ND	ug/L	0.50	1		10/04/17 23:38	75-27-4	
Bromoform	ND	ug/L	2.0	1		10/04/17 23:38	75-25-2	
Bromomethane	ND	ug/L	20.0	1		10/04/17 23:38	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		10/04/17 23:38	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		10/04/17 23:38	108-90-7	
Chloroethane	ND	ug/L	2.0	1		10/04/17 23:38	75-00-3	
Chloroform	ND	ug/L	0.50	1		10/04/17 23:38	67-66-3	
Chloromethane	ND	ug/L	0.50	1		10/04/17 23:38	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		10/04/17 23:38	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 23:38	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 23:38	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 23:38	106-46-7	
1,1-Dichloroethane	2.8	ug/L	0.50	1		10/04/17 23:38	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		10/04/17 23:38	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		10/04/17 23:38	75-35-4	
cis-1,2-Dichloroethene	83.1	ug/L	0.50	1		10/04/17 23:38	156-59-2	
trans-1,2-Dichloroethene	2.5	ug/L	0.50	1		10/04/17 23:38	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		10/04/17 23:38	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/04/17 23:38	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/04/17 23:38	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		10/04/17 23:38	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		10/04/17 23:38	79-34-5	
Tetrachloroethene	102	ug/L	2.5	5		10/06/17 01:47	127-18-4	
1,1,1-Trichloroethane	2.4	ug/L	0.50	1		10/04/17 23:38	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/04/17 23:38	79-00-5	
Trichloroethene	66.7	ug/L	0.50	1		10/04/17 23:38	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		10/04/17 23:38	75-69-4	
Vinyl chloride	0.99	ug/L	0.50	1		10/04/17 23:38	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	109	%	75-125	1		10/04/17 23:38	17060-07-0	
Toluene-d8 (S)	100	%	75-125	1		10/04/17 23:38	2037-26-5	
4-Bromofluorobenzene (S)	86	%	75-125	1		10/04/17 23:38	460-00-4	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 1297909

Sample: MW-10	Lab ID: 1297909025	Collected: 09/27/17 12:08	Received: 10/03/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		10/04/17 23:57	75-27-4	
Bromoform	ND	ug/L	2.0	1		10/04/17 23:57	75-25-2	
Bromomethane	ND	ug/L	20.0	1		10/04/17 23:57	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		10/04/17 23:57	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		10/04/17 23:57	108-90-7	
Chloroethane	ND	ug/L	2.0	1		10/04/17 23:57	75-00-3	
Chloroform	ND	ug/L	0.50	1		10/04/17 23:57	67-66-3	
Chloromethane	ND	ug/L	0.50	1		10/04/17 23:57	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		10/04/17 23:57	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 23:57	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 23:57	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 23:57	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		10/04/17 23:57	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		10/04/17 23:57	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		10/04/17 23:57	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	0.50	1		10/04/17 23:57	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		10/04/17 23:57	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		10/04/17 23:57	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/04/17 23:57	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/04/17 23:57	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		10/04/17 23:57	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		10/04/17 23:57	79-34-5	
Tetrachloroethene	3.7	ug/L	0.50	1		10/04/17 23:57	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		10/04/17 23:57	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/04/17 23:57	79-00-5	
Trichloroethene	2.4	ug/L	0.50	1		10/04/17 23:57	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		10/04/17 23:57	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		10/04/17 23:57	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	110	%	75-125	1		10/04/17 23:57	17060-07-0	
Toluene-d8 (S)	99	%	75-125	1		10/04/17 23:57	2037-26-5	
4-Bromofluorobenzene (S)	86	%	75-125	1		10/04/17 23:57	460-00-4	

Sample: MW-12	Lab ID: 1297909026	Collected: 09/28/17 13:30	Received: 10/03/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175						
Ethane	ND	ug/L	10.0	1		10/08/17 13:41	74-84-0	
Ethene	16.0	ug/L	10.0	1		10/08/17 13:41	74-85-1	
Methane	7310	ug/L	10.0	1		10/08/17 13:41	74-82-8	
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	3.1	6.25		10/05/17 20:55	75-27-4	
Bromoform	ND	ug/L	3.1	6.25		10/05/17 20:55	75-25-2	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 1297909

Sample: MW-12	Lab ID: 1297909026	Collected: 09/28/17 13:30	Received: 10/03/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual

8260 MSV Med Water

Analytical Method: EPA 8260B

Bromomethane	ND	ug/L	125	6.25		10/05/17 20:55	74-83-9	
Carbon tetrachloride	ND	ug/L	3.1	6.25		10/05/17 20:55	56-23-5	
Chlorobenzene	ND	ug/L	3.1	6.25		10/05/17 20:55	108-90-7	
Chloroethane	17.4	ug/L	12.5	6.25		10/05/17 20:55	75-00-3	
Chloroform	ND	ug/L	3.1	6.25		10/05/17 20:55	67-66-3	
Chloromethane	ND	ug/L	12.5	6.25		10/05/17 20:55	74-87-3	
Dibromochloromethane	ND	ug/L	3.1	6.25		10/05/17 20:55	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	3.1	6.25		10/05/17 20:55	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	3.1	6.25		10/05/17 20:55	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	3.1	6.25		10/05/17 20:55	106-46-7	
1,1-Dichloroethane	19.5	ug/L	3.1	6.25		10/05/17 20:55	75-34-3	
1,2-Dichloroethane	ND	ug/L	3.1	6.25		10/05/17 20:55	107-06-2	
1,1-Dichloroethene	ND	ug/L	3.1	6.25		10/05/17 20:55	75-35-4	
cis-1,2-Dichloroethene	457	ug/L	3.1	6.25		10/05/17 20:55	156-59-2	
trans-1,2-Dichloroethene	5.4	ug/L	3.1	6.25		10/05/17 20:55	156-60-5	
1,2-Dichloropropane	ND	ug/L	3.1	6.25		10/05/17 20:55	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	3.1	6.25		10/05/17 20:55	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	3.1	6.25		10/05/17 20:55	10061-02-6	
Methylene Chloride	ND	ug/L	31.2	6.25		10/05/17 20:55	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	3.1	6.25		10/05/17 20:55	79-34-5	
Tetrachloroethene	ND	ug/L	3.1	6.25		10/05/17 20:55	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	3.1	6.25		10/05/17 20:55	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	3.1	6.25		10/05/17 20:55	79-00-5	
Trichloroethene	ND	ug/L	3.1	6.25		10/05/17 20:55	79-01-6	
Trichlorofluoromethane	ND	ug/L	3.1	6.25		10/05/17 20:55	75-69-4	
Vinyl chloride	47.7	ug/L	3.1	6.25		10/05/17 20:55	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	96	%	75-125	6.25		10/05/17 20:55	17060-07-0	
Toluene-d8 (S)	100	%	75-125	6.25		10/05/17 20:55	2037-26-5	
4-Bromofluorobenzene (S)	95	%	75-125	6.25		10/05/17 20:55	460-00-4	

5310B TOC

Analytical Method: SM 5310B

Total Organic Carbon	243	mg/L	25.0	25		10/09/17 14:40	7440-44-0	
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Sample: MW-12 DUP	Lab ID: 1297909027	Collected: 09/28/17 13:30	Received: 10/03/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual

8260 MSV Med Water

Analytical Method: EPA 8260B

Bromodichloromethane	ND	ug/L	1.7	3.33		10/06/17 17:50	75-27-4	
Bromoform	ND	ug/L	1.7	3.33		10/06/17 17:50	75-25-2	
Bromomethane	ND	ug/L	66.6	3.33		10/06/17 17:50	74-83-9	
Carbon tetrachloride	ND	ug/L	1.7	3.33		10/06/17 17:50	56-23-5	
Chlorobenzene	ND	ug/L	1.7	3.33		10/06/17 17:50	108-90-7	
Chloroethane	16.3	ug/L	6.7	3.33		10/06/17 17:50	75-00-3	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

Sample: MW-12 DUP		Lab ID: 1297909027		Collected: 09/28/17 13:30		Received: 10/03/17 09:55		Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual	
8260 MSV Med Water		Analytical Method: EPA 8260B							
Chloroform	ND	ug/L	1.7	3.33		10/06/17 17:50	67-66-3		
Chloromethane	ND	ug/L	6.7	3.33		10/06/17 17:50	74-87-3		
Dibromochloromethane	ND	ug/L	1.7	3.33		10/06/17 17:50	124-48-1		
1,2-Dichlorobenzene	ND	ug/L	1.7	3.33		10/06/17 17:50	95-50-1		
1,3-Dichlorobenzene	ND	ug/L	1.7	3.33		10/06/17 17:50	541-73-1		
1,4-Dichlorobenzene	ND	ug/L	1.7	3.33		10/06/17 17:50	106-46-7		
1,1-Dichloroethane	17.3	ug/L	1.7	3.33		10/06/17 17:50	75-34-3		
1,2-Dichloroethane	ND	ug/L	1.7	3.33		10/06/17 17:50	107-06-2		
1,1-Dichloroethene	ND	ug/L	1.7	3.33		10/06/17 17:50	75-35-4		
cis-1,2-Dichloroethene	428	ug/L	1.7	3.33		10/06/17 17:50	156-59-2		
trans-1,2-Dichloroethene	5.2	ug/L	1.7	3.33		10/06/17 17:50	156-60-5		
1,2-Dichloropropane	ND	ug/L	1.7	3.33		10/06/17 17:50	78-87-5		
cis-1,3-Dichloropropene	ND	ug/L	1.7	3.33		10/06/17 17:50	10061-01-5		
trans-1,3-Dichloropropene	ND	ug/L	1.7	3.33		10/06/17 17:50	10061-02-6		
Methylene Chloride	ND	ug/L	16.6	3.33		10/06/17 17:50	75-09-2		
1,1,1,2-Tetrachloroethane	ND	ug/L	1.7	3.33		10/06/17 17:50	79-34-5		
Tetrachloroethene	ND	ug/L	1.7	3.33		10/06/17 17:50	127-18-4		
1,1,1-Trichloroethane	ND	ug/L	1.7	3.33		10/06/17 17:50	71-55-6		
1,1,2-Trichloroethane	ND	ug/L	1.7	3.33		10/06/17 17:50	79-00-5		
Trichloroethene	ND	ug/L	1.7	3.33		10/06/17 17:50	79-01-6		
Trichlorofluoromethane	ND	ug/L	1.7	3.33		10/06/17 17:50	75-69-4		
Vinyl chloride	45.1	ug/L	1.7	3.33		10/06/17 17:50	75-01-4		
Surrogates									
1,2-Dichloroethane-d4 (S)	94	%	75-125	3.33		10/06/17 17:50	17060-07-0		
Toluene-d8 (S)	99	%	75-125	3.33		10/06/17 17:50	2037-26-5		
4-Bromofluorobenzene (S)	97	%	75-125	3.33		10/06/17 17:50	460-00-4		

Sample: MW-13		Lab ID: 1297909028		Collected: 09/27/17 12:36		Received: 10/03/17 09:55		Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual	
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Ethane	ND	ug/L	10.0	1		10/08/17 12:33	74-84-0		
Ethene	ND	ug/L	10.0	1		10/08/17 12:33	74-85-1		
Methane	7750	ug/L	10.0	1		10/08/17 12:33	74-82-8		
8260 MSV Med Water		Analytical Method: EPA 8260B							
Bromodichloromethane	ND	ug/L	1.0	2		10/06/17 03:35	75-27-4		
Bromoform	ND	ug/L	1.0	2		10/06/17 03:35	75-25-2		
Bromomethane	ND	ug/L	40.0	2		10/06/17 03:35	74-83-9		
Carbon tetrachloride	ND	ug/L	1.0	2		10/06/17 03:35	56-23-5		
Chlorobenzene	ND	ug/L	1.0	2		10/06/17 03:35	108-90-7		
Chloroethane	ND	ug/L	4.0	2		10/06/17 03:35	75-00-3		
Chloroform	ND	ug/L	1.0	2		10/06/17 03:35	67-66-3		
Chloromethane	ND	ug/L	4.0	2		10/06/17 03:35	74-87-3		

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

Sample: MW-13	Lab ID: 1297909028	Collected: 09/27/17 12:36	Received: 10/03/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Dibromochloromethane	ND	ug/L	1.0	2		10/06/17 03:35	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	1.0	2		10/06/17 03:35	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	1.0	2		10/06/17 03:35	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	2		10/06/17 03:35	106-46-7	
1,1-Dichloroethane	ND	ug/L	1.0	2		10/06/17 03:35	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	2		10/06/17 03:35	107-06-2	
1,1-Dichloroethene	5.0	ug/L	1.0	2		10/06/17 03:35	75-35-4	
cis-1,2-Dichloroethene	3220	ug/L	62.5	125		10/06/17 19:10	156-59-2	
trans-1,2-Dichloroethene	7.3	ug/L	1.0	2		10/06/17 03:35	156-60-5	
1,2-Dichloropropane	ND	ug/L	1.0	2		10/06/17 03:35	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	1.0	2		10/06/17 03:35	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	1.0	2		10/06/17 03:35	10061-02-6	
Methylene Chloride	ND	ug/L	10.0	2		10/06/17 03:35	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	2		10/06/17 03:35	79-34-5	
Tetrachloroethene	3.3	ug/L	1.0	2		10/06/17 03:35	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	1.0	2		10/06/17 03:35	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	2		10/06/17 03:35	79-00-5	
Trichloroethene	1.3	ug/L	1.0	2		10/06/17 03:35	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	2		10/06/17 03:35	75-69-4	
Vinyl chloride	25.0	ug/L	1.0	2		10/06/17 03:35	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	94	%	75-125	2		10/06/17 03:35	17060-07-0	
Toluene-d8 (S)	98	%	75-125	2		10/06/17 03:35	2037-26-5	
4-Bromofluorobenzene (S)	97	%	75-125	2		10/06/17 03:35	460-00-4	
5310B TOC		Analytical Method: SM 5310B						
Total Organic Carbon	55.8	mg/L	25.0	25		10/09/17 16:15	7440-44-0	

Sample: MW-14	Lab ID: 1297909029	Collected: 09/26/17 12:12	Received: 10/03/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175						
Ethane	ND	ug/L	10.0	1		10/08/17 11:57	74-84-0	
Ethene	ND	ug/L	10.0	1		10/08/17 11:57	74-85-1	
Methane	680	ug/L	10.0	1		10/08/17 11:57	74-82-8	
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.84	1.67		10/06/17 17:30	75-27-4	
Bromoform	ND	ug/L	0.84	1.67		10/06/17 17:30	75-25-2	
Bromomethane	ND	ug/L	33.4	1.67		10/06/17 17:30	74-83-9	
Carbon tetrachloride	ND	ug/L	0.84	1.67		10/06/17 17:30	56-23-5	
Chlorobenzene	ND	ug/L	0.84	1.67		10/06/17 17:30	108-90-7	
Chloroethane	ND	ug/L	3.3	1.67		10/06/17 17:30	75-00-3	
Chloroform	ND	ug/L	0.84	1.67		10/06/17 17:30	67-66-3	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

Sample: MW-14	Lab ID: 1297909029	Collected: 09/26/17 12:12	Received: 10/03/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Chloromethane	ND	ug/L	3.3	1.67		10/06/17 17:30	74-87-3	
Dibromochloromethane	ND	ug/L	0.84	1.67		10/06/17 17:30	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.84	1.67		10/06/17 17:30	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.84	1.67		10/06/17 17:30	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.84	1.67		10/06/17 17:30	106-46-7	
1,1-Dichloroethane	6.2	ug/L	0.84	1.67		10/06/17 17:30	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.84	1.67		10/06/17 17:30	107-06-2	
1,1-Dichloroethene	2.6	ug/L	0.84	1.67		10/06/17 17:30	75-35-4	
cis-1,2-Dichloroethene	279	ug/L	0.84	1.67		10/06/17 17:30	156-59-2	
trans-1,2-Dichloroethene	2.8	ug/L	0.84	1.67		10/06/17 17:30	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.84	1.67		10/06/17 17:30	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.84	1.67		10/06/17 17:30	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.84	1.67		10/06/17 17:30	10061-02-6	
Methylene Chloride	ND	ug/L	8.4	1.67		10/06/17 17:30	75-09-2	
1,1,1,2-Tetrachloroethane	ND	ug/L	0.84	1.67		10/06/17 17:30	79-34-5	
Tetrachloroethene	62.4	ug/L	0.84	1.67		10/06/17 17:30	127-18-4	
1,1,1-Trichloroethane	1.1	ug/L	0.84	1.67		10/06/17 17:30	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.84	1.67		10/06/17 17:30	79-00-5	
Trichloroethene	265	ug/L	0.84	1.67		10/06/17 17:30	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.84	1.67		10/06/17 17:30	75-69-4	
Vinyl chloride	ND	ug/L	0.84	1.67		10/06/17 17:30	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	96	%	75-125	1.67		10/06/17 17:30	17060-07-0	
Toluene-d8 (S)	99	%	75-125	1.67		10/06/17 17:30	2037-26-5	
4-Bromofluorobenzene (S)	96	%	75-125	1.67		10/06/17 17:30	460-00-4	
5310B TOC		Analytical Method: SM 5310B						
Total Organic Carbon	3.8	mg/L	1.0	1		10/09/17 16:34	7440-44-0	

Sample: MW-15	Lab ID: 1297909030	Collected: 09/28/17 09:33	Received: 10/03/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		10/05/17 23:32	75-27-4	
Bromoform	ND	ug/L	2.0	1		10/05/17 23:32	75-25-2	
Bromomethane	ND	ug/L	20.0	1		10/05/17 23:32	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		10/05/17 23:32	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		10/05/17 23:32	108-90-7	
Chloroethane	ND	ug/L	2.0	1		10/05/17 23:32	75-00-3	
Chloroform	ND	ug/L	0.50	1		10/05/17 23:32	67-66-3	
Chloromethane	ND	ug/L	0.50	1		10/05/17 23:32	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		10/05/17 23:32	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 23:32	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 23:32	541-73-1	

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ANALYTICAL RESULTS

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Pace Project No.: 1297909

Sample: MW-15		Lab ID: 1297909030		Collected: 09/28/17 09:33		Received: 10/03/17 09:55		Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual	
8260 MSV Med Water		Analytical Method: EPA 8260B							
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 23:32	106-46-7		
1,1-Dichloroethane	ND	ug/L	0.50	1		10/05/17 23:32	75-34-3		
1,2-Dichloroethane	ND	ug/L	1.0	1		10/05/17 23:32	107-06-2		
1,1-Dichloroethene	ND	ug/L	0.50	1		10/05/17 23:32	75-35-4		
cis-1,2-Dichloroethene	ND	ug/L	0.50	1		10/05/17 23:32	156-59-2		
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		10/05/17 23:32	156-60-5		
1,2-Dichloropropane	ND	ug/L	0.50	1		10/05/17 23:32	78-87-5		
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 23:32	10061-01-5		
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 23:32	10061-02-6		
Methylene Chloride	ND	ug/L	5.0	1		10/05/17 23:32	75-09-2		
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		10/05/17 23:32	79-34-5		
Tetrachloroethene	ND	ug/L	0.50	1		10/05/17 23:32	127-18-4		
1,1,1-Trichloroethane	ND	ug/L	0.50	1		10/05/17 23:32	71-55-6		
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/05/17 23:32	79-00-5		
Trichloroethene	ND	ug/L	0.50	1		10/05/17 23:32	79-01-6		
Trichlorofluoromethane	ND	ug/L	0.50	1		10/05/17 23:32	75-69-4		
Vinyl chloride	ND	ug/L	0.50	1		10/05/17 23:32	75-01-4		
Surrogates									
1,2-Dichloroethane-d4 (S)	110	%	75-125	1		10/05/17 23:32	17060-07-0		
Toluene-d8 (S)	99	%	75-125	1		10/05/17 23:32	2037-26-5		
4-Bromofluorobenzene (S)	87	%	75-125	1		10/05/17 23:32	460-00-4		

Sample: MW-16		Lab ID: 1297909031		Collected: 09/25/17 13:35		Received: 10/03/17 09:55		Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual	
8260 MSV Med Water		Analytical Method: EPA 8260B							
Bromodichloromethane	ND	ug/L	0.50	1		10/04/17 18:15	75-27-4		
Bromoform	ND	ug/L	2.0	1		10/04/17 18:15	75-25-2		
Bromomethane	ND	ug/L	20.0	1		10/04/17 18:15	74-83-9		
Carbon tetrachloride	ND	ug/L	0.50	1		10/04/17 18:15	56-23-5		
Chlorobenzene	ND	ug/L	0.50	1		10/04/17 18:15	108-90-7		
Chloroethane	ND	ug/L	2.0	1		10/04/17 18:15	75-00-3		
Chloroform	ND	ug/L	0.50	1		10/04/17 18:15	67-66-3		
Chloromethane	ND	ug/L	0.50	1		10/04/17 18:15	74-87-3		
Dibromochloromethane	ND	ug/L	0.50	1		10/04/17 18:15	124-48-1		
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 18:15	95-50-1		
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 18:15	541-73-1		
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 18:15	106-46-7		
1,1-Dichloroethane	ND	ug/L	0.50	1		10/04/17 18:15	75-34-3		
1,2-Dichloroethane	ND	ug/L	1.0	1		10/04/17 18:15	107-06-2		
1,1-Dichloroethene	ND	ug/L	0.50	1		10/04/17 18:15	75-35-4		
cis-1,2-Dichloroethene	1.3	ug/L	0.50	1		10/04/17 18:15	156-59-2		
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		10/04/17 18:15	156-60-5		
1,2-Dichloropropane	ND	ug/L	0.50	1		10/04/17 18:15	78-87-5		
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/04/17 18:15	10061-01-5		

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ANALYTICAL RESULTS

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Sample: MW-16		Lab ID: 1297909031		Collected: 09/25/17 13:35		Received: 10/03/17 09:55		Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual	
8260 MSV Med Water		Analytical Method: EPA 8260B							
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/04/17 18:15	10061-02-6		
Methylene Chloride	ND	ug/L	5.0	1		10/04/17 18:15	75-09-2		
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		10/04/17 18:15	79-34-5		
Tetrachloroethene	148	ug/L	0.50	1		10/04/17 18:15	127-18-4		
1,1,1-Trichloroethane	1.0	ug/L	0.50	1		10/04/17 18:15	71-55-6		
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/04/17 18:15	79-00-5		
Trichloroethene	11.1	ug/L	0.50	1		10/04/17 18:15	79-01-6		
Trichlorofluoromethane	ND	ug/L	0.50	1		10/04/17 18:15	75-69-4		
Vinyl chloride	ND	ug/L	0.50	1		10/04/17 18:15	75-01-4		
Surrogates									
1,2-Dichloroethane-d4 (S)	95	%	75-125	1		10/04/17 18:15	17060-07-0		
Toluene-d8 (S)	91	%	75-125	1		10/04/17 18:15	2037-26-5		
4-Bromofluorobenzene (S)	90	%	75-125	1		10/04/17 18:15	460-00-4		

Sample: MW-17		Lab ID: 1297909032		Collected: 09/29/17 13:05		Received: 10/03/17 09:55		Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual	
8260 MSV Med Water		Analytical Method: EPA 8260B							
Bromodichloromethane	ND	ug/L	0.50	1		10/05/17 23:51	75-27-4		
Bromoform	ND	ug/L	2.0	1		10/05/17 23:51	75-25-2		
Bromomethane	ND	ug/L	20.0	1		10/05/17 23:51	74-83-9		
Carbon tetrachloride	ND	ug/L	0.50	1		10/05/17 23:51	56-23-5		
Chlorobenzene	ND	ug/L	0.50	1		10/05/17 23:51	108-90-7		
Chloroethane	ND	ug/L	2.0	1		10/05/17 23:51	75-00-3		
Chloroform	ND	ug/L	0.50	1		10/05/17 23:51	67-66-3		
Chloromethane	ND	ug/L	0.50	1		10/05/17 23:51	74-87-3		
Dibromochloromethane	ND	ug/L	0.50	1		10/05/17 23:51	124-48-1		
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 23:51	95-50-1		
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 23:51	541-73-1		
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 23:51	106-46-7		
1,1-Dichloroethane	ND	ug/L	0.50	1		10/05/17 23:51	75-34-3		
1,2-Dichloroethane	ND	ug/L	1.0	1		10/05/17 23:51	107-06-2		
1,1-Dichloroethene	ND	ug/L	0.50	1		10/05/17 23:51	75-35-4		
cis-1,2-Dichloroethene	2.7	ug/L	0.50	1		10/05/17 23:51	156-59-2		
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		10/05/17 23:51	156-60-5		
1,2-Dichloropropane	ND	ug/L	0.50	1		10/05/17 23:51	78-87-5		
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 23:51	10061-01-5		
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 23:51	10061-02-6		
Methylene Chloride	ND	ug/L	5.0	1		10/05/17 23:51	75-09-2		
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		10/05/17 23:51	79-34-5		
Tetrachloroethene	4.6	ug/L	0.50	1		10/05/17 23:51	127-18-4		
1,1,1-Trichloroethane	ND	ug/L	0.50	1		10/05/17 23:51	71-55-6		
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/05/17 23:51	79-00-5		
Trichloroethene	11.4	ug/L	0.50	1		10/05/17 23:51	79-01-6		
Trichlorofluoromethane	ND	ug/L	0.50	1		10/05/17 23:51	75-69-4		

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ANALYTICAL RESULTS

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Pace Project No.: 1297909

Sample: MW-17		Lab ID: 1297909032		Collected: 09/29/17 13:05	Received: 10/03/17 09:55	Matrix: Water		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Vinyl chloride	ND	ug/L	0.50	1		10/05/17 23:51	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	110	%.	75-125	1		10/05/17 23:51	17060-07-0	
Toluene-d8 (S)	99	%.	75-125	1		10/05/17 23:51	2037-26-5	
4-Bromofluorobenzene (S)	85	%.	75-125	1		10/05/17 23:51	460-00-4	

Sample: MW-18i		Lab ID: 1297909033		Collected: 09/27/17 16:13	Received: 10/03/17 09:55	Matrix: Water		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		10/05/17 00:16	75-27-4	
Bromoform	ND	ug/L	2.0	1		10/05/17 00:16	75-25-2	
Bromomethane	ND	ug/L	20.0	1		10/05/17 00:16	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		10/05/17 00:16	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		10/05/17 00:16	108-90-7	
Chloroethane	ND	ug/L	2.0	1		10/05/17 00:16	75-00-3	
Chloroform	ND	ug/L	0.50	1		10/05/17 00:16	67-66-3	
Chloromethane	ND	ug/L	0.50	1		10/05/17 00:16	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		10/05/17 00:16	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 00:16	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 00:16	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 00:16	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		10/05/17 00:16	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		10/05/17 00:16	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		10/05/17 00:16	75-35-4	
cis-1,2-Dichloroethene	6.4	ug/L	0.50	1		10/05/17 00:16	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		10/05/17 00:16	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		10/05/17 00:16	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 00:16	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 00:16	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		10/05/17 00:16	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		10/05/17 00:16	79-34-5	
Tetrachloroethene	1.9	ug/L	0.50	1		10/05/17 00:16	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		10/05/17 00:16	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/05/17 00:16	79-00-5	
Trichloroethene	1.3	ug/L	0.50	1		10/05/17 00:16	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		10/05/17 00:16	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		10/05/17 00:16	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	109	%.	75-125	1		10/05/17 00:16	17060-07-0	
Toluene-d8 (S)	100	%.	75-125	1		10/05/17 00:16	2037-26-5	
4-Bromofluorobenzene (S)	86	%.	75-125	1		10/05/17 00:16	460-00-4	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 1297909

Sample: MW-19	Lab ID: 1297909034	Collected: 09/26/17 08:24	Received: 10/03/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175						
Ethane	19.2	ug/L	10.0	1		10/08/17 12:04	74-84-0	
Ethene	44.3	ug/L	10.0	1		10/08/17 12:04	74-85-1	
Methane	3320	ug/L	10.0	1		10/08/17 12:04	74-82-8	
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	2.5	5		10/06/17 02:15	75-27-4	
Bromoform	ND	ug/L	2.5	5		10/06/17 02:15	75-25-2	
Bromomethane	ND	ug/L	100	5		10/06/17 02:15	74-83-9	
Carbon tetrachloride	ND	ug/L	2.5	5		10/06/17 02:15	56-23-5	
Chlorobenzene	ND	ug/L	2.5	5		10/06/17 02:15	108-90-7	
Chloroethane	ND	ug/L	10.0	5		10/06/17 02:15	75-00-3	
Chloroform	ND	ug/L	2.5	5		10/06/17 02:15	67-66-3	
Chloromethane	ND	ug/L	10.0	5		10/06/17 02:15	74-87-3	
Dibromochloromethane	ND	ug/L	2.5	5		10/06/17 02:15	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	2.5	5		10/06/17 02:15	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	2.5	5		10/06/17 02:15	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	2.5	5		10/06/17 02:15	106-46-7	
1,1-Dichloroethane	ND	ug/L	2.5	5		10/06/17 02:15	75-34-3	
1,2-Dichloroethane	ND	ug/L	2.5	5		10/06/17 02:15	107-06-2	
1,1-Dichloroethene	26.5	ug/L	2.5	5		10/06/17 02:15	75-35-4	
cis-1,2-Dichloroethene	1160	ug/L	62.5	125		10/06/17 19:30	156-59-2	
trans-1,2-Dichloroethene	5.4	ug/L	2.5	5		10/06/17 02:15	156-60-5	
1,2-Dichloropropane	ND	ug/L	2.5	5		10/06/17 02:15	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	2.5	5		10/06/17 02:15	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	2.5	5		10/06/17 02:15	10061-02-6	
Methylene Chloride	ND	ug/L	25.0	5		10/06/17 02:15	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	2.5	5		10/06/17 02:15	79-34-5	
Tetrachloroethene	3620	ug/L	62.5	125		10/06/17 19:30	127-18-4	
1,1,1-Trichloroethane	38.9	ug/L	2.5	5		10/06/17 02:15	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	2.5	5		10/06/17 02:15	79-00-5	
Trichloroethene	1450	ug/L	62.5	125		10/06/17 19:30	79-01-6	
Trichlorofluoromethane	ND	ug/L	2.5	5		10/06/17 02:15	75-69-4	
Vinyl chloride	111	ug/L	2.5	5		10/06/17 02:15	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	97	%	75-125	5		10/06/17 02:15	17060-07-0	
Toluene-d8 (S)	99	%	75-125	5		10/06/17 02:15	2037-26-5	
4-Bromofluorobenzene (S)	95	%	75-125	5		10/06/17 02:15	460-00-4	
5310B TOC		Analytical Method: SM 5310B						
Total Organic Carbon	8.1	mg/L	1.0	1		10/09/17 16:52	7440-44-0	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

Sample: MW-19 DUP		Lab ID: 1297909035	Collected: 09/26/17 08:24		Received: 10/03/17 09:55		Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	2.5	5		10/06/17 02:35	75-27-4	
Bromoform	ND	ug/L	2.5	5		10/06/17 02:35	75-25-2	
Bromomethane	ND	ug/L	100	5		10/06/17 02:35	74-83-9	
Carbon tetrachloride	ND	ug/L	2.5	5		10/06/17 02:35	56-23-5	
Chlorobenzene	ND	ug/L	2.5	5		10/06/17 02:35	108-90-7	
Chloroethane	ND	ug/L	10.0	5		10/06/17 02:35	75-00-3	
Chloroform	ND	ug/L	2.5	5		10/06/17 02:35	67-66-3	
Chloromethane	ND	ug/L	10.0	5		10/06/17 02:35	74-87-3	
Dibromochloromethane	ND	ug/L	2.5	5		10/06/17 02:35	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	2.5	5		10/06/17 02:35	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	2.5	5		10/06/17 02:35	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	2.5	5		10/06/17 02:35	106-46-7	
1,1-Dichloroethane	11.1	ug/L	2.5	5		10/06/17 02:35	75-34-3	
1,2-Dichloroethane	ND	ug/L	2.5	5		10/06/17 02:35	107-06-2	
1,1-Dichloroethene	28.9	ug/L	2.5	5		10/06/17 02:35	75-35-4	
cis-1,2-Dichloroethene	1150	ug/L	62.5	125		10/06/17 19:50	156-59-2	
trans-1,2-Dichloroethene	5.4	ug/L	2.5	5		10/06/17 02:35	156-60-5	
1,2-Dichloropropane	ND	ug/L	2.5	5		10/06/17 02:35	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	2.5	5		10/06/17 02:35	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	2.5	5		10/06/17 02:35	10061-02-6	
Methylene Chloride	ND	ug/L	25.0	5		10/06/17 02:35	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	2.5	5		10/06/17 02:35	79-34-5	
Tetrachloroethene	3710	ug/L	62.5	125		10/06/17 19:50	127-18-4	
1,1,1-Trichloroethane	40.4	ug/L	2.5	5		10/06/17 02:35	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	2.5	5		10/06/17 02:35	79-00-5	
Trichloroethene	1480	ug/L	62.5	125		10/06/17 19:50	79-01-6	
Trichlorofluoromethane	ND	ug/L	2.5	5		10/06/17 02:35	75-69-4	
Vinyl chloride	111	ug/L	2.5	5		10/06/17 02:35	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	95	%	75-125	5		10/06/17 02:35	17060-07-0	
Toluene-d8 (S)	99	%	75-125	5		10/06/17 02:35	2037-26-5	
4-Bromofluorobenzene (S)	92	%	75-125	5		10/06/17 02:35	460-00-4	

Sample: MW-19i		Lab ID: 1297909036	Collected: 09/28/17 08:57		Received: 10/03/17 09:55		Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		10/06/17 00:10	75-27-4	
Bromoform	ND	ug/L	2.0	1		10/06/17 00:10	75-25-2	
Bromomethane	ND	ug/L	20.0	1		10/06/17 00:10	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		10/06/17 00:10	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		10/06/17 00:10	108-90-7	
Chloroethane	ND	ug/L	2.0	1		10/06/17 00:10	75-00-3	
Chloroform	ND	ug/L	0.50	1		10/06/17 00:10	67-66-3	
Chloromethane	ND	ug/L	0.50	1		10/06/17 00:10	74-87-3	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 1297909

Sample: MW-19i	Lab ID: 1297909036	Collected: 09/28/17 08:57	Received: 10/03/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Dibromochloromethane	ND	ug/L	0.50	1		10/06/17 00:10	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/06/17 00:10	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/06/17 00:10	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/06/17 00:10	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		10/06/17 00:10	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	1		10/06/17 00:10	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		10/06/17 00:10	75-35-4	
cis-1,2-Dichloroethene	0.83	ug/L	0.50	1		10/06/17 00:10	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		10/06/17 00:10	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		10/06/17 00:10	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/06/17 00:10	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/06/17 00:10	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		10/06/17 00:10	75-09-2	
1,1,1,2-Tetrachloroethane	ND	ug/L	0.50	1		10/06/17 00:10	79-34-5	
Tetrachloroethene	ND	ug/L	0.50	1		10/06/17 00:10	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		10/06/17 00:10	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/06/17 00:10	79-00-5	
Trichloroethene	ND	ug/L	0.50	1		10/06/17 00:10	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		10/06/17 00:10	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		10/06/17 00:10	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	111	%	75-125	1		10/06/17 00:10	17060-07-0	
Toluene-d8 (S)	99	%	75-125	1		10/06/17 00:10	2037-26-5	
4-Bromofluorobenzene (S)	85	%	75-125	1		10/06/17 00:10	460-00-4	

Sample: MW-20i	Lab ID: 1297909037	Collected: 09/27/17 15:45	Received: 10/03/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		10/05/17 00:35	75-27-4	
Bromoform	ND	ug/L	2.0	1		10/05/17 00:35	75-25-2	
Bromomethane	ND	ug/L	20.0	1		10/05/17 00:35	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		10/05/17 00:35	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		10/05/17 00:35	108-90-7	
Chloroethane	ND	ug/L	2.0	1		10/05/17 00:35	75-00-3	
Chloroform	ND	ug/L	0.50	1		10/05/17 00:35	67-66-3	
Chloromethane	ND	ug/L	0.50	1		10/05/17 00:35	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		10/05/17 00:35	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 00:35	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 00:35	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 00:35	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		10/05/17 00:35	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		10/05/17 00:35	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		10/05/17 00:35	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	0.50	1		10/05/17 00:35	156-59-2	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

Sample: MW-20i		Lab ID: 1297909037		Collected: 09/27/17 15:45		Received: 10/03/17 09:55		Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual	
8260 MSV Med Water		Analytical Method: EPA 8260B							
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		10/05/17 00:35	156-60-5		
1,2-Dichloropropane	ND	ug/L	0.50	1		10/05/17 00:35	78-87-5		
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 00:35	10061-01-5		
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 00:35	10061-02-6		
Methylene Chloride	ND	ug/L	5.0	1		10/05/17 00:35	75-09-2		
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		10/05/17 00:35	79-34-5		
Tetrachloroethene	0.67	ug/L	0.50	1		10/05/17 00:35	127-18-4		
1,1,1-Trichloroethane	ND	ug/L	0.50	1		10/05/17 00:35	71-55-6		
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/05/17 00:35	79-00-5		
Trichloroethene	ND	ug/L	0.50	1		10/05/17 00:35	79-01-6		
Trichlorofluoromethane	ND	ug/L	0.50	1		10/05/17 00:35	75-69-4		
Vinyl chloride	ND	ug/L	0.50	1		10/05/17 00:35	75-01-4		
Surrogates									
1,2-Dichloroethane-d4 (S)	110	%	75-125	1		10/05/17 00:35	17060-07-0		
Toluene-d8 (S)	99	%	75-125	1		10/05/17 00:35	2037-26-5		
4-Bromofluorobenzene (S)	86	%	75-125	1		10/05/17 00:35	460-00-4		

Sample: MW-21i-40		Lab ID: 1297909038		Collected: 09/27/17 14:04		Received: 10/03/17 09:55		Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual	
8260 MSV Med Water		Analytical Method: EPA 8260B							
Bromodichloromethane	ND	ug/L	0.50	1		10/05/17 12:25	75-27-4		
Bromoform	ND	ug/L	2.0	1		10/05/17 12:25	75-25-2		
Bromomethane	ND	ug/L	20.0	1		10/05/17 12:25	74-83-9		
Carbon tetrachloride	ND	ug/L	0.50	1		10/05/17 12:25	56-23-5		
Chlorobenzene	ND	ug/L	0.50	1		10/05/17 12:25	108-90-7		
Chloroethane	ND	ug/L	2.0	1		10/05/17 12:25	75-00-3		
Chloroform	ND	ug/L	0.50	1		10/05/17 12:25	67-66-3		
Chloromethane	ND	ug/L	0.50	1		10/05/17 12:25	74-87-3		
Dibromochloromethane	ND	ug/L	0.50	1		10/05/17 12:25	124-48-1		
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 12:25	95-50-1		
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 12:25	541-73-1		
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 12:25	106-46-7		
1,1-Dichloroethane	2.3	ug/L	0.50	1		10/05/17 12:25	75-34-3		
1,2-Dichloroethane	ND	ug/L	1.0	1		10/05/17 12:25	107-06-2		
1,1-Dichloroethene	0.70	ug/L	0.50	1		10/05/17 12:25	75-35-4		
cis-1,2-Dichloroethene	60.0	ug/L	0.50	1		10/05/17 12:25	156-59-2		
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		10/05/17 12:25	156-60-5		
1,2-Dichloropropane	ND	ug/L	0.50	1		10/05/17 12:25	78-87-5		
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 12:25	10061-01-5		
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 12:25	10061-02-6		
Methylene Chloride	ND	ug/L	5.0	1		10/05/17 12:25	75-09-2		
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		10/05/17 12:25	79-34-5		
Tetrachloroethene	18.1	ug/L	0.50	1		10/05/17 12:25	127-18-4		
1,1,1-Trichloroethane	ND	ug/L	0.50	1		10/05/17 12:25	71-55-6		

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 1297909

Sample: MW-21i-40		Lab ID: 1297909038	Collected: 09/27/17 14:04	Received: 10/03/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/05/17 12:25	79-00-5	
Trichloroethene	15.0	ug/L	0.50	1		10/05/17 12:25	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		10/05/17 12:25	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		10/05/17 12:25	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	108	%	75-125	1		10/05/17 12:25	17060-07-0	
Toluene-d8 (S)	98	%	75-125	1		10/05/17 12:25	2037-26-5	
4-Bromofluorobenzene (S)	87	%	75-125	1		10/05/17 12:25	460-00-4	

Sample: MW-21i-105		Lab ID: 1297909039	Collected: 09/27/17 14:50	Received: 10/03/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		10/05/17 13:23	75-27-4	
Bromoform	ND	ug/L	2.0	1		10/05/17 13:23	75-25-2	
Bromomethane	ND	ug/L	20.0	1		10/05/17 13:23	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		10/05/17 13:23	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		10/05/17 13:23	108-90-7	
Chloroethane	ND	ug/L	2.0	1		10/05/17 13:23	75-00-3	
Chloroform	ND	ug/L	0.50	1		10/05/17 13:23	67-66-3	
Chloromethane	ND	ug/L	0.50	1		10/05/17 13:23	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		10/05/17 13:23	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 13:23	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 13:23	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 13:23	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		10/05/17 13:23	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	1		10/05/17 13:23	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		10/05/17 13:23	75-35-4	
cis-1,2-Dichloroethene	4.3	ug/L	0.50	1		10/05/17 13:23	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		10/05/17 13:23	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		10/05/17 13:23	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 13:23	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 13:23	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		10/05/17 13:23	75-09-2	
1,1,1,2-Tetrachloroethane	ND	ug/L	0.50	1		10/05/17 13:23	79-34-5	
Tetrachloroethene	5.7	ug/L	0.50	1		10/05/17 13:23	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		10/05/17 13:23	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/05/17 13:23	79-00-5	
Trichloroethene	3.9	ug/L	0.50	1		10/05/17 13:23	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		10/05/17 13:23	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		10/05/17 13:23	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	109	%	75-125	1		10/05/17 13:23	17060-07-0	
Toluene-d8 (S)	98	%	75-125	1		10/05/17 13:23	2037-26-5	
4-Bromofluorobenzene (S)	86	%	75-125	1		10/05/17 13:23	460-00-4	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

Sample: MW-22i		Lab ID: 1297909040		Collected: 09/27/17 11:33		Received: 10/03/17 09:55		Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual	
8260 MSV Med Water		Analytical Method: EPA 8260B							
Bromodichloromethane	ND	ug/L	0.50	1		10/05/17 13:42	75-27-4		
Bromoform	ND	ug/L	2.0	1		10/05/17 13:42	75-25-2		
Bromomethane	ND	ug/L	20.0	1		10/05/17 13:42	74-83-9		
Carbon tetrachloride	ND	ug/L	0.50	1		10/05/17 13:42	56-23-5		
Chlorobenzene	ND	ug/L	0.50	1		10/05/17 13:42	108-90-7		
Chloroethane	ND	ug/L	2.0	1		10/05/17 13:42	75-00-3		
Chloroform	ND	ug/L	0.50	1		10/05/17 13:42	67-66-3		
Chloromethane	ND	ug/L	0.50	1		10/05/17 13:42	74-87-3		
Dibromochloromethane	ND	ug/L	0.50	1		10/05/17 13:42	124-48-1		
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 13:42	95-50-1		
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 13:42	541-73-1		
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 13:42	106-46-7		
1,1-Dichloroethane	ND	ug/L	0.50	1		10/05/17 13:42	75-34-3		
1,2-Dichloroethane	ND	ug/L	1.0	1		10/05/17 13:42	107-06-2		
1,1-Dichloroethene	ND	ug/L	0.50	1		10/05/17 13:42	75-35-4		
cis-1,2-Dichloroethene	8.8	ug/L	0.50	1		10/05/17 13:42	156-59-2		
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		10/05/17 13:42	156-60-5		
1,2-Dichloropropane	ND	ug/L	0.50	1		10/05/17 13:42	78-87-5		
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 13:42	10061-01-5		
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 13:42	10061-02-6		
Methylene Chloride	ND	ug/L	5.0	1		10/05/17 13:42	75-09-2		
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		10/05/17 13:42	79-34-5		
Tetrachloroethene	0.88	ug/L	0.50	1		10/05/17 13:42	127-18-4		
1,1,1-Trichloroethane	ND	ug/L	0.50	1		10/05/17 13:42	71-55-6		
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/05/17 13:42	79-00-5		
Trichloroethene	6.3	ug/L	0.50	1		10/05/17 13:42	79-01-6		
Trichlorofluoromethane	ND	ug/L	0.50	1		10/05/17 13:42	75-69-4		
Vinyl chloride	ND	ug/L	0.50	1		10/05/17 13:42	75-01-4		
Surrogates									
1,2-Dichloroethane-d4 (S)	110	%	75-125	1		10/05/17 13:42	17060-07-0		
Toluene-d8 (S)	99	%	75-125	1		10/05/17 13:42	2037-26-5		
4-Bromofluorobenzene (S)	84	%	75-125	1		10/05/17 13:42	460-00-4		

Sample: MW-23i		Lab ID: 1297909041		Collected: 09/26/17 12:41		Received: 10/03/17 09:55		Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual	
8260 MSV Med Water		Analytical Method: EPA 8260B							
Bromodichloromethane	ND	ug/L	0.50	1		10/04/17 21:03	75-27-4		
Bromoform	ND	ug/L	2.0	1		10/04/17 21:03	75-25-2		
Bromomethane	ND	ug/L	20.0	1		10/04/17 21:03	74-83-9		
Carbon tetrachloride	ND	ug/L	0.50	1		10/04/17 21:03	56-23-5		
Chlorobenzene	ND	ug/L	0.50	1		10/04/17 21:03	108-90-7		
Chloroethane	ND	ug/L	2.0	1		10/04/17 21:03	75-00-3		
Chloroform	ND	ug/L	0.50	1		10/04/17 21:03	67-66-3		
Chloromethane	ND	ug/L	0.50	1		10/04/17 21:03	74-87-3		

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

Sample: MW-23i	Lab ID: 1297909041	Collected: 09/26/17 12:41	Received: 10/03/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Dibromochloromethane	ND	ug/L	0.50	1		10/04/17 21:03	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 21:03	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 21:03	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 21:03	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		10/04/17 21:03	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		10/04/17 21:03	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		10/04/17 21:03	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	0.50	1		10/04/17 21:03	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		10/04/17 21:03	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		10/04/17 21:03	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/04/17 21:03	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/04/17 21:03	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		10/04/17 21:03	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		10/04/17 21:03	79-34-5	
Tetrachloroethene	ND	ug/L	0.50	1		10/04/17 21:03	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		10/04/17 21:03	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/04/17 21:03	79-00-5	
Trichloroethene	ND	ug/L	0.50	1		10/04/17 21:03	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		10/04/17 21:03	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		10/04/17 21:03	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	109	%	75-125	1		10/04/17 21:03	17060-07-0	
Toluene-d8 (S)	99	%	75-125	1		10/04/17 21:03	2037-26-5	
4-Bromofluorobenzene (S)	87	%	75-125	1		10/04/17 21:03	460-00-4	

Sample: MW-24i	Lab ID: 1297909042	Collected: 09/26/17 09:57	Received: 10/03/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175						
Ethane	ND	ug/L	10.0	1		10/08/17 12:11	74-84-0	
Ethene	ND	ug/L	10.0	1		10/08/17 12:11	74-85-1	
Methane	ND	ug/L	10.0	1		10/08/17 12:11	74-82-8	
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		10/04/17 21:22	75-27-4	
Bromoform	ND	ug/L	2.0	1		10/04/17 21:22	75-25-2	
Bromomethane	ND	ug/L	20.0	1		10/04/17 21:22	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		10/04/17 21:22	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		10/04/17 21:22	108-90-7	
Chloroethane	ND	ug/L	2.0	1		10/04/17 21:22	75-00-3	
Chloroform	ND	ug/L	0.50	1		10/04/17 21:22	67-66-3	
Chloromethane	ND	ug/L	0.50	1		10/04/17 21:22	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		10/04/17 21:22	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 21:22	95-50-1	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 1297909

Sample: MW-24i		Lab ID: 1297909042	Collected: 09/26/17 09:57	Received: 10/03/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 21:22	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 21:22	106-46-7	
1,1-Dichloroethane	2.1	ug/L	0.50	1		10/04/17 21:22	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		10/04/17 21:22	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		10/04/17 21:22	75-35-4	
cis-1,2-Dichloroethene	24.5	ug/L	0.50	1		10/04/17 21:22	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		10/04/17 21:22	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		10/04/17 21:22	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/04/17 21:22	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/04/17 21:22	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		10/04/17 21:22	75-09-2	
1,1,1,2-Tetrachloroethane	ND	ug/L	0.50	1		10/04/17 21:22	79-34-5	
Tetrachloroethene	30.1	ug/L	0.50	1		10/04/17 21:22	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		10/04/17 21:22	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/04/17 21:22	79-00-5	
Trichloroethene	16.6	ug/L	0.50	1		10/04/17 21:22	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		10/04/17 21:22	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		10/04/17 21:22	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	109	%	75-125	1		10/04/17 21:22	17060-07-0	
Toluene-d8 (S)	99	%	75-125	1		10/04/17 21:22	2037-26-5	
4-Bromofluorobenzene (S)	87	%	75-125	1		10/04/17 21:22	460-00-4	

Sample: MW-24i		Lab ID: 1297909042	Collected: 09/26/17 09:57	Received: 10/03/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
5310B TOC		Analytical Method: SM 5310B						
Total Organic Carbon	1.2	mg/L	1.0	1		10/09/17 17:11	7440-44-0	

Sample: MW-24d		Lab ID: 1297909043	Collected: 09/25/17 14:43	Received: 10/03/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		10/04/17 18:41	75-27-4	
Bromoform	ND	ug/L	2.0	1		10/04/17 18:41	75-25-2	
Bromomethane	ND	ug/L	20.0	1		10/04/17 18:41	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		10/04/17 18:41	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		10/04/17 18:41	108-90-7	
Chloroethane	ND	ug/L	2.0	1		10/04/17 18:41	75-00-3	
Chloroform	ND	ug/L	0.50	1		10/04/17 18:41	67-66-3	
Chloromethane	ND	ug/L	0.50	1		10/04/17 18:41	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		10/04/17 18:41	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 18:41	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 18:41	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 18:41	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		10/04/17 18:41	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	1		10/04/17 18:41	107-06-2	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

Sample: MW-24d		Lab ID: 1297909043		Collected: 09/25/17 14:43		Received: 10/03/17 09:55		Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual	
8260 MSV Med Water		Analytical Method: EPA 8260B							
1,1-Dichloroethene	ND	ug/L	0.50	1		10/04/17 18:41	75-35-4		
cis-1,2-Dichloroethene	ND	ug/L	0.50	1		10/04/17 18:41	156-59-2		
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		10/04/17 18:41	156-60-5		
1,2-Dichloropropane	ND	ug/L	0.50	1		10/04/17 18:41	78-87-5		
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/04/17 18:41	10061-01-5		
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/04/17 18:41	10061-02-6		
Methylene Chloride	ND	ug/L	5.0	1		10/04/17 18:41	75-09-2		
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		10/04/17 18:41	79-34-5		
Tetrachloroethene	ND	ug/L	0.50	1		10/04/17 18:41	127-18-4		
1,1,1-Trichloroethane	ND	ug/L	0.50	1		10/04/17 18:41	71-55-6		
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/04/17 18:41	79-00-5		
Trichloroethene	ND	ug/L	0.50	1		10/04/17 18:41	79-01-6		
Trichlorofluoromethane	ND	ug/L	0.50	1		10/04/17 18:41	75-69-4		
Vinyl chloride	ND	ug/L	0.50	1		10/04/17 18:41	75-01-4		
Surrogates									
1,2-Dichloroethane-d4 (S)	109	%	75-125	1		10/04/17 18:41	17060-07-0		
Toluene-d8 (S)	89	%	75-125	1		10/04/17 18:41	2037-26-5		
4-Bromofluorobenzene (S)	94	%	75-125	1		10/04/17 18:41	460-00-4		

Sample: MW-25i		Lab ID: 1297909044		Collected: 09/27/17 10:46		Received: 10/03/17 09:55		Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual	
8260 MSV Med Water		Analytical Method: EPA 8260B							
Bromodichloromethane	ND	ug/L	0.50	1		10/05/17 14:01	75-27-4		
Bromoform	ND	ug/L	2.0	1		10/05/17 14:01	75-25-2		
Bromomethane	ND	ug/L	20.0	1		10/05/17 14:01	74-83-9		
Carbon tetrachloride	ND	ug/L	0.50	1		10/05/17 14:01	56-23-5		
Chlorobenzene	ND	ug/L	0.50	1		10/05/17 14:01	108-90-7		
Chloroethane	ND	ug/L	2.0	1		10/05/17 14:01	75-00-3		
Chloroform	ND	ug/L	0.50	1		10/05/17 14:01	67-66-3		
Chloromethane	ND	ug/L	0.50	1		10/05/17 14:01	74-87-3		
Dibromochloromethane	ND	ug/L	0.50	1		10/05/17 14:01	124-48-1		
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 14:01	95-50-1		
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 14:01	541-73-1		
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 14:01	106-46-7		
1,1-Dichloroethane	ND	ug/L	0.50	1		10/05/17 14:01	75-34-3		
1,2-Dichloroethane	ND	ug/L	1.0	1		10/05/17 14:01	107-06-2		
1,1-Dichloroethene	ND	ug/L	0.50	1		10/05/17 14:01	75-35-4		
cis-1,2-Dichloroethene	ND	ug/L	0.50	1		10/05/17 14:01	156-59-2		
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		10/05/17 14:01	156-60-5		
1,2-Dichloropropane	ND	ug/L	0.50	1		10/05/17 14:01	78-87-5		
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 14:01	10061-01-5		
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 14:01	10061-02-6		
Methylene Chloride	ND	ug/L	5.0	1		10/05/17 14:01	75-09-2		
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		10/05/17 14:01	79-34-5		

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

Sample: MW-25i		Lab ID: 1297909044	Collected: 09/27/17 10:46	Received: 10/03/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Tetrachloroethene	ND	ug/L	0.50	1		10/05/17 14:01	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		10/05/17 14:01	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/05/17 14:01	79-00-5	
Trichloroethene	ND	ug/L	0.50	1		10/05/17 14:01	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		10/05/17 14:01	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		10/05/17 14:01	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	110	%	75-125	1		10/05/17 14:01	17060-07-0	
Toluene-d8 (S)	98	%	75-125	1		10/05/17 14:01	2037-26-5	
4-Bromofluorobenzene (S)	85	%	75-125	1		10/05/17 14:01	460-00-4	

Sample: MW-26		Lab ID: 1297909045	Collected: 09/26/17 11:33	Received: 10/03/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175						
Ethane	ND	ug/L	10.0	1		10/08/17 12:19	74-84-0	
Ethene	ND	ug/L	10.0	1		10/08/17 12:19	74-85-1	
Methane	2620	ug/L	10.0	1		10/08/17 12:19	74-82-8	
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		10/04/17 21:42	75-27-4	
Bromoform	ND	ug/L	2.0	1		10/04/17 21:42	75-25-2	
Bromomethane	ND	ug/L	20.0	1		10/04/17 21:42	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		10/04/17 21:42	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		10/04/17 21:42	108-90-7	
Chloroethane	ND	ug/L	2.0	1		10/04/17 21:42	75-00-3	
Chloroform	ND	ug/L	0.50	1		10/04/17 21:42	67-66-3	
Chloromethane	ND	ug/L	0.50	1		10/04/17 21:42	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		10/04/17 21:42	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 21:42	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 21:42	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 21:42	106-46-7	
1,1-Dichloroethane	5.1	ug/L	0.50	1		10/04/17 21:42	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		10/04/17 21:42	107-06-2	
1,1-Dichloroethene	1.0	ug/L	0.50	1		10/04/17 21:42	75-35-4	
cis-1,2-Dichloroethene	192	ug/L	2.5	5		10/06/17 01:28	156-59-2	
trans-1,2-Dichloroethene	2.1	ug/L	0.50	1		10/04/17 21:42	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		10/04/17 21:42	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/04/17 21:42	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/04/17 21:42	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		10/04/17 21:42	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		10/04/17 21:42	79-34-5	
Tetrachloroethene	68.4	ug/L	0.50	1		10/04/17 21:42	127-18-4	
1,1,1-Trichloroethane	0.83	ug/L	0.50	1		10/04/17 21:42	71-55-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 1297909

Sample: MW-26		Lab ID: 1297909045	Collected: 09/26/17 11:33	Received: 10/03/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/04/17 21:42	79-00-5	
Trichloroethene	192	ug/L	0.50	1		10/04/17 21:42	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		10/04/17 21:42	75-69-4	
Vinyl chloride	0.98	ug/L	0.50	1		10/04/17 21:42	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	109	%	75-125	1		10/04/17 21:42	17060-07-0	
Toluene-d8 (S)	99	%	75-125	1		10/04/17 21:42	2037-26-5	
4-Bromofluorobenzene (S)	86	%	75-125	1		10/04/17 21:42	460-00-4	
5310B TOC		Analytical Method: SM 5310B						
Total Organic Carbon	7.1	mg/L	1.0	1		10/09/17 17:30	7440-44-0	

Sample: S-1		Lab ID: 1297909046	Collected: 09/28/17 12:32	Received: 10/03/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		10/06/17 00:30	75-27-4	
Bromoform	ND	ug/L	2.0	1		10/06/17 00:30	75-25-2	
Bromomethane	ND	ug/L	20.0	1		10/06/17 00:30	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		10/06/17 00:30	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		10/06/17 00:30	108-90-7	
Chloroethane	ND	ug/L	2.0	1		10/06/17 00:30	75-00-3	
Chloroform	ND	ug/L	0.50	1		10/06/17 00:30	67-66-3	
Chloromethane	ND	ug/L	0.50	1		10/06/17 00:30	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		10/06/17 00:30	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/06/17 00:30	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/06/17 00:30	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/06/17 00:30	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		10/06/17 00:30	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	1		10/06/17 00:30	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		10/06/17 00:30	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	0.50	1		10/06/17 00:30	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		10/06/17 00:30	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		10/06/17 00:30	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/06/17 00:30	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/06/17 00:30	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		10/06/17 00:30	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		10/06/17 00:30	79-34-5	
Tetrachloroethene	ND	ug/L	0.50	1		10/06/17 00:30	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		10/06/17 00:30	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/06/17 00:30	79-00-5	
Trichloroethene	ND	ug/L	0.50	1		10/06/17 00:30	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		10/06/17 00:30	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		10/06/17 00:30	75-01-4	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

Sample: S-1		Lab ID: 1297909046	Collected: 09/28/17 12:32	Received: 10/03/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Surrogates								
1,2-Dichloroethane-d4 (S)	110	%	75-125	1		10/06/17 00:30	17060-07-0	
Toluene-d8 (S)	99	%	75-125	1		10/06/17 00:30	2037-26-5	
4-Bromofluorobenzene (S)	86	%	75-125	1		10/06/17 00:30	460-00-4	

Sample: S-2		Lab ID: 1297909047	Collected: 09/28/17 12:13	Received: 10/03/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		10/06/17 00:49	75-27-4	
Bromoform	ND	ug/L	2.0	1		10/06/17 00:49	75-25-2	
Bromomethane	ND	ug/L	20.0	1		10/06/17 00:49	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		10/06/17 00:49	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		10/06/17 00:49	108-90-7	
Chloroethane	ND	ug/L	2.0	1		10/06/17 00:49	75-00-3	
Chloroform	ND	ug/L	0.50	1		10/06/17 00:49	67-66-3	
Chloromethane	ND	ug/L	0.50	1		10/06/17 00:49	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		10/06/17 00:49	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/06/17 00:49	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/06/17 00:49	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/06/17 00:49	106-46-7	
1,1-Dichloroethane	8.0	ug/L	0.50	1		10/06/17 00:49	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	1		10/06/17 00:49	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		10/06/17 00:49	75-35-4	
cis-1,2-Dichloroethene	13.2	ug/L	0.50	1		10/06/17 00:49	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		10/06/17 00:49	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		10/06/17 00:49	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/06/17 00:49	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/06/17 00:49	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		10/06/17 00:49	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		10/06/17 00:49	79-34-5	
Tetrachloroethene	ND	ug/L	0.50	1		10/06/17 00:49	127-18-4	
1,1,1-Trichloroethane	0.86	ug/L	0.50	1		10/06/17 00:49	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/06/17 00:49	79-00-5	
Trichloroethene	0.51	ug/L	0.50	1		10/06/17 00:49	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		10/06/17 00:49	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		10/06/17 00:49	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	110	%	75-125	1		10/06/17 00:49	17060-07-0	
Toluene-d8 (S)	99	%	75-125	1		10/06/17 00:49	2037-26-5	
4-Bromofluorobenzene (S)	86	%	75-125	1		10/06/17 00:49	460-00-4	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

Sample: Field Blank		Lab ID: 1297909048	Collected: 09/25/17 15:30	Received: 10/03/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		10/04/17 14:54	75-27-4	
Bromoform	ND	ug/L	2.0	1		10/04/17 14:54	75-25-2	
Bromomethane	ND	ug/L	20.0	1		10/04/17 14:54	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		10/04/17 14:54	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		10/04/17 14:54	108-90-7	
Chloroethane	ND	ug/L	2.0	1		10/04/17 14:54	75-00-3	
Chloroform	ND	ug/L	0.50	1		10/04/17 14:54	67-66-3	
Chloromethane	ND	ug/L	0.50	1		10/04/17 14:54	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		10/04/17 14:54	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 14:54	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 14:54	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 14:54	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		10/04/17 14:54	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	1		10/04/17 14:54	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		10/04/17 14:54	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	0.50	1		10/04/17 14:54	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		10/04/17 14:54	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		10/04/17 14:54	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/04/17 14:54	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/04/17 14:54	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		10/04/17 14:54	75-09-2	
1,1,1,2-Tetrachloroethane	ND	ug/L	0.50	1		10/04/17 14:54	79-34-5	
Tetrachloroethene	ND	ug/L	0.50	1		10/04/17 14:54	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		10/04/17 14:54	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/04/17 14:54	79-00-5	
Trichloroethene	ND	ug/L	0.50	1		10/04/17 14:54	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		10/04/17 14:54	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		10/04/17 14:54	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	95	%	75-125	1		10/04/17 14:54	17060-07-0	
Toluene-d8 (S)	91	%	75-125	1		10/04/17 14:54	2037-26-5	
4-Bromofluorobenzene (S)	92	%	75-125	1		10/04/17 14:54	460-00-4	

Sample: Field Blank		Lab ID: 1297909049	Collected: 09/26/17 08:30	Received: 10/03/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		10/04/17 19:46	75-27-4	
Bromoform	ND	ug/L	2.0	1		10/04/17 19:46	75-25-2	
Bromomethane	ND	ug/L	20.0	1		10/04/17 19:46	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		10/04/17 19:46	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		10/04/17 19:46	108-90-7	
Chloroethane	ND	ug/L	2.0	1		10/04/17 19:46	75-00-3	
Chloroform	ND	ug/L	0.50	1		10/04/17 19:46	67-66-3	
Chloromethane	ND	ug/L	0.50	1		10/04/17 19:46	74-87-3	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

Sample: Field Blank		Lab ID: 1297909049	Collected: 09/26/17 08:30	Received: 10/03/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Dibromochloromethane	ND	ug/L	0.50	1		10/04/17 19:46	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 19:46	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 19:46	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 19:46	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		10/04/17 19:46	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		10/04/17 19:46	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		10/04/17 19:46	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	0.50	1		10/04/17 19:46	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		10/04/17 19:46	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		10/04/17 19:46	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/04/17 19:46	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/04/17 19:46	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		10/04/17 19:46	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		10/04/17 19:46	79-34-5	
Tetrachloroethene	ND	ug/L	0.50	1		10/04/17 19:46	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		10/04/17 19:46	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/04/17 19:46	79-00-5	
Trichloroethene	ND	ug/L	0.50	1		10/04/17 19:46	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		10/04/17 19:46	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		10/04/17 19:46	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	109	%	75-125	1		10/04/17 19:46	17060-07-0	
Toluene-d8 (S)	99	%	75-125	1		10/04/17 19:46	2037-26-5	
4-Bromofluorobenzene (S)	87	%	75-125	1		10/04/17 19:46	460-00-4	

Sample: Field Blank		Lab ID: 1297909050	Collected: 09/27/17 07:30	Received: 10/03/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		10/05/17 14:21	75-27-4	
Bromoform	ND	ug/L	2.0	1		10/05/17 14:21	75-25-2	
Bromomethane	ND	ug/L	20.0	1		10/05/17 14:21	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		10/05/17 14:21	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		10/05/17 14:21	108-90-7	
Chloroethane	ND	ug/L	2.0	1		10/05/17 14:21	75-00-3	
Chloroform	ND	ug/L	0.50	1		10/05/17 14:21	67-66-3	
Chloromethane	ND	ug/L	0.50	1		10/05/17 14:21	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		10/05/17 14:21	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 14:21	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 14:21	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 14:21	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		10/05/17 14:21	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	1		10/05/17 14:21	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		10/05/17 14:21	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	0.50	1		10/05/17 14:21	156-59-2	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

Sample: Field Blank		Lab ID: 1297909050	Collected: 09/27/17 07:30	Received: 10/03/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		10/05/17 14:21	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		10/05/17 14:21	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 14:21	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 14:21	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		10/05/17 14:21	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		10/05/17 14:21	79-34-5	
Tetrachloroethene	ND	ug/L	0.50	1		10/05/17 14:21	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		10/05/17 14:21	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/05/17 14:21	79-00-5	
Trichloroethene	ND	ug/L	0.50	1		10/05/17 14:21	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		10/05/17 14:21	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		10/05/17 14:21	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	110	%	75-125	1		10/05/17 14:21	17060-07-0	
Toluene-d8 (S)	99	%	75-125	1		10/05/17 14:21	2037-26-5	
4-Bromofluorobenzene (S)	87	%	75-125	1		10/05/17 14:21	460-00-4	

Sample: Field Blank		Lab ID: 1297909051	Collected: 09/28/17 07:45	Received: 10/03/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		10/05/17 20:00	75-27-4	
Bromoform	ND	ug/L	2.0	1		10/05/17 20:00	75-25-2	
Bromomethane	ND	ug/L	20.0	1		10/05/17 20:00	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		10/05/17 20:00	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		10/05/17 20:00	108-90-7	
Chloroethane	ND	ug/L	2.0	1		10/05/17 20:00	75-00-3	
Chloroform	ND	ug/L	0.50	1		10/05/17 20:00	67-66-3	
Chloromethane	ND	ug/L	0.50	1		10/05/17 20:00	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		10/05/17 20:00	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 20:00	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 20:00	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 20:00	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		10/05/17 20:00	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	1		10/05/17 20:00	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		10/05/17 20:00	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	0.50	1		10/05/17 20:00	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		10/05/17 20:00	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		10/05/17 20:00	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 20:00	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 20:00	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		10/05/17 20:00	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		10/05/17 20:00	79-34-5	
Tetrachloroethene	ND	ug/L	0.50	1		10/05/17 20:00	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		10/05/17 20:00	71-55-6	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 1297909

Sample: Field Blank		Lab ID: 1297909051	Collected: 09/28/17 07:45	Received: 10/03/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/05/17 20:00	79-00-5	
Trichloroethene	ND	ug/L	0.50	1		10/05/17 20:00	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		10/05/17 20:00	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		10/05/17 20:00	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	109	%	75-125	1		10/05/17 20:00	17060-07-0	
Toluene-d8 (S)	99	%	75-125	1		10/05/17 20:00	2037-26-5	
4-Bromofluorobenzene (S)	88	%	75-125	1		10/05/17 20:00	460-00-4	

Sample: Equipment Blank		Lab ID: 1297909052	Collected: 09/28/17 07:40	Received: 10/03/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		10/05/17 20:19	75-27-4	
Bromoform	ND	ug/L	2.0	1		10/05/17 20:19	75-25-2	
Bromomethane	ND	ug/L	20.0	1		10/05/17 20:19	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		10/05/17 20:19	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		10/05/17 20:19	108-90-7	
Chloroethane	ND	ug/L	2.0	1		10/05/17 20:19	75-00-3	
Chloroform	ND	ug/L	0.50	1		10/05/17 20:19	67-66-3	
Chloromethane	ND	ug/L	0.50	1		10/05/17 20:19	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		10/05/17 20:19	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 20:19	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 20:19	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 20:19	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		10/05/17 20:19	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	1		10/05/17 20:19	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		10/05/17 20:19	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	0.50	1		10/05/17 20:19	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		10/05/17 20:19	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		10/05/17 20:19	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 20:19	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 20:19	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		10/05/17 20:19	75-09-2	
1,1,1,2-Tetrachloroethane	ND	ug/L	0.50	1		10/05/17 20:19	79-34-5	
Tetrachloroethene	ND	ug/L	0.50	1		10/05/17 20:19	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		10/05/17 20:19	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/05/17 20:19	79-00-5	
Trichloroethene	ND	ug/L	0.50	1		10/05/17 20:19	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		10/05/17 20:19	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		10/05/17 20:19	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	110	%	75-125	1		10/05/17 20:19	17060-07-0	
Toluene-d8 (S)	99	%	75-125	1		10/05/17 20:19	2037-26-5	
4-Bromofluorobenzene (S)	86	%	75-125	1		10/05/17 20:19	460-00-4	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

Sample: Fieldblank		Lab ID: 1297909053	Collected: 09/29/17 07:30		Received: 10/03/17 09:55		Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		10/05/17 20:38	75-27-4	
Bromoform	ND	ug/L	2.0	1		10/05/17 20:38	75-25-2	
Bromomethane	ND	ug/L	20.0	1		10/05/17 20:38	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		10/05/17 20:38	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		10/05/17 20:38	108-90-7	
Chloroethane	ND	ug/L	2.0	1		10/05/17 20:38	75-00-3	
Chloroform	ND	ug/L	0.50	1		10/05/17 20:38	67-66-3	
Chloromethane	ND	ug/L	0.50	1		10/05/17 20:38	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		10/05/17 20:38	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 20:38	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 20:38	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/05/17 20:38	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		10/05/17 20:38	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	1		10/05/17 20:38	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		10/05/17 20:38	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	0.50	1		10/05/17 20:38	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		10/05/17 20:38	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		10/05/17 20:38	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 20:38	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/05/17 20:38	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		10/05/17 20:38	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		10/05/17 20:38	79-34-5	
Tetrachloroethene	ND	ug/L	0.50	1		10/05/17 20:38	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		10/05/17 20:38	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/05/17 20:38	79-00-5	
Trichloroethene	ND	ug/L	0.50	1		10/05/17 20:38	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		10/05/17 20:38	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		10/05/17 20:38	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	109	%	75-125	1		10/05/17 20:38	17060-07-0	
Toluene-d8 (S)	99	%	75-125	1		10/05/17 20:38	2037-26-5	
4-Bromofluorobenzene (S)	86	%	75-125	1		10/05/17 20:38	460-00-4	

Sample: Trip Blank		Lab ID: 1297909054	Collected: 09/26/17 00:00		Received: 10/03/17 09:55		Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		10/04/17 20:05	75-27-4	
Bromoform	ND	ug/L	2.0	1		10/04/17 20:05	75-25-2	
Bromomethane	ND	ug/L	20.0	1		10/04/17 20:05	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		10/04/17 20:05	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		10/04/17 20:05	108-90-7	
Chloroethane	ND	ug/L	2.0	1		10/04/17 20:05	75-00-3	
Chloroform	ND	ug/L	0.50	1		10/04/17 20:05	67-66-3	
Chloromethane	ND	ug/L	0.50	1		10/04/17 20:05	74-87-3	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

Sample: Trip Blank	Lab ID: 1297909054	Collected: 09/26/17 00:00	Received: 10/03/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water	Analytical Method: EPA 8260B							
Dibromochloromethane	ND	ug/L	0.50	1		10/04/17 20:05	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 20:05	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 20:05	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		10/04/17 20:05	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		10/04/17 20:05	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		10/04/17 20:05	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		10/04/17 20:05	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	0.50	1		10/04/17 20:05	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		10/04/17 20:05	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		10/04/17 20:05	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		10/04/17 20:05	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		10/04/17 20:05	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		10/04/17 20:05	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		10/04/17 20:05	79-34-5	
Tetrachloroethene	ND	ug/L	0.50	1		10/04/17 20:05	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		10/04/17 20:05	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		10/04/17 20:05	79-00-5	
Trichloroethene	ND	ug/L	0.50	1		10/04/17 20:05	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		10/04/17 20:05	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		10/04/17 20:05	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	110	%.	75-125	1		10/04/17 20:05	17060-07-0	
Toluene-d8 (S)	99	%.	75-125	1		10/04/17 20:05	2037-26-5	
4-Bromofluorobenzene (S)	87	%.	75-125	1		10/04/17 20:05	460-00-4	

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 1297909

QC Batch: 501230 Analysis Method: RSK 175
QC Batch Method: RSK 175 Analysis Description: RSK 175 AIR HEADSPACE
Associated Lab Samples: 1297909002, 1297909003, 1297909006, 1297909010, 1297909015, 1297909021, 1297909026, 1297909028, 1297909029, 1297909034, 1297909042, 1297909045

METHOD BLANK: 2725021 Matrix: Water
Associated Lab Samples: 1297909002, 1297909003, 1297909006, 1297909010, 1297909015, 1297909021, 1297909026, 1297909028, 1297909029, 1297909034, 1297909042, 1297909045

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Ethane	ug/L	ND	10.0	10/08/17 11:05	
Ethene	ug/L	ND	10.0	10/08/17 11:05	
Methane	ug/L	ND	10.0	10/08/17 11:05	

LABORATORY CONTROL SAMPLE & LCSD: 2725022 2725023

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Ethane	ug/L	114	97.6	103	86	90	85-115	5	20	
Ethene	ug/L	106	91.9	96.6	87	91	85-115	5	20	
Methane	ug/L	60.7	51.9	55.3	86	91	85-115	6	20	

SAMPLE DUPLICATE: 2725024

Parameter	Units	1297909002 Result	Dup Result	RPD	Max RPD	Qualifiers
Ethane	ug/L	54.4	56.8	4	20	
Ethene	ug/L	17.5	18.1	4	20	
Methane	ug/L	4490	4510	0	20	

SAMPLE DUPLICATE: 2725025

Parameter	Units	10405930001 Result	Dup Result	RPD	Max RPD	Qualifiers
Ethane	ug/L	<4.9	ND		20	
Ethene	ug/L	<0.68	ND		20	
Methane	ug/L	2.5J	3.6J		20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 1297909

QC Batch: 127515 Analysis Method: EPA 8260B
QC Batch Method: EPA 8260B Analysis Description: 8260 MSV Med Water
Associated Lab Samples: 1297909002, 1297909010, 1297909017, 1297909018, 1297909023, 1297909031, 1297909043, 1297909048

METHOD BLANK: 507034 Matrix: Water
Associated Lab Samples: 1297909002, 1297909010, 1297909017, 1297909018, 1297909023, 1297909031, 1297909043, 1297909048

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	0.50	10/04/17 12:47	
1,1,2,2-Tetrachloroethane	ug/L	ND	0.50	10/04/17 12:47	
1,1,2-Trichloroethane	ug/L	ND	0.50	10/04/17 12:47	
1,1-Dichloroethane	ug/L	ND	0.50	10/04/17 12:47	
1,1-Dichloroethene	ug/L	ND	0.50	10/04/17 12:47	
1,2-Dichlorobenzene	ug/L	ND	0.50	10/04/17 12:47	
1,2-Dichloroethane	ug/L	ND	1.0	10/04/17 12:47	
1,2-Dichloropropane	ug/L	ND	0.50	10/04/17 12:47	
1,3-Dichlorobenzene	ug/L	ND	0.50	10/04/17 12:47	
1,4-Dichlorobenzene	ug/L	ND	0.50	10/04/17 12:47	
Bromodichloromethane	ug/L	ND	0.50	10/04/17 12:47	
Bromoform	ug/L	ND	2.0	10/04/17 12:47	
Bromomethane	ug/L	ND	20.0	10/04/17 12:47	
Carbon tetrachloride	ug/L	ND	0.50	10/04/17 12:47	
Chlorobenzene	ug/L	ND	0.50	10/04/17 12:47	
Chloroethane	ug/L	ND	2.0	10/04/17 12:47	
Chloroform	ug/L	ND	0.50	10/04/17 12:47	
Chloromethane	ug/L	ND	0.50	10/04/17 12:47	
cis-1,2-Dichloroethene	ug/L	ND	0.50	10/04/17 12:47	
cis-1,3-Dichloropropene	ug/L	ND	0.50	10/04/17 12:47	
Dibromochloromethane	ug/L	ND	0.50	10/04/17 12:47	
Methylene Chloride	ug/L	ND	5.0	10/04/17 12:47	
Tetrachloroethene	ug/L	ND	0.50	10/04/17 12:47	
trans-1,2-Dichloroethene	ug/L	ND	0.50	10/04/17 12:47	
trans-1,3-Dichloropropene	ug/L	ND	0.50	10/04/17 12:47	
Trichloroethene	ug/L	ND	0.50	10/04/17 12:47	
Trichlorofluoromethane	ug/L	ND	0.50	10/04/17 12:47	
Vinyl chloride	ug/L	ND	0.50	10/04/17 12:47	
1,2-Dichloroethane-d4 (S)	%	103	75-125	10/04/17 12:47	
4-Bromofluorobenzene (S)	%	93	75-125	10/04/17 12:47	
Toluene-d8 (S)	%	94	75-125	10/04/17 12:47	

LABORATORY CONTROL SAMPLE: 507035

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	40	36.5	91	75-125	
1,1,2,2-Tetrachloroethane	ug/L	40	41.0	103	75-125	
1,1,2-Trichloroethane	ug/L	40	34.3	86	75-125	
1,1-Dichloroethane	ug/L	40	38.1	95	75-125	
1,1-Dichloroethene	ug/L	40	34.2	86	75-125	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

LABORATORY CONTROL SAMPLE: 507035

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2-Dichlorobenzene	ug/L	40	43.0	107	75-125	
1,2-Dichloroethane	ug/L	40	34.7	87	75-125	
1,2-Dichloropropane	ug/L	40	34.8	87	75-125	
1,3-Dichlorobenzene	ug/L	40	41.3	103	75-125	
1,4-Dichlorobenzene	ug/L	40	42.1	105	75-125	
Bromodichloromethane	ug/L	40	36.4	91	75-125	
Bromoform	ug/L	40	42.0	105	75-128	
Bromomethane	ug/L	40	43.1	108	30-150	
Carbon tetrachloride	ug/L	40	38.3	96	75-125	
Chlorobenzene	ug/L	40	41.3	103	75-125	
Chloroethane	ug/L	40	33.8	84	75-125	
Chloroform	ug/L	40	36.6	91	75-125	
Chloromethane	ug/L	40	34.8	87	44-132	
cis-1,2-Dichloroethene	ug/L	40	35.5	89	75-125	
cis-1,3-Dichloropropene	ug/L	40	35.9	90	75-125	
Dibromochloromethane	ug/L	40	35.5	89	74-135	
Methylene Chloride	ug/L	40	35.3	88	75-125	
Tetrachloroethene	ug/L	40	35.1	88	75-125	
trans-1,2-Dichloroethene	ug/L	40	36.7	92	75-125	
trans-1,3-Dichloropropene	ug/L	40	36.2	90	75-125	
Trichloroethene	ug/L	40	34.3	86	75-125	
Trichlorofluoromethane	ug/L	40	34.6	87	72-125	
Vinyl chloride	ug/L	40	35.7	89	69-130	
1,2-Dichloroethane-d4 (S)	%			108	75-125	
4-Bromofluorobenzene (S)	%			97	75-125	
Toluene-d8 (S)	%			95	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 507036 507037

Parameter	Units	507036		507037		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual	
		1297909010 Result	MS Spike Conc.	MSD Spike Conc.	MS Result							MSD Result
1,1,1-Trichloroethane	ug/L	ND	40	40	36.3	37.5	91	94	75-125	3	30	
1,1,2,2-Tetrachloroethane	ug/L	ND	40	40	41.2	43.3	103	108	75-125	5	30	
1,1,2-Trichloroethane	ug/L	ND	40	40	34.4	35.2	86	88	75-125	2	30	
1,1-Dichloroethane	ug/L	1.1	40	40	38.9	40.4	94	98	75-125	4	30	
1,1-Dichloroethene	ug/L	ND	40	40	30.0	30.8	75	77	69-136	3	30	
1,2-Dichlorobenzene	ug/L	ND	40	40	43.0	42.7	107	107	75-125	1	30	
1,2-Dichloroethane	ug/L	ND	40	40	35.0	35.6	88	89	75-125	2	30	
1,2-Dichloropropane	ug/L	ND	40	40	34.9	36.0	87	90	75-125	3	30	
1,3-Dichlorobenzene	ug/L	ND	40	40	40.6	41.3	102	103	70-125	2	30	
1,4-Dichlorobenzene	ug/L	ND	40	40	42.5	42.2	106	106	73-125	1	30	
Bromodichloromethane	ug/L	ND	40	40	35.5	36.0	89	90	72-132	2	30	
Bromoform	ug/L	ND	40	40	39.9	41.1	100	103	75-125	3	30	
Bromomethane	ug/L	ND	40	40	42.1	51.9	105	130	30-150	21	30	
Carbon tetrachloride	ug/L	ND	40	40	37.4	39.2	93	98	75-127	5	30	

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

Parameter	Units	MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 507036		507037		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	Max RPD	RPD	Qual
		1297909010 Result	MS Spike Conc.	MSD Spike Conc.									
Chlorobenzene	ug/L	ND	40	40	41.6	42.1	104	105	75-125	1	30		
Chloroethane	ug/L	ND	40	40	36.5	39.6	91	99	75-125	8	30		
Chloroform	ug/L	ND	40	40	36.9	37.7	92	94	75-125	2	30		
Chloromethane	ug/L	ND	40	40	36.4	32.7	91	82	54-125	11	30		
cis-1,2-Dichloroethene	ug/L	0.69	40	40	35.9	37.2	88	91	75-125	4	30		
cis-1,3-Dichloropropene	ug/L	ND	40	40	34.0	34.6	85	87	75-125	2	30		
Dibromochloromethane	ug/L	ND	40	40	34.5	34.2	86	86	64-150	1	30		
Methylene Chloride	ug/L	ND	40	40	35.6	34.0	89	85	75-125	5	30		
Tetrachloroethene	ug/L	0.79	40	40	35.8	34.5	87	84	68-126	4	30		
trans-1,2-Dichloroethene	ug/L	ND	40	40	35.7	34.4	89	86	73-127	4	30		
trans-1,3-Dichloropropene	ug/L	ND	40	40	34.0	34.7	85	87	75-128	2	30		
Trichloroethene	ug/L	ND	40	40	34.3	34.8	85	86	71-125	2	30		
Trichlorofluoromethane	ug/L	ND	40	40	36.0	36.0	90	90	70-125	0	30		
Vinyl chloride	ug/L	ND	40	40	33.3	33.5	83	83	72-129	0	30		
1,2-Dichloroethane-d4 (S)	%						108	110	75-125				
4-Bromofluorobenzene (S)	%						97	96	75-125				
Toluene-d8 (S)	%						79	74	75-125				S0

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 1297909

QC Batch: 127528 Analysis Method: EPA 8260B
QC Batch Method: EPA 8260B Analysis Description: 8260 MSV Med Water
Associated Lab Samples: 1297909015, 1297909019, 1297909021, 1297909022, 1297909024, 1297909025, 1297909033, 1297909037, 1297909041, 1297909042, 1297909045, 1297909049, 1297909054

METHOD BLANK: 507098 Matrix: Water
Associated Lab Samples: 1297909015, 1297909019, 1297909021, 1297909022, 1297909024, 1297909025, 1297909033, 1297909037, 1297909041, 1297909042, 1297909045, 1297909049, 1297909054

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	0.50	10/04/17 18:10	
1,1,2,2-Tetrachloroethane	ug/L	ND	0.50	10/04/17 18:10	
1,1,2-Trichloroethane	ug/L	ND	0.50	10/04/17 18:10	
1,1-Dichloroethane	ug/L	ND	0.50	10/04/17 18:10	
1,1-Dichloroethene	ug/L	ND	0.50	10/04/17 18:10	
1,2-Dichlorobenzene	ug/L	ND	0.50	10/04/17 18:10	
1,2-Dichloroethane	ug/L	ND	0.50	10/04/17 18:10	
1,2-Dichloropropane	ug/L	ND	0.50	10/04/17 18:10	
1,3-Dichlorobenzene	ug/L	ND	0.50	10/04/17 18:10	
1,4-Dichlorobenzene	ug/L	ND	0.50	10/04/17 18:10	
Bromodichloromethane	ug/L	ND	0.50	10/04/17 18:10	
Bromoform	ug/L	ND	2.0	10/04/17 18:10	
Bromomethane	ug/L	ND	20.0	10/04/17 18:10	
Carbon tetrachloride	ug/L	ND	0.50	10/04/17 18:10	
Chlorobenzene	ug/L	ND	0.50	10/04/17 18:10	
Chloroethane	ug/L	ND	2.0	10/04/17 18:10	
Chloroform	ug/L	ND	0.50	10/04/17 18:10	
Chloromethane	ug/L	ND	0.50	10/04/17 18:10	
cis-1,2-Dichloroethene	ug/L	ND	0.50	10/04/17 18:10	
cis-1,3-Dichloropropene	ug/L	ND	0.50	10/04/17 18:10	
Dibromochloromethane	ug/L	ND	0.50	10/04/17 18:10	
Methylene Chloride	ug/L	ND	5.0	10/04/17 18:10	
Tetrachloroethene	ug/L	ND	0.50	10/04/17 18:10	
trans-1,2-Dichloroethene	ug/L	ND	0.50	10/04/17 18:10	
trans-1,3-Dichloropropene	ug/L	ND	0.50	10/04/17 18:10	
Trichloroethene	ug/L	ND	0.50	10/04/17 18:10	
Trichlorofluoromethane	ug/L	ND	0.50	10/04/17 18:10	
Vinyl chloride	ug/L	ND	0.50	10/04/17 18:10	
1,2-Dichloroethane-d4 (S)	%	110	75-125	10/04/17 18:10	
4-Bromofluorobenzene (S)	%	86	75-125	10/04/17 18:10	
Toluene-d8 (S)	%	99	75-125	10/04/17 18:10	

LABORATORY CONTROL SAMPLE: 507099

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	40	41.7	104	75-125	
1,1,2,2-Tetrachloroethane	ug/L	40	39.4	98	75-125	
1,1,2-Trichloroethane	ug/L	40	39.7	99	75-125	

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 1297909

LABORATORY CONTROL SAMPLE: 507099

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1-Dichloroethane	ug/L	40	42.8	107	75-125	
1,1-Dichloroethene	ug/L	40	37.9	95	75-125	
1,2-Dichlorobenzene	ug/L	40	38.5	96	75-125	
1,2-Dichloroethane	ug/L	40	39.2	98	75-125	
1,2-Dichloropropane	ug/L	40	42.5	106	75-125	
1,3-Dichlorobenzene	ug/L	40	38.5	96	75-125	
1,4-Dichlorobenzene	ug/L	40	37.8	94	75-125	
Bromodichloromethane	ug/L	40	42.1	105	75-125	
Bromoform	ug/L	40	37.4	93	75-128	
Bromomethane	ug/L	40	29.5	74	30-150	
Carbon tetrachloride	ug/L	40	42.6	107	75-125	
Chlorobenzene	ug/L	40	39.3	98	75-125	
Chloroethane	ug/L	40	32.9	82	75-125	
Chloroform	ug/L	40	41.1	103	75-125	
Chloromethane	ug/L	40	34.8	87	44-132	
cis-1,2-Dichloroethene	ug/L	40	39.9	100	75-125	
cis-1,3-Dichloropropene	ug/L	40	40.7	102	75-125	
Dibromochloromethane	ug/L	40	39.4	99	74-135	
Methylene Chloride	ug/L	40	40.7	102	75-125	
Tetrachloroethene	ug/L	40	38.1	95	75-125	
trans-1,2-Dichloroethene	ug/L	40	40.2	101	75-125	
trans-1,3-Dichloropropene	ug/L	40	39.9	100	75-125	
Trichloroethene	ug/L	40	38.8	97	75-125	
Trichlorofluoromethane	ug/L	40	31.6	79	72-125	
Vinyl chloride	ug/L	40	34.5	86	69-130	
1,2-Dichloroethane-d4 (S)	%			106	75-125	
4-Bromofluorobenzene (S)	%			93	75-125	
Toluene-d8 (S)	%			99	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 507119 507120

Parameter	Units	MS		MSD		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	Max RPD	Qual
		1297909015 Result	Spike Conc.	Spike Conc.	MSD Result							
1,1,1-Trichloroethane	ug/L	ND	40	40	42.3	43.3	105	108	75-125	2	30	
1,1,2,2-Tetrachloroethane	ug/L	ND	40	40	42.0	42.6	105	107	75-125	1	30	
1,1,2-Trichloroethane	ug/L	ND	40	40	41.2	41.9	103	105	75-125	2	30	
1,1-Dichloroethane	ug/L	3.4	40	40	47.7	47.7	111	111	75-125	0	30	
1,1-Dichloroethene	ug/L	4.5	40	40	40.6	42.1	90	94	69-136	4	30	
1,2-Dichlorobenzene	ug/L	ND	40	40	40.4	40.7	101	102	75-125	1	30	
1,2-Dichloroethane	ug/L	ND	40	40	40.7	41.5	102	104	75-125	2	30	
1,2-Dichloropropane	ug/L	ND	40	40	43.3	44.1	108	110	75-125	2	30	
1,3-Dichlorobenzene	ug/L	ND	40	40	39.0	39.5	98	99	70-125	1	30	
1,4-Dichlorobenzene	ug/L	ND	40	40	39.0	39.0	97	98	73-125	0	30	
Bromodichloromethane	ug/L	ND	40	40	43.2	44.3	108	111	72-132	2	30	
Bromoform	ug/L	ND	40	40	39.4	40.5	98	101	75-125	3	30	

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

Parameter	Units	1297909015		507119		507120		% Rec	% Rec	Limits	RPD	Max RPD	Qual
		Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec						
Bromomethane	ug/L	ND	40	40	34.5	38.2	84	93	30-150	10	30		
Carbon tetrachloride	ug/L	ND	40	40	43.8	44.8	110	112	75-127	2	30		
Chlorobenzene	ug/L	ND	40	40	39.5	40.4	99	101	75-125	2	30		
Chloroethane	ug/L	ND	40	40	33.4	34.6	84	86	75-125	3	30		
Chloroform	ug/L	ND	40	40	42.3	42.5	106	106	75-125	1	30		
Chloromethane	ug/L	ND	40	40	36.4	37.5	91	94	54-125	3	30		
cis-1,2-Dichloroethene	ug/L	83.0	40	40	127	128	110	113	75-125	1	30		
cis-1,3-Dichloropropene	ug/L	ND	40	40	41.7	42.8	104	107	75-125	2	30		
Dibromochloromethane	ug/L	ND	40	40	41.2	42.2	103	106	64-150	3	30		
Methylene Chloride	ug/L	ND	40	40	41.3	42.4	103	106	75-125	3	30		
Tetrachloroethene	ug/L	356	40	40	400	410	109	135	68-126	3	30	E,M0	
trans-1,2-Dichloroethene	ug/L	0.83	40	40	41.5	42.5	102	104	73-127	2	30		
trans-1,3-Dichloropropene	ug/L	ND	40	40	41.3	42.1	103	105	75-128	2	30		
Trichloroethene	ug/L	65.9	40	40	107	108	104	106	71-125	1	30		
Trichlorofluoromethane	ug/L	ND	40	40	34.1	35.2	85	88	70-125	3	30		
Vinyl chloride	ug/L	2.3	40	40	37.5	38.8	88	91	72-129	4	30		
1,2-Dichloroethane-d4 (S)	%.						106	106	75-125				
4-Bromofluorobenzene (S)	%.						93	95	75-125				
Toluene-d8 (S)	%.						100	100	75-125				

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

QC Batch: 127546 Analysis Method: EPA 8260B
 QC Batch Method: EPA 8260B Analysis Description: 8260 MSV Med Water
 Associated Lab Samples: 1297909001, 1297909004, 1297909005, 1297909006, 1297909007, 1297909008, 1297909038, 1297909039,
 1297909040, 1297909044, 1297909050

METHOD BLANK: 507198 Matrix: Water
 Associated Lab Samples: 1297909001, 1297909004, 1297909005, 1297909006, 1297909007, 1297909008, 1297909038, 1297909039,
 1297909040, 1297909044, 1297909050

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	0.50	10/05/17 10:28	
1,1,2,2-Tetrachloroethane	ug/L	ND	0.50	10/05/17 10:28	
1,1,2-Trichloroethane	ug/L	ND	0.50	10/05/17 10:28	
1,1-Dichloroethane	ug/L	ND	0.50	10/05/17 10:28	
1,1-Dichloroethene	ug/L	ND	0.50	10/05/17 10:28	
1,2-Dichlorobenzene	ug/L	ND	0.50	10/05/17 10:28	
1,2-Dichloroethane	ug/L	ND	1.0	10/05/17 10:28	
1,2-Dichloropropane	ug/L	ND	0.50	10/05/17 10:28	
1,3-Dichlorobenzene	ug/L	ND	0.50	10/05/17 10:28	
1,4-Dichlorobenzene	ug/L	ND	0.50	10/05/17 10:28	
Bromodichloromethane	ug/L	ND	0.50	10/05/17 10:28	
Bromoform	ug/L	ND	2.0	10/05/17 10:28	
Bromomethane	ug/L	ND	20.0	10/05/17 10:28	
Carbon tetrachloride	ug/L	ND	0.50	10/05/17 10:28	
Chlorobenzene	ug/L	ND	0.50	10/05/17 10:28	
Chloroethane	ug/L	ND	2.0	10/05/17 10:28	
Chloroform	ug/L	ND	0.50	10/05/17 10:28	
Chloromethane	ug/L	ND	0.50	10/05/17 10:28	
cis-1,2-Dichloroethene	ug/L	ND	0.50	10/05/17 10:28	
cis-1,3-Dichloropropene	ug/L	ND	0.50	10/05/17 10:28	
Dibromochloromethane	ug/L	ND	0.50	10/05/17 10:28	
Methylene Chloride	ug/L	ND	5.0	10/05/17 10:28	
Tetrachloroethene	ug/L	ND	0.50	10/05/17 10:28	
trans-1,2-Dichloroethene	ug/L	ND	0.50	10/05/17 10:28	
trans-1,3-Dichloropropene	ug/L	ND	0.50	10/05/17 10:28	
Trichloroethene	ug/L	ND	0.50	10/05/17 10:28	
Trichlorofluoromethane	ug/L	ND	0.50	10/05/17 10:28	
Vinyl chloride	ug/L	ND	0.50	10/05/17 10:28	
1,2-Dichloroethane-d4 (S)	%	109	75-125	10/05/17 10:28	
4-Bromofluorobenzene (S)	%	87	75-125	10/05/17 10:28	
Toluene-d8 (S)	%	99	75-125	10/05/17 10:28	

LABORATORY CONTROL SAMPLE: 507199

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	40	42.4	106	75-125	
1,1,2,2-Tetrachloroethane	ug/L	40	40.0	100	75-125	
1,1,2-Trichloroethane	ug/L	40	40.8	102	75-125	

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

LABORATORY CONTROL SAMPLE: 507199

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1-Dichloroethane	ug/L	40	43.4	108	75-125	
1,1-Dichloroethene	ug/L	40	39.3	98	75-125	
1,2-Dichlorobenzene	ug/L	40	38.7	97	75-125	
1,2-Dichloroethane	ug/L	40	40.1	100	75-125	
1,2-Dichloropropane	ug/L	40	42.7	107	75-125	
1,3-Dichlorobenzene	ug/L	40	37.6	94	75-125	
1,4-Dichlorobenzene	ug/L	40	38.0	95	75-125	
Bromodichloromethane	ug/L	40	43.1	108	75-125	
Bromoform	ug/L	40	39.3	98	75-128	
Bromomethane	ug/L	40	37.4	93	30-150	
Carbon tetrachloride	ug/L	40	43.9	110	75-125	
Chlorobenzene	ug/L	40	38.8	97	75-125	
Chloroethane	ug/L	40	34.5	86	75-125	
Chloroform	ug/L	40	41.7	104	75-125	
Chloromethane	ug/L	40	39.3	98	44-132	
cis-1,2-Dichloroethene	ug/L	40	40.4	101	75-125	
cis-1,3-Dichloropropene	ug/L	40	42.0	105	75-125	
Dibromochloromethane	ug/L	40	41.4	104	74-135	
Methylene Chloride	ug/L	40	41.4	103	75-125	
Tetrachloroethene	ug/L	40	39.3	98	75-125	
trans-1,2-Dichloroethene	ug/L	40	41.3	103	75-125	
trans-1,3-Dichloropropene	ug/L	40	41.5	104	75-125	
Trichloroethene	ug/L	40	39.1	98	75-125	
Trichlorofluoromethane	ug/L	40	35.2	88	72-125	
Vinyl chloride	ug/L	40	37.5	94	69-130	
1,2-Dichloroethane-d4 (S)	%			108	75-125	
4-Bromofluorobenzene (S)	%			92	75-125	
Toluene-d8 (S)	%			101	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 507200 507201

Parameter	Units	MS		MSD		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	Max RPD	Qual
		1297660001 Result	Spike Conc.	Spike Conc.	MSD Result							
1,1,1-Trichloroethane	ug/L	ND	40	40	44.0	44.3	110	111	75-125	1	30	
1,1,2,2-Tetrachloroethane	ug/L	ND	40	40	42.5	42.7	106	107	75-125	0	30	
1,1,2-Trichloroethane	ug/L	ND	40	40	42.5	43.2	106	108	75-125	1	30	
1,1-Dichloroethane	ug/L	ND	40	40	45.8	45.5	114	114	75-125	1	30	
1,1-Dichloroethene	ug/L	ND	40	40	38.0	38.8	95	97	69-136	2	30	
1,2-Dichlorobenzene	ug/L	ND	40	40	41.3	40.7	103	102	75-125	1	30	
1,2-Dichloroethane	ug/L	ND	40	40	42.1	42.3	105	106	75-125	0	30	
1,2-Dichloropropane	ug/L	ND	40	40	45.1	45.1	113	113	75-125	0	30	
1,3-Dichlorobenzene	ug/L	ND	40	40	39.3	39.9	98	100	70-125	1	30	
1,4-Dichlorobenzene	ug/L	ND	40	40	39.7	39.5	99	99	73-125	0	30	
Bromodichloromethane	ug/L	ND	40	40	44.5	44.9	111	112	72-132	1	30	
Bromoform	ug/L	ND	40	40	40.7	40.9	102	102	75-125	0	30	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 1297909

Parameter	Units	MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 507200		507201		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	Max RPD	RPD	Qual
		1297660001 Result	MS Spike Conc.	MSD Spike Conc.									
Bromomethane	ug/L	ND	40	40	36.2	40.1	91	100	30-150	10	30		
Carbon tetrachloride	ug/L	ND	40	40	45.3	45.6	113	114	75-127	1	30		
Chlorobenzene	ug/L	ND	40	40	40.2	40.6	101	101	75-125	1	30		
Chloroethane	ug/L	ND	40	40	35.7	36.1	89	90	75-125	1	30		
Chloroform	ug/L	ND	40	40	43.7	43.9	109	110	75-125	1	30		
Chloromethane	ug/L	ND	40	40	40.6	40.8	102	102	54-125	0	30		
cis-1,2-Dichloroethene	ug/L	ND	40	40	42.7	42.8	107	107	75-125	0	30		
cis-1,3-Dichloropropene	ug/L	ND	40	40	43.2	43.1	108	108	75-125	0	30		
Dibromochloromethane	ug/L	ND	40	40	42.5	42.7	106	107	64-150	0	30		
Methylene Chloride	ug/L	ND	40	40	43.2	43.6	108	109	75-125	1	30		
Tetrachloroethene	ug/L	1.1	40	40	41.4	41.6	101	101	68-126	0	30		
trans-1,2-Dichloroethene	ug/L	ND	40	40	42.6	42.1	106	105	73-127	1	30		
trans-1,3-Dichloropropene	ug/L	ND	40	40	42.7	43.2	107	108	75-128	1	30		
Trichloroethene	ug/L	ND	40	40	41.2	41.1	103	103	71-125	0	30		
Trichlorofluoromethane	ug/L	ND	40	40	36.3	37.1	91	93	70-125	2	30		
Vinyl chloride	ug/L	ND	40	40	38.8	40.0	97	100	72-129	3	30		
1,2-Dichloroethane-d4 (S)	%.						107	108	75-125				
4-Bromofluorobenzene (S)	%.						93	93	75-125				
Toluene-d8 (S)	%.						100	101	75-125				

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

QC Batch: 127640 Analysis Method: EPA 8260B
 QC Batch Method: EPA 8260B Analysis Description: 8260 MSV Med Water
 Associated Lab Samples: 1297909009, 1297909011, 1297909012, 1297909013, 1297909014, 1297909016, 1297909020, 1297909024,
 1297909029, 1297909030, 1297909032, 1297909036, 1297909045, 1297909046, 1297909047, 1297909051,
 1297909052, 1297909053

METHOD BLANK: 507667 Matrix: Water

Associated Lab Samples: 1297909009, 1297909011, 1297909012, 1297909013, 1297909014, 1297909016, 1297909020, 1297909024,
 1297909029, 1297909030, 1297909032, 1297909036, 1297909045, 1297909046, 1297909047, 1297909051,
 1297909052, 1297909053

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	0.50	10/05/17 18:24	
1,1,2,2-Tetrachloroethane	ug/L	ND	0.50	10/05/17 18:24	
1,1,2-Trichloroethane	ug/L	ND	0.50	10/05/17 18:24	
1,1-Dichloroethane	ug/L	ND	0.50	10/05/17 18:24	
1,1-Dichloroethene	ug/L	ND	0.50	10/05/17 18:24	
1,2-Dichlorobenzene	ug/L	ND	0.50	10/05/17 18:24	
1,2-Dichloroethane	ug/L	ND	1.0	10/05/17 18:24	
1,2-Dichloropropane	ug/L	ND	0.50	10/05/17 18:24	
1,3-Dichlorobenzene	ug/L	ND	0.50	10/05/17 18:24	
1,4-Dichlorobenzene	ug/L	ND	0.50	10/05/17 18:24	
Bromodichloromethane	ug/L	ND	0.50	10/05/17 18:24	
Bromoform	ug/L	ND	2.0	10/05/17 18:24	
Bromomethane	ug/L	ND	20.0	10/05/17 18:24	
Carbon tetrachloride	ug/L	ND	0.50	10/05/17 18:24	
Chlorobenzene	ug/L	ND	0.50	10/05/17 18:24	
Chloroethane	ug/L	ND	2.0	10/05/17 18:24	
Chloroform	ug/L	ND	0.50	10/05/17 18:24	
Chloromethane	ug/L	ND	0.50	10/05/17 18:24	
cis-1,2-Dichloroethene	ug/L	ND	0.50	10/05/17 18:24	
cis-1,3-Dichloropropene	ug/L	ND	0.50	10/05/17 18:24	
Dibromochloromethane	ug/L	ND	0.50	10/05/17 18:24	
Methylene Chloride	ug/L	ND	5.0	10/05/17 18:24	
Tetrachloroethene	ug/L	ND	0.50	10/05/17 18:24	
trans-1,2-Dichloroethene	ug/L	ND	0.50	10/05/17 18:24	
trans-1,3-Dichloropropene	ug/L	ND	0.50	10/05/17 18:24	
Trichloroethene	ug/L	ND	0.50	10/05/17 18:24	
Trichlorofluoromethane	ug/L	ND	0.50	10/05/17 18:24	
Vinyl chloride	ug/L	ND	0.50	10/05/17 18:24	
1,2-Dichloroethane-d4 (S)	%	111	75-125	10/05/17 18:24	
4-Bromofluorobenzene (S)	%	87	75-125	10/05/17 18:24	
Toluene-d8 (S)	%	100	75-125	10/05/17 18:24	

LABORATORY CONTROL SAMPLE: 507668

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	40	42.2	105	75-125	

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

LABORATORY CONTROL SAMPLE: 507668

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,2,2-Tetrachloroethane	ug/L	40	41.0	103	75-125	
1,1,2-Trichloroethane	ug/L	40	40.6	101	75-125	
1,1-Dichloroethane	ug/L	40	43.8	110	75-125	
1,1-Dichloroethene	ug/L	40	39.8	99	75-125	
1,2-Dichlorobenzene	ug/L	40	38.8	97	75-125	
1,2-Dichloroethane	ug/L	40	40.5	101	75-125	
1,2-Dichloropropane	ug/L	40	43.3	108	75-125	
1,3-Dichlorobenzene	ug/L	40	38.0	95	75-125	
1,4-Dichlorobenzene	ug/L	40	37.8	95	75-125	
Bromodichloromethane	ug/L	40	42.4	106	75-125	
Bromoform	ug/L	40	37.6	94	75-128	
Bromomethane	ug/L	40	32.6	82	30-150	
Carbon tetrachloride	ug/L	40	43.7	109	75-125	
Chlorobenzene	ug/L	40	38.6	96	75-125	
Chloroethane	ug/L	40	34.1	85	75-125	
Chloroform	ug/L	40	42.1	105	75-125	
Chloromethane	ug/L	40	39.0	98	44-132	
cis-1,2-Dichloroethene	ug/L	40	41.1	103	75-125	
cis-1,3-Dichloropropene	ug/L	40	41.5	104	75-125	
Dibromochloromethane	ug/L	40	39.8	100	74-135	
Methylene Chloride	ug/L	40	41.6	104	75-125	
Tetrachloroethene	ug/L	40	38.9	97	75-125	
trans-1,2-Dichloroethene	ug/L	40	41.5	104	75-125	
trans-1,3-Dichloropropene	ug/L	40	40.5	101	75-125	
Trichloroethene	ug/L	40	39.1	98	75-125	
Trichlorofluoromethane	ug/L	40	32.7	82	72-125	
Vinyl chloride	ug/L	40	37.7	94	69-130	
1,2-Dichloroethane-d4 (S)	%			108	75-125	
4-Bromofluorobenzene (S)	%			94	75-125	
Toluene-d8 (S)	%			101	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 507671 507672

Parameter	Units	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual	
		1297909011 Result	Spike Conc.	Spike Conc.	MS Result							MSD Result
1,1,1-Trichloroethane	ug/L	ND	40	40	42.3	42.5	106	106	75-125	0	30	
1,1,2,2-Tetrachloroethane	ug/L	ND	40	40	40.8	40.8	102	102	75-125	0	30	
1,1,2-Trichloroethane	ug/L	ND	40	40	41.0	41.0	102	102	75-125	0	30	
1,1-Dichloroethane	ug/L	1.1	40	40	45.1	45.0	110	110	75-125	0	30	
1,1-Dichloroethene	ug/L	ND	40	40	38.7	40.1	97	100	69-136	3	30	
1,2-Dichlorobenzene	ug/L	ND	40	40	39.6	39.3	99	98	75-125	1	30	
1,2-Dichloroethane	ug/L	ND	40	40	40.7	40.9	102	102	75-125	0	30	
1,2-Dichloropropane	ug/L	ND	40	40	43.5	43.6	109	109	75-125	0	30	
1,3-Dichlorobenzene	ug/L	ND	40	40	38.5	38.1	96	95	70-125	1	30	
1,4-Dichlorobenzene	ug/L	ND	40	40	38.6	38.1	96	95	73-125	1	30	

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

Parameter	Units	1297909011		507671		507672		% Rec	% Rec	% Rec	Limits	RPD	Max RPD	Qual
		Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec							
Bromodichloromethane	ug/L	ND	40	40	42.8	43.2	107	108	72-132	1	30			
Bromoform	ug/L	ND	40	40	37.9	39.2	95	98	75-125	3	30			
Bromomethane	ug/L	ND	40	40	35.5	39.5	89	99	30-150	11	30			
Carbon tetrachloride	ug/L	ND	40	40	44.3	43.8	111	110	75-127	1	30			
Chlorobenzene	ug/L	ND	40	40	39.7	39.3	99	98	75-125	1	30			
Chloroethane	ug/L	ND	40	40	34.9	38.3	87	96	75-125	9	30			
Chloroform	ug/L	ND	40	40	42.3	42.5	106	106	75-125	1	30			
Chloromethane	ug/L	ND	40	40	40.0	40.2	100	101	54-125	1	30			
cis-1,2-Dichloroethene	ug/L	0.82	40	40	42.6	41.9	104	103	75-125	2	30			
cis-1,3-Dichloropropene	ug/L	ND	40	40	41.2	41.9	103	105	75-125	2	30			
Dibromochloromethane	ug/L	ND	40	40	40.8	41.2	102	103	64-150	1	30			
Methylene Chloride	ug/L	ND	40	40	42.2	42.1	106	105	75-125	0	30			
Tetrachloroethene	ug/L	0.86	40	40	40.2	39.7	98	97	68-126	1	30			
trans-1,2-Dichloroethene	ug/L	ND	40	40	41.2	41.5	103	104	73-127	1	30			
trans-1,3-Dichloropropene	ug/L	ND	40	40	40.8	41.5	102	104	75-128	2	30			
Trichloroethene	ug/L	ND	40	40	40.1	40.0	99	99	71-125	0	30			
Trichlorofluoromethane	ug/L	ND	40	40	35.2	35.4	88	88	70-125	0	30			
Vinyl chloride	ug/L	ND	40	40	38.4	38.5	96	96	72-129	0	30			
1,2-Dichloroethane-d4 (S)	%						107	107	75-125					
4-Bromofluorobenzene (S)	%						95	93	75-125					
Toluene-d8 (S)	%						100	101	75-125					

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 1297909

QC Batch: 127677 Analysis Method: EPA 8260B
QC Batch Method: EPA 8260B Analysis Description: 8260 MSV Med Water
Associated Lab Samples: 1297909003, 1297909026, 1297909027, 1297909028, 1297909034, 1297909035

METHOD BLANK: 507845 Matrix: Water
Associated Lab Samples: 1297909003, 1297909026, 1297909027, 1297909028, 1297909034, 1297909035

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	0.50	10/05/17 20:35	
1,1,2,2-Tetrachloroethane	ug/L	ND	0.50	10/05/17 20:35	
1,1,2-Trichloroethane	ug/L	ND	0.50	10/05/17 20:35	
1,1-Dichloroethane	ug/L	ND	0.50	10/05/17 20:35	
1,1-Dichloroethene	ug/L	ND	0.50	10/05/17 20:35	
1,2-Dichlorobenzene	ug/L	ND	0.50	10/05/17 20:35	
1,2-Dichloroethane	ug/L	ND	0.50	10/05/17 20:35	
1,2-Dichloropropane	ug/L	ND	0.50	10/05/17 20:35	
1,3-Dichlorobenzene	ug/L	ND	0.50	10/05/17 20:35	
1,4-Dichlorobenzene	ug/L	ND	0.50	10/05/17 20:35	
Bromodichloromethane	ug/L	ND	0.50	10/05/17 20:35	
Bromoform	ug/L	ND	0.50	10/05/17 20:35	
Bromomethane	ug/L	ND	20.0	10/05/17 20:35	
Carbon tetrachloride	ug/L	ND	0.50	10/05/17 20:35	
Chlorobenzene	ug/L	ND	0.50	10/05/17 20:35	
Chloroethane	ug/L	ND	2.0	10/05/17 20:35	
Chloroform	ug/L	ND	0.50	10/05/17 20:35	
Chloromethane	ug/L	ND	2.0	10/05/17 20:35	
cis-1,2-Dichloroethene	ug/L	ND	0.50	10/05/17 20:35	
cis-1,3-Dichloropropene	ug/L	ND	0.50	10/05/17 20:35	
Dibromochloromethane	ug/L	ND	0.50	10/05/17 20:35	
Methylene Chloride	ug/L	ND	5.0	10/05/17 20:35	
Tetrachloroethene	ug/L	ND	0.50	10/05/17 20:35	
trans-1,2-Dichloroethene	ug/L	ND	0.50	10/05/17 20:35	
trans-1,3-Dichloropropene	ug/L	ND	0.50	10/05/17 20:35	
Trichloroethene	ug/L	ND	0.50	10/05/17 20:35	
Trichlorofluoromethane	ug/L	ND	0.50	10/05/17 20:35	
Vinyl chloride	ug/L	ND	0.50	10/05/17 20:35	
1,2-Dichloroethane-d4 (S)	%	97	75-125	10/05/17 20:35	
4-Bromofluorobenzene (S)	%	92	75-125	10/05/17 20:35	
Toluene-d8 (S)	%	100	75-125	10/05/17 20:35	

LABORATORY CONTROL SAMPLE: 507846

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	40	39.0	98	75-125	
1,1,2,2-Tetrachloroethane	ug/L	40	40.0	100	75-125	
1,1,2-Trichloroethane	ug/L	40	39.9	100	75-125	
1,1-Dichloroethane	ug/L	40	40.0	100	75-125	
1,1-Dichloroethene	ug/L	40	39.1	98	75-125	

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

LABORATORY CONTROL SAMPLE: 507846

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2-Dichlorobenzene	ug/L	40	39.1	98	75-125	
1,2-Dichloroethane	ug/L	40	37.7	94	75-125	
1,2-Dichloropropane	ug/L	40	39.8	99	75-125	
1,3-Dichlorobenzene	ug/L	40	39.4	99	75-125	
1,4-Dichlorobenzene	ug/L	40	36.6	91	75-125	
Bromodichloromethane	ug/L	40	39.3	98	75-125	
Bromoform	ug/L	40	40.4	101	75-128	
Bromomethane	ug/L	40	22.7	57	30-150	
Carbon tetrachloride	ug/L	40	41.1	103	75-125	
Chlorobenzene	ug/L	40	39.2	98	75-125	
Chloroethane	ug/L	40	30.1	75	75-125	
Chloroform	ug/L	40	38.5	96	75-125	
Chloromethane	ug/L	40	44.9	112	44-132	
cis-1,2-Dichloroethene	ug/L	40	38.8	97	75-125	
cis-1,3-Dichloropropene	ug/L	40	40.6	101	75-125	
Dibromochloromethane	ug/L	40	40.4	101	74-135	
Methylene Chloride	ug/L	40	40.1	100	75-125	
Tetrachloroethene	ug/L	40	38.8	97	75-125	
trans-1,2-Dichloroethene	ug/L	40	38.8	97	75-125	
trans-1,3-Dichloropropene	ug/L	40	40.4	101	75-125	
Trichloroethene	ug/L	40	39.5	99	75-125	
Trichlorofluoromethane	ug/L	40	34.5	86	72-125	
Vinyl chloride	ug/L	40	41.7	104	69-130	
1,2-Dichloroethane-d4 (S)	%			95	75-125	
4-Bromofluorobenzene (S)	%			99	75-125	
Toluene-d8 (S)	%			100	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 507847 507848

Parameter	Units	MS		MSD		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		1297909026	Spike Conc.	Spike Conc.	Result								
1,1,1-Trichloroethane	ug/L	ND	250	250	240	239	96	96	75-125	0	30		
1,1,2,2-Tetrachloroethane	ug/L	ND	250	250	240	243	96	97	75-125	1	30		
1,1,2-Trichloroethane	ug/L	ND	250	250	237	238	95	95	75-125	0	30		
1,1-Dichloroethane	ug/L	19.5	250	250	260	263	96	97	75-125	1	30		
1,1-Dichloroethene	ug/L	ND	250	250	238	245	95	98	69-136	3	30		
1,2-Dichlorobenzene	ug/L	ND	250	250	240	240	96	96	75-125	0	30		
1,2-Dichloroethane	ug/L	ND	250	250	226	225	90	90	75-125	0	30		
1,2-Dichloropropane	ug/L	ND	250	250	245	241	98	96	75-125	2	30		
1,3-Dichlorobenzene	ug/L	ND	250	250	240	243	96	97	70-125	1	30		
1,4-Dichlorobenzene	ug/L	ND	250	250	226	227	90	91	73-125	1	30		
Bromodichloromethane	ug/L	ND	250	250	236	236	94	94	72-132	0	30		
Bromoform	ug/L	ND	250	250	245	249	98	100	75-125	2	30		
Bromomethane	ug/L	ND	250	250	152	147	61	59	30-150	4	30		
Carbon tetrachloride	ug/L	ND	250	250	248	251	99	100	75-127	1	30		

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

Parameter	Units	MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 507847		507848		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	Max RPD	RPD	Qual
		1297909026 Result	MS Spike Conc.	MSD Spike Conc.	MS Result								
Chlorobenzene	ug/L	ND	250	250	240	244	96	98	75-125	2	30		
Chloroethane	ug/L	17.4	250	250	206	204	75	75	75-125	1	30		
Chloroform	ug/L	ND	250	250	238	236	95	94	75-125	1	30		
Chloromethane	ug/L	ND	250	250	270	270	108	108	54-125	0	30		
cis-1,2-Dichloroethene	ug/L	457	250	250	651	656	78	80	75-125	1	30		
cis-1,3-Dichloropropene	ug/L	ND	250	250	250	250	100	100	75-125	0	30		
Dibromochloromethane	ug/L	ND	250	250	241	248	96	99	64-150	3	30		
Methylene Chloride	ug/L	ND	250	250	245	252	98	101	75-125	3	30		
Tetrachloroethene	ug/L	ND	250	250	237	242	95	97	68-126	2	30		
trans-1,2-Dichloroethene	ug/L	5.4	250	250	245	249	96	97	73-127	1	30		
trans-1,3-Dichloropropene	ug/L	ND	250	250	245	246	98	98	75-128	0	30		
Trichloroethene	ug/L	ND	250	250	241	242	96	97	71-125	1	30		
Trichlorofluoromethane	ug/L	ND	250	250	210	211	84	84	70-125	1	30		
Vinyl chloride	ug/L	47.7	250	250	303	302	102	102	72-129	0	30		
1,2-Dichloroethane-d4 (S)	%						93	92	75-125				
4-Bromofluorobenzene (S)	%						101	101	75-125				
Toluene-d8 (S)	%						99	99	75-125				

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

QC Batch: 127790

Analysis Method: EPA 8260B

QC Batch Method: EPA 8260B

Analysis Description: 8260 MSV Med Water

Associated Lab Samples: 1297909003, 1297909006, 1297909015, 1297909027, 1297909028, 1297909029, 1297909034, 1297909035

METHOD BLANK: 508315

Matrix: Water

Associated Lab Samples: 1297909003, 1297909006, 1297909015, 1297909027, 1297909028, 1297909029, 1297909034, 1297909035

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	0.50	10/06/17 11:50	
1,1,2,2-Tetrachloroethane	ug/L	ND	0.50	10/06/17 11:50	
1,1,2-Trichloroethane	ug/L	ND	0.50	10/06/17 11:50	
1,1-Dichloroethane	ug/L	ND	0.50	10/06/17 11:50	
1,1-Dichloroethene	ug/L	ND	0.50	10/06/17 11:50	
1,2-Dichlorobenzene	ug/L	ND	0.50	10/06/17 11:50	
1,2-Dichloroethane	ug/L	ND	0.50	10/06/17 11:50	
1,2-Dichloropropane	ug/L	ND	0.50	10/06/17 11:50	
1,3-Dichlorobenzene	ug/L	ND	0.50	10/06/17 11:50	
1,4-Dichlorobenzene	ug/L	ND	0.50	10/06/17 11:50	
Bromodichloromethane	ug/L	ND	0.50	10/06/17 11:50	
Bromoform	ug/L	ND	0.50	10/06/17 11:50	
Bromomethane	ug/L	ND	20.0	10/06/17 11:50	
Carbon tetrachloride	ug/L	ND	0.50	10/06/17 11:50	
Chlorobenzene	ug/L	ND	0.50	10/06/17 11:50	
Chloroethane	ug/L	ND	2.0	10/06/17 11:50	
Chloroform	ug/L	ND	0.50	10/06/17 11:50	
Chloromethane	ug/L	ND	2.0	10/06/17 11:50	
cis-1,2-Dichloroethene	ug/L	ND	0.50	10/06/17 11:50	
cis-1,3-Dichloropropene	ug/L	ND	0.50	10/06/17 11:50	
Dibromochloromethane	ug/L	ND	0.50	10/06/17 11:50	
Methylene Chloride	ug/L	ND	5.0	10/06/17 11:50	
Tetrachloroethene	ug/L	ND	0.50	10/06/17 11:50	
trans-1,2-Dichloroethene	ug/L	ND	0.50	10/06/17 11:50	
trans-1,3-Dichloropropene	ug/L	ND	0.50	10/06/17 11:50	
Trichloroethene	ug/L	ND	0.50	10/06/17 11:50	
Trichlorofluoromethane	ug/L	ND	0.50	10/06/17 11:50	
Vinyl chloride	ug/L	ND	0.50	10/06/17 11:50	
1,2-Dichloroethane-d4 (S)	%	95	75-125	10/06/17 11:50	
4-Bromofluorobenzene (S)	%	95	75-125	10/06/17 11:50	
Toluene-d8 (S)	%	99	75-125	10/06/17 11:50	

LABORATORY CONTROL SAMPLE: 508316

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	40	41.3	103	75-125	
1,1,2,2-Tetrachloroethane	ug/L	40	43.4	109	75-125	
1,1,2-Trichloroethane	ug/L	40	41.4	104	75-125	
1,1-Dichloroethane	ug/L	40	42.0	105	75-125	
1,1-Dichloroethene	ug/L	40	41.1	103	75-125	

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

LABORATORY CONTROL SAMPLE: 508316

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2-Dichlorobenzene	ug/L	40	40.8	102	75-125	
1,2-Dichloroethane	ug/L	40	39.6	99	75-125	
1,2-Dichloropropane	ug/L	40	42.1	105	75-125	
1,3-Dichlorobenzene	ug/L	40	42.3	106	75-125	
1,4-Dichlorobenzene	ug/L	40	38.6	96	75-125	
Bromodichloromethane	ug/L	40	40.8	102	75-125	
Bromoform	ug/L	40	43.4	109	75-128	
Bromomethane	ug/L	40	15.8J	40	30-150	
Carbon tetrachloride	ug/L	40	43.4	108	75-125	
Chlorobenzene	ug/L	40	41.4	104	75-125	
Chloroethane	ug/L	40	30.4	76	75-125	
Chloroform	ug/L	40	40.3	101	75-125	
Chloromethane	ug/L	40	50.7	127	44-132	
cis-1,2-Dichloroethene	ug/L	40	41.3	103	75-125	
cis-1,3-Dichloropropene	ug/L	40	43.1	108	75-125	
Dibromochloromethane	ug/L	40	42.5	106	74-135	
Methylene Chloride	ug/L	40	41.5	104	75-125	
Tetrachloroethene	ug/L	40	41.5	104	75-125	
trans-1,2-Dichloroethene	ug/L	40	41.5	104	75-125	
trans-1,3-Dichloropropene	ug/L	40	42.5	106	75-125	
Trichloroethene	ug/L	40	41.6	104	75-125	
Trichlorofluoromethane	ug/L	40	36.8	92	72-125	
Vinyl chloride	ug/L	40	43.9	110	69-130	
1,2-Dichloroethane-d4 (S)	%			94	75-125	
4-Bromofluorobenzene (S)	%			105	75-125	
Toluene-d8 (S)	%			100	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 508317 508318

Parameter	Units	1297660002		508318		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual	
		MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result							
1,1,1-Trichloroethane	ug/L	ND	40	40	41.9	41.1	105	103	75-125	2	30	
1,1,2,2-Tetrachloroethane	ug/L	ND	40	40	41.6	40.9	104	102	75-125	2	30	
1,1,2-Trichloroethane	ug/L	ND	40	40	40.1	39.8	100	100	75-125	1	30	
1,1-Dichloroethane	ug/L	ND	40	40	42.1	41.3	105	103	75-125	2	30	
1,1-Dichloroethene	ug/L	ND	40	40	42.2	41.5	105	104	69-136	2	30	
1,2-Dichlorobenzene	ug/L	ND	40	40	41.3	41.1	103	103	75-125	1	30	
1,2-Dichloroethane	ug/L	ND	40	40	38.8	37.7	97	94	75-125	3	30	
1,2-Dichloropropane	ug/L	ND	40	40	42.2	41.2	105	103	75-125	2	30	
1,3-Dichlorobenzene	ug/L	ND	40	40	42.3	41.9	106	105	70-125	1	30	
1,4-Dichlorobenzene	ug/L	ND	40	40	39.5	38.3	99	96	73-125	3	30	
Bromodichloromethane	ug/L	ND	40	40	40.6	39.7	102	99	72-132	2	30	
Bromoform	ug/L	ND	40	40	43.3	41.2	108	103	75-125	5	30	
Bromomethane	ug/L	ND	40	40	20.5	21.2	51	53	30-150	3	30	
Carbon tetrachloride	ug/L	ND	40	40	44.3	43.2	111	108	75-127	3	30	

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

Parameter	Units	1297660002		508317		508318		% Rec	% Rec	Limits	RPD	Max RPD	Qual
		Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result							
Chlorobenzene	ug/L	ND	40	40	41.6	41.1	104	103	75-125	1	30		
Chloroethane	ug/L	ND	40	40	30.8	31.0	77	78	75-125	1	30		
Chloroform	ug/L	ND	40	40	40.5	39.3	101	98	75-125	3	30		
Chloromethane	ug/L	ND	40	40	48.6	47.1	121	118	54-125	3	30		
cis-1,2-Dichloroethene	ug/L	ND	40	40	40.8	40.9	102	102	75-125	0	30		
cis-1,3-Dichloropropene	ug/L	ND	40	40	42.4	42.0	106	105	75-125	1	30		
Dibromochloromethane	ug/L	ND	40	40	42.2	40.8	106	102	64-150	3	30		
Methylene Chloride	ug/L	ND	40	40	42.5	41.8	106	105	75-125	2	30		
Tetrachloroethene	ug/L	21.8	40	40	63.1	62.1	103	101	68-126	2	30		
trans-1,2-Dichloroethene	ug/L	ND	40	40	41.5	41.0	104	102	73-127	1	30		
trans-1,3-Dichloropropene	ug/L	ND	40	40	42.4	41.0	106	103	75-128	3	30		
Trichloroethene	ug/L	0.50	40	40	42.5	41.7	105	103	71-125	2	30		
Trichlorofluoromethane	ug/L	ND	40	40	38.6	36.7	96	92	70-125	5	30		
Vinyl chloride	ug/L	ND	40	40	45.0	44.2	112	111	72-129	2	30		
1,2-Dichloroethane-d4 (S)	%						93	92	75-125				
4-Bromofluorobenzene (S)	%						103	103	75-125				
Toluene-d8 (S)	%						99	99	75-125				

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

QC Batch: 91196

Analysis Method: SM 5310B

QC Batch Method: SM 5310B

Analysis Description: 5310B TOC

Associated Lab Samples: 1297909002, 1297909003, 1297909006, 1297909010, 1297909015, 1297909021, 1297909026, 1297909028, 1297909029, 1297909034, 1297909042, 1297909045

METHOD BLANK: 392001

Matrix: Water

Associated Lab Samples: 1297909002, 1297909003, 1297909006, 1297909010, 1297909015, 1297909021, 1297909026, 1297909028, 1297909029, 1297909034, 1297909042, 1297909045

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Organic Carbon	mg/L	ND	1.0	10/09/17 12:09	

LABORATORY CONTROL SAMPLE: 392002

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	31.6	31.3	99	90-110	

MATRIX SPIKE SAMPLE: 392004

Parameter	Units	1297909026 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	243	500	720	95	75-125	

SAMPLE DUPLICATE: 392003

Parameter	Units	1297909026 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Organic Carbon	mg/L	243	260	7	20	

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QUALIFIERS

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 1297909

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.
ND - Not Detected at or above adjusted reporting limit.
TNTC - Too Numerous To Count
J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.
MDL - Adjusted Method Detection Limit.
PQL - Practical Quantitation Limit.
RL - Reporting Limit.
S - Surrogate
1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.
Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.
LCS(D) - Laboratory Control Sample (Duplicate)
MS(D) - Matrix Spike (Duplicate)
DUP - Sample Duplicate
RPD - Relative Percent Difference
NC - Not Calculable.
SG - Silica Gel - Clean-Up
U - Indicates the compound was analyzed for, but not detected.
N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.
Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.
TNI - The NELAC Institute.

LABORATORIES

PASI-DAV Pace Analytical Services - Davis
PASI-M Pace Analytical Services - Minneapolis
PASI-N Pace Analytical Services - New Orleans

BATCH QUALIFIERS

Batch: 127790

[1] The continuing calibration for Bromomethane is outside of Pace Analytical acceptance limits. The Bromomethane results are estimated.

ANALYTE QUALIFIERS

E Analyte concentration exceeded the calibration range. The reported result is estimated.
M0 Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
S0 Surrogate recovery outside laboratory control limits.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 1297909

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
1297909002	EX	RSK 175	501230		
1297909003	MGMS1-43	RSK 175	501230		
1297909006	MGMS2-40	RSK 175	501230		
1297909010	MGMS3-40	RSK 175	501230		
1297909015	MP-1	RSK 175	501230		
1297909021	MW-7	RSK 175	501230		
1297909026	MW-12	RSK 175	501230		
1297909028	MW-13	RSK 175	501230		
1297909029	MW-14	RSK 175	501230		
1297909034	MW-19	RSK 175	501230		
1297909042	MW-24i	RSK 175	501230		
1297909045	MW-26	RSK 175	501230		
1297909001	EW-1	EPA 8260B	127546		
1297909002	EX	EPA 8260B	127515		
1297909003	MGMS1-43	EPA 8260B	127677		
1297909003	MGMS1-43	EPA 8260B	127790		
1297909004	MGMS1-60	EPA 8260B	127546		
1297909005	MGMS1-110	EPA 8260B	127546		
1297909006	MGMS2-40	EPA 8260B	127546		
1297909006	MGMS2-40	EPA 8260B	127790		
1297909007	MGMS2-60	EPA 8260B	127546		
1297909008	MGMS2-110	EPA 8260B	127546		
1297909009	MGMS2-132	EPA 8260B	127640		
1297909010	MGMS3-40	EPA 8260B	127515		
1297909011	MGMS3-40 DUP	EPA 8260B	127640		
1297909012	MGMS3-60	EPA 8260B	127640		
1297909013	MGMS3-101	EPA 8260B	127640		
1297909014	MGMS3-132	EPA 8260B	127640		
1297909015	MP-1	EPA 8260B	127528		
1297909015	MP-1	EPA 8260B	127790		
1297909016	MW-1	EPA 8260B	127640		
1297909017	MW-2	EPA 8260B	127515		
1297909018	MW-3	EPA 8260B	127515		
1297909019	MW-5	EPA 8260B	127528		
1297909020	MW-6	EPA 8260B	127640		
1297909021	MW-7	EPA 8260B	127528		
1297909022	MW-7 DUP	EPA 8260B	127528		
1297909023	MW-8	EPA 8260B	127515		
1297909024	MW-9	EPA 8260B	127528		

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
1297909024	MW-9	EPA 8260B	127640		
1297909025	MW-10	EPA 8260B	127528		
1297909026	MW-12	EPA 8260B	127677		
1297909027	MW-12 DUP	EPA 8260B	127677		
1297909027	MW-12 DUP	EPA 8260B	127790		
1297909028	MW-13	EPA 8260B	127677		
1297909028	MW-13	EPA 8260B	127790		
1297909029	MW-14	EPA 8260B	127640		
1297909029	MW-14	EPA 8260B	127790		
1297909030	MW-15	EPA 8260B	127640		
1297909031	MW-16	EPA 8260B	127515		
1297909032	MW-17	EPA 8260B	127640		
1297909033	MW-18i	EPA 8260B	127528		
1297909034	MW-19	EPA 8260B	127677		
1297909034	MW-19	EPA 8260B	127790		
1297909035	MW-19 DUP	EPA 8260B	127677		
1297909035	MW-19 DUP	EPA 8260B	127790		
1297909036	MW-19i	EPA 8260B	127640		
1297909037	MW-20i	EPA 8260B	127528		
1297909038	MW-21i-40	EPA 8260B	127546		
1297909039	MW-21i-105	EPA 8260B	127546		
1297909040	MW-22i	EPA 8260B	127546		
1297909041	MW-23i	EPA 8260B	127528		
1297909042	MW-24i	EPA 8260B	127528		
1297909043	MW-24d	EPA 8260B	127515		
1297909044	MW-25i	EPA 8260B	127546		
1297909045	MW-26	EPA 8260B	127528		
1297909045	MW-26	EPA 8260B	127640		
1297909046	S-1	EPA 8260B	127640		
1297909047	S-2	EPA 8260B	127640		
1297909048	Field Blank	EPA 8260B	127515		
1297909049	Field Blank	EPA 8260B	127528		
1297909050	Field Blank	EPA 8260B	127546		
1297909051	Field Blank	EPA 8260B	127640		
1297909052	Equipment Blank	EPA 8260B	127640		

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 1297909

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
1297909053	Fieldblank	EPA 8260B	127640		
1297909054	Trip Blank	EPA 8260B	127528		
1297909002	EX	SM 5310B	91196		
1297909003	MGMS1-43	SM 5310B	91196		
1297909006	MGMS2-40	SM 5310B	91196		
1297909010	MGMS3-40	SM 5310B	91196		
1297909015	MP-1	SM 5310B	91196		
1297909021	MW-7	SM 5310B	91196		
1297909026	MW-12	SM 5310B	91196		
1297909028	MW-13	SM 5310B	91196		
1297909029	MW-14	SM 5310B	91196		
1297909034	MW-19	SM 5310B	91196		
1297909042	MW-24i	SM 5310B	91196		
1297909045	MW-26	SM 5310B	91196		

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2795 2nd Street, Suite 300
Davis, CA 95618
Lab: 530.297.4800
Fax: 530.297.4802

1297909

SRG # / Lab No.

Project Contact (Hardcopy or PDF To):
Stephanie Bosze

Company / Address: Apex Companies
3015 SW 1st Ave., Portland, OR 97201

Phone Number:
503-924-4707

Project #:
320001126-20

P.O. #:
Apex Companies

Project Name:
NuStar Vancouver GWM

Sampler Name & Signature: M. Masterson & J. Munsey

Global ID:
EDD Deliverable To (Email Address):
Heather.Gosack@apexcos.com
Bill to:
Apex Companies

California EDF Report? Yes No
CRA EQUIS Required Yes No
XLS Report Required Yes No

Chain-of-Custody Record and Analysis Request

Analysis Request

Other: Please Specify

TAT
 12 hr
 24 hr
 48hr
 72hr
 1 wk

For Lab Use Only

Temp °C

Initials

Date

Time

Therm. ID #

Coolant Present

Yes No

Temp °C: 8.4 / 8.0

Initials: [Signature]

Date: 10/25/17

Time: 0855

Therm. ID #: 14934

Coolant Present: Yes

Remarks:

MSMSD is from well MW-12 (extra bottles labeled as MW-12 MS/ MW-12 MSD)

Received by: [Signature]

Time: 1400

Date: 10/2/17

Received by: [Signature]

Time: [Blank]

Date: [Blank]

Received by: [Blank]

Time: [Blank]

Date: [Blank]

Received by: [Blank]

Time: [Blank]

Date: [Blank]

Received by: [Blank]

Time: [Blank]

Date: [Blank]

Received by: [Blank]

Time: [Blank]

Date: [Blank]

Received by: [Blank]

Sample Designation	Sampling		Container				Preservative				Matrix				TAT
	Date	Time	40 ml VOA	Sieve	Poly	250 mL Glass	Tedlar	HCl	HNO ₃	H ₂ SO ₄	None	Water	Soil	Air	
EW-1	9/28/2017	1106	3					3				X			X
EX	9/26/2017	0924	8					6	2			X			X
MGMS1-43	9/29/2017	1110	8					6	2			X			X
MGMS1-60	9/29/2017	1226	3					3				X			X
MGMS1-110	9/29/2017	1205	3					3				X			X
MGMS2-40	9/29/2017	1014	8					6	2			X			X
MGMS2-60	9/29/2017	0840	3					3				X			X
MGMS2-110	9/29/2017	0910	3					3				X			X
MGMS2-132	9/29/2017	0938	3					3				X			X
MGMS3-40	9/26/2017	1430	8					6	2			X			X
MGMS3-40 DUP	9/26/2017	1430	3					3				X			X
MGMS3-60	9/26/2017	1514	3					3				X			X
MGMS3-101	9/26/2017	1615	3					3				X			X

Volatle Halocarbons (EPA 8260B)

Methane, Ethane, Ethene

Temp °C: 8.4 / 8.0

Initials: [Signature]

Date: 10/25/17

Time: 0855

Therm. ID #: 14934

Coolant Present: Yes

Remarks:

MSMSD is from well MW-12 (extra bottles labeled as MW-12 MS/ MW-12 MSD)

Received by: [Signature]

Time: 1400

Date: 10/2/17

Received by: [Signature]

Time: [Blank]

Date: [Blank]

Received by: [Blank]



2795 2nd Street, Suite 300
Davis, CA 95618
Lab: 530.297.4800
Fax: 530.297.4802

1292909

Project Contact (Hardcopy or PDF To):
Stephanie Bosze

Company / Address: Apex Companies
3015 SW 1st Ave., Portland, OR 97201

Phone Number: 503-924-4704 ext 1913

Fax Number: 503-924-4707

Project #: _____ P.O. #: _____

320001126-20

Project Name: NuStar Vancouver GWM

Sampler Name & Signature: M. Masterson & J. Munsey

Global ID: _____

California EDF Report? Yes No
CRA EQUIS Required Yes No
XLS Report Required Yes No

EDD Deliverable To (Email Address):
Heather.Gosack@apexcos.com
Bill to: Apex Companies

Chain-of-Custody Record and Analysis Request

Analysis Request

Other: Please Specify

Sample Designation	Date	Time	Container				Preservative			Matrix			TAT				
			40 ml VOA	Sleeve	Poly	250 ml Glass	Tedlar	HCl	HNO ₃	H ₂ SO ₄	None	Water		Soil	Air		
MGMS3-132	09/26/17	1545	3					3				X				X	
MP-1	09/26/17	1039	8					6	2			X				X	
MW-1	09/26/17	1330	3					3				X				X	
MW-2	09/25/17	1642	3					3				X				X	
MW-3	09/25/17	1717	3					3				X				X	
MW-5	09/27/17	0955	3					3				X				X	
MW-6	09/28/17	1035	3					3				X				X	
MW-7	09/27/17	0855	8					6	2			X				X	
MW-7 DUP	09/27/17	0855	3					3				X				X	
MW-8	09/25/17	1404	3					3				X				X	
MW-9	09/27/17	0820	3					3				X				X	
MW-10	09/27/17	1208	3					3				X				X	
MW-12	09/28/17	1330	8					6	2			X				X	

Volatle Halocarbons (EPA 8260B)

TOC

Methane, Ethane, Ethene

HOLD

For Lab Use Only

Remarks:

MS/MSD is from well MW-12 (extra bottles labeled as MW-12 MS/ MW-12 MSD)

Relinquished by: _____ Date: _____ Time: _____
Received by: *Stephanie Bosze* Date: _____ Time: _____
Received by Laboratory: _____ Date: _____ Time: _____

For Lab Use Only: Sample Receipt			
Temp °C	Initials	Date	Time
			Therm. ID #
			Coolant Present
			Yes / No



2795 2nd Street, Suite 300
Davis, CA 95618
Lab: 530.297.4800
Fax: 530.297.4802

SRG # / Lab No.

1292909

Project Contact (Hardcopy or PDF To): Stephanie Bosze		California EDF Report? CRA EQUIS Required		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		XLS Report Required		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>									
Company / Address: Apex Companies 3015 SW 1st Ave., Portland, OR 97201		Global ID:		EDD Deliverable To (Email Address): Heather.Gosack@apexcos.com		Bill to: Apex Companies		Sampler Name & Signature: M. Masterson & J. Munsey		Container		Preservative		Matrix									
Phone Number: 503-924-4704 ext 1913		P.O. #:		Sleeve		Poly		Tedar		HCl		HNO ₃		H ₂ SO ₄		None		Water		Soil		Air	
Project #: 320001126-20		Project Name: NuStar Vancouver GWM		40 ml VOA		250 ml Glass																	
Project Address:		Sampling		Date		Time		Date		Time		Date		Time		Date		Time		Date		Time	
Sample Designation		Date		Time		Date		Time		Date		Time		Date		Time		Date		Time		Time	
MW-12 DUP	9/28/2017	1330	3																				
MW-12 MSMSD	9/28/2017	1330	6																				
MW-13	9/27/2017	1236	8																				
MW-14	9/26/2017	1212	8																				
MW-15	9/28/2017	0933	3																				
MW-16	9/25/2017	1335	3																				
MW-17	9/29/2017	1305	3																				
MW-18i	9/27/2017	1613	3																				
MW-19	9/26/2017	0824	8																				
MW-19 DUP	9/26/2017	0824	3																				
WM-19i	9/28/2017	0857	3																				
MW-20i	9/27/2017	1545	3																				
Relinquished by:		Date		Time		Date		Time		Date		Time		Date		Time		Date		Time		Date	
Relinquished by:		Date		Time		Date		Time		Date		Time		Date		Time		Date		Time		Date	
Relinquished by:		Date		Time		Date		Time		Date		Time		Date		Time		Date		Time		Date	

Remarks:

MS/MSD is from well MW-12 (extra bottles labeled as MW-12 MS/ MW-12 MSD)

Temp °C Initials Date Time Therm. ID # Coolant Present Yes / No



2795 2nd Street, Suite 300
 Davis, CA 95618
 Lab: 530.297.4800
 Fax: 530.297.4802

SRG # / Lab No. 1297909

Project Contact (Hardcopy or PDF To):

Stephanie Bosze
 Company / Address: Apex Companies
 3015 SW 1st Ave., Portland, OR 97201

Phone Number: 503-924-4704 ext 1913

Fax Number: 503-924-4707

Project #: 320001126-20
 P.O. #:

Project Name: NuStar Vancouver GWM

Global ID:
 EDD Deliverable To (Email Address):
 Heather.Gosack@apexcos.com
 Bill to:
 Apex Companies
 Sampler Name & Signature: M. Masterson & J. Munsey

California EDF Report?
 Yes No
CRA EQUIS Required
 Yes No
XLS Report Required
 Yes No

Chain-of-Custody Record and Analysis Request

Analysis Request

Other: Please Specify

Sample Designation	Sampling		Container				Preservative				Matrix			TAT
	Date	Time	40 ml VOA	Sieve	Poly	250 ml Glass	Tedlar	HCl	HNO ₃	H ₂ SO ₄	None	Water	Soil	
MW-21i-40	9/27/2017	1404	3					3				X		
MW-21i-105	9/27/2017	1450	3					3				X		
MW-22i	9/27/2017	1133	3					3				X		
MW-23i	9/26/2017	1241	3					3				X		
MW-24i	9/26/2017	0957	8					6	2			X		
MW-24d	9/25/2017	1443	3					3				X		
MW-25i	9/27/2017	1046	3					3				X		
MW-26	9/26/2017	1133	8					6	2			X		
S-1	9/28/2017	1232	3					3				X		
S-2	9/28/2017	1213	3					3				X		

For Lab Use Only

Volatile Halocarbons (EPA 8260B)

HOLD

TOC

Methane, Ethane, Ethene

028
029
040
041
042
043
044
045
046
047
048
049

Remarks:

MS/MSD is from well MW-12 (extra bottles labeled as MW-12 MS/ MW-12 MSD)

Received by: *[Signature]*
 Time: *10:37*
 Date: *09/25*

Received by Laboratory:
 Time:
 Date:

Received by:
 Time:
 Date:

Temp °C	Initials	Date	Time	Therm. ID #	Coolant Present
					Yes / No

Sample Condition Upon Receipt

Client Name: Aperx, LLC

Project #:

WO# : 1297909



1297909

Courier: Fed Ex UPS USPS Client
 Commercial Pace OnTrac Other: _____
 Tracking Number: _____

Custody Seal on Cooler/Box Present? Yes No Seals Intact? Yes No Optional: Proj. Due Date: Proj. Name:

Packing Material: Bubble Wrap Bubble Bags None Other: Paper Temp Blank? Yes No

Thermom. Used: DA1434 DA2285 Type of Ice: Wet Blue Dry Ice None Samples on ice, cooling process has begun

Cooler Temp Read(°C): 7.6/7.2 Cooler Temp Corrected(°C): 8.4/8.0 Biological Tissue Frozen? Yes No N/A
 Temp should be above freezing to 6°C Correction Factor: 10.8 Date and Initials of Person Examining Contents: ky 10/3/17

Comments:

Chain of Custody Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1. Containers not on COC:
Chain of Custody Filled Out?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2. mens-340 - 2 V69S containers
Chain of Custody Relinquished?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3. - 3 V69H
Sampler Name and/or Signature on COC?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	4. MW-19 Dup - 2 V69S
Samples Arrived within Hold Time?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5. MW-7 Dup - 5 V69H
Short Hold Time Analysis (<72 hr)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	6. - 2 V69S
Rush Turn Around Time Requested?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	7. MW-19 Dup - 1 V69H
Sufficient Volume?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	8. Trip Blank - 4 V69H
Correct Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9. All, except "Trip Blank", have an "X"
-Pace Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10. marked over the container labels.
Containers Intact?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	11. Note if sediment is visible in the dissolved container.
Filtered Volume Received for Dissolved Tests?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	12.
Sample Labels Match COC?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
-Includes Date/Time/ID/Analysis Matrix: <u>WT</u>		
All containers needing acid/base preservation have been checked?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	13. <input type="checkbox"/> HNO ₃ <input type="checkbox"/> H ₂ SO ₄ <input type="checkbox"/> NaOH <input type="checkbox"/> HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO ₃ , H ₂ SO ₄ , HCl<2; NaOH >9 Sulfide, NaOH >12 Cyanide)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Sample #
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	initial when completed: _____ Lot # of added preservative: _____
Headspace in VOA Vials (>6mm)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	14.
Trip Blank Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	15.
Trip Blank Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased): _____		

CLIENT NOTIFICATION/RESOLUTION

Field Data Required? Yes No

Person Contacted: _____ Date/Time: _____

Comments/Resolution: _____

Project Manager Review: Scott J. [Signature]

Date: 10/4/17

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

January 25, 2018

Stephanie Bosze-Salisbury
Apex Companies, LLC
3015 SW First Avenue
Portland, OR 97201

RE: Project: NuStar Vancouver GWM-Revised
Pace Project No.: 12100804

Dear Stephanie Bosze-Salisbury:

Enclosed are the analytical results for sample(s) received by the laboratory between November 14, 2017 and November 15, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

This report was revised on 1/4/18 to add Copper on 002, 005, 006, 025, 027, 029 and 048.

This report was revised on January 4, 2018 to include copper analysis on samples 12100804 -002, -005, -006, -025, -027, -029 and -048.

This report was further revised on January 4, 2018 to qualify the incorrect preservation used for 6010 analysis.

This report was revised on January 23, 2018 to remove copper by 6010 from this report.

This report was revised on 1/25/18 to report the metals on a separate project and report MS..MSD results on batch 131609.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



REPORT OF LABORATORY ANALYSIS

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January 25, 2018
Page 2



Julie Bowser for
Scott M Forbes
scott.forbes@pacelabs.com
(530) 297-4800
Project Manager

Enclosures

cc: Kelsi Evans, Apex Companies, LLC
Megan Masterson, Apex Companies, LLC



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 12100804

Minnesota Certification IDs

1700 Elm Street SE, Suite 200, Minneapolis, MN 55414-2485
A2LA Certification #: 2926.01
Alabama Certification #: 40770
Alaska Contaminated Sites Certification #: 17-009
Alaska DW Certification #: MN00064
Arizona Certification #: AZ0014
Arkansas Certification #: 88-0680
California Certification #: 2929
CNMI Saipan Certification #: MP0003
Colorado Certification #: MN00064
Connecticut Certification #: PH-0256
EPA Region 8+Wyoming DW Certification #: via MN 027-053-137
Florida Certification #: E87605
Georgia Certification #: 959
Guam EPA Certification #: MN00064
Hawaii Certification #: MN00064
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification #: C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky DW Certification #: 90062
Kentucky WW Certification #: 90062
Louisiana DEQ Certification #: 03086
Louisiana DW Certification #: MN00064
Maine Certification #: MN00064
Maryland Certification #: 322
Massachusetts Certification #: M-MN064

Michigan Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: MN00064
Montana Certification #: CERT0092
Nebraska Certification #: NE-OS-18-06
Nevada Certification #: MN00064
New Hampshire Certification #: 2081
New Jersey Certification #: MN002
New York Certification #: 11647
North Carolina DW Certification #: 27700
North Carolina WW Certification #: 530
North Dakota Certification #: R-036
Ohio DW Certification #: 41244
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon NwTPH Certification #: MN300001
Oregon Secondary Certification #: MN200001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification #: MN00064
South Carolina Certification #: 74003001
Tennessee Certification #: TN02818
Texas Certification #: T104704192
Utah Certification #: MN00064
Virginia Certification #: 460163
Washington Certification #: C486
West Virginia DW Certification #: 9952 C
West Virginia DEP Certification #: 382
Wisconsin Certification #: 999407970

Davis Certification IDs

2795 Second Street Suite 300 Davis, CA 95618
North Dakota Certification #: R-214
Oregon Certification #: CA300002
Washington Certification #: C926-15a

California Certification #: 08263CA
Minnesota Department of Health Certification #: 006-999-465

New Orleans Certification IDs

California Env. Lab Accreditation Program Branch: 11277CA
Florida Department of Health (NELAC): E87595
Illinois Environmental Protection Agency: 0025721
Kansas Department of Health and Environment (NELAC): E-10266
Louisiana Dept. of Environmental Quality (NELAC/LELAP): 02006

Pennsylvania Dept. of Env Protection (NELAC): 68-04202
Texas Commission on Env. Quality (NELAC): T104704405-09-TX
U.S. Dept. of Agriculture Foreign Soil Import: P330-10-00119
Commonwealth of Virginia (TNI): 480246

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Lab ID	Sample ID	Matrix	Date Collected	Date Received
12100804001	EW-1	Water	11/09/17 09:15	11/14/17 09:55
12100804002	MGMS1-43	Water	11/07/17 16:20	11/14/17 09:55
12100804005	MGMS2-40	Water	11/09/17 16:02	11/14/17 09:55
12100804009	MGMS3-40	Water	11/10/17 12:25	11/14/17 09:55
12100804014	MP-1	Water	11/09/17 10:43	11/14/17 09:55
12100804020	MW-7	Water	11/07/17 09:10	11/14/17 09:55
12100804025	MW-12	Water	11/09/17 09:06	11/14/17 09:55
12100804027	MW-13	Water	11/07/17 14:25	11/14/17 09:55
12100804028	MW-14	Water	11/08/17 09:50	11/14/17 09:55
12100804033	MW-19	Water	11/09/17 12:36	11/14/17 09:55
12100804041	MW-24i	Water	11/09/17 11:49	11/14/17 09:55
12100804044	MW-26	Water	11/08/17 13:07	11/14/17 09:55
12100804003	MGMS1-60	Water	11/07/17 15:41	11/14/17 09:55
12100804004	MGMS1-110	Water	11/07/17 16:58	11/14/17 09:55
12100804006	MGMS2-60	Water	11/09/17 15:39	11/14/17 09:55
12100804007	MGMS2-110	Water	11/09/17 15:04	11/14/17 09:55
12100804008	MGMS2-132	Water	11/09/17 14:26	11/14/17 09:55
12100804010	MGMS3-40 DUP	Water	11/10/17 12:25	11/14/17 09:55
12100804011	MGMS3-60	Water	11/10/17 11:52	11/14/17 09:55
12100804012	MGMS3-101	Water	11/10/17 11:26	11/14/17 09:55
12100804013	MGMS3-132	Water	11/10/17 10:36	11/14/17 09:55
12100804015	MW-1	Water	11/09/17 10:09	11/14/17 09:55
12100804016	MW-2	Water	11/06/17 12:38	11/14/17 09:55
12100804017	MW-3	Water	11/08/17 16:45	11/14/17 09:55
12100804018	MW-5	Water	11/07/17 10:15	11/14/17 09:55
12100804019	MW-6	Water	11/07/17 13:43	11/14/17 09:55
12100804021	MW-7 DUP	Water	11/07/17 09:10	11/14/17 09:55
12100804022	MW-8	Water	11/06/17 11:12	11/14/17 09:55
12100804023	MW-9	Water	11/07/17 08:18	11/14/17 09:55
12100804024	MW-10	Water	11/06/17 13:30	11/14/17 09:55
12100804026	MW-12 DUP	Water	11/09/17 08:06	11/14/17 09:55
12100804029	MW-15	Water	11/06/17 16:31	11/14/17 09:55
12100804030	MW-16	Water	11/06/17 11:53	11/14/17 09:55
12100804031	MW-17	Water	11/08/17 08:08	11/14/17 09:55
12100804032	MW-18i	Water	11/07/17 12:13	11/14/17 09:55
12100804034	MW-19 DUP	Water	11/09/17 12:36	11/14/17 09:55
12100804035	MW-19i	Water	11/08/17 16:04	11/14/17 09:55

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Lab ID	Sample ID	Matrix	Date Collected	Date Received
12100804036	MW-20i	Water	11/07/17 12:51	11/14/17 09:55
12100804037	MW-21i-40	Water	11/08/17 15:10	11/14/17 09:55
12100804038	MW-21i-105	Water	11/08/17 14:30	11/14/17 09:55
12100804039	MW-22i	Water	11/07/17 11:02	11/14/17 09:55
12100804040	MW-23i	Water	11/08/17 09:07	11/14/17 09:55
12100804042	MW-24d	Water	11/06/17 10:30	11/14/17 09:55
12100804043	MW-25i	Water	11/08/17 12:28	11/14/17 09:55
12100804045	MW-32s	Water	11/10/17 09:11	11/14/17 09:55
12100804046	MW-32i	Water	11/10/17 08:32	11/14/17 09:55
12100804047	S-1	Water	11/08/17 10:53	11/14/17 09:55
12100804048	S-2	Water	11/08/17 11:27	11/14/17 09:55
12100804049	FB-110617	Water	11/06/17 09:50	11/14/17 09:55
12100804050	FB-11072017	Water	11/07/17 07:45	11/14/17 09:55
12100804051	FB-11082017	Water	11/08/17 07:35	11/14/17 09:55
12100804052	FB-11092017	Water	11/09/17 07:30	11/14/17 09:55
12100804053	FB-11102017	Water	11/10/17 07:40	11/14/17 09:55
12100804054	EB-11082017	Water	11/08/17 08:25	11/14/17 09:55
12100804055	Trip Blank	Water	11/06/17 00:00	11/15/17 09:55

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 12100804

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
12100804001	EW-1	EPA 8260B	PP1	31	PASI-DAV
12100804002	MGMS1-43	RSK 175	DR1	3	PASI-M
		EPA 8260B	PP1	31	PASI-DAV
		SM 5310B	KWS	1	PASI-N
12100804005	MGMS2-40	RSK 175	DR1	3	PASI-M
		EPA 8260B	PP1	31	PASI-DAV
		SM 5310B	KWS	1	PASI-N
12100804009	MGMS3-40	RSK 175	DR1	3	PASI-M
		EPA 8260B	PP1	31	PASI-DAV
		SM 5310B	KWS	1	PASI-N
12100804014	MP-1	RSK 175	DR1	3	PASI-M
		EPA 8260B	PP1	31	PASI-DAV
		SM 5310B	KWS	1	PASI-N
12100804020	MW-7	RSK 175	DR1	3	PASI-M
		EPA 8260B	PP1	31	PASI-DAV
		SM 5310B	KWS	1	PASI-N
12100804025	MW-12	RSK 175	DR1	3	PASI-M
		EPA 8260B	PP1	31	PASI-DAV
		SM 5310B	KWS	1	PASI-N
12100804027	MW-13	RSK 175	DR1	3	PASI-M
		EPA 8260B	PP1	31	PASI-DAV
		SM 5310B	KWS	1	PASI-N
12100804028	MW-14	RSK 175	DR1	3	PASI-M
		EPA 8260B	PP1	31	PASI-DAV
		SM 5310B	KWS	1	PASI-N
12100804033	MW-19	RSK 175	DR1	3	PASI-M
		EPA 8260B	PP1	31	PASI-DAV
		SM 5310B	KWS	1	PASI-N
12100804041	MW-24i	RSK 175	DR1	3	PASI-M
		EPA 8260B	PP1	31	PASI-DAV
		SM 5310B	KWS	1	PASI-N
12100804044	MW-26	RSK 175	DR1	3	PASI-M
		EPA 8260B	PP1	31	PASI-DAV
		SM 5310B	KWS	1	PASI-N
12100804003	MGMS1-60	EPA 8260B	PP1	31	PASI-DAV
12100804004	MGMS1-110	EPA 8260B	PP1	31	PASI-DAV
12100804006	MGMS2-60	EPA 8260B	PP1	31	PASI-DAV

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SAMPLE ANALYTE COUNT

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
12100804007	MGMS2-110	EPA 8260B	PP1	31	PASI-DAV
12100804008	MGMS2-132	EPA 8260B	PP1	31	PASI-DAV
12100804010	MGMS3-40 DUP	EPA 8260B	PP1	31	PASI-DAV
12100804011	MGMS3-60	EPA 8260B	PP1	31	PASI-DAV
12100804012	MGMS3-101	EPA 8260B	PP1	31	PASI-DAV
12100804013	MGMS3-132	EPA 8260B	PP1	31	PASI-DAV
12100804015	MW-1	EPA 8260B	PP1	31	PASI-DAV
12100804016	MW-2	EPA 8260B	PP1	31	PASI-DAV
12100804017	MW-3	EPA 8260B	PP1	31	PASI-DAV
12100804018	MW-5	EPA 8260B	PP1	31	PASI-DAV
12100804019	MW-6	EPA 8260B	PP1	31	PASI-DAV
12100804021	MW-7 DUP	EPA 8260B	PP1	31	PASI-DAV
12100804022	MW-8	EPA 8260B	PP1	31	PASI-DAV
12100804023	MW-9	EPA 8260B	PP1	31	PASI-DAV
12100804024	MW-10	EPA 8260B	PP1	31	PASI-DAV
12100804026	MW-12 DUP	EPA 8260B	PP1	31	PASI-DAV
12100804029	MW-15	EPA 8260B	PP1	31	PASI-DAV
12100804030	MW-16	EPA 8260B	PP1	31	PASI-DAV
12100804031	MW-17	EPA 8260B	PP1	31	PASI-DAV
12100804032	MW-18i	EPA 8260B	PP1	31	PASI-DAV
12100804034	MW-19 DUP	EPA 8260B	PP1	31	PASI-DAV
12100804035	MW-19i	EPA 8260B	PP1	31	PASI-DAV
12100804036	MW-20i	EPA 8260B	PP1	31	PASI-DAV
12100804037	MW-21i-40	EPA 8260B	PP1	31	PASI-DAV
12100804038	MW-21i-105	EPA 8260B	PP1	31	PASI-DAV
12100804039	MW-22i	EPA 8260B	PP1	31	PASI-DAV
12100804040	MW-23i	EPA 8260B	PP1	31	PASI-DAV
12100804042	MW-24d	EPA 8260B	PP1	31	PASI-DAV
12100804043	MW-25i	EPA 8260B	PP1	31	PASI-DAV
12100804045	MW-32s	EPA 8260B	PP1	31	PASI-DAV
12100804046	MW-32i	EPA 8260B	PP1	31	PASI-DAV
12100804047	S-1	EPA 8260B	PP1	31	PASI-DAV
12100804048	S-2	EPA 8260B	PP1	31	PASI-DAV
12100804049	FB-110617	EPA 8260B	PP1	31	PASI-DAV
12100804050	FB-11072017	EPA 8260B	PP1	31	PASI-DAV
12100804051	FB-11082017	EPA 8260B	PP1	31	PASI-DAV
12100804052	FB-11092017	EPA 8260B	PP1	31	PASI-DAV

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SAMPLE ANALYTE COUNT

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
12100804053	FB-11102017	EPA 8260B	PP1	31	PASI-DAV
12100804054	EB-11082017	EPA 8260B	PP1	31	PASI-DAV

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Sample: EW-1		Lab ID: 12100804001	Collected: 11/09/17 09:15	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/15/17 17:08	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/15/17 17:08	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/15/17 17:08	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/15/17 17:08	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/15/17 17:08	108-90-7	
Chloroethane	ND	ug/L	2.0	1		11/15/17 17:08	75-00-3	
Chloroform	0.91	ug/L	0.50	1		11/15/17 17:08	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/15/17 17:08	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		11/15/17 17:08	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 17:08	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 17:08	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 17:08	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		11/15/17 17:08	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/15/17 17:08	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		11/15/17 17:08	75-35-4	
cis-1,2-Dichloroethene	3.3	ug/L	0.50	1		11/15/17 17:08	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		11/15/17 17:08	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/15/17 17:08	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 17:08	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 17:08	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/15/17 17:08	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		11/15/17 17:08	79-34-5	
Tetrachloroethene	33.0	ug/L	0.50	1		11/15/17 17:08	127-18-4	
1,1,1-Trichloroethane	0.66	ug/L	0.50	1		11/15/17 17:08	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/15/17 17:08	79-00-5	
Trichloroethene	7.3	ug/L	0.50	1		11/15/17 17:08	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/15/17 17:08	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		11/15/17 17:08	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	111	%	75-125	1		11/15/17 17:08	17060-07-0	
Toluene-d8 (S)	103	%	75-125	1		11/15/17 17:08	2037-26-5	
4-Bromofluorobenzene (S)	97	%	75-125	1		11/15/17 17:08	460-00-4	

Sample: MGMS1-43		Lab ID: 12100804002	Collected: 11/07/17 16:20	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175						
Ethane	30.5	ug/L	10.0	1		11/20/17 09:30	74-84-0	
Ethene	ND	ug/L	10.0	1		11/20/17 09:30	74-85-1	
Methane	5040	ug/L	10.0	1		11/20/17 09:30	74-82-8	
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	2.5	5		11/15/17 20:18	75-27-4	
Bromoform	ND	ug/L	10.0	5		11/15/17 20:18	75-25-2	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Sample: MGMS1-43 **Lab ID: 12100804002** Collected: 11/07/17 16:20 Received: 11/14/17 09:55 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromomethane	ND	ug/L	100	5		11/15/17 20:18	74-83-9	
Carbon tetrachloride	ND	ug/L	2.5	5		11/15/17 20:18	56-23-5	
Chlorobenzene	ND	ug/L	2.5	5		11/15/17 20:18	108-90-7	
Chloroethane	ND	ug/L	10.0	5		11/15/17 20:18	75-00-3	
Chloroform	ND	ug/L	2.5	5		11/15/17 20:18	67-66-3	
Chloromethane	ND	ug/L	2.5	5		11/15/17 20:18	74-87-3	
Dibromochloromethane	ND	ug/L	2.5	5		11/15/17 20:18	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	2.5	5		11/15/17 20:18	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	2.5	5		11/15/17 20:18	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	2.5	5		11/15/17 20:18	106-46-7	
1,1-Dichloroethane	153	ug/L	2.5	5		11/15/17 20:18	75-34-3	
1,2-Dichloroethane	ND	ug/L	2.5	5		11/15/17 20:18	107-06-2	
1,1-Dichloroethene	13.7	ug/L	2.5	5		11/15/17 20:18	75-35-4	
cis-1,2-Dichloroethene	2350	ug/L	50.0	100		11/17/17 16:17	156-59-2	HS
trans-1,2-Dichloroethene	26.6	ug/L	2.5	5		11/15/17 20:18	156-60-5	
1,2-Dichloropropane	ND	ug/L	2.5	5		11/15/17 20:18	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	2.5	5		11/15/17 20:18	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	2.5	5		11/15/17 20:18	10061-02-6	
Methylene Chloride	ND	ug/L	25.0	5		11/15/17 20:18	75-09-2	
1,1,1,2-Tetrachloroethane	ND	ug/L	2.5	5		11/15/17 20:18	79-34-5	
Tetrachloroethene	108	ug/L	2.5	5		11/15/17 20:18	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	2.5	5		11/15/17 20:18	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	2.5	5		11/15/17 20:18	79-00-5	
Trichloroethene	211	ug/L	2.5	5		11/15/17 20:18	79-01-6	
Trichlorofluoromethane	ND	ug/L	2.5	5		11/15/17 20:18	75-69-4	
Vinyl chloride	181	ug/L	2.5	5		11/15/17 20:18	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	107	%	75-125	5		11/15/17 20:18	17060-07-0	
Toluene-d8 (S)	102	%	75-125	5		11/15/17 20:18	2037-26-5	
4-Bromofluorobenzene (S)	97	%	75-125	5		11/15/17 20:18	460-00-4	

5310B TOC Analytical Method: SM 5310B

Total Organic Carbon	5.6	mg/L	1.0	1		11/21/17 11:48	7440-44-0	
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Sample: MGMS2-40 **Lab ID: 12100804005** Collected: 11/09/17 16:02 Received: 11/14/17 09:55 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175						
Ethane	31.4	ug/L	10.0	1		11/20/17 10:28	74-84-0	
Ethene	95.7	ug/L	10.0	1		11/20/17 10:28	74-85-1	
Methane	842	ug/L	10.0	1		11/20/17 10:28	74-82-8	

8260 MSV Med Water Analytical Method: EPA 8260B

Bromodichloromethane	ND	ug/L	0.50	1		11/16/17 14:11	75-27-4	
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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Sample: MGMS2-40	Lab ID: 12100804005	Collected: 11/09/17 16:02	Received: 11/14/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromoform	ND	ug/L	2.0	1		11/16/17 14:11	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/16/17 14:11	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/16/17 14:11	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/16/17 14:11	108-90-7	
Chloroethane	ND	ug/L	2.0	1		11/16/17 14:11	75-00-3	
Chloroform	ND	ug/L	0.50	1		11/16/17 14:11	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/16/17 14:11	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		11/16/17 14:11	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 14:11	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 14:11	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 14:11	106-46-7	
1,1-Dichloroethane	21.3	ug/L	0.50	1		11/16/17 14:11	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/16/17 14:11	107-06-2	
1,1-Dichloroethene	0.86	ug/L	0.50	1		11/16/17 14:11	75-35-4	
cis-1,2-Dichloroethene	61.6	ug/L	0.50	1		11/16/17 14:11	156-59-2	
trans-1,2-Dichloroethene	0.52	ug/L	0.50	1		11/16/17 14:11	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/16/17 14:11	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 14:11	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 14:11	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/16/17 14:11	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		11/16/17 14:11	79-34-5	
Tetrachloroethene	13.2	ug/L	0.50	1		11/16/17 14:11	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/16/17 14:11	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/16/17 14:11	79-00-5	
Trichloroethene	9.2	ug/L	0.50	1		11/16/17 14:11	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/16/17 14:11	75-69-4	
Vinyl chloride	170	ug/L	0.50	1		11/16/17 14:11	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	114	%	75-125	1		11/16/17 14:11	17060-07-0	
Toluene-d8 (S)	96	%	75-125	1		11/16/17 14:11	2037-26-5	
4-Bromofluorobenzene (S)	97	%	75-125	1		11/16/17 14:11	460-00-4	
5310B TOC		Analytical Method: SM 5310B						
Total Organic Carbon	6.2	mg/L	1.0	1		11/21/17 12:07	7440-44-0	

Sample: MGMS3-40	Lab ID: 12100804009	Collected: 11/10/17 12:25	Received: 11/14/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175						
Ethane	55.0	ug/L	10.0	1		11/20/17 11:27	74-84-0	
Ethene	54.8	ug/L	10.0	1		11/20/17 11:27	74-85-1	
Methane	9460	ug/L	10.0	1		11/20/17 11:27	74-82-8	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Sample: MGMS3-40		Lab ID: 12100804009	Collected: 11/10/17 12:25	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/15/17 13:26	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/15/17 13:26	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/15/17 13:26	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/15/17 13:26	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/15/17 13:26	108-90-7	
Chloroethane	ND	ug/L	2.0	1		11/15/17 13:26	75-00-3	
Chloroform	ND	ug/L	0.50	1		11/15/17 13:26	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/15/17 13:26	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		11/15/17 13:26	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 13:26	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 13:26	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 13:26	106-46-7	
1,1-Dichloroethane	4.2	ug/L	0.50	1		11/15/17 13:26	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/15/17 13:26	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		11/15/17 13:26	75-35-4	
cis-1,2-Dichloroethene	7.6	ug/L	0.50	1		11/15/17 13:26	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		11/15/17 13:26	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/15/17 13:26	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 13:26	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 13:26	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/15/17 13:26	75-09-2	
1,1,1,2-Tetrachloroethane	ND	ug/L	0.50	1		11/15/17 13:26	79-34-5	
Tetrachloroethene	0.85	ug/L	0.50	1		11/15/17 13:26	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/15/17 13:26	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/15/17 13:26	79-00-5	
Trichloroethene	ND	ug/L	0.50	1		11/15/17 13:26	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/15/17 13:26	75-69-4	
Vinyl chloride	12.8	ug/L	0.50	1		11/15/17 13:26	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	104	%	75-125	1		11/15/17 13:26	17060-07-0	
Toluene-d8 (S)	96	%	75-125	1		11/15/17 13:26	2037-26-5	
4-Bromofluorobenzene (S)	98	%	75-125	1		11/15/17 13:26	460-00-4	
5310B TOC		Analytical Method: SM 5310B						
Total Organic Carbon	6.5	mg/L	1.0	1		11/21/17 12:26	7440-44-0	

Sample: MP-1		Lab ID: 12100804014	Collected: 11/09/17 10:43	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175						
Ethane	ND	ug/L	10.0	1		11/20/17 10:35	74-84-0	
Ethene	ND	ug/L	10.0	1		11/20/17 10:35	74-85-1	
Methane	3470	ug/L	10.0	1		11/20/17 10:35	74-82-8	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 12100804

Sample: MP-1		Lab ID: 12100804014	Collected: 11/09/17 10:43	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/16/17 14:38	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/16/17 14:38	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/16/17 14:38	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/16/17 14:38	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/16/17 14:38	108-90-7	
Chloroethane	ND	ug/L	2.0	1		11/16/17 14:38	75-00-3	
Chloroform	ND	ug/L	0.50	1		11/16/17 14:38	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/16/17 14:38	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		11/16/17 14:38	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 14:38	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 14:38	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 14:38	106-46-7	
1,1-Dichloroethane	3.3	ug/L	0.50	1		11/16/17 14:38	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/16/17 14:38	107-06-2	
1,1-Dichloroethene	4.3	ug/L	0.50	1		11/16/17 14:38	75-35-4	
cis-1,2-Dichloroethene	105	ug/L	0.50	1		11/16/17 14:38	156-59-2	
trans-1,2-Dichloroethene	0.91	ug/L	0.50	1		11/16/17 14:38	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/16/17 14:38	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 14:38	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 14:38	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/16/17 14:38	75-09-2	
1,1,1,2-Tetrachloroethane	ND	ug/L	0.50	1		11/16/17 14:38	79-34-5	
Tetrachloroethene	198	ug/L	5.0	10		11/15/17 21:13	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/16/17 14:38	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/16/17 14:38	79-00-5	
Trichloroethene	74.0	ug/L	0.50	1		11/16/17 14:38	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/16/17 14:38	75-69-4	
Vinyl chloride	2.6	ug/L	0.50	1		11/16/17 14:38	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	112	%	75-125	1		11/16/17 14:38	17060-07-0	
Toluene-d8 (S)	102	%	75-125	1		11/16/17 14:38	2037-26-5	
4-Bromofluorobenzene (S)	97	%	75-125	1		11/16/17 14:38	460-00-4	
5310B TOC		Analytical Method: SM 5310B						
Total Organic Carbon	3.7	mg/L	1.0	1		11/21/17 12:44	7440-44-0	

Sample: MW-7		Lab ID: 12100804020	Collected: 11/07/17 09:10	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175						
Ethane	ND	ug/L	10.0	1		11/20/17 09:37	74-84-0	
Ethene	ND	ug/L	10.0	1		11/20/17 09:37	74-85-1	
Methane	4980	ug/L	10.0	1		11/20/17 09:37	74-82-8	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Sample: MW-7	Lab ID: 12100804020	Collected: 11/07/17 09:10	Received: 11/14/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/15/17 17:35	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/15/17 17:35	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/15/17 17:35	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/15/17 17:35	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/15/17 17:35	108-90-7	
Chloroethane	ND	ug/L	2.0	1		11/15/17 17:35	75-00-3	
Chloroform	ND	ug/L	0.50	1		11/15/17 17:35	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/15/17 17:35	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		11/15/17 17:35	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 17:35	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 17:35	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 17:35	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		11/15/17 17:35	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/15/17 17:35	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		11/15/17 17:35	75-35-4	
cis-1,2-Dichloroethene	2.6	ug/L	0.50	1		11/15/17 17:35	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		11/15/17 17:35	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/15/17 17:35	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 17:35	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 17:35	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/15/17 17:35	75-09-2	
1,1,1,2-Tetrachloroethane	ND	ug/L	0.50	1		11/15/17 17:35	79-34-5	
Tetrachloroethene	6.3	ug/L	0.50	1		11/15/17 17:35	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/15/17 17:35	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/15/17 17:35	79-00-5	
Trichloroethene	7.8	ug/L	0.50	1		11/15/17 17:35	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/15/17 17:35	75-69-4	
Vinyl chloride	1.4	ug/L	0.50	1		11/15/17 17:35	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	112	%	75-125	1		11/15/17 17:35	17060-07-0	
Toluene-d8 (S)	95	%	75-125	1		11/15/17 17:35	2037-26-5	
4-Bromofluorobenzene (S)	96	%	75-125	1		11/15/17 17:35	460-00-4	
5310B TOC		Analytical Method: SM 5310B						
Total Organic Carbon	3.1	mg/L	1.0	1		11/21/17 13:03	7440-44-0	

Sample: MW-12	Lab ID: 12100804025	Collected: 11/09/17 09:06	Received: 11/14/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175						
Ethane	ND	ug/L	10.0	1		11/20/17 09:44	74-84-0	
Ethene	ND	ug/L	10.0	1		11/20/17 09:44	74-85-1	
Methane	8900	ug/L	10.0	1		11/20/17 09:44	74-82-8	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Sample: MW-12	Lab ID: 12100804025	Collected: 11/09/17 09:06	Received: 11/14/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/16/17 10:56	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/16/17 10:56	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/16/17 10:56	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/16/17 10:56	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/16/17 10:56	108-90-7	
Chloroethane	15.4	ug/L	2.0	1		11/16/17 10:56	75-00-3	
Chloroform	ND	ug/L	0.50	1		11/16/17 10:56	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/16/17 10:56	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		11/16/17 10:56	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 10:56	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 10:56	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 10:56	106-46-7	
1,1-Dichloroethane	4.5	ug/L	0.50	1		11/16/17 10:56	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/16/17 10:56	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		11/16/17 10:56	75-35-4	
cis-1,2-Dichloroethene	22.2	ug/L	0.50	1		11/16/17 10:56	156-59-2	
trans-1,2-Dichloroethene	1.4	ug/L	0.50	1		11/16/17 10:56	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/16/17 10:56	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 10:56	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 10:56	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/16/17 10:56	75-09-2	
1,1,1,2-Tetrachloroethane	ND	ug/L	0.50	1		11/16/17 10:56	79-34-5	
Tetrachloroethene	ND	ug/L	0.50	1		11/16/17 10:56	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/16/17 10:56	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/16/17 10:56	79-00-5	
Trichloroethene	ND	ug/L	0.50	1		11/16/17 10:56	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/16/17 10:56	75-69-4	M1
Vinyl chloride	49.1	ug/L	0.50	1		11/16/17 10:56	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	105	%	75-125	1		11/16/17 10:56	17060-07-0	
Toluene-d8 (S)	101	%	75-125	1		11/16/17 10:56	2037-26-5	
4-Bromofluorobenzene (S)	95	%	75-125	1		11/16/17 10:56	460-00-4	
5310B TOC		Analytical Method: SM 5310B						
Total Organic Carbon	326	mg/L	5.0	5		11/21/17 13:22	7440-44-0	M1

Sample: MW-13	Lab ID: 12100804027	Collected: 11/07/17 14:25	Received: 11/14/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175						
Ethane	ND	ug/L	10.0	1		11/20/17 10:06	74-84-0	
Ethene	11.6	ug/L	10.0	1		11/20/17 10:06	74-85-1	
Methane	10600	ug/L	10.0	1		11/20/17 10:06	74-82-8	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Sample: MW-13		Lab ID: 12100804027	Collected: 11/07/17 14:25	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	4.2	8.33		11/16/17 21:00	75-27-4	
Bromoform	ND	ug/L	16.7	8.33		11/16/17 21:00	75-25-2	
Bromomethane	ND	ug/L	167	8.33		11/16/17 21:00	74-83-9	
Carbon tetrachloride	ND	ug/L	4.2	8.33		11/16/17 21:00	56-23-5	
Chlorobenzene	ND	ug/L	4.2	8.33		11/16/17 21:00	108-90-7	
Chloroethane	ND	ug/L	16.7	8.33		11/16/17 21:00	75-00-3	
Chloroform	ND	ug/L	4.2	8.33		11/16/17 21:00	67-66-3	
Chloromethane	ND	ug/L	4.2	8.33		11/16/17 21:00	74-87-3	
Dibromochloromethane	ND	ug/L	4.2	8.33		11/16/17 21:00	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	4.2	8.33		11/16/17 21:00	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	4.2	8.33		11/16/17 21:00	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	4.2	8.33		11/16/17 21:00	106-46-7	
1,1-Dichloroethane	ND	ug/L	4.2	8.33		11/16/17 21:00	75-34-3	
1,2-Dichloroethane	ND	ug/L	4.2	8.33		11/16/17 21:00	107-06-2	
1,1-Dichloroethene	ND	ug/L	4.2	8.33		11/16/17 21:00	75-35-4	
cis-1,2-Dichloroethene	1360	ug/L	62.5	125		11/15/17 20:35	156-59-2	
trans-1,2-Dichloroethene	5.4	ug/L	4.2	8.33		11/16/17 21:00	156-60-5	
1,2-Dichloropropane	ND	ug/L	4.2	8.33		11/16/17 21:00	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	4.2	8.33		11/16/17 21:00	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	4.2	8.33		11/16/17 21:00	10061-02-6	
Methylene Chloride	ND	ug/L	41.6	8.33		11/16/17 21:00	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	4.2	8.33		11/16/17 21:00	79-34-5	
Tetrachloroethene	ND	ug/L	4.2	8.33		11/16/17 21:00	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	4.2	8.33		11/16/17 21:00	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	4.2	8.33		11/16/17 21:00	79-00-5	
Trichloroethene	ND	ug/L	4.2	8.33		11/16/17 21:00	79-01-6	
Trichlorofluoromethane	ND	ug/L	4.2	8.33		11/16/17 21:00	75-69-4	
Vinyl chloride	25.0	ug/L	4.2	8.33		11/16/17 21:00	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	108	%	75-125	8.33		11/16/17 21:00	17060-07-0	
Toluene-d8 (S)	101	%	75-125	8.33		11/16/17 21:00	2037-26-5	
4-Bromofluorobenzene (S)	97	%	75-125	8.33		11/16/17 21:00	460-00-4	
5310B TOC		Analytical Method: SM 5310B						
Total Organic Carbon	85.5	mg/L	1.0	1		11/21/17 14:19	7440-44-0	

Sample: MW-14		Lab ID: 12100804028	Collected: 11/08/17 09:50	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175						
Ethane	ND	ug/L	10.0	1		11/20/17 10:13	74-84-0	
Ethene	ND	ug/L	10.0	1		11/20/17 10:13	74-85-1	
Methane	1770	ug/L	10.0	1		11/20/17 10:13	74-82-8	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Sample: MW-14	Lab ID: 12100804028	Collected: 11/08/17 09:50	Received: 11/14/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.84	1.67		11/15/17 19:37	75-27-4	
Bromoform	ND	ug/L	3.3	1.67		11/15/17 19:37	75-25-2	
Bromomethane	ND	ug/L	33.4	1.67		11/15/17 19:37	74-83-9	
Carbon tetrachloride	ND	ug/L	0.84	1.67		11/15/17 19:37	56-23-5	
Chlorobenzene	ND	ug/L	0.84	1.67		11/15/17 19:37	108-90-7	
Chloroethane	ND	ug/L	3.3	1.67		11/15/17 19:37	75-00-3	
Chloroform	ND	ug/L	0.84	1.67		11/15/17 19:37	67-66-3	
Chloromethane	ND	ug/L	0.84	1.67		11/15/17 19:37	74-87-3	
Dibromochloromethane	ND	ug/L	0.84	1.67		11/15/17 19:37	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.84	1.67		11/15/17 19:37	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.84	1.67		11/15/17 19:37	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.84	1.67		11/15/17 19:37	106-46-7	
1,1-Dichloroethane	4.5	ug/L	0.84	1.67		11/15/17 19:37	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.84	1.67		11/15/17 19:37	107-06-2	
1,1-Dichloroethene	2.1	ug/L	0.84	1.67		11/15/17 19:37	75-35-4	
cis-1,2-Dichloroethene	306	ug/L	0.84	1.67		11/15/17 19:37	156-59-2	
trans-1,2-Dichloroethene	2.2	ug/L	0.84	1.67		11/15/17 19:37	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.84	1.67		11/15/17 19:37	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.84	1.67		11/15/17 19:37	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.84	1.67		11/15/17 19:37	10061-02-6	
Methylene Chloride	ND	ug/L	8.4	1.67		11/15/17 19:37	75-09-2	
1,1,1,2-Tetrachloroethane	ND	ug/L	0.84	1.67		11/15/17 19:37	79-34-5	
Tetrachloroethene	39.3	ug/L	0.84	1.67		11/15/17 19:37	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.84	1.67		11/15/17 19:37	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.84	1.67		11/15/17 19:37	79-00-5	
Trichloroethene	160	ug/L	0.84	1.67		11/15/17 19:37	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.84	1.67		11/15/17 19:37	75-69-4	
Vinyl chloride	0.91	ug/L	0.84	1.67		11/15/17 19:37	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	105	%	75-125	1.67		11/15/17 19:37	17060-07-0	
Toluene-d8 (S)	101	%	75-125	1.67		11/15/17 19:37	2037-26-5	
4-Bromofluorobenzene (S)	90	%	75-125	1.67		11/15/17 19:37	460-00-4	
5310B TOC		Analytical Method: SM 5310B						
Total Organic Carbon	8.5	mg/L	1.0	1		11/21/17 14:38	7440-44-0	

Sample: MW-19	Lab ID: 12100804033	Collected: 11/09/17 12:36	Received: 11/14/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175						
Ethane	26.9	ug/L	10.0	1		11/20/17 11:13	74-84-0	
Ethene	11.8	ug/L	10.0	1		11/20/17 11:13	74-85-1	
Methane	8460	ug/L	10.0	1		11/20/17 11:13	74-82-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Sample: MW-19		Lab ID: 12100804033	Collected: 11/09/17 12:36	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	5.0	10		11/17/17 16:44	75-27-4	
Bromoform	ND	ug/L	20.0	10		11/17/17 16:44	75-25-2	
Bromomethane	ND	ug/L	200	10		11/17/17 16:44	74-83-9	
Carbon tetrachloride	ND	ug/L	5.0	10		11/17/17 16:44	56-23-5	
Chlorobenzene	ND	ug/L	5.0	10		11/17/17 16:44	108-90-7	
Chloroethane	ND	ug/L	20.0	10		11/17/17 16:44	75-00-3	
Chloroform	ND	ug/L	5.0	10		11/17/17 16:44	67-66-3	
Chloromethane	ND	ug/L	5.0	10		11/17/17 16:44	74-87-3	
Dibromochloromethane	ND	ug/L	5.0	10		11/17/17 16:44	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	5.0	10		11/17/17 16:44	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	5.0	10		11/17/17 16:44	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	5.0	10		11/17/17 16:44	106-46-7	
1,1-Dichloroethane	104	ug/L	5.0	10		11/17/17 16:44	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	10		11/17/17 16:44	107-06-2	
1,1-Dichloroethene	24.9	ug/L	5.0	10		11/17/17 16:44	75-35-4	
cis-1,2-Dichloroethene	1660	ug/L	5.0	10		11/17/17 16:44	156-59-2	
trans-1,2-Dichloroethene	24.0	ug/L	5.0	10		11/17/17 16:44	156-60-5	
1,2-Dichloropropane	ND	ug/L	5.0	10		11/17/17 16:44	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	5.0	10		11/17/17 16:44	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	5.0	10		11/17/17 16:44	10061-02-6	
Methylene Chloride	ND	ug/L	50.0	10		11/17/17 16:44	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	5.0	10		11/17/17 16:44	79-34-5	
Tetrachloroethene	1530	ug/L	5.0	10		11/17/17 16:44	127-18-4	
1,1,1-Trichloroethane	20.2	ug/L	5.0	10		11/17/17 16:44	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	5.0	10		11/17/17 16:44	79-00-5	
Trichloroethene	1020	ug/L	5.0	10		11/17/17 16:44	79-01-6	
Trichlorofluoromethane	ND	ug/L	5.0	10		11/17/17 16:44	75-69-4	
Vinyl chloride	109	ug/L	5.0	10		11/17/17 16:44	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	118	%	75-125	10		11/17/17 16:44	17060-07-0	
Toluene-d8 (S)	98	%	75-125	10		11/17/17 16:44	2037-26-5	
4-Bromofluorobenzene (S)	98	%	75-125	10		11/17/17 16:44	460-00-4	

5310B TOC		Analytical Method: SM 5310B						
Total Organic Carbon	6.9	mg/L	1.0	1		11/21/17 16:03	7440-44-0	

Sample: MW-24i		Lab ID: 12100804041	Collected: 11/09/17 11:49	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175						
Ethane	ND	ug/L	10.0	1		11/20/17 11:20	74-84-0	
Ethene	ND	ug/L	10.0	1		11/20/17 11:20	74-85-1	
Methane	ND	ug/L	10.0	1		11/20/17 11:20	74-82-8	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Sample: MW-24i	Lab ID: 12100804041	Collected: 11/09/17 11:49	Received: 11/14/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/16/17 15:29	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/16/17 15:29	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/16/17 15:29	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/16/17 15:29	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/16/17 15:29	108-90-7	
Chloroethane	ND	ug/L	2.0	1		11/16/17 15:29	75-00-3	
Chloroform	ND	ug/L	0.50	1		11/16/17 15:29	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/16/17 15:29	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		11/16/17 15:29	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 15:29	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 15:29	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 15:29	106-46-7	
1,1-Dichloroethane	1.1	ug/L	0.50	1		11/16/17 15:29	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/16/17 15:29	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		11/16/17 15:29	75-35-4	
cis-1,2-Dichloroethene	9.6	ug/L	0.50	1		11/16/17 15:29	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		11/16/17 15:29	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/16/17 15:29	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 15:29	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 15:29	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/16/17 15:29	75-09-2	
1,1,1,2-Tetrachloroethane	ND	ug/L	0.50	1		11/16/17 15:29	79-34-5	
Tetrachloroethene	12.7	ug/L	0.50	1		11/16/17 15:29	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/16/17 15:29	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/16/17 15:29	79-00-5	
Trichloroethene	5.9	ug/L	0.50	1		11/16/17 15:29	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/16/17 15:29	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		11/16/17 15:29	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	105	%	75-125	1		11/16/17 15:29	17060-07-0	
Toluene-d8 (S)	100	%	75-125	1		11/16/17 15:29	2037-26-5	
4-Bromofluorobenzene (S)	91	%	75-125	1		11/16/17 15:29	460-00-4	

Sample: MW-26	Lab ID: 12100804044	Collected: 11/08/17 13:07	Received: 11/14/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
5310B TOC		Analytical Method: SM 5310B						
Total Organic Carbon	1.3	mg/L	1.0	1		11/21/17 16:22	7440-44-0	

Sample: MW-26	Lab ID: 12100804044	Collected: 11/08/17 13:07	Received: 11/14/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175						
Ethane	ND	ug/L	10.0	1		11/20/17 10:20	74-84-0	
Ethene	ND	ug/L	10.0	1		11/20/17 10:20	74-85-1	
Methane	3840	ug/L	10.0	1		11/20/17 10:20	74-82-8	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Sample: MW-26	Lab ID: 12100804044	Collected: 11/08/17 13:07	Received: 11/14/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/16/17 15:48	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/16/17 15:48	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/16/17 15:48	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/16/17 15:48	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/16/17 15:48	108-90-7	
Chloroethane	2.4	ug/L	2.0	1		11/16/17 15:48	75-00-3	
Chloroform	ND	ug/L	0.50	1		11/16/17 15:48	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/16/17 15:48	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		11/16/17 15:48	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 15:48	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 15:48	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 15:48	106-46-7	
1,1-Dichloroethane	4.8	ug/L	0.50	1		11/16/17 15:48	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/16/17 15:48	107-06-2	
1,1-Dichloroethene	1.5	ug/L	0.50	1		11/16/17 15:48	75-35-4	
cis-1,2-Dichloroethene	204	ug/L	2.5	5		11/17/17 16:00	156-59-2	
trans-1,2-Dichloroethene	2.3	ug/L	0.50	1		11/16/17 15:48	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/16/17 15:48	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 15:48	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 15:48	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/16/17 15:48	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		11/16/17 15:48	79-34-5	
Tetrachloroethene	88.1	ug/L	0.50	1		11/16/17 15:48	127-18-4	
1,1,1-Trichloroethane	1.0	ug/L	0.50	1		11/16/17 15:48	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/16/17 15:48	79-00-5	
Trichloroethene	170	ug/L	2.5	5		11/17/17 16:00	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/16/17 15:48	75-69-4	
Vinyl chloride	1.8	ug/L	0.50	1		11/16/17 15:48	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	105	%	75-125	1		11/16/17 15:48	17060-07-0	
Toluene-d8 (S)	100	%	75-125	1		11/16/17 15:48	2037-26-5	
4-Bromofluorobenzene (S)	90	%	75-125	1		11/16/17 15:48	460-00-4	
5310B TOC		Analytical Method: SM 5310B						
Total Organic Carbon	5.9	mg/L	1.0	1		11/21/17 16:41	7440-44-0	

Sample: MGMS1-60	Lab ID: 12100804003	Collected: 11/07/17 15:41	Received: 11/14/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/15/17 18:02	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/15/17 18:02	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/15/17 18:02	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/15/17 18:02	56-23-5	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Sample: MGMS1-60		Lab ID: 12100804003		Collected: 11/07/17 15:41	Received: 11/14/17 09:55	Matrix: Water		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Chlorobenzene	ND	ug/L	0.50	1		11/15/17 18:02	108-90-7	
Chloroethane	ND	ug/L	2.0	1		11/15/17 18:02	75-00-3	
Chloroform	ND	ug/L	0.50	1		11/15/17 18:02	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/15/17 18:02	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		11/15/17 18:02	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 18:02	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 18:02	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 18:02	106-46-7	
1,1-Dichloroethane	1.6	ug/L	0.50	1		11/15/17 18:02	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/15/17 18:02	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		11/15/17 18:02	75-35-4	
cis-1,2-Dichloroethene	24.9	ug/L	0.50	1		11/15/17 18:02	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		11/15/17 18:02	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/15/17 18:02	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 18:02	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 18:02	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/15/17 18:02	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		11/15/17 18:02	79-34-5	
Tetrachloroethene	14.0	ug/L	0.50	1		11/15/17 18:02	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/15/17 18:02	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/15/17 18:02	79-00-5	
Trichloroethene	14.7	ug/L	0.50	1		11/15/17 18:02	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/15/17 18:02	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		11/15/17 18:02	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	112	%	75-125	1		11/15/17 18:02	17060-07-0	
Toluene-d8 (S)	101	%	75-125	1		11/15/17 18:02	2037-26-5	
4-Bromofluorobenzene (S)	95	%	75-125	1		11/15/17 18:02	460-00-4	

Sample: MGMS1-110		Lab ID: 12100804004		Collected: 11/07/17 16:58	Received: 11/14/17 09:55	Matrix: Water		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/15/17 18:29	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/15/17 18:29	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/15/17 18:29	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/15/17 18:29	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/15/17 18:29	108-90-7	
Chloroethane	ND	ug/L	2.0	1		11/15/17 18:29	75-00-3	
Chloroform	ND	ug/L	0.50	1		11/15/17 18:29	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/15/17 18:29	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		11/15/17 18:29	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 18:29	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 18:29	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 18:29	106-46-7	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Sample: MGMS1-110		Lab ID: 12100804004	Collected: 11/07/17 16:58	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
1,1-Dichloroethane	10.5	ug/L	0.50	1		11/15/17 18:29	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/15/17 18:29	107-06-2	
1,1-Dichloroethene	0.91	ug/L	0.50	1		11/15/17 18:29	75-35-4	
cis-1,2-Dichloroethene	257	ug/L	5.0	10		11/16/17 23:05	156-59-2	
trans-1,2-Dichloroethene	0.67	ug/L	0.50	1		11/15/17 18:29	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/15/17 18:29	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 18:29	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 18:29	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/15/17 18:29	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		11/15/17 18:29	79-34-5	
Tetrachloroethene	11.5	ug/L	0.50	1		11/15/17 18:29	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/15/17 18:29	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/15/17 18:29	79-00-5	
Trichloroethene	41.8	ug/L	0.50	1		11/15/17 18:29	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/15/17 18:29	75-69-4	
Vinyl chloride	0.89	ug/L	0.50	1		11/15/17 18:29	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	110	%	75-125	1		11/15/17 18:29	17060-07-0	
Toluene-d8 (S)	102	%	75-125	1		11/15/17 18:29	2037-26-5	
4-Bromofluorobenzene (S)	98	%	75-125	1		11/15/17 18:29	460-00-4	

Sample: MGMS2-60		Lab ID: 12100804006	Collected: 11/09/17 15:39	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/15/17 16:22	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/15/17 16:22	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/15/17 16:22	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/15/17 16:22	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/15/17 16:22	108-90-7	
Chloroethane	ND	ug/L	2.0	1		11/15/17 16:22	75-00-3	
Chloroform	ND	ug/L	0.50	1		11/15/17 16:22	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/15/17 16:22	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		11/15/17 16:22	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 16:22	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 16:22	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 16:22	106-46-7	
1,1-Dichloroethane	1.8	ug/L	0.50	1		11/15/17 16:22	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/15/17 16:22	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		11/15/17 16:22	75-35-4	
cis-1,2-Dichloroethene	30.2	ug/L	0.50	1		11/15/17 16:22	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		11/15/17 16:22	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/15/17 16:22	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 16:22	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 16:22	10061-02-6	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Sample: MGMS2-60		Lab ID: 12100804006	Collected: 11/09/17 15:39	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Methylene Chloride	ND	ug/L	5.0	1		11/15/17 16:22	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		11/15/17 16:22	79-34-5	
Tetrachloroethene	34.2	ug/L	0.50	1		11/15/17 16:22	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/15/17 16:22	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/15/17 16:22	79-00-5	
Trichloroethene	20.1	ug/L	0.50	1		11/15/17 16:22	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/15/17 16:22	75-69-4	
Vinyl chloride	1.1	ug/L	0.50	1		11/15/17 16:22	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	105	%.	75-125	1		11/15/17 16:22	17060-07-0	
Toluene-d8 (S)	100	%.	75-125	1		11/15/17 16:22	2037-26-5	
4-Bromofluorobenzene (S)	95	%.	75-125	1		11/15/17 16:22	460-00-4	

Sample: MGMS2-110		Lab ID: 12100804007	Collected: 11/09/17 15:04	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/15/17 16:41	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/15/17 16:41	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/15/17 16:41	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/15/17 16:41	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/15/17 16:41	108-90-7	
Chloroethane	ND	ug/L	2.0	1		11/15/17 16:41	75-00-3	
Chloroform	ND	ug/L	0.50	1		11/15/17 16:41	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/15/17 16:41	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		11/15/17 16:41	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 16:41	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 16:41	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 16:41	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		11/15/17 16:41	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/15/17 16:41	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		11/15/17 16:41	75-35-4	
cis-1,2-Dichloroethene	6.3	ug/L	0.50	1		11/15/17 16:41	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		11/15/17 16:41	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/15/17 16:41	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 16:41	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 16:41	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/15/17 16:41	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		11/15/17 16:41	79-34-5	
Tetrachloroethene	3.9	ug/L	0.50	1		11/15/17 16:41	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/15/17 16:41	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/15/17 16:41	79-00-5	
Trichloroethene	3.1	ug/L	0.50	1		11/15/17 16:41	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/15/17 16:41	75-69-4	
Vinyl chloride	1.9	ug/L	0.50	1		11/15/17 16:41	75-01-4	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Sample: MGMS2-110		Lab ID: 12100804007	Collected: 11/09/17 15:04	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Surrogates								
1,2-Dichloroethane-d4 (S)	104	%.	75-125	1		11/15/17 16:41	17060-07-0	
Toluene-d8 (S)	100	%.	75-125	1		11/15/17 16:41	2037-26-5	
4-Bromofluorobenzene (S)	93	%.	75-125	1		11/15/17 16:41	460-00-4	

Sample: MGMS2-132		Lab ID: 12100804008	Collected: 11/09/17 14:26	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/15/17 17:01	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/15/17 17:01	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/15/17 17:01	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/15/17 17:01	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/15/17 17:01	108-90-7	
Chloroethane	ND	ug/L	2.0	1		11/15/17 17:01	75-00-3	
Chloroform	ND	ug/L	0.50	1		11/15/17 17:01	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/15/17 17:01	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		11/15/17 17:01	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 17:01	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 17:01	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 17:01	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		11/15/17 17:01	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/15/17 17:01	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		11/15/17 17:01	75-35-4	
cis-1,2-Dichloroethene	14.3	ug/L	0.50	1		11/15/17 17:01	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		11/15/17 17:01	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/15/17 17:01	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 17:01	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 17:01	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/15/17 17:01	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		11/15/17 17:01	79-34-5	
Tetrachloroethene	3.6	ug/L	0.50	1		11/15/17 17:01	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/15/17 17:01	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/15/17 17:01	79-00-5	
Trichloroethene	4.5	ug/L	0.50	1		11/15/17 17:01	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/15/17 17:01	75-69-4	
Vinyl chloride	5.0	ug/L	0.50	1		11/15/17 17:01	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	104	%.	75-125	1		11/15/17 17:01	17060-07-0	
Toluene-d8 (S)	100	%.	75-125	1		11/15/17 17:01	2037-26-5	
4-Bromofluorobenzene (S)	91	%.	75-125	1		11/15/17 17:01	460-00-4	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Sample: MGMS3-40 DUP		Lab ID: 12100804010	Collected: 11/10/17 12:25	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/15/17 17:20	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/15/17 17:20	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/15/17 17:20	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/15/17 17:20	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/15/17 17:20	108-90-7	
Chloroethane	ND	ug/L	2.0	1		11/15/17 17:20	75-00-3	
Chloroform	ND	ug/L	0.50	1		11/15/17 17:20	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/15/17 17:20	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		11/15/17 17:20	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 17:20	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 17:20	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 17:20	106-46-7	
1,1-Dichloroethane	4.3	ug/L	0.50	1		11/15/17 17:20	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/15/17 17:20	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		11/15/17 17:20	75-35-4	
cis-1,2-Dichloroethene	8.0	ug/L	0.50	1		11/15/17 17:20	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		11/15/17 17:20	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/15/17 17:20	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 17:20	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 17:20	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/15/17 17:20	75-09-2	
1,1,1,2-Tetrachloroethane	ND	ug/L	0.50	1		11/15/17 17:20	79-34-5	
Tetrachloroethene	0.71	ug/L	0.50	1		11/15/17 17:20	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/15/17 17:20	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/15/17 17:20	79-00-5	
Trichloroethene	ND	ug/L	0.50	1		11/15/17 17:20	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/15/17 17:20	75-69-4	
Vinyl chloride	15.8	ug/L	0.50	1		11/15/17 17:20	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	105	%	75-125	1		11/15/17 17:20	17060-07-0	
Toluene-d8 (S)	100	%	75-125	1		11/15/17 17:20	2037-26-5	
4-Bromofluorobenzene (S)	92	%	75-125	1		11/15/17 17:20	460-00-4	

Sample: MGMS3-60		Lab ID: 12100804011	Collected: 11/10/17 11:52	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/15/17 17:40	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/15/17 17:40	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/15/17 17:40	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/15/17 17:40	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/15/17 17:40	108-90-7	
Chloroethane	ND	ug/L	2.0	1		11/15/17 17:40	75-00-3	
Chloroform	ND	ug/L	0.50	1		11/15/17 17:40	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/15/17 17:40	74-87-3	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 12100804

Sample: MGMS3-60		Lab ID: 12100804011		Collected: 11/10/17 11:52	Received: 11/14/17 09:55	Matrix: Water		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Dibromochloromethane	ND	ug/L	0.50	1		11/15/17 17:40	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 17:40	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 17:40	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 17:40	106-46-7	
1,1-Dichloroethane	1.7	ug/L	0.50	1		11/15/17 17:40	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/15/17 17:40	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		11/15/17 17:40	75-35-4	
cis-1,2-Dichloroethene	37.6	ug/L	0.50	1		11/15/17 17:40	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		11/15/17 17:40	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/15/17 17:40	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 17:40	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 17:40	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/15/17 17:40	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		11/15/17 17:40	79-34-5	
Tetrachloroethene	0.78	ug/L	0.50	1		11/15/17 17:40	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/15/17 17:40	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/15/17 17:40	79-00-5	
Trichloroethene	1.5	ug/L	0.50	1		11/15/17 17:40	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/15/17 17:40	75-69-4	
Vinyl chloride	13.9	ug/L	0.50	1		11/15/17 17:40	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	106	%	75-125	1		11/15/17 17:40	17060-07-0	
Toluene-d8 (S)	101	%	75-125	1		11/15/17 17:40	2037-26-5	
4-Bromofluorobenzene (S)	92	%	75-125	1		11/15/17 17:40	460-00-4	

Sample: MGMS3-101		Lab ID: 12100804012		Collected: 11/10/17 11:26	Received: 11/14/17 09:55	Matrix: Water		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/15/17 18:00	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/15/17 18:00	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/15/17 18:00	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/15/17 18:00	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/15/17 18:00	108-90-7	
Chloroethane	ND	ug/L	2.0	1		11/15/17 18:00	75-00-3	
Chloroform	ND	ug/L	0.50	1		11/15/17 18:00	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/15/17 18:00	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		11/15/17 18:00	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 18:00	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 18:00	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 18:00	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		11/15/17 18:00	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/15/17 18:00	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		11/15/17 18:00	75-35-4	
cis-1,2-Dichloroethene	1.6	ug/L	0.50	1		11/15/17 18:00	156-59-2	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Sample: MGMS3-101		Lab ID: 12100804012		Collected: 11/10/17 11:26	Received: 11/14/17 09:55	Matrix: Water		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		11/15/17 18:00	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/15/17 18:00	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 18:00	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 18:00	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/15/17 18:00	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		11/15/17 18:00	79-34-5	
Tetrachloroethene	2.5	ug/L	0.50	1		11/15/17 18:00	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/15/17 18:00	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/15/17 18:00	79-00-5	
Trichloroethene	1.5	ug/L	0.50	1		11/15/17 18:00	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/15/17 18:00	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		11/15/17 18:00	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	106	%	75-125	1		11/15/17 18:00	17060-07-0	
Toluene-d8 (S)	100	%	75-125	1		11/15/17 18:00	2037-26-5	
4-Bromofluorobenzene (S)	92	%	75-125	1		11/15/17 18:00	460-00-4	

Sample: MGMS3-132		Lab ID: 12100804013		Collected: 11/10/17 10:36	Received: 11/14/17 09:55	Matrix: Water		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/15/17 18:38	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/15/17 18:38	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/15/17 18:38	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/15/17 18:38	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/15/17 18:38	108-90-7	
Chloroethane	ND	ug/L	2.0	1		11/15/17 18:38	75-00-3	
Chloroform	ND	ug/L	0.50	1		11/15/17 18:38	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/15/17 18:38	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		11/15/17 18:38	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 18:38	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 18:38	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 18:38	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		11/15/17 18:38	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/15/17 18:38	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		11/15/17 18:38	75-35-4	
cis-1,2-Dichloroethene	3.3	ug/L	0.50	1		11/15/17 18:38	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		11/15/17 18:38	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/15/17 18:38	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 18:38	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 18:38	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/15/17 18:38	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		11/15/17 18:38	79-34-5	
Tetrachloroethene	5.1	ug/L	0.50	1		11/15/17 18:38	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/15/17 18:38	71-55-6	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Sample: MGMS3-132		Lab ID: 12100804013	Collected: 11/10/17 10:36	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/15/17 18:38	79-00-5	
Trichloroethene	3.8	ug/L	0.50	1		11/15/17 18:38	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/15/17 18:38	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		11/15/17 18:38	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	106	%.	75-125	1		11/15/17 18:38	17060-07-0	
Toluene-d8 (S)	100	%.	75-125	1		11/15/17 18:38	2037-26-5	
4-Bromofluorobenzene (S)	90	%.	75-125	1		11/15/17 18:38	460-00-4	

Sample: MW-1		Lab ID: 12100804015	Collected: 11/09/17 10:09	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/15/17 18:19	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/15/17 18:19	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/15/17 18:19	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/15/17 18:19	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/15/17 18:19	108-90-7	
Chloroethane	ND	ug/L	2.0	1		11/15/17 18:19	75-00-3	
Chloroform	ND	ug/L	0.50	1		11/15/17 18:19	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/15/17 18:19	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		11/15/17 18:19	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 18:19	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 18:19	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 18:19	106-46-7	
1,1-Dichloroethane	5.0	ug/L	0.50	1		11/15/17 18:19	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/15/17 18:19	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		11/15/17 18:19	75-35-4	
cis-1,2-Dichloroethene	22.8	ug/L	0.50	1		11/15/17 18:19	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		11/15/17 18:19	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/15/17 18:19	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 18:19	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 18:19	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/15/17 18:19	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		11/15/17 18:19	79-34-5	
Tetrachloroethene	9.5	ug/L	0.50	1		11/15/17 18:19	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/15/17 18:19	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/15/17 18:19	79-00-5	
Trichloroethene	6.5	ug/L	0.50	1		11/15/17 18:19	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/15/17 18:19	75-69-4	
Vinyl chloride	1.1	ug/L	0.50	1		11/15/17 18:19	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	107	%.	75-125	1		11/15/17 18:19	17060-07-0	
Toluene-d8 (S)	100	%.	75-125	1		11/15/17 18:19	2037-26-5	
4-Bromofluorobenzene (S)	90	%.	75-125	1		11/15/17 18:19	460-00-4	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Sample: MW-2		Lab ID: 12100804016		Collected: 11/06/17 12:38		Received: 11/14/17 09:55		Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual	
8260 MSV Med Water		Analytical Method: EPA 8260B							
Bromodichloromethane	ND	ug/L	0.50	1		11/15/17 13:57	75-27-4		
Bromoform	ND	ug/L	2.0	1		11/15/17 13:57	75-25-2		
Bromomethane	ND	ug/L	20.0	1		11/15/17 13:57	74-83-9		
Carbon tetrachloride	ND	ug/L	0.50	1		11/15/17 13:57	56-23-5		
Chlorobenzene	ND	ug/L	0.50	1		11/15/17 13:57	108-90-7		
Chloroethane	ND	ug/L	2.0	1		11/15/17 13:57	75-00-3		
Chloroform	ND	ug/L	0.50	1		11/15/17 13:57	67-66-3		
Chloromethane	ND	ug/L	0.50	1		11/15/17 13:57	74-87-3		
Dibromochloromethane	ND	ug/L	0.50	1		11/15/17 13:57	124-48-1		
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 13:57	95-50-1		
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 13:57	541-73-1		
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 13:57	106-46-7		
1,1-Dichloroethane	ND	ug/L	0.50	1		11/15/17 13:57	75-34-3		
1,2-Dichloroethane	ND	ug/L	0.50	1		11/15/17 13:57	107-06-2		
1,1-Dichloroethene	ND	ug/L	0.50	1		11/15/17 13:57	75-35-4		
cis-1,2-Dichloroethene	ND	ug/L	0.50	1		11/15/17 13:57	156-59-2		
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		11/15/17 13:57	156-60-5		
1,2-Dichloropropane	ND	ug/L	0.50	1		11/15/17 13:57	78-87-5		
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 13:57	10061-01-5		
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 13:57	10061-02-6		
Methylene Chloride	ND	ug/L	5.0	1		11/15/17 13:57	75-09-2		
1,1,1,2-Tetrachloroethane	ND	ug/L	0.50	1		11/15/17 13:57	79-34-5		
Tetrachloroethene	ND	ug/L	0.50	1		11/15/17 13:57	127-18-4		
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/15/17 13:57	71-55-6		
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/15/17 13:57	79-00-5		
Trichloroethene	ND	ug/L	0.50	1		11/15/17 13:57	79-01-6		
Trichlorofluoromethane	ND	ug/L	0.50	1		11/15/17 13:57	75-69-4		
Vinyl chloride	ND	ug/L	0.50	1		11/15/17 13:57	75-01-4		
Surrogates									
1,2-Dichloroethane-d4 (S)	98	%	75-125	1		11/15/17 13:57	17060-07-0		
Toluene-d8 (S)	94	%	75-125	1		11/15/17 13:57	2037-26-5		
4-Bromofluorobenzene (S)	96	%	75-125	1		11/15/17 13:57	460-00-4		

Sample: MW-3		Lab ID: 12100804017		Collected: 11/08/17 16:45		Received: 11/14/17 09:55		Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual	
8260 MSV Med Water		Analytical Method: EPA 8260B							
Bromodichloromethane	ND	ug/L	0.50	1		11/15/17 18:58	75-27-4		
Bromoform	ND	ug/L	2.0	1		11/15/17 18:58	75-25-2		
Bromomethane	ND	ug/L	20.0	1		11/15/17 18:58	74-83-9		
Carbon tetrachloride	ND	ug/L	0.50	1		11/15/17 18:58	56-23-5		
Chlorobenzene	ND	ug/L	0.50	1		11/15/17 18:58	108-90-7		
Chloroethane	ND	ug/L	2.0	1		11/15/17 18:58	75-00-3		
Chloroform	ND	ug/L	0.50	1		11/15/17 18:58	67-66-3		
Chloromethane	ND	ug/L	0.50	1		11/15/17 18:58	74-87-3		

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 12100804

Sample: MW-3		Lab ID: 12100804017		Collected: 11/08/17 16:45		Received: 11/14/17 09:55		Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual	
8260 MSV Med Water		Analytical Method: EPA 8260B							
Dibromochloromethane	ND	ug/L	0.50	1		11/15/17 18:58	124-48-1		
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 18:58	95-50-1		
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 18:58	541-73-1		
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 18:58	106-46-7		
1,1-Dichloroethane	5.0	ug/L	0.50	1		11/15/17 18:58	75-34-3		
1,2-Dichloroethane	ND	ug/L	0.50	1		11/15/17 18:58	107-06-2		
1,1-Dichloroethene	ND	ug/L	0.50	1		11/15/17 18:58	75-35-4		
cis-1,2-Dichloroethene	59.5	ug/L	0.50	1		11/15/17 18:58	156-59-2		
trans-1,2-Dichloroethene	0.60	ug/L	0.50	1		11/15/17 18:58	156-60-5		
1,2-Dichloropropane	ND	ug/L	0.50	1		11/15/17 18:58	78-87-5		
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 18:58	10061-01-5		
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 18:58	10061-02-6		
Methylene Chloride	ND	ug/L	5.0	1		11/15/17 18:58	75-09-2		
1,1,1,2-Tetrachloroethane	ND	ug/L	0.50	1		11/15/17 18:58	79-34-5		
Tetrachloroethene	67.1	ug/L	0.50	1		11/15/17 18:58	127-18-4		
1,1,1-Trichloroethane	0.57	ug/L	0.50	1		11/15/17 18:58	71-55-6		
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/15/17 18:58	79-00-5		
Trichloroethene	16.1	ug/L	0.50	1		11/15/17 18:58	79-01-6		
Trichlorofluoromethane	ND	ug/L	0.50	1		11/15/17 18:58	75-69-4		
Vinyl chloride	0.68	ug/L	0.50	1		11/15/17 18:58	75-01-4		
Surrogates									
1,2-Dichloroethane-d4 (S)	105	%	75-125	1		11/15/17 18:58	17060-07-0		
Toluene-d8 (S)	100	%	75-125	1		11/15/17 18:58	2037-26-5		
4-Bromofluorobenzene (S)	93	%	75-125	1		11/15/17 18:58	460-00-4		

Sample: MW-5		Lab ID: 12100804018		Collected: 11/07/17 10:15		Received: 11/14/17 09:55		Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual	
8260 MSV Med Water		Analytical Method: EPA 8260B							
Bromodichloromethane	ND	ug/L	0.50	1		11/15/17 19:17	75-27-4		
Bromoform	ND	ug/L	2.0	1		11/15/17 19:17	75-25-2		
Bromomethane	ND	ug/L	20.0	1		11/15/17 19:17	74-83-9		
Carbon tetrachloride	ND	ug/L	0.50	1		11/15/17 19:17	56-23-5		
Chlorobenzene	ND	ug/L	0.50	1		11/15/17 19:17	108-90-7		
Chloroethane	ND	ug/L	2.0	1		11/15/17 19:17	75-00-3		
Chloroform	ND	ug/L	0.50	1		11/15/17 19:17	67-66-3		
Chloromethane	ND	ug/L	0.50	1		11/15/17 19:17	74-87-3		
Dibromochloromethane	ND	ug/L	0.50	1		11/15/17 19:17	124-48-1		
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 19:17	95-50-1		
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 19:17	541-73-1		
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 19:17	106-46-7		
1,1-Dichloroethane	0.99	ug/L	0.50	1		11/15/17 19:17	75-34-3		
1,2-Dichloroethane	ND	ug/L	0.50	1		11/15/17 19:17	107-06-2		
1,1-Dichloroethene	ND	ug/L	0.50	1		11/15/17 19:17	75-35-4		
cis-1,2-Dichloroethene	35.6	ug/L	0.50	1		11/15/17 19:17	156-59-2		

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Sample: MW-5		Lab ID: 12100804018		Collected: 11/07/17 10:15	Received: 11/14/17 09:55	Matrix: Water		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		11/15/17 19:17	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/15/17 19:17	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 19:17	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 19:17	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/15/17 19:17	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		11/15/17 19:17	79-34-5	
Tetrachloroethene	3.5	ug/L	0.50	1		11/15/17 19:17	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/15/17 19:17	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/15/17 19:17	79-00-5	
Trichloroethene	9.7	ug/L	0.50	1		11/15/17 19:17	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/15/17 19:17	75-69-4	
Vinyl chloride	5.3	ug/L	0.50	1		11/15/17 19:17	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	106	%	75-125	1		11/15/17 19:17	17060-07-0	
Toluene-d8 (S)	101	%	75-125	1		11/15/17 19:17	2037-26-5	
4-Bromofluorobenzene (S)	90	%	75-125	1		11/15/17 19:17	460-00-4	

Sample: MW-6		Lab ID: 12100804019		Collected: 11/07/17 13:43	Received: 11/14/17 09:55	Matrix: Water		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/16/17 16:08	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/16/17 16:08	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/16/17 16:08	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/16/17 16:08	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/16/17 16:08	108-90-7	
Chloroethane	ND	ug/L	2.0	1		11/16/17 16:08	75-00-3	
Chloroform	ND	ug/L	0.50	1		11/16/17 16:08	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/16/17 16:08	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		11/16/17 16:08	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 16:08	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 16:08	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 16:08	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		11/16/17 16:08	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/16/17 16:08	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		11/16/17 16:08	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	0.50	1		11/16/17 16:08	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		11/16/17 16:08	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/16/17 16:08	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 16:08	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 16:08	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/16/17 16:08	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		11/16/17 16:08	79-34-5	
Tetrachloroethene	ND	ug/L	0.50	1		11/16/17 16:08	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/16/17 16:08	71-55-6	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Sample: MW-6		Lab ID: 12100804019	Collected: 11/07/17 13:43	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/16/17 16:08	79-00-5	
Trichloroethene	ND	ug/L	0.50	1		11/16/17 16:08	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/16/17 16:08	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		11/16/17 16:08	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	106	%.	75-125	1		11/16/17 16:08	17060-07-0	
Toluene-d8 (S)	101	%.	75-125	1		11/16/17 16:08	2037-26-5	
4-Bromofluorobenzene (S)	89	%.	75-125	1		11/16/17 16:08	460-00-4	

Sample: MW-7 DUP		Lab ID: 12100804021	Collected: 11/07/17 09:10	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/16/17 16:27	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/16/17 16:27	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/16/17 16:27	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/16/17 16:27	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/16/17 16:27	108-90-7	
Chloroethane	ND	ug/L	2.0	1		11/16/17 16:27	75-00-3	
Chloroform	ND	ug/L	0.50	1		11/16/17 16:27	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/16/17 16:27	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		11/16/17 16:27	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 16:27	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 16:27	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 16:27	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		11/16/17 16:27	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/16/17 16:27	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		11/16/17 16:27	75-35-4	
cis-1,2-Dichloroethene	2.5	ug/L	0.50	1		11/16/17 16:27	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		11/16/17 16:27	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/16/17 16:27	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 16:27	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 16:27	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/16/17 16:27	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		11/16/17 16:27	79-34-5	
Tetrachloroethene	3.8	ug/L	0.50	1		11/16/17 16:27	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/16/17 16:27	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/16/17 16:27	79-00-5	
Trichloroethene	6.4	ug/L	0.50	1		11/16/17 16:27	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/16/17 16:27	75-69-4	
Vinyl chloride	1.5	ug/L	0.50	1		11/16/17 16:27	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	106	%.	75-125	1		11/16/17 16:27	17060-07-0	
Toluene-d8 (S)	101	%.	75-125	1		11/16/17 16:27	2037-26-5	
4-Bromofluorobenzene (S)	89	%.	75-125	1		11/16/17 16:27	460-00-4	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Sample: MW-8		Lab ID: 12100804022	Collected: 11/06/17 11:12	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/15/17 14:24	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/15/17 14:24	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/15/17 14:24	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/15/17 14:24	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/15/17 14:24	108-90-7	
Chloroethane	ND	ug/L	2.0	1		11/15/17 14:24	75-00-3	
Chloroform	ND	ug/L	0.50	1		11/15/17 14:24	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/15/17 14:24	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		11/15/17 14:24	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 14:24	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 14:24	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 14:24	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		11/15/17 14:24	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/15/17 14:24	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		11/15/17 14:24	75-35-4	
cis-1,2-Dichloroethene	1.2	ug/L	0.50	1		11/15/17 14:24	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		11/15/17 14:24	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/15/17 14:24	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 14:24	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 14:24	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/15/17 14:24	75-09-2	
1,1,1,2-Tetrachloroethane	ND	ug/L	0.50	1		11/15/17 14:24	79-34-5	
Tetrachloroethene	4.4	ug/L	0.50	1		11/15/17 14:24	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/15/17 14:24	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/15/17 14:24	79-00-5	
Trichloroethene	ND	ug/L	0.50	1		11/15/17 14:24	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/15/17 14:24	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		11/15/17 14:24	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	106	%	75-125	1		11/15/17 14:24	17060-07-0	
Toluene-d8 (S)	100	%	75-125	1		11/15/17 14:24	2037-26-5	
4-Bromofluorobenzene (S)	98	%	75-125	1		11/15/17 14:24	460-00-4	

Sample: MW-9		Lab ID: 12100804023	Collected: 11/07/17 08:18	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/16/17 16:47	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/16/17 16:47	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/16/17 16:47	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/16/17 16:47	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/16/17 16:47	108-90-7	
Chloroethane	ND	ug/L	2.0	1		11/16/17 16:47	75-00-3	
Chloroform	ND	ug/L	0.50	1		11/16/17 16:47	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/16/17 16:47	74-87-3	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Sample: MW-9		Lab ID: 12100804023	Collected: 11/07/17 08:18	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Dibromochloromethane	ND	ug/L	0.50	1		11/16/17 16:47	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 16:47	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 16:47	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 16:47	106-46-7	
1,1-Dichloroethane	20.3	ug/L	0.50	1		11/16/17 16:47	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/16/17 16:47	107-06-2	
1,1-Dichloroethene	3.3	ug/L	0.50	1		11/16/17 16:47	75-35-4	
cis-1,2-Dichloroethene	569	ug/L	6.2	12.5		11/17/17 16:39	156-59-2	
trans-1,2-Dichloroethene	15.2	ug/L	0.50	1		11/16/17 16:47	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/16/17 16:47	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 16:47	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 16:47	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/16/17 16:47	75-09-2	
1,1,1,2-Tetrachloroethane	ND	ug/L	0.50	1		11/16/17 16:47	79-34-5	
Tetrachloroethene	205	ug/L	6.2	12.5		11/17/17 16:39	127-18-4	
1,1,1-Trichloroethane	4.5	ug/L	0.50	1		11/16/17 16:47	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/16/17 16:47	79-00-5	
Trichloroethene	167	ug/L	6.2	12.5		11/17/17 16:39	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/16/17 16:47	75-69-4	
Vinyl chloride	7.8	ug/L	0.50	1		11/16/17 16:47	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	105	%	75-125	1		11/16/17 16:47	17060-07-0	
Toluene-d8 (S)	100	%	75-125	1		11/16/17 16:47	2037-26-5	
4-Bromofluorobenzene (S)	90	%	75-125	1		11/16/17 16:47	460-00-4	

Sample: MW-10		Lab ID: 12100804024	Collected: 11/06/17 13:30	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/15/17 14:52	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/15/17 14:52	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/15/17 14:52	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/15/17 14:52	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/15/17 14:52	108-90-7	
Chloroethane	ND	ug/L	2.0	1		11/15/17 14:52	75-00-3	
Chloroform	ND	ug/L	0.50	1		11/15/17 14:52	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/15/17 14:52	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		11/15/17 14:52	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 14:52	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 14:52	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 14:52	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		11/15/17 14:52	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/15/17 14:52	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		11/15/17 14:52	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	0.50	1		11/15/17 14:52	156-59-2	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Sample: MW-10		Lab ID: 12100804024		Collected: 11/06/17 13:30	Received: 11/14/17 09:55	Matrix: Water		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		11/15/17 14:52	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/15/17 14:52	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 14:52	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 14:52	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/15/17 14:52	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		11/15/17 14:52	79-34-5	
Tetrachloroethene	2.5	ug/L	0.50	1		11/15/17 14:52	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/15/17 14:52	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/15/17 14:52	79-00-5	
Trichloroethene	1.1	ug/L	0.50	1		11/15/17 14:52	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/15/17 14:52	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		11/15/17 14:52	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	106	%	75-125	1		11/15/17 14:52	17060-07-0	
Toluene-d8 (S)	101	%	75-125	1		11/15/17 14:52	2037-26-5	
4-Bromofluorobenzene (S)	97	%	75-125	1		11/15/17 14:52	460-00-4	

Sample: MW-12 DUP		Lab ID: 12100804026		Collected: 11/09/17 08:06	Received: 11/14/17 09:55	Matrix: Water		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/17/17 15:50	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/17/17 15:50	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/17/17 15:50	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/17/17 15:50	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/17/17 15:50	108-90-7	
Chloroethane	12.6	ug/L	2.0	1		11/17/17 15:50	75-00-3	
Chloroform	ND	ug/L	0.50	1		11/17/17 15:50	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/17/17 15:50	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		11/17/17 15:50	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/17/17 15:50	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/17/17 15:50	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/17/17 15:50	106-46-7	
1,1-Dichloroethane	4.5	ug/L	0.50	1		11/17/17 15:50	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/17/17 15:50	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		11/17/17 15:50	75-35-4	
cis-1,2-Dichloroethene	21.0	ug/L	0.50	1		11/17/17 15:50	156-59-2	
trans-1,2-Dichloroethene	1.6	ug/L	0.50	1		11/17/17 15:50	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/17/17 15:50	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/17/17 15:50	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/17/17 15:50	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/17/17 15:50	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		11/17/17 15:50	79-34-5	
Tetrachloroethene	ND	ug/L	0.50	1		11/17/17 15:50	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/17/17 15:50	71-55-6	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 12100804

Sample: MW-12 DUP		Lab ID: 12100804026	Collected: 11/09/17 08:06	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/17/17 15:50	79-00-5	
Trichloroethene	ND	ug/L	0.50	1		11/17/17 15:50	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/17/17 15:50	75-69-4	
Vinyl chloride	36.4	ug/L	0.50	1		11/17/17 15:50	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	119	%.	75-125	1		11/17/17 15:50	17060-07-0	
Toluene-d8 (S)	98	%.	75-125	1		11/17/17 15:50	2037-26-5	
4-Bromofluorobenzene (S)	99	%.	75-125	1		11/17/17 15:50	460-00-4	

Sample: MW-15		Lab ID: 12100804029	Collected: 11/06/17 16:31	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/15/17 15:19	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/15/17 15:19	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/15/17 15:19	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/15/17 15:19	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/15/17 15:19	108-90-7	
Chloroethane	ND	ug/L	2.0	1		11/15/17 15:19	75-00-3	
Chloroform	ND	ug/L	0.50	1		11/15/17 15:19	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/15/17 15:19	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		11/15/17 15:19	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 15:19	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 15:19	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 15:19	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		11/15/17 15:19	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/15/17 15:19	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		11/15/17 15:19	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	0.50	1		11/15/17 15:19	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		11/15/17 15:19	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/15/17 15:19	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 15:19	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 15:19	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/15/17 15:19	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		11/15/17 15:19	79-34-5	
Tetrachloroethene	0.64	ug/L	0.50	1		11/15/17 15:19	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/15/17 15:19	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/15/17 15:19	79-00-5	
Trichloroethene	ND	ug/L	0.50	1		11/15/17 15:19	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/15/17 15:19	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		11/15/17 15:19	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	109	%.	75-125	1		11/15/17 15:19	17060-07-0	
Toluene-d8 (S)	102	%.	75-125	1		11/15/17 15:19	2037-26-5	
4-Bromofluorobenzene (S)	95	%.	75-125	1		11/15/17 15:19	460-00-4	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Sample: MW-16		Lab ID: 12100804030	Collected: 11/06/17 11:53	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/15/17 15:46	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/15/17 15:46	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/15/17 15:46	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/15/17 15:46	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/15/17 15:46	108-90-7	
Chloroethane	ND	ug/L	2.0	1		11/15/17 15:46	75-00-3	
Chloroform	ND	ug/L	0.50	1		11/15/17 15:46	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/15/17 15:46	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		11/15/17 15:46	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 15:46	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 15:46	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 15:46	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		11/15/17 15:46	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/15/17 15:46	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		11/15/17 15:46	75-35-4	
cis-1,2-Dichloroethene	3.8	ug/L	0.50	1		11/15/17 15:46	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		11/15/17 15:46	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/15/17 15:46	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 15:46	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 15:46	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/15/17 15:46	75-09-2	
1,1,1,2-Tetrachloroethane	ND	ug/L	0.50	1		11/15/17 15:46	79-34-5	
Tetrachloroethene	150	ug/L	0.50	1		11/15/17 15:46	127-18-4	
1,1,1-Trichloroethane	0.96	ug/L	0.50	1		11/15/17 15:46	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/15/17 15:46	79-00-5	
Trichloroethene	17.4	ug/L	0.50	1		11/15/17 15:46	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/15/17 15:46	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		11/15/17 15:46	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	108	%	75-125	1		11/15/17 15:46	17060-07-0	
Toluene-d8 (S)	101	%	75-125	1		11/15/17 15:46	2037-26-5	
4-Bromofluorobenzene (S)	98	%	75-125	1		11/15/17 15:46	460-00-4	

Sample: MW-17		Lab ID: 12100804031	Collected: 11/08/17 08:08	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/17/17 15:41	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/17/17 15:41	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/17/17 15:41	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/17/17 15:41	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/17/17 15:41	108-90-7	
Chloroethane	ND	ug/L	2.0	1		11/17/17 15:41	75-00-3	
Chloroform	ND	ug/L	0.50	1		11/17/17 15:41	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/17/17 15:41	74-87-3	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Sample: MW-17	Lab ID: 12100804031	Collected: 11/08/17 08:08	Received: 11/14/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Dibromochloromethane	ND	ug/L	0.50	1		11/17/17 15:41	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/17/17 15:41	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/17/17 15:41	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/17/17 15:41	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		11/17/17 15:41	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/17/17 15:41	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		11/17/17 15:41	75-35-4	
cis-1,2-Dichloroethene	9.3	ug/L	0.50	1		11/17/17 15:41	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		11/17/17 15:41	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/17/17 15:41	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/17/17 15:41	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/17/17 15:41	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/17/17 15:41	75-09-2	
1,1,1,2-Tetrachloroethane	ND	ug/L	0.50	1		11/17/17 15:41	79-34-5	
Tetrachloroethene	9.9	ug/L	0.50	1		11/17/17 15:41	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/17/17 15:41	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/17/17 15:41	79-00-5	
Trichloroethene	21.9	ug/L	0.50	1		11/17/17 15:41	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/17/17 15:41	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		11/17/17 15:41	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	107	%	75-125	1		11/17/17 15:41	17060-07-0	
Toluene-d8 (S)	101	%	75-125	1		11/17/17 15:41	2037-26-5	
4-Bromofluorobenzene (S)	89	%	75-125	1		11/17/17 15:41	460-00-4	

Sample: MW-18i	Lab ID: 12100804032	Collected: 11/07/17 12:13	Received: 11/14/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/16/17 13:44	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/16/17 13:44	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/16/17 13:44	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/16/17 13:44	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/16/17 13:44	108-90-7	
Chloroethane	ND	ug/L	2.0	1		11/16/17 13:44	75-00-3	
Chloroform	ND	ug/L	0.50	1		11/16/17 13:44	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/16/17 13:44	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		11/16/17 13:44	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 13:44	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 13:44	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 13:44	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		11/16/17 13:44	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/16/17 13:44	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		11/16/17 13:44	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	0.50	1		11/16/17 13:44	156-59-2	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Sample: MW-18i		Lab ID: 12100804032	Collected: 11/07/17 12:13	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		11/16/17 13:44	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/16/17 13:44	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 13:44	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 13:44	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/16/17 13:44	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		11/16/17 13:44	79-34-5	
Tetrachloroethene	0.90	ug/L	0.50	1		11/16/17 13:44	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/16/17 13:44	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/16/17 13:44	79-00-5	
Trichloroethene	0.50	ug/L	0.50	1		11/16/17 13:44	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/16/17 13:44	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		11/16/17 13:44	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	111	%	75-125	1		11/16/17 13:44	17060-07-0	
Toluene-d8 (S)	102	%	75-125	1		11/16/17 13:44	2037-26-5	
4-Bromofluorobenzene (S)	97	%	75-125	1		11/16/17 13:44	460-00-4	

Sample: MW-19 DUP		Lab ID: 12100804034	Collected: 11/09/17 12:36	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/20/17 14:55	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/20/17 14:55	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/20/17 14:55	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/20/17 14:55	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/20/17 14:55	108-90-7	
Chloroethane	ND	ug/L	2.0	1		11/20/17 14:55	75-00-3	
Chloroform	ND	ug/L	0.50	1		11/20/17 14:55	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/20/17 14:55	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		11/20/17 14:55	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/20/17 14:55	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/20/17 14:55	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/20/17 14:55	106-46-7	
1,1-Dichloroethane	56.5	ug/L	0.50	1		11/20/17 14:55	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/20/17 14:55	107-06-2	
1,1-Dichloroethene	14.7	ug/L	0.50	1		11/20/17 14:55	75-35-4	
cis-1,2-Dichloroethene	1040	ug/L	62.5	125		11/17/17 02:58	156-59-2	
trans-1,2-Dichloroethene	14.7	ug/L	0.50	1		11/20/17 14:55	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/20/17 14:55	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/20/17 14:55	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/20/17 14:55	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/20/17 14:55	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		11/20/17 14:55	79-34-5	
Tetrachloroethene	970	ug/L	62.5	125		11/17/17 02:58	127-18-4	
1,1,1-Trichloroethane	13.0	ug/L	0.50	1		11/20/17 14:55	71-55-6	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 12100804

Sample: MW-19 DUP		Lab ID: 12100804034	Collected: 11/09/17 12:36	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
1,1,2-Trichloroethane	0.75	ug/L	0.50	1		11/20/17 14:55	79-00-5	
Trichloroethene	790	ug/L	2.5	5		11/17/17 17:14	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/20/17 14:55	75-69-4	
Vinyl chloride	115	ug/L	2.5	5		11/17/17 17:14	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	103	%.	75-125	1		11/20/17 14:55	17060-07-0	
Toluene-d8 (S)	98	%.	75-125	1		11/20/17 14:55	2037-26-5	
4-Bromofluorobenzene (S)	92	%.	75-125	1		11/20/17 14:55	460-00-4	

Sample: MW-19i		Lab ID: 12100804035	Collected: 11/08/17 16:04	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/16/17 15:06	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/16/17 15:06	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/16/17 15:06	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/16/17 15:06	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/16/17 15:06	108-90-7	
Chloroethane	ND	ug/L	2.0	1		11/16/17 15:06	75-00-3	
Chloroform	ND	ug/L	0.50	1		11/16/17 15:06	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/16/17 15:06	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		11/16/17 15:06	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 15:06	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 15:06	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 15:06	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		11/16/17 15:06	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/16/17 15:06	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		11/16/17 15:06	75-35-4	
cis-1,2-Dichloroethene	0.57	ug/L	0.50	1		11/16/17 15:06	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		11/16/17 15:06	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/16/17 15:06	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 15:06	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 15:06	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/16/17 15:06	75-09-2	
1,1,1,2-Tetrachloroethane	ND	ug/L	0.50	1		11/16/17 15:06	79-34-5	
Tetrachloroethene	ND	ug/L	0.50	1		11/16/17 15:06	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/16/17 15:06	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/16/17 15:06	79-00-5	
Trichloroethene	ND	ug/L	0.50	1		11/16/17 15:06	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/16/17 15:06	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		11/16/17 15:06	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	117	%.	75-125	1		11/16/17 15:06	17060-07-0	
Toluene-d8 (S)	98	%.	75-125	1		11/16/17 15:06	2037-26-5	
4-Bromofluorobenzene (S)	97	%.	75-125	1		11/16/17 15:06	460-00-4	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Sample: MW-20i		Lab ID: 12100804036	Collected: 11/07/17 12:51	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/16/17 15:33	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/16/17 15:33	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/16/17 15:33	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/16/17 15:33	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/16/17 15:33	108-90-7	
Chloroethane	ND	ug/L	2.0	1		11/16/17 15:33	75-00-3	
Chloroform	ND	ug/L	0.50	1		11/16/17 15:33	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/16/17 15:33	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		11/16/17 15:33	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 15:33	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 15:33	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 15:33	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		11/16/17 15:33	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/16/17 15:33	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		11/16/17 15:33	75-35-4	
cis-1,2-Dichloroethene	7.7	ug/L	0.50	1		11/16/17 15:33	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		11/16/17 15:33	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/16/17 15:33	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 15:33	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 15:33	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/16/17 15:33	75-09-2	
1,1,1,2-Tetrachloroethane	ND	ug/L	0.50	1		11/16/17 15:33	79-34-5	
Tetrachloroethene	2.8	ug/L	0.50	1		11/16/17 15:33	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/16/17 15:33	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/16/17 15:33	79-00-5	
Trichloroethene	1.5	ug/L	0.50	1		11/16/17 15:33	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/16/17 15:33	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		11/16/17 15:33	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	115	%	75-125	1		11/16/17 15:33	17060-07-0	
Toluene-d8 (S)	103	%	75-125	1		11/16/17 15:33	2037-26-5	
4-Bromofluorobenzene (S)	97	%	75-125	1		11/16/17 15:33	460-00-4	

Sample: MW-21i-40		Lab ID: 12100804037	Collected: 11/08/17 15:10	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/16/17 16:00	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/16/17 16:00	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/16/17 16:00	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/16/17 16:00	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/16/17 16:00	108-90-7	
Chloroethane	ND	ug/L	2.0	1		11/16/17 16:00	75-00-3	
Chloroform	ND	ug/L	0.50	1		11/16/17 16:00	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/16/17 16:00	74-87-3	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Sample: MW-21i-40	Lab ID: 12100804037	Collected: 11/08/17 15:10	Received: 11/14/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Dibromochloromethane	ND	ug/L	0.50	1		11/16/17 16:00	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 16:00	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 16:00	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 16:00	106-46-7	
1,1-Dichloroethane	2.6	ug/L	0.50	1		11/16/17 16:00	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/16/17 16:00	107-06-2	
1,1-Dichloroethene	0.84	ug/L	0.50	1		11/16/17 16:00	75-35-4	
cis-1,2-Dichloroethene	65.4	ug/L	0.50	1		11/16/17 16:00	156-59-2	
trans-1,2-Dichloroethene	0.63	ug/L	0.50	1		11/16/17 16:00	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/16/17 16:00	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 16:00	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 16:00	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/16/17 16:00	75-09-2	
1,1,1,2-Tetrachloroethane	ND	ug/L	0.50	1		11/16/17 16:00	79-34-5	
Tetrachloroethene	17.4	ug/L	0.50	1		11/16/17 16:00	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/16/17 16:00	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/16/17 16:00	79-00-5	
Trichloroethene	14.6	ug/L	0.50	1		11/16/17 16:00	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/16/17 16:00	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		11/16/17 16:00	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	114	%	75-125	1		11/16/17 16:00	17060-07-0	
Toluene-d8 (S)	101	%	75-125	1		11/16/17 16:00	2037-26-5	
4-Bromofluorobenzene (S)	98	%	75-125	1		11/16/17 16:00	460-00-4	

Sample: MW-21i-105	Lab ID: 12100804038	Collected: 11/08/17 14:30	Received: 11/14/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/16/17 16:28	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/16/17 16:28	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/16/17 16:28	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/16/17 16:28	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/16/17 16:28	108-90-7	
Chloroethane	ND	ug/L	2.0	1		11/16/17 16:28	75-00-3	
Chloroform	ND	ug/L	0.50	1		11/16/17 16:28	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/16/17 16:28	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		11/16/17 16:28	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 16:28	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 16:28	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 16:28	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		11/16/17 16:28	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/16/17 16:28	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		11/16/17 16:28	75-35-4	
cis-1,2-Dichloroethene	13.0	ug/L	0.50	1		11/16/17 16:28	156-59-2	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Sample: MW-21i-105		Lab ID: 12100804038	Collected: 11/08/17 14:30	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		11/16/17 16:28	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/16/17 16:28	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 16:28	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 16:28	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/16/17 16:28	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		11/16/17 16:28	79-34-5	
Tetrachloroethene	7.4	ug/L	0.50	1		11/16/17 16:28	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/16/17 16:28	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/16/17 16:28	79-00-5	
Trichloroethene	6.4	ug/L	0.50	1		11/16/17 16:28	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/16/17 16:28	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		11/16/17 16:28	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	116	%	75-125	1		11/16/17 16:28	17060-07-0	
Toluene-d8 (S)	99	%	75-125	1		11/16/17 16:28	2037-26-5	
4-Bromofluorobenzene (S)	97	%	75-125	1		11/16/17 16:28	460-00-4	

Sample: MW-22i		Lab ID: 12100804039	Collected: 11/07/17 11:02	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/16/17 16:55	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/16/17 16:55	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/16/17 16:55	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/16/17 16:55	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/16/17 16:55	108-90-7	
Chloroethane	ND	ug/L	2.0	1		11/16/17 16:55	75-00-3	
Chloroform	ND	ug/L	0.50	1		11/16/17 16:55	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/16/17 16:55	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		11/16/17 16:55	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 16:55	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 16:55	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 16:55	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		11/16/17 16:55	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/16/17 16:55	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		11/16/17 16:55	75-35-4	
cis-1,2-Dichloroethene	9.7	ug/L	0.50	1		11/16/17 16:55	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		11/16/17 16:55	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/16/17 16:55	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 16:55	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 16:55	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/16/17 16:55	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		11/16/17 16:55	79-34-5	
Tetrachloroethene	1.2	ug/L	0.50	1		11/16/17 16:55	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/16/17 16:55	71-55-6	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Sample: MW-22i		Lab ID: 12100804039	Collected: 11/07/17 11:02	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/16/17 16:55	79-00-5	
Trichloroethene	6.4	ug/L	0.50	1		11/16/17 16:55	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/16/17 16:55	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		11/16/17 16:55	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	117	%	75-125	1		11/16/17 16:55	17060-07-0	
Toluene-d8 (S)	91	%	75-125	1		11/16/17 16:55	2037-26-5	
4-Bromofluorobenzene (S)	97	%	75-125	1		11/16/17 16:55	460-00-4	

Sample: MW-23i		Lab ID: 12100804040	Collected: 11/08/17 09:07	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/16/17 17:22	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/16/17 17:22	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/16/17 17:22	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/16/17 17:22	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/16/17 17:22	108-90-7	
Chloroethane	ND	ug/L	2.0	1		11/16/17 17:22	75-00-3	
Chloroform	ND	ug/L	0.50	1		11/16/17 17:22	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/16/17 17:22	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		11/16/17 17:22	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 17:22	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 17:22	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 17:22	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		11/16/17 17:22	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/16/17 17:22	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		11/16/17 17:22	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	0.50	1		11/16/17 17:22	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		11/16/17 17:22	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/16/17 17:22	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 17:22	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 17:22	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/16/17 17:22	75-09-2	
1,1,1,2-Tetrachloroethane	ND	ug/L	0.50	1		11/16/17 17:22	79-34-5	
Tetrachloroethene	ND	ug/L	0.50	1		11/16/17 17:22	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/16/17 17:22	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/16/17 17:22	79-00-5	
Trichloroethene	ND	ug/L	0.50	1		11/16/17 17:22	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/16/17 17:22	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		11/16/17 17:22	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	115	%	75-125	1		11/16/17 17:22	17060-07-0	
Toluene-d8 (S)	100	%	75-125	1		11/16/17 17:22	2037-26-5	
4-Bromofluorobenzene (S)	94	%	75-125	1		11/16/17 17:22	460-00-4	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Sample: MW-24d		Lab ID: 12100804042	Collected: 11/06/17 10:30	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/15/17 16:13	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/15/17 16:13	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/15/17 16:13	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/15/17 16:13	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/15/17 16:13	108-90-7	
Chloroethane	ND	ug/L	2.0	1		11/15/17 16:13	75-00-3	
Chloroform	ND	ug/L	0.50	1		11/15/17 16:13	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/15/17 16:13	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		11/15/17 16:13	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 16:13	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 16:13	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 16:13	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		11/15/17 16:13	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/15/17 16:13	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		11/15/17 16:13	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	0.50	1		11/15/17 16:13	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		11/15/17 16:13	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/15/17 16:13	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 16:13	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 16:13	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/15/17 16:13	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		11/15/17 16:13	79-34-5	
Tetrachloroethene	ND	ug/L	0.50	1		11/15/17 16:13	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/15/17 16:13	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/15/17 16:13	79-00-5	
Trichloroethene	ND	ug/L	0.50	1		11/15/17 16:13	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/15/17 16:13	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		11/15/17 16:13	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	112	%	75-125	1		11/15/17 16:13	17060-07-0	
Toluene-d8 (S)	101	%	75-125	1		11/15/17 16:13	2037-26-5	
4-Bromofluorobenzene (S)	97	%	75-125	1		11/15/17 16:13	460-00-4	

Sample: MW-25i		Lab ID: 12100804043	Collected: 11/08/17 12:28	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/16/17 17:49	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/16/17 17:49	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/16/17 17:49	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/16/17 17:49	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/16/17 17:49	108-90-7	
Chloroethane	ND	ug/L	2.0	1		11/16/17 17:49	75-00-3	
Chloroform	ND	ug/L	0.50	1		11/16/17 17:49	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/16/17 17:49	74-87-3	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Sample: MW-25i		Lab ID: 12100804043		Collected: 11/08/17 12:28	Received: 11/14/17 09:55	Matrix: Water		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Dibromochloromethane	ND	ug/L	0.50	1		11/16/17 17:49	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 17:49	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 17:49	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 17:49	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		11/16/17 17:49	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/16/17 17:49	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		11/16/17 17:49	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	0.50	1		11/16/17 17:49	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		11/16/17 17:49	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/16/17 17:49	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 17:49	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 17:49	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/16/17 17:49	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		11/16/17 17:49	79-34-5	
Tetrachloroethene	ND	ug/L	0.50	1		11/16/17 17:49	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/16/17 17:49	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/16/17 17:49	79-00-5	
Trichloroethene	ND	ug/L	0.50	1		11/16/17 17:49	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/16/17 17:49	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		11/16/17 17:49	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	109	%	75-125	1		11/16/17 17:49	17060-07-0	
Toluene-d8 (S)	100	%	75-125	1		11/16/17 17:49	2037-26-5	
4-Bromofluorobenzene (S)	95	%	75-125	1		11/16/17 17:49	460-00-4	

Sample: MW-32s		Lab ID: 12100804045		Collected: 11/10/17 09:11	Received: 11/14/17 09:55	Matrix: Water		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/16/17 18:16	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/16/17 18:16	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/16/17 18:16	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/16/17 18:16	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/16/17 18:16	108-90-7	
Chloroethane	ND	ug/L	2.0	1		11/16/17 18:16	75-00-3	
Chloroform	ND	ug/L	0.50	1		11/16/17 18:16	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/16/17 18:16	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		11/16/17 18:16	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 18:16	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 18:16	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 18:16	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		11/16/17 18:16	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/16/17 18:16	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		11/16/17 18:16	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	0.50	1		11/16/17 18:16	156-59-2	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Sample: MW-32s		Lab ID: 12100804045		Collected: 11/10/17 09:11	Received: 11/14/17 09:55	Matrix: Water		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		11/16/17 18:16	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/16/17 18:16	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 18:16	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 18:16	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/16/17 18:16	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		11/16/17 18:16	79-34-5	
Tetrachloroethene	ND	ug/L	0.50	1		11/16/17 18:16	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/16/17 18:16	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/16/17 18:16	79-00-5	
Trichloroethene	ND	ug/L	0.50	1		11/16/17 18:16	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/16/17 18:16	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		11/16/17 18:16	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	113	%	75-125	1		11/16/17 18:16	17060-07-0	
Toluene-d8 (S)	102	%	75-125	1		11/16/17 18:16	2037-26-5	
4-Bromofluorobenzene (S)	97	%	75-125	1		11/16/17 18:16	460-00-4	

Sample: MW-32i		Lab ID: 12100804046		Collected: 11/10/17 08:32	Received: 11/14/17 09:55	Matrix: Water		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/16/17 18:44	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/16/17 18:44	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/16/17 18:44	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/16/17 18:44	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/16/17 18:44	108-90-7	
Chloroethane	ND	ug/L	2.0	1		11/16/17 18:44	75-00-3	
Chloroform	ND	ug/L	0.50	1		11/16/17 18:44	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/16/17 18:44	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		11/16/17 18:44	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 18:44	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 18:44	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 18:44	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		11/16/17 18:44	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/16/17 18:44	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		11/16/17 18:44	75-35-4	
cis-1,2-Dichloroethene	7.0	ug/L	0.50	1		11/16/17 18:44	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		11/16/17 18:44	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/16/17 18:44	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 18:44	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 18:44	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/16/17 18:44	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		11/16/17 18:44	79-34-5	
Tetrachloroethene	8.2	ug/L	0.50	1		11/16/17 18:44	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/16/17 18:44	71-55-6	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Sample: MW-32i		Lab ID: 12100804046	Collected: 11/10/17 08:32	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/16/17 18:44	79-00-5	
Trichloroethene	3.4	ug/L	0.50	1		11/16/17 18:44	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/16/17 18:44	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		11/16/17 18:44	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	107	%	75-125	1		11/16/17 18:44	17060-07-0	
Toluene-d8 (S)	102	%	75-125	1		11/16/17 18:44	2037-26-5	
4-Bromofluorobenzene (S)	96	%	75-125	1		11/16/17 18:44	460-00-4	

Sample: S-1		Lab ID: 12100804047	Collected: 11/08/17 10:53	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/16/17 19:11	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/16/17 19:11	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/16/17 19:11	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/16/17 19:11	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/16/17 19:11	108-90-7	
Chloroethane	ND	ug/L	2.0	1		11/16/17 19:11	75-00-3	
Chloroform	ND	ug/L	0.50	1		11/16/17 19:11	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/16/17 19:11	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		11/16/17 19:11	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 19:11	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 19:11	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 19:11	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		11/16/17 19:11	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/16/17 19:11	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		11/16/17 19:11	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	0.50	1		11/16/17 19:11	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		11/16/17 19:11	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/16/17 19:11	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 19:11	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 19:11	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/16/17 19:11	75-09-2	
1,1,1,2-Tetrachloroethane	ND	ug/L	0.50	1		11/16/17 19:11	79-34-5	
Tetrachloroethene	ND	ug/L	0.50	1		11/16/17 19:11	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/16/17 19:11	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/16/17 19:11	79-00-5	
Trichloroethene	ND	ug/L	0.50	1		11/16/17 19:11	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/16/17 19:11	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		11/16/17 19:11	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	108	%	75-125	1		11/16/17 19:11	17060-07-0	
Toluene-d8 (S)	83	%	75-125	1		11/16/17 19:11	2037-26-5	
4-Bromofluorobenzene (S)	94	%	75-125	1		11/16/17 19:11	460-00-4	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Sample: S-2		Lab ID: 12100804048	Collected: 11/08/17 11:27	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/16/17 19:38	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/16/17 19:38	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/16/17 19:38	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/16/17 19:38	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/16/17 19:38	108-90-7	
Chloroethane	ND	ug/L	2.0	1		11/16/17 19:38	75-00-3	
Chloroform	ND	ug/L	0.50	1		11/16/17 19:38	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/16/17 19:38	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		11/16/17 19:38	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 19:38	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 19:38	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 19:38	106-46-7	
1,1-Dichloroethane	7.1	ug/L	0.50	1		11/16/17 19:38	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/16/17 19:38	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		11/16/17 19:38	75-35-4	
cis-1,2-Dichloroethene	12.1	ug/L	0.50	1		11/16/17 19:38	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		11/16/17 19:38	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/16/17 19:38	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 19:38	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 19:38	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/16/17 19:38	75-09-2	
1,1,1,2-Tetrachloroethane	ND	ug/L	0.50	1		11/16/17 19:38	79-34-5	
Tetrachloroethene	ND	ug/L	0.50	1		11/16/17 19:38	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/16/17 19:38	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/16/17 19:38	79-00-5	
Trichloroethene	ND	ug/L	0.50	1		11/16/17 19:38	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/16/17 19:38	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		11/16/17 19:38	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	112	%	75-125	1		11/16/17 19:38	17060-07-0	
Toluene-d8 (S)	97	%	75-125	1		11/16/17 19:38	2037-26-5	
4-Bromofluorobenzene (S)	97	%	75-125	1		11/16/17 19:38	460-00-4	

Sample: FB-110617		Lab ID: 12100804049	Collected: 11/06/17 09:50	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/15/17 16:40	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/15/17 16:40	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/15/17 16:40	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/15/17 16:40	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/15/17 16:40	108-90-7	
Chloroethane	ND	ug/L	2.0	1		11/15/17 16:40	75-00-3	
Chloroform	ND	ug/L	0.50	1		11/15/17 16:40	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/15/17 16:40	74-87-3	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Sample: FB-110617		Lab ID: 12100804049		Collected: 11/06/17 09:50	Received: 11/14/17 09:55	Matrix: Water		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Dibromochloromethane	ND	ug/L	0.50	1		11/15/17 16:40	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 16:40	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 16:40	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/15/17 16:40	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		11/15/17 16:40	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/15/17 16:40	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		11/15/17 16:40	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	0.50	1		11/15/17 16:40	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		11/15/17 16:40	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/15/17 16:40	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 16:40	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/15/17 16:40	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/15/17 16:40	75-09-2	
1,1,1,2-Tetrachloroethane	ND	ug/L	0.50	1		11/15/17 16:40	79-34-5	
Tetrachloroethene	ND	ug/L	0.50	1		11/15/17 16:40	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/15/17 16:40	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/15/17 16:40	79-00-5	
Trichloroethene	ND	ug/L	0.50	1		11/15/17 16:40	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/15/17 16:40	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		11/15/17 16:40	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	112	%	75-125	1		11/15/17 16:40	17060-07-0	
Toluene-d8 (S)	102	%	75-125	1		11/15/17 16:40	2037-26-5	
4-Bromofluorobenzene (S)	95	%	75-125	1		11/15/17 16:40	460-00-4	

Sample: FB-11072017		Lab ID: 12100804050		Collected: 11/07/17 07:45	Received: 11/14/17 09:55	Matrix: Water		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/16/17 21:08	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/16/17 21:08	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/16/17 21:08	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/16/17 21:08	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/16/17 21:08	108-90-7	
Chloroethane	ND	ug/L	2.0	1		11/16/17 21:08	75-00-3	L1
Chloroform	ND	ug/L	0.50	1		11/16/17 21:08	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/16/17 21:08	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		11/16/17 21:08	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 21:08	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 21:08	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 21:08	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		11/16/17 21:08	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/16/17 21:08	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		11/16/17 21:08	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	0.50	1		11/16/17 21:08	156-59-2	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Sample: FB-11072017		Lab ID: 12100804050	Collected: 11/07/17 07:45	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		11/16/17 21:08	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/16/17 21:08	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 21:08	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 21:08	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/16/17 21:08	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		11/16/17 21:08	79-34-5	
Tetrachloroethene	ND	ug/L	0.50	1		11/16/17 21:08	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/16/17 21:08	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/16/17 21:08	79-00-5	
Trichloroethene	ND	ug/L	0.50	1		11/16/17 21:08	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/16/17 21:08	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		11/16/17 21:08	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	105	%	75-125	1		11/16/17 21:08	17060-07-0	
Toluene-d8 (S)	101	%	75-125	1		11/16/17 21:08	2037-26-5	
4-Bromofluorobenzene (S)	93	%	75-125	1		11/16/17 21:08	460-00-4	

Sample: FB-11082017		Lab ID: 12100804051	Collected: 11/08/17 07:35	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/16/17 21:27	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/16/17 21:27	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/16/17 21:27	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/16/17 21:27	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/16/17 21:27	108-90-7	
Chloroethane	ND	ug/L	2.0	1		11/16/17 21:27	75-00-3	L1
Chloroform	ND	ug/L	0.50	1		11/16/17 21:27	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/16/17 21:27	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		11/16/17 21:27	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 21:27	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 21:27	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 21:27	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		11/16/17 21:27	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/16/17 21:27	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		11/16/17 21:27	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	0.50	1		11/16/17 21:27	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		11/16/17 21:27	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/16/17 21:27	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 21:27	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 21:27	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/16/17 21:27	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		11/16/17 21:27	79-34-5	
Tetrachloroethene	ND	ug/L	0.50	1		11/16/17 21:27	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/16/17 21:27	71-55-6	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Sample: FB-11082017		Lab ID: 12100804051	Collected: 11/08/17 07:35	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/16/17 21:27	79-00-5	
Trichloroethene	ND	ug/L	0.50	1		11/16/17 21:27	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/16/17 21:27	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		11/16/17 21:27	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	106	%.	75-125	1		11/16/17 21:27	17060-07-0	
Toluene-d8 (S)	101	%.	75-125	1		11/16/17 21:27	2037-26-5	
4-Bromofluorobenzene (S)	91	%.	75-125	1		11/16/17 21:27	460-00-4	

Sample: FB-11092017		Lab ID: 12100804052	Collected: 11/09/17 07:30	Received: 11/14/17 09:55	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Bromodichloromethane	ND	ug/L	0.50	1		11/16/17 21:47	75-27-4	
Bromoform	ND	ug/L	2.0	1		11/16/17 21:47	75-25-2	
Bromomethane	ND	ug/L	20.0	1		11/16/17 21:47	74-83-9	
Carbon tetrachloride	ND	ug/L	0.50	1		11/16/17 21:47	56-23-5	
Chlorobenzene	ND	ug/L	0.50	1		11/16/17 21:47	108-90-7	
Chloroethane	ND	ug/L	2.0	1		11/16/17 21:47	75-00-3	L1
Chloroform	ND	ug/L	0.50	1		11/16/17 21:47	67-66-3	
Chloromethane	ND	ug/L	0.50	1		11/16/17 21:47	74-87-3	
Dibromochloromethane	ND	ug/L	0.50	1		11/16/17 21:47	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 21:47	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 21:47	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 21:47	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		11/16/17 21:47	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/16/17 21:47	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		11/16/17 21:47	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	0.50	1		11/16/17 21:47	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		11/16/17 21:47	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/16/17 21:47	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 21:47	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 21:47	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/16/17 21:47	75-09-2	
1,1,1,2-Tetrachloroethane	ND	ug/L	0.50	1		11/16/17 21:47	79-34-5	
Tetrachloroethene	ND	ug/L	0.50	1		11/16/17 21:47	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/16/17 21:47	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/16/17 21:47	79-00-5	
Trichloroethene	ND	ug/L	0.50	1		11/16/17 21:47	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/16/17 21:47	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		11/16/17 21:47	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	106	%.	75-125	1		11/16/17 21:47	17060-07-0	
Toluene-d8 (S)	101	%.	75-125	1		11/16/17 21:47	2037-26-5	
4-Bromofluorobenzene (S)	92	%.	75-125	1		11/16/17 21:47	460-00-4	

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Sample: FB-11102017		Lab ID: 12100804053		Collected: 11/10/17 07:40		Received: 11/14/17 09:55		Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual	
8260 MSV Med Water		Analytical Method: EPA 8260B							
Bromodichloromethane	ND	ug/L	0.50	1		11/16/17 22:06	75-27-4		
Bromoform	ND	ug/L	2.0	1		11/16/17 22:06	75-25-2		
Bromomethane	ND	ug/L	20.0	1		11/16/17 22:06	74-83-9		
Carbon tetrachloride	ND	ug/L	0.50	1		11/16/17 22:06	56-23-5		
Chlorobenzene	ND	ug/L	0.50	1		11/16/17 22:06	108-90-7		
Chloroethane	ND	ug/L	2.0	1		11/16/17 22:06	75-00-3	L1	
Chloroform	ND	ug/L	0.50	1		11/16/17 22:06	67-66-3		
Chloromethane	ND	ug/L	0.50	1		11/16/17 22:06	74-87-3		
Dibromochloromethane	ND	ug/L	0.50	1		11/16/17 22:06	124-48-1		
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 22:06	95-50-1		
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 22:06	541-73-1		
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 22:06	106-46-7		
1,1-Dichloroethane	ND	ug/L	0.50	1		11/16/17 22:06	75-34-3		
1,2-Dichloroethane	ND	ug/L	0.50	1		11/16/17 22:06	107-06-2		
1,1-Dichloroethene	ND	ug/L	0.50	1		11/16/17 22:06	75-35-4		
cis-1,2-Dichloroethene	ND	ug/L	0.50	1		11/16/17 22:06	156-59-2		
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		11/16/17 22:06	156-60-5		
1,2-Dichloropropane	ND	ug/L	0.50	1		11/16/17 22:06	78-87-5		
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 22:06	10061-01-5		
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 22:06	10061-02-6		
Methylene Chloride	ND	ug/L	5.0	1		11/16/17 22:06	75-09-2		
1,1,1,2-Tetrachloroethane	ND	ug/L	0.50	1		11/16/17 22:06	79-34-5		
Tetrachloroethene	ND	ug/L	0.50	1		11/16/17 22:06	127-18-4		
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/16/17 22:06	71-55-6		
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/16/17 22:06	79-00-5		
Trichloroethene	ND	ug/L	0.50	1		11/16/17 22:06	79-01-6		
Trichlorofluoromethane	ND	ug/L	0.50	1		11/16/17 22:06	75-69-4		
Vinyl chloride	ND	ug/L	0.50	1		11/16/17 22:06	75-01-4		
Surrogates									
1,2-Dichloroethane-d4 (S)	107	%	75-125	1		11/16/17 22:06	17060-07-0		
Toluene-d8 (S)	101	%	75-125	1		11/16/17 22:06	2037-26-5		
4-Bromofluorobenzene (S)	90	%	75-125	1		11/16/17 22:06	460-00-4		

Sample: EB-11082017		Lab ID: 12100804054		Collected: 11/08/17 08:25		Received: 11/14/17 09:55		Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual	
8260 MSV Med Water		Analytical Method: EPA 8260B							
Bromodichloromethane	ND	ug/L	0.50	1		11/16/17 22:26	75-27-4		
Bromoform	ND	ug/L	2.0	1		11/16/17 22:26	75-25-2		
Bromomethane	ND	ug/L	20.0	1		11/16/17 22:26	74-83-9		
Carbon tetrachloride	ND	ug/L	0.50	1		11/16/17 22:26	56-23-5		
Chlorobenzene	ND	ug/L	0.50	1		11/16/17 22:26	108-90-7		
Chloroethane	ND	ug/L	2.0	1		11/16/17 22:26	75-00-3	L1	
Chloroform	ND	ug/L	0.50	1		11/16/17 22:26	67-66-3		
Chloromethane	ND	ug/L	0.50	1		11/16/17 22:26	74-87-3		

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ANALYTICAL RESULTS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Sample: EB-11082017	Lab ID: 12100804054	Collected: 11/08/17 08:25	Received: 11/14/17 09:55	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Water		Analytical Method: EPA 8260B						
Dibromochloromethane	ND	ug/L	0.50	1		11/16/17 22:26	124-48-1	
1,2-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 22:26	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 22:26	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	1		11/16/17 22:26	106-46-7	
1,1-Dichloroethane	ND	ug/L	0.50	1		11/16/17 22:26	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	1		11/16/17 22:26	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	1		11/16/17 22:26	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	0.50	1		11/16/17 22:26	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	1		11/16/17 22:26	156-60-5	
1,2-Dichloropropane	ND	ug/L	0.50	1		11/16/17 22:26	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 22:26	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	0.50	1		11/16/17 22:26	10061-02-6	
Methylene Chloride	ND	ug/L	5.0	1		11/16/17 22:26	75-09-2	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	1		11/16/17 22:26	79-34-5	
Tetrachloroethene	ND	ug/L	0.50	1		11/16/17 22:26	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	0.50	1		11/16/17 22:26	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	1		11/16/17 22:26	79-00-5	
Trichloroethene	ND	ug/L	0.50	1		11/16/17 22:26	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	1		11/16/17 22:26	75-69-4	
Vinyl chloride	ND	ug/L	0.50	1		11/16/17 22:26	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	106	%.	75-125	1		11/16/17 22:26	17060-07-0	
Toluene-d8 (S)	101	%.	75-125	1		11/16/17 22:26	2037-26-5	
4-Bromofluorobenzene (S)	90	%.	75-125	1		11/16/17 22:26	460-00-4	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 12100804

QC Batch: 509550 Analysis Method: RSK 175
QC Batch Method: RSK 175 Analysis Description: RSK 175 AIR HEADSPACE
Associated Lab Samples: 12100804002, 12100804005, 12100804009, 12100804014, 12100804020, 12100804025, 12100804027, 12100804028, 12100804033, 12100804041, 12100804044

METHOD BLANK: 2770567 Matrix: Water
Associated Lab Samples: 12100804002, 12100804005, 12100804009, 12100804014, 12100804020, 12100804025, 12100804027, 12100804028, 12100804033, 12100804041, 12100804044

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Ethane	ug/L	ND	10.0	11/20/17 08:41	
Ethene	ug/L	ND	10.0	11/20/17 08:41	
Methane	ug/L	ND	10.0	11/20/17 08:41	

LABORATORY CONTROL SAMPLE & LCSD: 2770568 2770569

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Ethane	ug/L	114	111	109	97	96	85-115	2	20	
Ethene	ug/L	106	104	102	98	97	85-115	1	20	
Methane	ug/L	60.7	60.5	59.7	100	98	85-115	1	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2770570 2770571

Parameter	Units	12100804025 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Ethane	ug/L	ND	114	114	107	121	94	105	30-150	12	20	
Ethene	ug/L	ND	106	106	110	121	94	105	30-150	10	20	
Methane	ug/L	8900	60.7	60.7	9770	8180	1430	-1190	30-150	18	20	P6

SAMPLE DUPLICATE: 2770572

Parameter	Units	60258041006 Result	Dup Result	RPD	Max RPD	Qualifiers
Ethane	ug/L	ND	ND		20	
Ethene	ug/L	ND	ND		20	
Methane	ug/L	ND	2.7J		20	

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

QC Batch: 131582 Analysis Method: EPA 8260B
 QC Batch Method: EPA 8260B Analysis Description: 8260 MSV Med Water
 Associated Lab Samples: 12100804001, 12100804002, 12100804003, 12100804004, 12100804005, 12100804009, 12100804014,
 12100804016, 12100804020, 12100804022, 12100804024, 12100804029, 12100804030, 12100804042,
 12100804049

METHOD BLANK: 523749 Matrix: Water

Associated Lab Samples: 12100804001, 12100804002, 12100804003, 12100804004, 12100804005, 12100804009, 12100804014,
 12100804016, 12100804020, 12100804022, 12100804024, 12100804029, 12100804030, 12100804042,
 12100804049

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	0.50	11/15/17 19:24	
1,1,2,2-Tetrachloroethane	ug/L	ND	0.50	11/15/17 19:24	
1,1,2-Trichloroethane	ug/L	ND	0.50	11/15/17 19:24	
1,1-Dichloroethane	ug/L	ND	0.50	11/15/17 19:24	
1,1-Dichloroethene	ug/L	ND	0.50	11/15/17 19:24	
1,2-Dichlorobenzene	ug/L	ND	0.50	11/15/17 19:24	
1,2-Dichloroethane	ug/L	ND	0.50	11/15/17 19:24	
1,2-Dichloropropane	ug/L	ND	0.50	11/15/17 19:24	
1,3-Dichlorobenzene	ug/L	ND	0.50	11/15/17 19:24	
1,4-Dichlorobenzene	ug/L	ND	0.50	11/15/17 19:24	
Bromodichloromethane	ug/L	ND	0.50	11/15/17 19:24	
Bromoform	ug/L	ND	2.0	11/15/17 19:24	
Bromomethane	ug/L	ND	20.0	11/15/17 19:24	
Carbon tetrachloride	ug/L	ND	0.50	11/15/17 19:24	
Chlorobenzene	ug/L	ND	0.50	11/15/17 19:24	
Chloroethane	ug/L	ND	2.0	11/15/17 19:24	
Chloroform	ug/L	ND	0.50	11/15/17 19:24	
Chloromethane	ug/L	ND	0.50	11/15/17 19:24	
cis-1,2-Dichloroethene	ug/L	ND	0.50	11/15/17 19:24	
cis-1,3-Dichloropropene	ug/L	ND	0.50	11/15/17 19:24	
Dibromochloromethane	ug/L	ND	0.50	11/15/17 19:24	
Methylene Chloride	ug/L	ND	5.0	11/15/17 19:24	
Tetrachloroethene	ug/L	ND	0.50	11/15/17 19:24	
trans-1,2-Dichloroethene	ug/L	ND	0.50	11/15/17 19:24	
trans-1,3-Dichloropropene	ug/L	ND	0.50	11/15/17 19:24	
Trichloroethene	ug/L	ND	0.50	11/15/17 19:24	
Trichlorofluoromethane	ug/L	ND	0.50	11/15/17 19:24	
Vinyl chloride	ug/L	ND	0.50	11/15/17 19:24	
1,2-Dichloroethane-d4 (S)	%	113	75-125	11/15/17 19:24	
4-Bromofluorobenzene (S)	%	97	75-125	11/15/17 19:24	
Toluene-d8 (S)	%	103	75-125	11/15/17 19:24	

LABORATORY CONTROL SAMPLE: 523750

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	40	37.0	92	75-125	

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 12100804

LABORATORY CONTROL SAMPLE: 523750

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,2,2-Tetrachloroethane	ug/L	40	41.3	103	75-125	
1,1,2-Trichloroethane	ug/L	40	35.4	89	75-125	
1,1-Dichloroethane	ug/L	40	37.2	93	75-125	
1,1-Dichloroethene	ug/L	40	35.5	89	75-125	
1,2-Dichlorobenzene	ug/L	40	41.9	105	75-125	
1,2-Dichloroethane	ug/L	40	33.9	85	75-125	
1,2-Dichloropropane	ug/L	40	34.8	87	75-125	
1,3-Dichlorobenzene	ug/L	40	39.6	99	75-125	
1,4-Dichlorobenzene	ug/L	40	41.3	103	75-125	
Bromodichloromethane	ug/L	40	36.2	91	75-125	
Bromoform	ug/L	40	46.1	115	75-128	
Bromomethane	ug/L	40	30.3	76	30-150	
Carbon tetrachloride	ug/L	40	39.9	100	75-125	
Chlorobenzene	ug/L	40	41.1	103	75-125	
Chloroethane	ug/L	40	32.6	81	75-125	
Chloroform	ug/L	40	35.8	90	75-125	
Chloromethane	ug/L	40	33.5	84	44-132	
cis-1,2-Dichloroethene	ug/L	40	34.9	87	75-125	
cis-1,3-Dichloropropene	ug/L	40	35.9	90	75-125	
Dibromochloromethane	ug/L	40	38.0	95	74-135	
Methylene Chloride	ug/L	40	36.0	90	75-125	
Tetrachloroethene	ug/L	40	40.8	102	75-125	
trans-1,2-Dichloroethene	ug/L	40	35.3	88	75-125	
trans-1,3-Dichloropropene	ug/L	40	38.2	96	75-125	
Trichloroethene	ug/L	40	35.1	88	75-125	
Trichlorofluoromethane	ug/L	40	35.9	90	72-125	
Vinyl chloride	ug/L	40	36.2	91	69-130	
1,2-Dichloroethane-d4 (S)	%			94	75-125	
4-Bromofluorobenzene (S)	%			98	75-125	
Toluene-d8 (S)	%			96	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 523751 523752

Parameter	Units	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual	
		12100804009	Spike Conc.	Spike Conc.	Result							Result
1,1,1-Trichloroethane	ug/L	ND	40	40	36.4	39.4	91	99	75-125	8	30	
1,1,2,2-Tetrachloroethane	ug/L	ND	40	40	42.0	41.7	105	104	75-125	1	30	
1,1,2-Trichloroethane	ug/L	ND	40	40	35.4	37.3	89	93	75-125	5	30	
1,1-Dichloroethane	ug/L	4.2	40	40	40.1	44.3	90	100	75-125	10	30	
1,1-Dichloroethene	ug/L	ND	40	40	34.6	37.6	86	94	69-136	8	30	
1,2-Dichlorobenzene	ug/L	ND	40	40	42.0	42.1	105	105	75-125	0	30	
1,2-Dichloroethane	ug/L	ND	40	40	33.7	36.9	84	92	75-125	9	30	
1,2-Dichloropropane	ug/L	ND	40	40	35.6	37.3	89	93	75-125	5	30	
1,3-Dichlorobenzene	ug/L	ND	40	40	39.8	40.5	100	101	70-125	2	30	
1,4-Dichlorobenzene	ug/L	ND	40	40	41.3	41.7	103	104	73-125	1	30	

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 12100804

Parameter	Units	MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 523751		523752		MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	Max RPD	RPD	Qual
		12100804009 Result	MS Spike Conc.	MSD Spike Conc.	MS Result										
Bromodichloromethane	ug/L	ND	40	40	35.7	37.9	89	95	72-132	6	30				
Bromoform	ug/L	ND	40	40	46.7	41.9	117	105	75-125	11	30				
Bromomethane	ug/L	ND	40	40	31.8	38.7	80	97	30-150	19	30				
Carbon tetrachloride	ug/L	ND	40	40	39.6	41.7	99	104	75-127	5	30				
Chlorobenzene	ug/L	ND	40	40	40.8	41.8	102	105	75-125	3	30				
Chloroethane	ug/L	ND	40	40	34.6	35.3	86	88	75-125	2	30				
Chloroform	ug/L	ND	40	40	35.1	38.9	88	97	75-125	10	30				
Chloromethane	ug/L	ND	40	40	31.3	34.3	78	86	54-125	9	30				
cis-1,2-Dichloroethene	ug/L	7.6	40	40	40.3	44.8	82	93	75-125	11	30				
cis-1,3-Dichloropropene	ug/L	ND	40	40	35.6	36.4	89	91	75-125	2	30				
Dibromochloromethane	ug/L	ND	40	40	37.9	37.3	95	93	64-150	1	30				
Methylene Chloride	ug/L	ND	40	40	35.2	38.0	88	95	75-125	8	30				
Tetrachloroethene	ug/L	0.85	40	40	41.0	43.7	100	107	68-126	7	30				
trans-1,2-Dichloroethene	ug/L	ND	40	40	34.8	38.3	86	95	73-127	10	30				
trans-1,3-Dichloropropene	ug/L	ND	40	40	37.9	38.2	95	95	75-128	1	30				
Trichloroethene	ug/L	ND	40	40	35.1	37.1	87	92	71-125	5	30				
Trichlorofluoromethane	ug/L	ND	40	40	38.3	39.6	96	99	70-125	3	30				
Vinyl chloride	ug/L	12.8	40	40	47.0	50.8	86	95	72-129	8	30				
1,2-Dichloroethane-d4 (S)	%						93	103	75-125						
4-Bromofluorobenzene (S)	%						98	97	75-125						
Toluene-d8 (S)	%						93	97	75-125						

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 12100804

QC Batch: 131609 Analysis Method: EPA 8260B
QC Batch Method: EPA 8260B Analysis Description: 8260 MSV Med Water
Associated Lab Samples: 12100804006, 12100804007, 12100804008, 12100804010, 12100804011, 12100804012, 12100804013, 12100804015, 12100804017, 12100804018, 12100804025, 12100804027, 12100804028

METHOD BLANK: 523863 Matrix: Water
Associated Lab Samples: 12100804006, 12100804007, 12100804008, 12100804010, 12100804011, 12100804012, 12100804013, 12100804015, 12100804017, 12100804018, 12100804025, 12100804027, 12100804028

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	0.50	11/15/17 12:21	
1,1,2,2-Tetrachloroethane	ug/L	ND	0.50	11/15/17 12:21	
1,1,2-Trichloroethane	ug/L	ND	0.50	11/15/17 12:21	
1,1-Dichloroethane	ug/L	ND	0.50	11/15/17 12:21	
1,1-Dichloroethene	ug/L	ND	0.50	11/15/17 12:21	
1,2-Dichlorobenzene	ug/L	ND	0.50	11/15/17 12:21	
1,2-Dichloroethane	ug/L	ND	0.50	11/15/17 12:21	
1,2-Dichloropropane	ug/L	ND	0.50	11/15/17 12:21	
1,3-Dichlorobenzene	ug/L	ND	0.50	11/15/17 12:21	
1,4-Dichlorobenzene	ug/L	ND	0.50	11/15/17 12:21	
Bromodichloromethane	ug/L	ND	0.50	11/15/17 12:21	
Bromoform	ug/L	ND	2.0	11/15/17 12:21	
Bromomethane	ug/L	ND	20.0	11/15/17 12:21	
Carbon tetrachloride	ug/L	ND	0.50	11/15/17 12:21	
Chlorobenzene	ug/L	ND	0.50	11/15/17 12:21	
Chloroethane	ug/L	ND	2.0	11/15/17 12:21	
Chloroform	ug/L	ND	0.50	11/15/17 12:21	
Chloromethane	ug/L	ND	0.50	11/15/17 12:21	
cis-1,2-Dichloroethene	ug/L	ND	0.50	11/15/17 12:21	
cis-1,3-Dichloropropene	ug/L	ND	0.50	11/15/17 12:21	
Dibromochloromethane	ug/L	ND	0.50	11/15/17 12:21	
Methylene Chloride	ug/L	ND	5.0	11/15/17 12:21	
Tetrachloroethene	ug/L	ND	0.50	11/15/17 12:21	
trans-1,2-Dichloroethene	ug/L	ND	0.50	11/15/17 12:21	
trans-1,3-Dichloropropene	ug/L	ND	0.50	11/15/17 12:21	
Trichloroethene	ug/L	ND	0.50	11/15/17 12:21	
Trichlorofluoromethane	ug/L	ND	0.50	11/15/17 12:21	
Vinyl chloride	ug/L	ND	0.50	11/15/17 12:21	
1,2-Dichloroethane-d4 (S)	%	105	75-125	11/15/17 12:21	
4-Bromofluorobenzene (S)	%	93	75-125	11/15/17 12:21	
Toluene-d8 (S)	%	100	75-125	11/15/17 12:21	

LABORATORY CONTROL SAMPLE: 523864

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	20	19.8	99	75-125	
1,1,2,2-Tetrachloroethane	ug/L	20	18.9	94	75-125	
1,1,2-Trichloroethane	ug/L	20	19.1	95	75-125	

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

LABORATORY CONTROL SAMPLE: 523864

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1-Dichloroethane	ug/L	20	19.2	96	75-125	
1,1-Dichloroethene	ug/L	20	19.6	98	75-125	
1,2-Dichlorobenzene	ug/L	20	19.9	99	75-125	
1,2-Dichloroethane	ug/L	20	19.5	98	75-125	
1,2-Dichloropropane	ug/L	20	19.6	98	75-125	
1,3-Dichlorobenzene	ug/L	20	20.1	100	75-125	
1,4-Dichlorobenzene	ug/L	20	19.4	97	75-125	
Bromodichloromethane	ug/L	20	19.5	98	75-125	
Bromoform	ug/L	20	19.9	100	75-128	
Bromomethane	ug/L	20	23.3	116	30-150	
Carbon tetrachloride	ug/L	20	19.9	99	75-125	
Chlorobenzene	ug/L	20	19.2	96	75-125	
Chloroethane	ug/L	20	20.4	102	75-125	
Chloroform	ug/L	20	19.6	98	75-125	
Chloromethane	ug/L	20	19.2	96	44-132	
cis-1,2-Dichloroethene	ug/L	20	19.2	96	75-125	
cis-1,3-Dichloropropene	ug/L	20	19.7	98	75-125	
Dibromochloromethane	ug/L	20	19.7	98	74-135	
Methylene Chloride	ug/L	20	18.8	94	75-125	
Tetrachloroethene	ug/L	20	19.5	97	75-125	
trans-1,2-Dichloroethene	ug/L	20	19.6	98	75-125	
trans-1,3-Dichloropropene	ug/L	20	19.7	98	75-125	
Trichloroethene	ug/L	20	18.9	94	75-125	
Trichlorofluoromethane	ug/L	20	21.1	105	72-125	
Vinyl chloride	ug/L	20	20.3	101	69-130	
1,2-Dichloroethane-d4 (S)	%			101	75-125	
4-Bromofluorobenzene (S)	%			102	75-125	
Toluene-d8 (S)	%			100	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 523865 523866

Parameter	Units	MS		MSD		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		12100804025 Result	Spike Conc.	Spike Conc.	MS Result								
1,1,1-Trichloroethane	ug/L	ND	250	250	275	271	110	108	75-125	1	30		
1,1,2,2-Tetrachloroethane	ug/L	ND	250	250	256	253	102	101	75-125	1	30		
1,1,2-Trichloroethane	ug/L	ND	250	250	263	257	105	103	75-125	3	30		
1,1-Dichloroethane	ug/L	4.5	250	250	265	260	106	104	75-125	2	30		
1,1-Dichloroethene	ug/L	ND	250	250	263	261	105	104	69-136	1	30		
1,2-Dichlorobenzene	ug/L	ND	250	250	263	265	105	106	75-125	1	30		
1,2-Dichloroethane	ug/L	ND	250	250	266	264	106	106	75-125	1	30		
1,2-Dichloropropane	ug/L	ND	250	250	262	260	105	104	75-125	1	30		
1,3-Dichlorobenzene	ug/L	ND	250	250	271	274	109	110	70-125	1	30		
1,4-Dichlorobenzene	ug/L	ND	250	250	257	258	103	103	73-125	1	30		
Bromodichloromethane	ug/L	ND	250	250	271	266	109	106	72-132	2	30		
Bromoform	ug/L	ND	250	250	280	272	112	109	75-125	3	30		

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Parameter	Units	12100804025		523865		523866		% Rec	% Rec	Limits	RPD	Max RPD	Qual
		Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec						
Bromomethane	ug/L	ND	250	250	196	169	78	68	30-150	15	30		
Carbon tetrachloride	ug/L	ND	250	250	274	271	109	108	75-127	1	30		
Chlorobenzene	ug/L	ND	250	250	258	252	103	101	75-125	2	30		
Chloroethane	ug/L	15.4	250	250	272	265	106	103	75-125	3	30		
Chloroform	ug/L	ND	250	250	269	263	108	105	75-125	2	30		
Chloromethane	ug/L	ND	250	250	255	251	102	101	54-125	2	30		
cis-1,2-Dichloroethene	ug/L	22.2	250	250	281	276	105	103	75-125	2	30		
cis-1,3-Dichloropropene	ug/L	ND	250	250	273	271	109	108	75-125	1	30		
Dibromochloromethane	ug/L	ND	250	250	274	268	110	107	64-150	2	30		
Methylene Chloride	ug/L	ND	250	250	258	250	103	100	75-125	3	30		
Tetrachloroethene	ug/L	ND	250	250	266	265	107	106	68-126	1	30		
trans-1,2-Dichloroethene	ug/L	1.4	250	250	279	267	111	107	73-127	4	30		
trans-1,3-Dichloropropene	ug/L	ND	250	250	273	272	109	109	75-128	0	30		
Trichloroethene	ug/L	ND	250	250	258	257	103	103	71-125	0	30		
Trichlorofluoromethane	ug/L	ND	250	250	294	307	118	123	70-125	4	30		
Vinyl chloride	ug/L	49.1	250	250	320	316	114	113	72-129	1	30		
1,2-Dichloroethane-d4 (S)	%.						101	100	75-125				
4-Bromofluorobenzene (S)	%.						102	104	75-125				
Toluene-d8 (S)	%.						101	101	75-125				

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 12100804

QC Batch: 131680 Analysis Method: EPA 8260B
QC Batch Method: EPA 8260B Analysis Description: 8260 MSV Med Water
Associated Lab Samples: 12100804019, 12100804021, 12100804023, 12100804025, 12100804026, 12100804031, 12100804041, 12100804044

METHOD BLANK: 524267 Matrix: Water
Associated Lab Samples: 12100804019, 12100804021, 12100804023, 12100804025, 12100804026, 12100804031, 12100804041, 12100804044

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	0.50	11/16/17 10:36	
1,1,2,2-Tetrachloroethane	ug/L	ND	0.50	11/16/17 10:36	
1,1,2-Trichloroethane	ug/L	ND	0.50	11/16/17 10:36	
1,1-Dichloroethane	ug/L	ND	0.50	11/16/17 10:36	
1,1-Dichloroethene	ug/L	ND	0.50	11/16/17 10:36	
1,2-Dichlorobenzene	ug/L	ND	0.50	11/16/17 10:36	
1,2-Dichloroethane	ug/L	ND	0.50	11/16/17 10:36	
1,2-Dichloropropane	ug/L	ND	0.50	11/16/17 10:36	
1,3-Dichlorobenzene	ug/L	ND	0.50	11/16/17 10:36	
1,4-Dichlorobenzene	ug/L	ND	0.50	11/16/17 10:36	
Bromodichloromethane	ug/L	ND	0.50	11/16/17 10:36	
Bromoform	ug/L	ND	2.0	11/16/17 10:36	
Bromomethane	ug/L	ND	20.0	11/16/17 10:36	
Carbon tetrachloride	ug/L	ND	0.50	11/16/17 10:36	
Chlorobenzene	ug/L	ND	0.50	11/16/17 10:36	
Chloroethane	ug/L	ND	2.0	11/16/17 10:36	
Chloroform	ug/L	ND	0.50	11/16/17 10:36	
Chloromethane	ug/L	ND	0.50	11/16/17 10:36	
cis-1,2-Dichloroethene	ug/L	ND	0.50	11/16/17 10:36	
cis-1,3-Dichloropropene	ug/L	ND	0.50	11/16/17 10:36	
Dibromochloromethane	ug/L	ND	0.50	11/16/17 10:36	
Methylene Chloride	ug/L	ND	5.0	11/16/17 10:36	
Tetrachloroethene	ug/L	ND	0.50	11/16/17 10:36	
trans-1,2-Dichloroethene	ug/L	ND	0.50	11/16/17 10:36	
trans-1,3-Dichloropropene	ug/L	ND	0.50	11/16/17 10:36	
Trichloroethene	ug/L	ND	0.50	11/16/17 10:36	
Trichlorofluoromethane	ug/L	ND	0.50	11/16/17 10:36	
Vinyl chloride	ug/L	ND	0.50	11/16/17 10:36	
1,2-Dichloroethane-d4 (S)	%	105	75-125	11/16/17 10:36	
4-Bromofluorobenzene (S)	%	90	75-125	11/16/17 10:36	
Toluene-d8 (S)	%	100	75-125	11/16/17 10:36	

LABORATORY CONTROL SAMPLE: 524268

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	40	41.1	103	75-125	
1,1,2,2-Tetrachloroethane	ug/L	40	39.4	98	75-125	
1,1,2-Trichloroethane	ug/L	40	40.1	100	75-125	

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

LABORATORY CONTROL SAMPLE: 524268

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1-Dichloroethane	ug/L	40	39.0	97	75-125	
1,1-Dichloroethene	ug/L	40	39.7	99	75-125	
1,2-Dichlorobenzene	ug/L	40	40.5	101	75-125	
1,2-Dichloroethane	ug/L	40	40.2	101	75-125	
1,2-Dichloropropane	ug/L	40	40.2	100	75-125	
1,3-Dichlorobenzene	ug/L	40	43.3	108	75-125	
1,4-Dichlorobenzene	ug/L	40	40.1	100	75-125	
Bromodichloromethane	ug/L	40	41.3	103	75-125	
Bromoform	ug/L	40	42.5	106	75-128	
Bromomethane	ug/L	40	55.8	140	30-150	
Carbon tetrachloride	ug/L	40	41.4	103	75-125	
Chlorobenzene	ug/L	40	39.4	99	75-125	
Chloroethane	ug/L	40	48.3	121	75-125	
Chloroform	ug/L	40	40.2	101	75-125	
Chloromethane	ug/L	40	40.4	101	44-132	
cis-1,2-Dichloroethene	ug/L	40	39.0	98	75-125	
cis-1,3-Dichloropropene	ug/L	40	41.3	103	75-125	
Dibromochloromethane	ug/L	40	41.6	104	74-135	
Methylene Chloride	ug/L	40	38.4	96	75-125	
Tetrachloroethene	ug/L	40	40.9	102	75-125	
trans-1,2-Dichloroethene	ug/L	40	41.2	103	75-125	
trans-1,3-Dichloropropene	ug/L	40	42.0	105	75-125	
Trichloroethene	ug/L	40	39.5	99	75-125	
Trichlorofluoromethane	ug/L	40	48.8	122	72-125	
Vinyl chloride	ug/L	40	44.7	112	69-130	
1,2-Dichloroethane-d4 (S)	%			100	75-125	
4-Bromofluorobenzene (S)	%			101	75-125	
Toluene-d8 (S)	%			100	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 524269 524270

Parameter	Units	MS		MSD		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	Max RPD	Qual
		12100804025 Result	Spike Conc.	Spike Conc.	MSD Result							
1,1,1-Trichloroethane	ug/L	ND	40	40	43.5	44.6	109	112	75-125	3	30	
1,1,2,2-Tetrachloroethane	ug/L	ND	40	40	39.6	40.9	99	102	75-125	3	30	
1,1,2-Trichloroethane	ug/L	ND	40	40	41.1	42.2	103	105	75-125	3	30	
1,1-Dichloroethane	ug/L	4.5	40	40	45.8	46.6	103	105	75-125	2	30	
1,1-Dichloroethene	ug/L	ND	40	40	45.1	45.3	113	113	69-136	0	30	
1,2-Dichlorobenzene	ug/L	ND	40	40	41.1	42.0	103	105	75-125	2	30	
1,2-Dichloroethane	ug/L	ND	40	40	42.3	43.4	106	109	75-125	3	30	
1,2-Dichloropropane	ug/L	ND	40	40	42.3	43.3	106	108	75-125	2	30	
1,3-Dichlorobenzene	ug/L	ND	40	40	43.9	44.6	110	112	70-125	2	30	
1,4-Dichlorobenzene	ug/L	ND	40	40	40.8	41.3	102	103	73-125	1	30	
Bromodichloromethane	ug/L	ND	40	40	42.4	43.6	106	109	72-132	3	30	
Bromoform	ug/L	ND	40	40	41.4	43.2	104	108	75-125	4	30	

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Parameter	Units	12100804025		524269		524270		% Rec	% Rec	Limits	RPD	Max RPD	Qual
		Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec						
Bromomethane	ug/L	ND	40	40	21.8	19.1J	54	48	30-150			30	
Carbon tetrachloride	ug/L	ND	40	40	42.2	43.0	105	107	75-127		2	30	
Chlorobenzene	ug/L	ND	40	40	40.6	41.5	101	104	75-125		2	30	
Chloroethane	ug/L	15.4	40	40	62.4	62.5	117	118	75-125		0	30	
Chloroform	ug/L	ND	40	40	43.0	44.4	107	111	75-125		3	30	
Chloromethane	ug/L	ND	40	40	40.7	41.3	102	103	54-125		2	30	
cis-1,2-Dichloroethene	ug/L	22.2	40	40	62.9	65.0	102	107	75-125		3	30	
cis-1,3-Dichloropropene	ug/L	ND	40	40	42.7	43.5	107	109	75-125		2	30	
Dibromochloromethane	ug/L	ND	40	40	42.4	43.8	106	109	64-150		3	30	
Methylene Chloride	ug/L	ND	40	40	41.1	41.7	103	104	75-125		1	30	
Tetrachloroethene	ug/L	ND	40	40	42.0	43.5	105	109	68-126		4	30	
trans-1,2-Dichloroethene	ug/L	1.4	40	40	44.5	45.7	108	111	73-127		3	30	
trans-1,3-Dichloropropene	ug/L	ND	40	40	43.3	44.8	108	112	75-128		4	30	
Trichloroethene	ug/L	ND	40	40	41.0	42.2	103	106	71-125		3	30	
Trichlorofluoromethane	ug/L	ND	40	40	52.2	53.0	130	133	70-125		2	30	M1
Vinyl chloride	ug/L	49.1	40	40	92.2	94.3	108	113	72-129		2	30	E
1,2-Dichloroethane-d4 (S)	%.						101	100	75-125				
4-Bromofluorobenzene (S)	%.						103	103	75-125				
Toluene-d8 (S)	%.						102	102	75-125				

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

QC Batch: 131700 Analysis Method: EPA 8260B
 QC Batch Method: EPA 8260B Analysis Description: 8260 MSV Med Water
 Associated Lab Samples: 12100804005, 12100804014, 12100804027, 12100804032, 12100804035, 12100804036, 12100804037, 12100804038, 12100804039, 12100804040, 12100804043, 12100804045, 12100804046, 12100804047, 12100804048

METHOD BLANK: 524367 Matrix: Water

Associated Lab Samples: 12100804005, 12100804014, 12100804027, 12100804032, 12100804035, 12100804036, 12100804037, 12100804038, 12100804039, 12100804040, 12100804043, 12100804045, 12100804046, 12100804047, 12100804048

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	0.50	11/16/17 20:33	
1,1,2,2-Tetrachloroethane	ug/L	ND	0.50	11/16/17 20:33	
1,1,2-Trichloroethane	ug/L	ND	0.50	11/16/17 20:33	
1,1-Dichloroethane	ug/L	ND	0.50	11/16/17 20:33	
1,1-Dichloroethene	ug/L	ND	0.50	11/16/17 20:33	
1,2-Dichlorobenzene	ug/L	ND	0.50	11/16/17 20:33	
1,2-Dichloroethane	ug/L	ND	0.50	11/16/17 20:33	
1,2-Dichloropropane	ug/L	ND	0.50	11/16/17 20:33	
1,3-Dichlorobenzene	ug/L	ND	0.50	11/16/17 20:33	
1,4-Dichlorobenzene	ug/L	ND	0.50	11/16/17 20:33	
Bromodichloromethane	ug/L	ND	0.50	11/16/17 20:33	
Bromoform	ug/L	ND	2.0	11/16/17 20:33	
Bromomethane	ug/L	ND	20.0	11/16/17 20:33	
Carbon tetrachloride	ug/L	ND	0.50	11/16/17 20:33	
Chlorobenzene	ug/L	ND	0.50	11/16/17 20:33	
Chloroethane	ug/L	ND	2.0	11/16/17 20:33	
Chloroform	ug/L	ND	0.50	11/16/17 20:33	
Chloromethane	ug/L	ND	0.50	11/16/17 20:33	
cis-1,2-Dichloroethene	ug/L	ND	0.50	11/16/17 20:33	
cis-1,3-Dichloropropene	ug/L	ND	0.50	11/16/17 20:33	
Dibromochloromethane	ug/L	ND	0.50	11/16/17 20:33	
Methylene Chloride	ug/L	ND	5.0	11/16/17 20:33	
Tetrachloroethene	ug/L	ND	0.50	11/16/17 20:33	
trans-1,2-Dichloroethene	ug/L	ND	0.50	11/16/17 20:33	
trans-1,3-Dichloropropene	ug/L	ND	0.50	11/16/17 20:33	
Trichloroethene	ug/L	ND	0.50	11/16/17 20:33	
Trichlorofluoromethane	ug/L	ND	0.50	11/16/17 20:33	
Vinyl chloride	ug/L	ND	0.50	11/16/17 20:33	
1,2-Dichloroethane-d4 (S)	%	107	75-125	11/16/17 20:33	
4-Bromofluorobenzene (S)	%	97	75-125	11/16/17 20:33	
Toluene-d8 (S)	%	101	75-125	11/16/17 20:33	

LABORATORY CONTROL SAMPLE: 524368

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	40	40.5	101	75-125	

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

LABORATORY CONTROL SAMPLE: 524368

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,2,2-Tetrachloroethane	ug/L	40	40.7	102	75-125	
1,1,2-Trichloroethane	ug/L	40	36.7	92	75-125	
1,1-Dichloroethane	ug/L	40	41.4	104	75-125	
1,1-Dichloroethene	ug/L	40	40.9	102	75-125	
1,2-Dichlorobenzene	ug/L	40	41.0	102	75-125	
1,2-Dichloroethane	ug/L	40	38.5	96	75-125	
1,2-Dichloropropane	ug/L	40	36.2	91	75-125	
1,3-Dichlorobenzene	ug/L	40	39.7	99	75-125	
1,4-Dichlorobenzene	ug/L	40	40.6	102	75-125	
Bromodichloromethane	ug/L	40	39.7	99	75-125	
Bromoform	ug/L	40	45.2	113	75-128	
Bromomethane	ug/L	40	41.2	103	30-150	
Carbon tetrachloride	ug/L	40	43.4	109	75-125	
Chlorobenzene	ug/L	40	40.7	102	75-125	
Chloroethane	ug/L	40	38.2	96	75-125	
Chloroform	ug/L	40	39.9	100	75-125	
Chloromethane	ug/L	40	35.0	87	44-132	
cis-1,2-Dichloroethene	ug/L	40	38.5	96	75-125	
cis-1,3-Dichloropropene	ug/L	40	38.6	96	75-125	
Dibromochloromethane	ug/L	40	39.6	99	74-135	
Methylene Chloride	ug/L	40	38.4	96	75-125	
Tetrachloroethene	ug/L	40	42.7	107	75-125	
trans-1,2-Dichloroethene	ug/L	40	39.5	99	75-125	
trans-1,3-Dichloropropene	ug/L	40	40.2	100	75-125	
Trichloroethene	ug/L	40	36.6	92	75-125	
Trichlorofluoromethane	ug/L	40	41.1	103	72-125	
Vinyl chloride	ug/L	40	39.4	98	69-130	
1,2-Dichloroethane-d4 (S)	%			107	75-125	
4-Bromofluorobenzene (S)	%			99	75-125	
Toluene-d8 (S)	%			102	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 524393 524394

Parameter	Units	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual	
		12100804032	Spike Conc.	Spike Conc.	Result							Result
1,1,1-Trichloroethane	ug/L	ND	40	40	43.2	42.6	108	106	75-125	1	30	
1,1,2,2-Tetrachloroethane	ug/L	ND	40	40	41.5	40.8	104	102	75-125	2	30	
1,1,2-Trichloroethane	ug/L	ND	40	40	38.6	38.2	97	95	75-125	1	30	
1,1-Dichloroethane	ug/L	ND	40	40	43.7	43.2	109	108	75-125	1	30	
1,1-Dichloroethene	ug/L	ND	40	40	41.9	41.5	105	104	69-136	1	30	
1,2-Dichlorobenzene	ug/L	ND	40	40	42.2	41.5	105	104	75-125	2	30	
1,2-Dichloroethane	ug/L	ND	40	40	40.9	40.5	102	101	75-125	1	30	
1,2-Dichloropropane	ug/L	ND	40	40	38.4	38.0	96	95	75-125	1	30	
1,3-Dichlorobenzene	ug/L	ND	40	40	40.8	39.8	102	100	70-125	2	30	
1,4-Dichlorobenzene	ug/L	ND	40	40	41.7	40.7	104	102	73-125	2	30	

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Parameter	Units	MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 524393		524394		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	Max RPD	RPD	Qual
		12100804032 Result	MS Spike Conc.	MSD Spike Conc.									
Bromodichloromethane	ug/L	ND	40	40	42.0	41.0	105	103	72-132	2	30		
Bromoform	ug/L	ND	40	40	44.7	39.6	112	99	75-125	12	30		
Bromomethane	ug/L	ND	40	40	43.5	40.6	109	102	30-150	7	30		
Carbon tetrachloride	ug/L	ND	40	40	45.8	44.1	114	110	75-127	4	30		
Chlorobenzene	ug/L	ND	40	40	42.3	40.7	106	102	75-125	4	30		
Chloroethane	ug/L	ND	40	40	41.1	40.5	103	101	75-125	1	30		
Chloroform	ug/L	ND	40	40	42.7	42.0	107	105	75-125	2	30		
Chloromethane	ug/L	ND	40	40	34.0	35.2	85	88	54-125	3	30		
cis-1,2-Dichloroethene	ug/L	ND	40	40	41.3	40.7	103	102	75-125	1	30		
cis-1,3-Dichloropropene	ug/L	ND	40	40	40.8	38.8	102	97	75-125	5	30		
Dibromochloromethane	ug/L	ND	40	40	41.6	38.8	104	97	64-150	7	30		
Methylene Chloride	ug/L	ND	40	40	40.2	39.9	101	100	75-125	1	30		
Tetrachloroethene	ug/L	0.90	40	40	44.2	43.3	108	106	68-126	2	30		
trans-1,2-Dichloroethene	ug/L	ND	40	40	42.3	41.8	106	105	73-127	1	30		
trans-1,3-Dichloropropene	ug/L	ND	40	40	41.9	40.0	105	100	75-128	5	30		
Trichloroethene	ug/L	0.50	40	40	39.1	38.7	96	95	71-125	1	30		
Trichlorofluoromethane	ug/L	ND	40	40	42.1	40.9	105	102	70-125	3	30		
Vinyl chloride	ug/L	ND	40	40	41.3	40.8	103	102	72-129	1	30		
1,2-Dichloroethane-d4 (S)	%						111	112	75-125				
4-Bromofluorobenzene (S)	%						100	99	75-125				
Toluene-d8 (S)	%						104	104	75-125				

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 12100804

QC Batch: 131759 Analysis Method: EPA 8260B
QC Batch Method: EPA 8260B Analysis Description: 8260 MSV Med Water
Associated Lab Samples: 12100804002, 12100804004, 12100804033, 12100804034, 12100804050, 12100804051, 12100804052, 12100804053, 12100804054

METHOD BLANK: 524590 Matrix: Water
Associated Lab Samples: 12100804002, 12100804004, 12100804033, 12100804034, 12100804050, 12100804051, 12100804052, 12100804053, 12100804054

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	0.50	11/16/17 19:31	
1,1,2,2-Tetrachloroethane	ug/L	ND	0.50	11/16/17 19:31	
1,1,2-Trichloroethane	ug/L	ND	0.50	11/16/17 19:31	
1,1-Dichloroethane	ug/L	ND	0.50	11/16/17 19:31	
1,1-Dichloroethene	ug/L	ND	0.50	11/16/17 19:31	
1,2-Dichlorobenzene	ug/L	ND	0.50	11/16/17 19:31	
1,2-Dichloroethane	ug/L	ND	0.50	11/16/17 19:31	
1,2-Dichloropropane	ug/L	ND	0.50	11/16/17 19:31	
1,3-Dichlorobenzene	ug/L	ND	0.50	11/16/17 19:31	
1,4-Dichlorobenzene	ug/L	ND	0.50	11/16/17 19:31	
Bromodichloromethane	ug/L	ND	0.50	11/16/17 19:31	
Bromoform	ug/L	ND	2.0	11/16/17 19:31	
Bromomethane	ug/L	ND	20.0	11/16/17 19:31	
Carbon tetrachloride	ug/L	ND	0.50	11/16/17 19:31	
Chlorobenzene	ug/L	ND	0.50	11/16/17 19:31	
Chloroethane	ug/L	ND	2.0	11/16/17 19:31	
Chloroform	ug/L	ND	0.50	11/16/17 19:31	
Chloromethane	ug/L	ND	0.50	11/16/17 19:31	
cis-1,2-Dichloroethene	ug/L	ND	0.50	11/16/17 19:31	
cis-1,3-Dichloropropene	ug/L	ND	0.50	11/16/17 19:31	
Dibromochloromethane	ug/L	ND	0.50	11/16/17 19:31	
Methylene Chloride	ug/L	ND	5.0	11/16/17 19:31	
Tetrachloroethene	ug/L	ND	0.50	11/16/17 19:31	
trans-1,2-Dichloroethene	ug/L	ND	0.50	11/16/17 19:31	
trans-1,3-Dichloropropene	ug/L	ND	0.50	11/16/17 19:31	
Trichloroethene	ug/L	ND	0.50	11/16/17 19:31	
Trichlorofluoromethane	ug/L	ND	0.50	11/16/17 19:31	
Vinyl chloride	ug/L	ND	0.50	11/16/17 19:31	
1,2-Dichloroethane-d4 (S)	%	105	75-125	11/16/17 19:31	
4-Bromofluorobenzene (S)	%	91	75-125	11/16/17 19:31	
Toluene-d8 (S)	%	100	75-125	11/16/17 19:31	

LABORATORY CONTROL SAMPLE: 524591

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	40	41.3	103	75-125	
1,1,2,2-Tetrachloroethane	ug/L	40	40.0	100	75-125	
1,1,2-Trichloroethane	ug/L	40	40.2	100	75-125	

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

LABORATORY CONTROL SAMPLE: 524591

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1-Dichloroethane	ug/L	40	39.2	98	75-125	
1,1-Dichloroethene	ug/L	40	38.7	97	75-125	
1,2-Dichlorobenzene	ug/L	40	41.5	104	75-125	
1,2-Dichloroethane	ug/L	40	40.6	102	75-125	
1,2-Dichloropropane	ug/L	40	40.1	100	75-125	
1,3-Dichlorobenzene	ug/L	40	43.1	108	75-125	
1,4-Dichlorobenzene	ug/L	40	40.6	102	75-125	
Bromodichloromethane	ug/L	40	41.0	102	75-125	
Bromoform	ug/L	40	41.4	103	75-128	
Bromomethane	ug/L	40	38.4	96	30-150	
Carbon tetrachloride	ug/L	40	41.4	104	75-125	
Chlorobenzene	ug/L	40	39.5	99	75-125	
Chloroethane	ug/L	40	52.1	130	75-125 L1	
Chloroform	ug/L	40	40.9	102	75-125	
Chloromethane	ug/L	40	37.1	93	44-132	
cis-1,2-Dichloroethene	ug/L	40	39.3	98	75-125	
cis-1,3-Dichloropropene	ug/L	40	40.9	102	75-125	
Dibromochloromethane	ug/L	40	41.3	103	74-135	
Methylene Chloride	ug/L	40	38.4	96	75-125	
Tetrachloroethene	ug/L	40	40.6	102	75-125	
trans-1,2-Dichloroethene	ug/L	40	40.8	102	75-125	
trans-1,3-Dichloropropene	ug/L	40	41.6	104	75-125	
Trichloroethene	ug/L	40	39.5	99	75-125	
Trichlorofluoromethane	ug/L	40	49.4	123	72-125	
Vinyl chloride	ug/L	40	43.3	108	69-130	
1,2-Dichloroethane-d4 (S)	%			100	75-125	
4-Bromofluorobenzene (S)	%			99	75-125	
Toluene-d8 (S)	%			101	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 524592 524593

Parameter	Units	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual	
		12100923004 Result	Spike Conc.	Spike Conc.	MS Result							MSD Result
1,1,1-Trichloroethane	ug/L	ND	40	40	43.0	43.0	108	107	75-125	0	30	
1,1,2,2-Tetrachloroethane	ug/L	ND	40	40	42.1	42.2	105	105	75-125	0	30	
1,1,2-Trichloroethane	ug/L	ND	40	40	41.9	41.6	105	104	75-125	1	30	
1,1-Dichloroethane	ug/L	ND	40	40	42.0	41.9	105	105	75-125	0	30	
1,1-Dichloroethene	ug/L	ND	40	40	42.4	41.3	106	103	69-136	3	30	
1,2-Dichlorobenzene	ug/L	ND	40	40	40.6	40.2	101	101	75-125	1	30	
1,2-Dichloroethane	ug/L	ND	40	40	41.2	40.7	103	102	75-125	1	30	
1,2-Dichloropropane	ug/L	ND	40	40	42.5	42.2	106	105	75-125	1	30	
1,3-Dichlorobenzene	ug/L	ND	40	40	43.1	42.8	108	107	70-125	1	30	
1,4-Dichlorobenzene	ug/L	ND	40	40	40.4	39.6	101	99	73-125	2	30	
Bromodichloromethane	ug/L	ND	40	40	43.6	43.7	109	109	72-132	0	30	
Bromoform	ug/L	ND	40	40	42.2	42.1	106	105	75-125	0	30	

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Parameter	Units	12100923004		524592		524593		% Rec	% Rec	Limits	RPD	Max RPD	Qual
		Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result							
Bromomethane	ug/L	ND	40	40	35.4	39.5	89	99	30-150	11	30		
Carbon tetrachloride	ug/L	ND	40	40	43.0	43.3	107	108	75-127	1	30		
Chlorobenzene	ug/L	ND	40	40	40.0	40.1	100	100	75-125	0	30		
Chloroethane	ug/L	ND	40	40	50.5	49.2	126	123	75-125	2	30	M0	
Chloroform	ug/L	ND	40	40	42.8	42.6	107	107	75-125	0	30		
Chloromethane	ug/L	ND	40	40	37.4	37.9	93	95	54-125	1	30		
cis-1,2-Dichloroethene	ug/L	ND	40	40	40.5	40.8	101	102	75-125	1	30		
cis-1,3-Dichloropropene	ug/L	ND	40	40	44.1	44.2	110	111	75-125	0	30		
Dibromochloromethane	ug/L	ND	40	40	42.1	41.6	105	104	64-150	1	30		
Methylene Chloride	ug/L	ND	40	40	39.8	39.5	99	99	75-125	1	30		
Tetrachloroethene	ug/L	ND	40	40	42.1	41.9	105	105	68-126	0	30		
trans-1,2-Dichloroethene	ug/L	ND	40	40	43.2	43.1	108	108	73-127	0	30		
trans-1,3-Dichloropropene	ug/L	ND	40	40	43.4	43.1	109	108	75-128	1	30		
Trichloroethene	ug/L	ND	40	40	39.2	38.9	98	97	71-125	1	30		
Trichlorofluoromethane	ug/L	ND	40	40	54.2	50.9	136	127	70-125	6	30	M1	
Vinyl chloride	ug/L	ND	40	40	44.8	44.9	112	112	72-129	0	30		
1,2-Dichloroethane-d4 (S)	%.						103	102	75-125				
4-Bromofluorobenzene (S)	%.						102	103	75-125				
Toluene-d8 (S)	%.						104	102	75-125				

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 12100804

QC Batch: 131767 Analysis Method: EPA 8260B
QC Batch Method: EPA 8260B Analysis Description: 8260 MSV Med Water
Associated Lab Samples: 12100804023, 12100804031, 12100804044

METHOD BLANK: 524624 Matrix: Water
Associated Lab Samples: 12100804023, 12100804031, 12100804044

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	0.50	11/17/17 10:47	
1,1,2,2-Tetrachloroethane	ug/L	ND	0.50	11/17/17 10:47	
1,1,2-Trichloroethane	ug/L	ND	0.50	11/17/17 10:47	
1,1-Dichloroethane	ug/L	ND	0.50	11/17/17 10:47	
1,1-Dichloroethene	ug/L	ND	0.50	11/17/17 10:47	
1,2-Dichlorobenzene	ug/L	ND	0.50	11/17/17 10:47	
1,2-Dichloroethane	ug/L	ND	0.50	11/17/17 10:47	
1,2-Dichloropropane	ug/L	ND	0.50	11/17/17 10:47	
1,3-Dichlorobenzene	ug/L	ND	0.50	11/17/17 10:47	
1,4-Dichlorobenzene	ug/L	ND	0.50	11/17/17 10:47	
Bromodichloromethane	ug/L	ND	0.50	11/17/17 10:47	
Bromoform	ug/L	ND	2.0	11/17/17 10:47	
Bromomethane	ug/L	ND	20.0	11/17/17 10:47	
Carbon tetrachloride	ug/L	ND	0.50	11/17/17 10:47	
Chlorobenzene	ug/L	ND	0.50	11/17/17 10:47	
Chloroethane	ug/L	ND	2.0	11/17/17 10:47	
Chloroform	ug/L	ND	0.50	11/17/17 10:47	
Chloromethane	ug/L	ND	0.50	11/17/17 10:47	
cis-1,2-Dichloroethene	ug/L	ND	0.50	11/17/17 10:47	
cis-1,3-Dichloropropene	ug/L	ND	0.50	11/17/17 10:47	
Dibromochloromethane	ug/L	ND	0.50	11/17/17 10:47	
Methylene Chloride	ug/L	ND	5.0	11/17/17 10:47	
Tetrachloroethene	ug/L	ND	0.50	11/17/17 10:47	
trans-1,2-Dichloroethene	ug/L	ND	0.50	11/17/17 10:47	
trans-1,3-Dichloropropene	ug/L	ND	0.50	11/17/17 10:47	
Trichloroethene	ug/L	ND	0.50	11/17/17 10:47	
Trichlorofluoromethane	ug/L	ND	0.50	11/17/17 10:47	
Vinyl chloride	ug/L	ND	0.50	11/17/17 10:47	
1,2-Dichloroethane-d4 (S)	%	106	75-125	11/17/17 10:47	
4-Bromofluorobenzene (S)	%	93	75-125	11/17/17 10:47	
Toluene-d8 (S)	%	101	75-125	11/17/17 10:47	

LABORATORY CONTROL SAMPLE: 524625

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	40	41.2	103	75-125	
1,1,2,2-Tetrachloroethane	ug/L	40	41.1	103	75-125	
1,1,2-Trichloroethane	ug/L	40	40.6	101	75-125	
1,1-Dichloroethane	ug/L	40	40.4	101	75-125	
1,1-Dichloroethene	ug/L	40	39.4	98	75-125	

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

LABORATORY CONTROL SAMPLE: 524625

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2-Dichlorobenzene	ug/L	40	40.4	101	75-125	
1,2-Dichloroethane	ug/L	40	39.7	99	75-125	
1,2-Dichloropropane	ug/L	40	41.5	104	75-125	
1,3-Dichlorobenzene	ug/L	40	41.5	104	75-125	
1,4-Dichlorobenzene	ug/L	40	40.0	100	75-125	
Bromodichloromethane	ug/L	40	41.8	105	75-125	
Bromoform	ug/L	40	41.3	103	75-128	
Bromomethane	ug/L	40	37.3	93	30-150	
Carbon tetrachloride	ug/L	40	41.4	103	75-125	
Chlorobenzene	ug/L	40	39.1	98	75-125	
Chloroethane	ug/L	40	44.5	111	75-125	
Chloroform	ug/L	40	40.6	102	75-125	
Chloromethane	ug/L	40	36.2	91	44-132	
cis-1,2-Dichloroethene	ug/L	40	39.1	98	75-125	
cis-1,3-Dichloropropene	ug/L	40	43.4	109	75-125	
Dibromochloromethane	ug/L	40	40.2	101	74-135	
Methylene Chloride	ug/L	40	38.1	95	75-125	
Tetrachloroethene	ug/L	40	40.7	102	75-125	
trans-1,2-Dichloroethene	ug/L	40	41.6	104	75-125	
trans-1,3-Dichloropropene	ug/L	40	42.4	106	75-125	
Trichloroethene	ug/L	40	38.3	96	75-125	
Trichlorofluoromethane	ug/L	40	49.4	124	72-125	
Vinyl chloride	ug/L	40	42.4	106	69-130	
1,2-Dichloroethane-d4 (S)	%			99	75-125	
4-Bromofluorobenzene (S)	%			102	75-125	
Toluene-d8 (S)	%			101	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 524626 524627

Parameter	Units	10411312003		MSD		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec					
1,1,1-Trichloroethane	ug/L	ND	40	40	43.1	44.1	108	110	75-125	2	30		
1,1,2,2-Tetrachloroethane	ug/L	ND	40	40	37.0	38.1	93	95	75-125	3	30		
1,1,2-Trichloroethane	ug/L	ND	40	40	53.0	52.9	133	132	75-125	0	30	M1	
1,1-Dichloroethane	ug/L	ND	40	40	42.1	43.2	105	108	75-125	3	30		
1,1-Dichloroethene	ug/L	ND	40	40	41.4	43.3	104	108	69-136	4	30		
1,2-Dichlorobenzene	ug/L	ND	40	40	40.3	41.4	101	103	75-125	3	30		
1,2-Dichloroethane	ug/L	ND	40	40	41.2	41.6	103	104	75-125	1	30		
1,2-Dichloropropane	ug/L	ND	40	40	43.7	42.7	109	107	75-125	3	30		
1,3-Dichlorobenzene	ug/L	ND	40	40	37.5	37.9	94	95	70-125	1	30		
1,4-Dichlorobenzene	ug/L	ND	40	40	39.8	40.8	99	102	73-125	2	30		
Bromodichloromethane	ug/L	ND	40	40	50.3	51.1	126	128	72-132	2	30		
Bromoform	ug/L	ND	40	40	36.0	37.9	90	95	75-125	5	30		
Bromomethane	ug/L	ND	40	40	32.7	37.0	82	92	30-150	12	30		
Carbon tetrachloride	ug/L	ND	40	40	42.3	43.4	106	108	75-127	3	30		

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 12100804

Parameter	Units	MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 524626		524627		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	Max RPD	RPD	Qual
		10411312003 Result	MS Spike Conc.	MSD Spike Conc.	MSD Result								
Chlorobenzene	ug/L	ND	40	40	35.3	36.4	88	91	75-125	3	30		
Chloroethane	ug/L	ND	40	40	44.9	44.4	112	111	75-125	1	30		
Chloroform	ug/L	ND	40	40	42.6	43.1	107	108	75-125	1	30		
Chloromethane	ug/L	ND	40	40	35.9	38.1	90	95	54-125	6	30		
cis-1,2-Dichloroethene	ug/L	ND	40	40	40.8	42.3	102	106	75-125	4	30		
cis-1,3-Dichloropropene	ug/L	ND	40	40	44.1	45.4	110	113	75-125	3	30		
Dibromochloromethane	ug/L	ND	40	40	40.8	42.2	102	106	64-150	3	30		
Methylene Chloride	ug/L	ND	40	40	40.4	41.1	101	103	75-125	2	30		
Tetrachloroethene	ug/L	ND	40	40	41.6	42.3	104	106	68-126	2	30		
trans-1,2-Dichloroethene	ug/L	ND	40	40	43.2	43.8	108	109	73-127	1	30		
trans-1,3-Dichloropropene	ug/L	ND	40	40	42.8	43.5	107	109	75-128	2	30		
Trichloroethene	ug/L	ND	40	40	39.2	40.0	98	100	71-125	2	30		
Trichlorofluoromethane	ug/L	ND	40	40	49.9	47.5	125	119	70-125	5	30		
Vinyl chloride	ug/L	ND	40	40	43.2	44.1	108	110	72-129	2	30		
1,2-Dichloroethane-d4 (S)	%						101	100	75-125				
4-Bromofluorobenzene (S)	%						91	91	75-125				
Toluene-d8 (S)	%						102	102	75-125				

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 12100804

QC Batch: 131830 Analysis Method: EPA 8260B
QC Batch Method: EPA 8260B Analysis Description: 8260 MSV Med Water
Associated Lab Samples: 12100804002, 12100804026, 12100804033, 12100804034

METHOD BLANK: 524958 Matrix: Water
Associated Lab Samples: 12100804002, 12100804026, 12100804033, 12100804034

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	0.50	11/17/17 18:08	
1,1,2,2-Tetrachloroethane	ug/L	ND	0.50	11/17/17 18:08	
1,1,2-Trichloroethane	ug/L	ND	0.50	11/17/17 18:08	
1,1-Dichloroethane	ug/L	ND	0.50	11/17/17 18:08	
1,1-Dichloroethene	ug/L	ND	0.50	11/17/17 18:08	
1,2-Dichlorobenzene	ug/L	ND	0.50	11/17/17 18:08	
1,2-Dichloroethane	ug/L	ND	0.50	11/17/17 18:08	
1,2-Dichloropropane	ug/L	ND	0.50	11/17/17 18:08	
1,3-Dichlorobenzene	ug/L	ND	0.50	11/17/17 18:08	
1,4-Dichlorobenzene	ug/L	ND	0.50	11/17/17 18:08	
Bromodichloromethane	ug/L	ND	0.50	11/17/17 18:08	
Bromoform	ug/L	ND	2.0	11/17/17 18:08	
Bromomethane	ug/L	ND	20.0	11/17/17 18:08	
Carbon tetrachloride	ug/L	ND	0.50	11/17/17 18:08	
Chlorobenzene	ug/L	ND	0.50	11/17/17 18:08	
Chloroethane	ug/L	ND	2.0	11/17/17 18:08	
Chloroform	ug/L	ND	0.50	11/17/17 18:08	
Chloromethane	ug/L	ND	0.50	11/17/17 18:08	
cis-1,2-Dichloroethene	ug/L	ND	0.50	11/17/17 18:08	
cis-1,3-Dichloropropene	ug/L	ND	0.50	11/17/17 18:08	
Dibromochloromethane	ug/L	ND	0.50	11/17/17 18:08	
Methylene Chloride	ug/L	ND	5.0	11/17/17 18:08	
Tetrachloroethene	ug/L	ND	0.50	11/17/17 18:08	
trans-1,2-Dichloroethene	ug/L	ND	0.50	11/17/17 18:08	
trans-1,3-Dichloropropene	ug/L	ND	0.50	11/17/17 18:08	
Trichloroethene	ug/L	ND	0.50	11/17/17 18:08	
Trichlorofluoromethane	ug/L	ND	0.50	11/17/17 18:08	
Vinyl chloride	ug/L	ND	0.50	11/17/17 18:08	
1,2-Dichloroethane-d4 (S)	%	117	75-125	11/17/17 18:08	
4-Bromofluorobenzene (S)	%	97	75-125	11/17/17 18:08	
Toluene-d8 (S)	%	100	75-125	11/17/17 18:08	

LABORATORY CONTROL SAMPLE: 524959

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	40	40.3	101	75-125	
1,1,2,2-Tetrachloroethane	ug/L	40	43.0	108	75-125	
1,1,2-Trichloroethane	ug/L	40	36.8	92	75-125	
1,1-Dichloroethane	ug/L	40	41.6	104	75-125	
1,1-Dichloroethene	ug/L	40	40.2	100	75-125	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

LABORATORY CONTROL SAMPLE: 524959

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2-Dichlorobenzene	ug/L	40	41.2	103	75-125	
1,2-Dichloroethane	ug/L	40	37.5	94	75-125	
1,2-Dichloropropane	ug/L	40	36.2	91	75-125	
1,3-Dichlorobenzene	ug/L	40	39.4	98	75-125	
1,4-Dichlorobenzene	ug/L	40	41.6	104	75-125	
Bromodichloromethane	ug/L	40	40.4	101	75-125	
Bromoform	ug/L	40	45.2	113	75-128	
Bromomethane	ug/L	40	43.2	108	30-150	
Carbon tetrachloride	ug/L	40	42.9	107	75-125	
Chlorobenzene	ug/L	40	40.8	102	75-125	
Chloroethane	ug/L	40	32.6	81	75-125	
Chloroform	ug/L	40	39.6	99	75-125	
Chloromethane	ug/L	40	32.5	81	44-132	
cis-1,2-Dichloroethene	ug/L	40	38.1	95	75-125	
cis-1,3-Dichloropropene	ug/L	40	40.1	100	75-125	
Dibromochloromethane	ug/L	40	38.7	97	74-135	
Methylene Chloride	ug/L	40	38.0	95	75-125	
Tetrachloroethene	ug/L	40	40.6	101	75-125	
trans-1,2-Dichloroethene	ug/L	40	39.4	99	75-125	
trans-1,3-Dichloropropene	ug/L	40	39.5	99	75-125	
Trichloroethene	ug/L	40	35.1	88	75-125	
Trichlorofluoromethane	ug/L	40	40.2	101	72-125	
Vinyl chloride	ug/L	40	37.7	94	69-130	
1,2-Dichloroethane-d4 (S)	%			109	75-125	
4-Bromofluorobenzene (S)	%			98	75-125	
Toluene-d8 (S)	%			101	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 524962 524963

Parameter	Units	12101001003		524962		524963		% Rec	% Rec	% Rec Limits	RPD	Max RPD	Qual
		MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec						
1,1,1-Trichloroethane	ug/L	ND	40	40	40.2	43.1	100	108	75-125	7	30		
1,1,2,2-Tetrachloroethane	ug/L	ND	40	40	43.3	42.0	108	105	75-125	3	30		
1,1,2-Trichloroethane	ug/L	ND	40	40	37.1	38.7	93	97	75-125	4	30		
1,1-Dichloroethane	ug/L	ND	40	40	42.4	44.8	106	112	75-125	6	30		
1,1-Dichloroethene	ug/L	ND	40	40	40.9	36.4	102	91	69-136	12	30		
1,2-Dichlorobenzene	ug/L	ND	40	40	41.3	41.3	103	103	75-125	0	30		
1,2-Dichloroethane	ug/L	ND	40	40	37.2	39.7	93	99	75-125	6	30		
1,2-Dichloropropane	ug/L	ND	40	40	36.9	38.6	92	96	75-125	5	30		
1,3-Dichlorobenzene	ug/L	ND	40	40	40.6	39.9	101	100	70-125	2	30		
1,4-Dichlorobenzene	ug/L	ND	40	40	41.3	41.0	103	103	73-125	1	30		
Bromodichloromethane	ug/L	ND	40	40	40.9	42.7	102	107	72-132	4	30		
Bromoform	ug/L	ND	40	40	45.1	41.8	113	105	75-125	8	30		
Bromomethane	ug/L	ND	40	40	42.9	47.3	107	118	30-150	10	30		
Carbon tetrachloride	ug/L	ND	40	40	42.9	45.0	107	112	75-127	5	30		

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 12100804

Parameter	Units	MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 524962		524963		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	Max RPD	RPD	Qual
		12101001003 Result	MS Spike Conc.	MSD Spike Conc.									
Chlorobenzene	ug/L	ND	40	40	41.4	40.9	104	102	75-125	1	30		
Chloroethane	ug/L	ND	40	40	34.1	39.0	85	97	75-125	13	30		
Chloroform	ug/L	ND	40	40	40.5	42.7	101	107	75-125	5	30		
Chloromethane	ug/L	ND	40	40	32.3	33.3	81	83	54-125	3	30		
cis-1,2-Dichloroethene	ug/L	ND	40	40	38.3	41.0	96	103	75-125	7	30		
cis-1,3-Dichloropropene	ug/L	ND	40	40	40.2	41.6	100	104	75-125	3	30		
Dibromochloromethane	ug/L	ND	40	40	38.3	38.9	96	97	64-150	1	30		
Methylene Chloride	ug/L	ND	40	40	38.3	39.5	96	99	75-125	3	30		
Tetrachloroethene	ug/L	ND	40	40	42.1	41.4	105	103	68-126	2	30		
trans-1,2-Dichloroethene	ug/L	ND	40	40	39.7	40.0	99	100	73-127	1	30		
trans-1,3-Dichloropropene	ug/L	ND	40	40	39.5	40.0	99	100	75-128	1	30		
Trichloroethene	ug/L	ND	40	40	34.9	37.0	87	92	71-125	6	30		
Trichlorofluoromethane	ug/L	ND	40	40	40.6	41.5	101	104	70-125	2	30		
Vinyl chloride	ug/L	ND	40	40	38.4	38.4	96	96	72-129	0	30		
1,2-Dichloroethane-d4 (S)	%						106	116	75-125				
4-Bromofluorobenzene (S)	%						99	98	75-125				
Toluene-d8 (S)	%						101	96	75-125				

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 12100804

QC Batch: 131868 Analysis Method: EPA 8260B
QC Batch Method: EPA 8260B Analysis Description: 8260 MSV Med Water
Associated Lab Samples: 12100804034

METHOD BLANK: 525059 Matrix: Water
Associated Lab Samples: 12100804034

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	0.50	11/20/17 11:21	
1,1,2,2-Tetrachloroethane	ug/L	ND	0.50	11/20/17 11:21	
1,1,2-Trichloroethane	ug/L	ND	0.50	11/20/17 11:21	
1,1-Dichloroethane	ug/L	ND	0.50	11/20/17 11:21	
1,1-Dichloroethene	ug/L	ND	0.50	11/20/17 11:21	
1,2-Dichlorobenzene	ug/L	ND	0.50	11/20/17 11:21	
1,2-Dichloroethane	ug/L	ND	0.50	11/20/17 11:21	
1,2-Dichloropropane	ug/L	ND	0.50	11/20/17 11:21	
1,3-Dichlorobenzene	ug/L	ND	0.50	11/20/17 11:21	
1,4-Dichlorobenzene	ug/L	ND	0.50	11/20/17 11:21	
Bromodichloromethane	ug/L	ND	0.50	11/20/17 11:21	
Bromoform	ug/L	ND	2.0	11/20/17 11:21	
Bromomethane	ug/L	ND	20.0	11/20/17 11:21	
Carbon tetrachloride	ug/L	ND	0.50	11/20/17 11:21	
Chlorobenzene	ug/L	ND	0.50	11/20/17 11:21	
Chloroethane	ug/L	ND	2.0	11/20/17 11:21	
Chloroform	ug/L	ND	0.50	11/20/17 11:21	
Chloromethane	ug/L	ND	0.50	11/20/17 11:21	
cis-1,3-Dichloropropene	ug/L	ND	0.50	11/20/17 11:21	
Dibromochloromethane	ug/L	ND	0.50	11/20/17 11:21	
Methylene Chloride	ug/L	ND	5.0	11/20/17 11:21	
trans-1,2-Dichloroethene	ug/L	ND	0.50	11/20/17 11:21	
trans-1,3-Dichloropropene	ug/L	ND	0.50	11/20/17 11:21	
Trichlorofluoromethane	ug/L	ND	0.50	11/20/17 11:21	
1,2-Dichloroethane-d4 (S)	%	104	75-125	11/20/17 11:21	
4-Bromofluorobenzene (S)	%	94	75-125	11/20/17 11:21	
Toluene-d8 (S)	%	99	75-125	11/20/17 11:21	

LABORATORY CONTROL SAMPLE: 525060

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	40	43.1	108	75-125	
1,1,2,2-Tetrachloroethane	ug/L	40	41.6	104	75-125	
1,1,2-Trichloroethane	ug/L	40	41.3	103	75-125	
1,1-Dichloroethane	ug/L	40	42.6	107	75-125	
1,1-Dichloroethene	ug/L	40	43.2	108	75-125	
1,2-Dichlorobenzene	ug/L	40	40.5	101	75-125	
1,2-Dichloroethane	ug/L	40	40.2	100	75-125	
1,2-Dichloropropane	ug/L	40	42.2	106	75-125	
1,3-Dichlorobenzene	ug/L	40	41.6	104	75-125	

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

LABORATORY CONTROL SAMPLE: 525060

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,4-Dichlorobenzene	ug/L	40	40.2	100	75-125	
Bromodichloromethane	ug/L	40	43.5	109	75-125	
Bromoform	ug/L	40	42.1	105	75-128	
Bromomethane	ug/L	40	35.2	88	30-150	
Carbon tetrachloride	ug/L	40	42.8	107	75-125	
Chlorobenzene	ug/L	40	39.4	98	75-125	
Chloroethane	ug/L	40	40.9	102	75-125	
Chloroform	ug/L	40	41.7	104	75-125	
Chloromethane	ug/L	40	37.2	93	44-132	
cis-1,3-Dichloropropene	ug/L	40	45.3	113	75-125	
Dibromochloromethane	ug/L	40	41.6	104	74-135	
Methylene Chloride	ug/L	40	40.8	102	75-125	
trans-1,2-Dichloroethene	ug/L	40	43.6	109	75-125	
trans-1,3-Dichloropropene	ug/L	40	43.2	108	75-125	
Trichlorofluoromethane	ug/L	40	42.4	106	72-125	
1,2-Dichloroethane-d4 (S)	%			101	75-125	
4-Bromofluorobenzene (S)	%			100	75-125	
Toluene-d8 (S)	%			101	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 525061 525062

Parameter	Units	MS		MSD		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	Max RPD	Qual
		10411312005 Result	Spike Conc.	Spike Conc.	Result							
1,1,1-Trichloroethane	ug/L	ND	2000	2000	2160	2220	108	111	75-125	3	30	
1,1,2,2-Tetrachloroethane	ug/L	ND	2000	2000	2100	2170	105	108	75-125	3	30	
1,1,2-Trichloroethane	ug/L	ND	2000	2000	2060	2150	103	107	75-125	4	30	
1,1-Dichloroethane	ug/L	ND	2000	2000	2170	2200	108	110	75-125	2	30	
1,1-Dichloroethene	ug/L	ND	2000	2000	2050	2150	102	107	69-136	5	30	
1,2-Dichlorobenzene	ug/L	ND	2000	2000	2000	2080	100	104	75-125	4	30	
1,2-Dichloroethane	ug/L	ND	2000	2000	2040	2090	102	104	75-125	2	30	
1,2-Dichloropropane	ug/L	ND	2000	2000	2150	2180	108	109	75-125	1	30	
1,3-Dichlorobenzene	ug/L	ND	2000	2000	2060	2120	103	106	70-125	3	30	
1,4-Dichlorobenzene	ug/L	ND	2000	2000	2000	2040	100	102	73-125	2	30	
Bromodichloromethane	ug/L	ND	2000	2000	2150	2210	107	110	72-132	3	30	
Bromoform	ug/L	ND	2000	2000	2100	2220	105	111	75-125	5	30	
Bromomethane	ug/L	ND	2000	2000	1580	1870	79	93	30-150	17	30	
Carbon tetrachloride	ug/L	ND	2000	2000	2130	2180	107	109	75-127	2	30	
Chlorobenzene	ug/L	ND	2000	2000	1980	2040	99	102	75-125	3	30	
Chloroethane	ug/L	ND	2000	2000	1990	2070	100	103	75-125	4	30	
Chloroform	ug/L	ND	2000	2000	2130	2160	106	108	75-125	1	30	
Chloromethane	ug/L	ND	2000	2000	1880	1930	94	97	54-125	3	30	
cis-1,3-Dichloropropene	ug/L	ND	2000	2000	2240	2330	112	116	75-125	4	30	
Dibromochloromethane	ug/L	ND	2000	2000	2060	2140	103	107	64-150	4	30	
Methylene Chloride	ug/L	ND	2000	2000	2070	2110	104	106	75-125	2	30	
trans-1,2-Dichloroethene	ug/L	ND	2000	2000	2200	2270	110	113	73-127	3	30	

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Parameter	Units	10411312005		525061		525062		% Rec	% Rec	% Rec	Limits	RPD	Max RPD	Qual
		MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS Result	MSD Result							
trans-1,3-Dichloropropene	ug/L	ND	2000	2000	2140	2220	107	111	75-128	4	30			
Trichlorofluoromethane	ug/L	ND	2000	2000	2100	2310	105	116	70-125	10	30			
1,2-Dichloroethane-d4 (S)	%.						101	101	75-125					
4-Bromofluorobenzene (S)	%.						100	99	75-125					
Toluene-d8 (S)	%.						101	100	75-125					

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QUALITY CONTROL DATA

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 12100804

QC Batch: 95043 Analysis Method: SM 5310B
QC Batch Method: SM 5310B Analysis Description: 5310B TOC
Associated Lab Samples: 12100804002, 12100804005, 12100804009, 12100804014, 12100804020, 12100804025, 12100804027, 12100804028, 12100804033, 12100804041, 12100804044

METHOD BLANK: 408782 Matrix: Water
Associated Lab Samples: 12100804002, 12100804005, 12100804009, 12100804014, 12100804020, 12100804025, 12100804027, 12100804028, 12100804033, 12100804041, 12100804044

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Organic Carbon	mg/L	ND	1.0	11/21/17 11:29	

LABORATORY CONTROL SAMPLE: 408783

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	38.2	41.9	110	90-110	

MATRIX SPIKE SAMPLE: 408785

Parameter	Units	12100804025 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	326	100	456	130	75-125	M1

SAMPLE DUPLICATE: 408784

Parameter	Units	12100804025 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Organic Carbon	mg/L	326	332	2	20	

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QUALIFIERS

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 12100804

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.
ND - Not Detected at or above adjusted reporting limit.
TNTC - Too Numerous To Count
J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.
MDL - Adjusted Method Detection Limit.
PQL - Practical Quantitation Limit.
RL - Reporting Limit.
S - Surrogate
1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.
Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.
LCS(D) - Laboratory Control Sample (Duplicate)
MS(D) - Matrix Spike (Duplicate)
DUP - Sample Duplicate
RPD - Relative Percent Difference
NC - Not Calculable.
SG - Silica Gel - Clean-Up
U - Indicates the compound was analyzed for, but not detected.
N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.
Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.
TNI - The NELAC Institute.

LABORATORIES

PASI-DAV Pace Analytical Services - Davis
PASI-M Pace Analytical Services - Minneapolis
PASI-N Pace Analytical Services - New Orleans

SAMPLE QUALIFIERS

Sample: 12100804002

- [1] Volume for 6010 analysis was received on December 28, 2017.
- [2] Sample field preservation does not meet EPA or method recommendations for 6010.

Sample: 12100804005

- [1] Volume for 6010 analysis was received on December 28, 2017.
- [2] Sample field preservation does not meet EPA or method recommendations for 6010.

Sample: 12100804025

- [1] Volume for 6010 analysis was received on December 28, 2017.
- [2] Sample field preservation does not meet EPA or method recommendations for 6010.

Sample: 12100804027

- [1] Volume for 6010 analysis was received on December 28, 2017.
- [2] Sample field preservation does not meet EPA or method recommendations for 6010.

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QUALIFIERS

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

BATCH QUALIFIERS

Batch: 131582

- [1] The continuing calibration for Bromomethane is outside of Pace Analytical acceptance limits. The Bromomethane results may be biased low.

Batch: 131868

- [1] Analysis conducted outside the recognized method holding time. Sample container had insufficient preservative to extend hold time.

ANALYTE QUALIFIERS

- E Analyte concentration exceeded the calibration range. The reported result is estimated.
- HS Results are from sample aliquot taken from VOA vial with headspace (air bubble greater than 6 mm diameter).
- L1 Analyte recovery in the laboratory control sample (LCS) was above QC limits. Results for this analyte in associated samples may be biased high.
- M0 Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
- M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
- P6 Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 12100804

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
12100804002	MGMS1-43	RSK 175	509550		
12100804005	MGMS2-40	RSK 175	509550		
12100804009	MGMS3-40	RSK 175	509550		
12100804014	MP-1	RSK 175	509550		
12100804020	MW-7	RSK 175	509550		
12100804025	MW-12	RSK 175	509550		
12100804027	MW-13	RSK 175	509550		
12100804028	MW-14	RSK 175	509550		
12100804033	MW-19	RSK 175	509550		
12100804041	MW-24i	RSK 175	509550		
12100804044	MW-26	RSK 175	509550		
12100804001	EW-1	EPA 8260B	131582		
12100804002	MGMS1-43	EPA 8260B	131582		
12100804002	MGMS1-43	EPA 8260B	131759		
12100804002	MGMS1-43	EPA 8260B	131830		
12100804005	MGMS2-40	EPA 8260B	131582		
12100804005	MGMS2-40	EPA 8260B	131700		
12100804009	MGMS3-40	EPA 8260B	131582		
12100804014	MP-1	EPA 8260B	131582		
12100804014	MP-1	EPA 8260B	131700		
12100804020	MW-7	EPA 8260B	131582		
12100804025	MW-12	EPA 8260B	131609		
12100804025	MW-12	EPA 8260B	131680		
12100804027	MW-13	EPA 8260B	131609		
12100804027	MW-13	EPA 8260B	131700		
12100804028	MW-14	EPA 8260B	131609		
12100804033	MW-19	EPA 8260B	131759		
12100804033	MW-19	EPA 8260B	131830		
12100804041	MW-24i	EPA 8260B	131680		
12100804044	MW-26	EPA 8260B	131680		
12100804044	MW-26	EPA 8260B	131767		
12100804003	MGMS1-60	EPA 8260B	131582		
12100804004	MGMS1-110	EPA 8260B	131582		
12100804004	MGMS1-110	EPA 8260B	131759		
12100804006	MGMS2-60	EPA 8260B	131609		
12100804007	MGMS2-110	EPA 8260B	131609		
12100804008	MGMS2-132	EPA 8260B	131609		
12100804010	MGMS3-40 DUP	EPA 8260B	131609		
12100804011	MGMS3-60	EPA 8260B	131609		

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: NuStar Vancouver GWM-Revised
Pace Project No.: 12100804

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
12100804012	MGMS3-101	EPA 8260B	131609		
12100804013	MGMS3-132	EPA 8260B	131609		
12100804015	MW-1	EPA 8260B	131609		
12100804016	MW-2	EPA 8260B	131582		
12100804017	MW-3	EPA 8260B	131609		
12100804018	MW-5	EPA 8260B	131609		
12100804019	MW-6	EPA 8260B	131680		
12100804021	MW-7 DUP	EPA 8260B	131680		
12100804022	MW-8	EPA 8260B	131582		
12100804023	MW-9	EPA 8260B	131680		
12100804023	MW-9	EPA 8260B	131767		
12100804024	MW-10	EPA 8260B	131582		
12100804026	MW-12 DUP	EPA 8260B	131680		
12100804026	MW-12 DUP	EPA 8260B	131830		
12100804029	MW-15	EPA 8260B	131582		
12100804030	MW-16	EPA 8260B	131582		
12100804031	MW-17	EPA 8260B	131680		
12100804031	MW-17	EPA 8260B	131767		
12100804032	MW-18i	EPA 8260B	131700		
12100804034	MW-19 DUP	EPA 8260B	131759		
12100804034	MW-19 DUP	EPA 8260B	131830		
12100804034	MW-19 DUP	EPA 8260B	131868		
12100804035	MW-19i	EPA 8260B	131700		
12100804036	MW-20i	EPA 8260B	131700		
12100804037	MW-21i-40	EPA 8260B	131700		
12100804038	MW-21i-105	EPA 8260B	131700		
12100804039	MW-22i	EPA 8260B	131700		
12100804040	MW-23i	EPA 8260B	131700		
12100804042	MW-24d	EPA 8260B	131582		
12100804043	MW-25i	EPA 8260B	131700		
12100804045	MW-32s	EPA 8260B	131700		
12100804046	MW-32i	EPA 8260B	131700		
12100804047	S-1	EPA 8260B	131700		
12100804048	S-2	EPA 8260B	131700		
12100804049	FB-110617	EPA 8260B	131582		
12100804050	FB-11072017	EPA 8260B	131759		
12100804051	FB-11082017	EPA 8260B	131759		
12100804052	FB-11092017	EPA 8260B	131759		

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: NuStar Vancouver GWM-Revised

Pace Project No.: 12100804

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
12100804053	FB-11102017	EPA 8260B	131759		
12100804054	EB-11082017	EPA 8260B	131759		
12100804002	MGMS1-43	SM 5310B	95043		
12100804005	MGMS2-40	SM 5310B	95043		
12100804009	MGMS3-40	SM 5310B	95043		
12100804014	MP-1	SM 5310B	95043		
12100804020	MW-7	SM 5310B	95043		
12100804025	MW-12	SM 5310B	95043		
12100804027	MW-13	SM 5310B	95043		
12100804028	MW-14	SM 5310B	95043		
12100804033	MW-19	SM 5310B	95043		
12100804041	MW-24i	SM 5310B	95043		
12100804044	MW-26	SM 5310B	95043		

REPORT OF LABORATORY ANALYSIS

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 Davis, CA 95618
 Lab: 530.297.4800
 Fax: 530.297.4802

SRG # / Lab No. **12100804**

Project Contact (Hardcopy or PDF To):		California EDF Report?		CRA EQUIS Required		XLS Report Required		Chain-of-Custody Record and Analysis Request													
Stephanie Bosze		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Analysis Request						TAT							
3015 SW 1st Ave., Portland, OR 97201								Other: Please Specify													
Phone Number: 503-924-4704 ext 1913		Global ID:		EDD Deliverable To (Email Address): Ssalisbury@apexcos.com		Bill to: Apex Companies		Methane, Ethane, Ethene						Volatile Halocarbons (EPA 826B)							
Fax Number: 503-924-4707		Project #:		P.O. #:		Sampler Name & Signature: M. Masterson		TOC						12 hr							
Project #:		320001126-20		320001126-20		NuStar Vancouver GWM		3						24 hr							
Project Address:		Sampling		Container		Preservative		Matrix		40 ml VOA						48hr					
		Date	Time	Sieve	Poly	250 ml Glass	Tedlar	HCl	HNO3	H2SO4	None	Water	Soil	Air	72hr						
								3				X			1 wk						
								6	2			X			X						
								3				X			X						
								3				X			X						
								6	2			X			X						
								3				X			X						
								3				X			X						
								3				X			X						
								3				X			X						
								6	2			X			X						
								3				X			X						
								3				X			X						
								3				X			X						
EW-1		11/9/2017	0915	3				3				X			X						
EX																					
MGMS1-43		11/17/2017	1620	8				6	2			X			X						
MGMS1-60		11/17/2017	1541	3				3				X			X						
MGMS1-110		11/17/2017	1658	3				3				X			X						
MGMS2-40		11/19/2017	1602	8				6	2			X			X						
MGMS2-60		11/19/2017	1539	3				3				X			X						
MGMS2-110		11/19/2017	1504	3				3				X			X						
MGMS2-132		11/19/2017	1426	3				3				X			X						
MGMS3-40		11/10/2017	1225	8				6	2			X			X						
MGMS3-40 DUP		11/10/2017	1225	3				3				X			X						
MGMS3-60		11/10/2017	1152	3				3				X			X						
MGMS3-101		11/10/2017	1126	3				3				X			X						
Relinquished by: <i>Megan Masterson</i>		Date: 11-13-17	Time: 1500					Received by: <i>Patricia J. ...</i>	Time: 0955	Date: 11/14/17	Initials: <i>PJ</i>	Temp °C: 5.1	Therm. ID #: 14354	Sample Receipt: Yes	Comments Present: No						
Relinquished by: _____		Date:	Time:					Received by:	Time:	Date:	Initials:	Temp °C: 4.1	Therm. ID #:	Sample Receipt:	Comments Present:						
Relinquished by: _____		Date:	Time:					Received by:	Time:	Date:	Initials:	Temp °C:	Therm. ID #:	Sample Receipt:	Comments Present:						

Remarks:
 MS/MSD is from well MW-12 (extra bottles labeled as MW-12 MS/ MW-12 MSD)



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SRG # / Lab No. 121008074

Project Contact (Hardcopy or PDF To): Stephanie Bosze		California EDF Report? CRA EQUIS Required		XLS Report Required		Global ID:		EDD Deliverable To (Email Address): Ssallisbury@apexcos.com		Bill to: Apex Companies		Sampler Name & Signature: M. Masterson					
Company / Address: Apex Companies 3015 SW 1st Ave., Portland, OR 97201		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>											
Phone Number: 503-924-4704 ext 1913																	
Fax Number: 503-924-4707																	
Project #: 320001126-20		P.O. #:															
Project Name: NuStar Vancouver GWM																	
Project Address:		Sampling		Container		Preservative		Matrix		Analysis Request		TAT					
		Date	Time	40 ml VOA	Sleeve	Poly	250 ml Glass	Tedlar	HCl	HNO ₃	H ₂ SO ₄	None	Water	Soil	Air		
14	MGMS3-132	11/10/17	1036	3					3				X			X	013
15	MP-1	11/09/17	1043	8					6	2			X			X	014
16	MW-1	11/09/17	1009	3					3				X			X	015
17	MW-2	11/06/17	1238	3					3				X			X	016
18	MW-3	11/08/17	1645	3					3				X			X	017
19	MW-5	11/07/17	1015	3					3				X			X	018
20	MW-6	11/07/17	1343	3					3				X			X	019
21	MW-7	11/07/17	0910	8					6	2			X			X	020
22	MW-7 DUP	11/07/17	0910	3					3				X			X	021
23	MW-8	11/06/17	1112	3					3				X			X	022
24	MW-9	11/07/17	0818	3					3				X			X	023
25	MW-10	11/06/17	1330	3					3				X			X	024
26	MW-12	11/09/17	0906	8					6	2			X			X	025

Remarks:
MS/MSD is from well MW-12 (extra bottles labeled as MW-12 MS/ MW-12 MSD)

Relinquished by:	Date	Time	Received by:	Time	Date	Temp °C	Initials	Date	Therm. ID #	Coolant Present
			<i>[Signature]</i>							Yes / No



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 Fax: 530.297.4802

SRG # / Lab No. 12102804

Project Contact (Hardcopy or PDF To): Stephanie Bosze		California EDF Report? CRA EQUIS Required		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>				
Company / Address: 3015 SW 1st Ave., Portland, OR 97201		XLS Report Required		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>				
Phone Number: 503-924-4704 ext 1913		Global ID:										
Fax Number: 503-924-4707		EDD Deliverable To (Email Address): Ssalisbury@apexcoos.com										
Project #: 320001126-20		Bill to: Apex Companies										
Project Name: NuStar Vancouver GWM		Sampler Name & Signature: M. Masterson										
Project Address:		Sampling		Container		Preservative		Matrix				
Sample Designation	Date	Time	40 mL VOA	Sieve	250 mL Glass	Tedlar	HCl	HNO ₃	H ₂ O ₄	Water	Soil	Air
MW-12 DUP	11/9/2017	0806	3				3			X		
MW-12 MS	11/9/2017	0806	3				3			X		
MW-12 MSD	11/9/2017	0806	3				3			X		
MW-13	11/7/2017	1425	8				6	2		X		
MW-14	11/8/2017	0950	8				6	2		X		
MW-15	11/6/2017	1631	3				3			X		
MW-16	11/6/2017	1153	3				3			X		
MW-17	11/8/2017	0808	3				3			X		
MW-18	11/7/2017	1213	3				3			X		
MW-19	11/9/2017	1236	8				6	2		X		
MW-19 DUP	11/9/2017	1236	3				3			X		
MW-19	11/8/2017	1604	3				3			X		
MW-20	11/7/2017	1251	3				3			X		

Relinquished by:	Date	Time	Received by:	Time
			<i>[Signature]</i>	11/9/2017 09:55

Remarks:
MS/MSD is from well MW-12 (extra bottles labeled as MW-12 MS/ MW-12 MSD)

Temp °C	Initials	Date	Time	Therm. ID #	Coolant Present
					Yes / No

27
28
29
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37
38
39



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Fax: 530.297.4802

SRG # / Lab No. 12100804

Project Contact (Hardcopy or PDF To):
Stephanie Bosze

Company / Address: Apex Companies
3015 SW 1st Ave., Portland, OR 97201

Phone Number:
503-924-4704 ext 1913

Fax Number:
503-924-4707

Project #:
320001126-20

P.O. #:
Project Name:
NuStar Vancouver GWM

Project Address:

Sampler Name & Signature: M. Masterson

Global ID:
EDD Deliverable To (Email Address):
Ssalisbury@apexcos.com
Bill to:
Apex Companies

California EDF Report?
 Yes No

CRA EQUIS Required
 Yes No

XLS Report Required
 Yes No

Chain-of-Custody Record and Analysis Request

Analysis Request

Other: Please Specify

Sample Designation	Sampling		Container				Preservative				Matrix			TAT			
	Date	Time	40 ml VOA	Sleeve	Poly	250 ml Glass	Tedlar	HCl	HNO ₃	H ₂ SO ₄	None	Water	Soil		Air		
MW-21i-40	11/8/17	1510	3					3				X				X	038
MW-21i-105	11/8/17	1430	3					3				X				X	039
MW-22i	11/7/17	1102	3					3				X				X	040
MW-23i	11/8/17	0907	3					3				X				X	041
MW-24i	11/9/17	1149	8					6	2			X				X	042
MW-24d	11/6/17	1030	3					3				X				X	043
MW-25i	11/8/17	1228	3					3				X				X	044
MW-26	11/8/17	1307	8					6	2			X				X	045
MW-32s	11/10/17	0911	3					3				X				X	046
MW-32i	11/10/17	0832	3					3				X				X	047
S-1	11/8/17	1053	3					3				X				X	048
S-2	11/8/17	1127	3					3				X				X	049

Relinquished by: [Signature] Date: 11/8/17 Time: [Blank]

Received by: [Signature] Date: [Blank] Time: [Blank]

Relinquished by: [Blank] Date: [Blank] Time: [Blank]

Received by: [Blank] Date: [Blank] Time: [Blank]

Relinquished by: [Blank] Date: [Blank] Time: [Blank]

Received by: [Blank] Date: [Blank] Time: [Blank]

Remarks:

MS/MSD is from well MW-12 (extra bottles labeled as MW-12 MS/ MW-12 MSD)

Temp °C: [Blank] Initials: [Blank] Date: [Blank] Time: [Blank] Therm. ID #: [Blank] Coolant Present: Yes / No

For Lab Use Only: Sample Receipt

Temp °C	Initials	Date	Time	Therm. ID #	Coolant Present
					Yes / No

For Lab Use Only: Sample Receipt

Temp °C	Initials	Date	Time	Therm. ID #	Coolant Present
					Yes / No



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SRG # / Lab No.

12100804

Page 5 of 5

Chain-of-Custody Record and Analysis Request

Project Contact (Hardcopy or PDF To):
 Stephanie Bosze
 Company / Address: Apex Companies
 3015 SW 1st Ave., Portland, OR 97201
 Phone Number: 503-924-4704 ext. 1913
 Fax Number: 503-924-4707
 Project #: 320001126-20
 P.O. #: [Blank]
 Project Name: NuStar Vancouver GWM
 Project Address: [Blank]

California EDF Report? Yes No
 CRA EQUIS Required Yes No
 XLS Report Required Yes No
 Global ID: [Blank]
 EDD Deliverable To (Email Address): Ssalisbury@apexcos.com
 Bill to: Apex Companies
 Sampler Name & Signature: M. Masterson

Sample Designation	Date	Time	Sampling			Container			Preservative			Matrix			Analysis Request Other: Please Specify	TAT	
			40 ml VOA	Sieve	Poly	250 ml Glass	Tedlar	1 L	HCl	HNO ₃	H ₂ SO ₄	None	Water	Soil			Air
FB-110617	11/6/17	0950	3														
FB-11072017	11/7/17	0745	3														
FB-11082017	11/8/17	0735	3														
FB-11092017	11/9/17	0730	3														
FB-11102017	11/10/17	0740	3														
EB-11082017	11/8/17	0825	3														

Volatle Halocarbons (EPA 8260B) X
 TOC X
 Methane, Ethane, Ethene X
 HOLD
 For Lab Use Only

Remarks:
 MS/MSD is from well MW-12 (extra bottles labeled as MW-12 MS/ MW-12 MSD)
 Received by: [Signature] 11/13/17 0959
 Received by: [Signature]
 Received by: [Signature]

Temp °C Initials Date Time Therm. ID # Coolant Present Yes / No

Sample Condition Upon Receipt Client Name: Apex LLC Project #: _____

WO# : 12100804

 12100804

Courier: Fed Ex UPS USPS Client
 Commercial Pace OnTrac Other:
 Tracking Number: 7884 4521 6375 / 0364

Custody Seal on Cooler/Box Present? Yes No Seals Intact? Yes No Optional: Proj. Due Date: Proj. Name:

Packing Material: Bubble Wrap Bubble Bags None Other: Temp Blank? Yes No

Thermom. Used: DA1434 DA2285 Type of Ice: Wet Blue Dry Ice None Samples on ice, cooling process has begun

Cooler Temp Read(°C): 5.4/4.4 Cooler Temp Corrected(°C): 5.1/4.1 Biological Tissue Frozen? Yes No N/A
 Temp should be above freezing to 6°C Correction Factor: -0.3 Date and Initials of Person Examining Contents: SAJ 11/15/17 114917

Chain of Custody Present?	Yes	No	N/A	1.
Chain of Custody Filled Out?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2. <u>6 vial containers received, labeled as Trip Blank but not as coc.</u>
Chain of Custody Relinquished?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3.
Sampler Name and/or Signature on COC?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4. <u>Sample 12 has an error</u>
Samples Arrived within Hold Time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5. <u>labeled as "110" and not "101" as</u>
Short Hold Time Analysis (<72 hr)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	6. <u>The coc states. The time and</u>
Rush Turn Around Time Requested?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	7. <u>date matches the coc and it</u>
Sufficient Volume?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	8. <u>was in the same bag as the other</u>
Correct Containers Used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	9. <u>containers for sample 12. SR will</u>
-Pace Containers Used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>treat this as sample 12.</u>
Containers Intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10.
Filtered Volume Received for Dissolved Tests?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	11. Note if sediment is visible in the dissolved container.
Sample Labels Match COC?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	12.
-Includes Date/Time/ID/Analysis Matrix: <u>WT</u>				
All containers needing acid/base preservation have been checked?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	13. <input type="checkbox"/> HNO ₃ <input type="checkbox"/> H ₂ SO ₄ <input type="checkbox"/> NaOH <input type="checkbox"/> HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO ₃ , H ₂ SO ₄ , HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Sample #
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	14.
Trip Blank Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	15.
Trip Blank Custody Seals Present?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Pace Trip Blank Lot # (if purchased):				

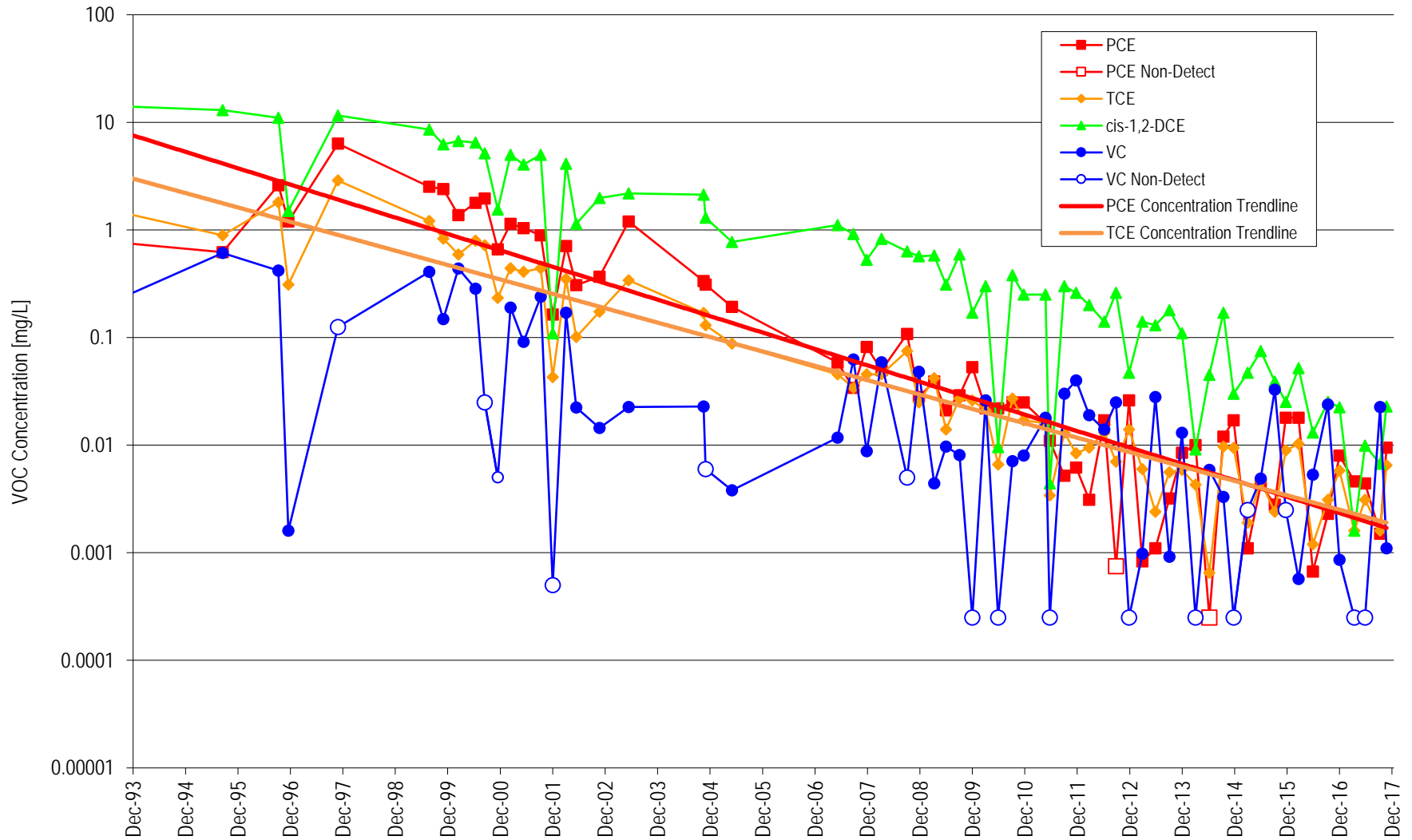
CLIENT NOTIFICATION/RESOLUTION Field Data Required? Yes No
 Person Contacted: _____ Date/Time: _____
 Comments/Resolution: _____

Project Manager Review: Scott J... Date: 11/15/17
 Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

Appendix D

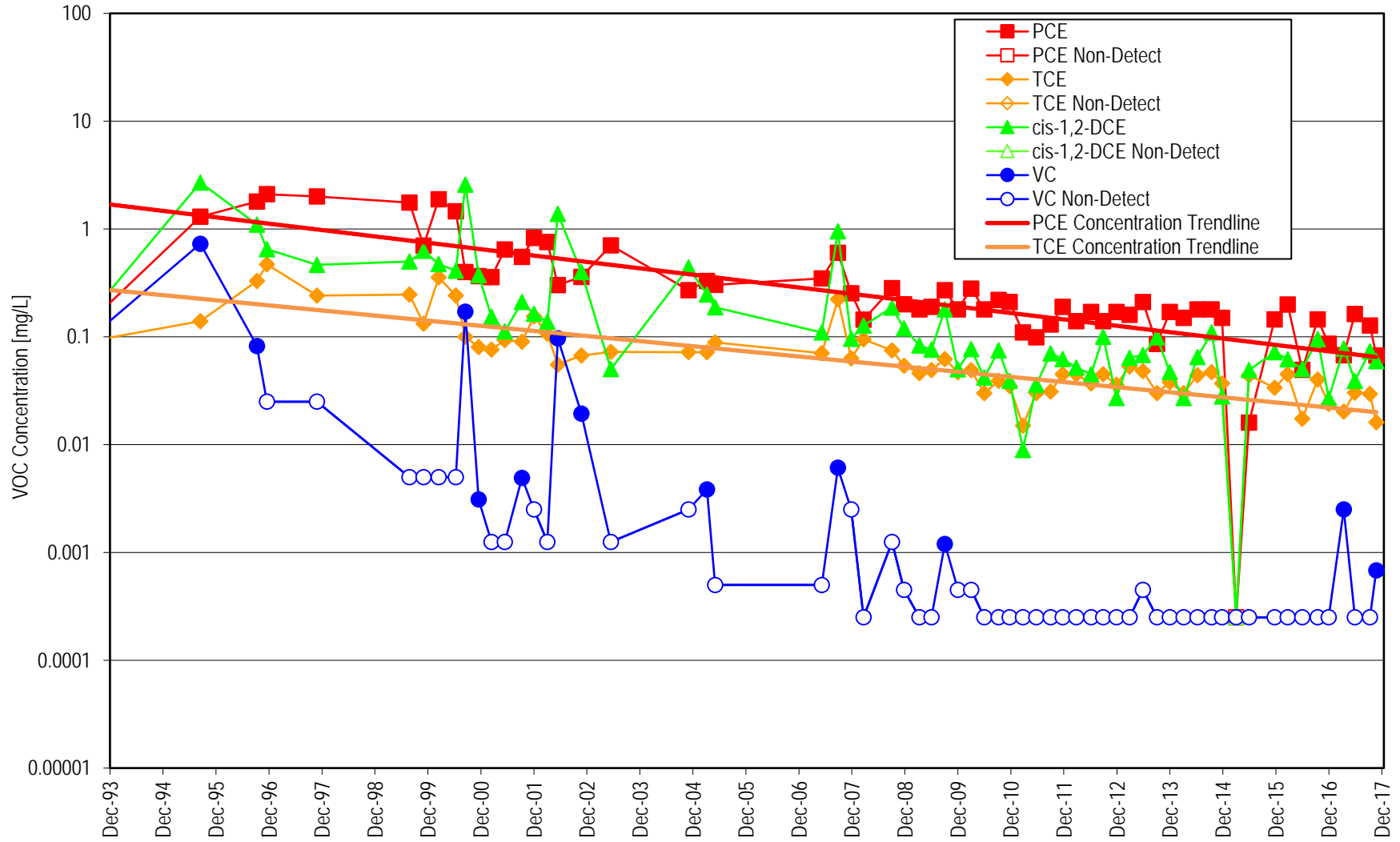
Concentration Trend Plots

VOC Concentrations in MW-1



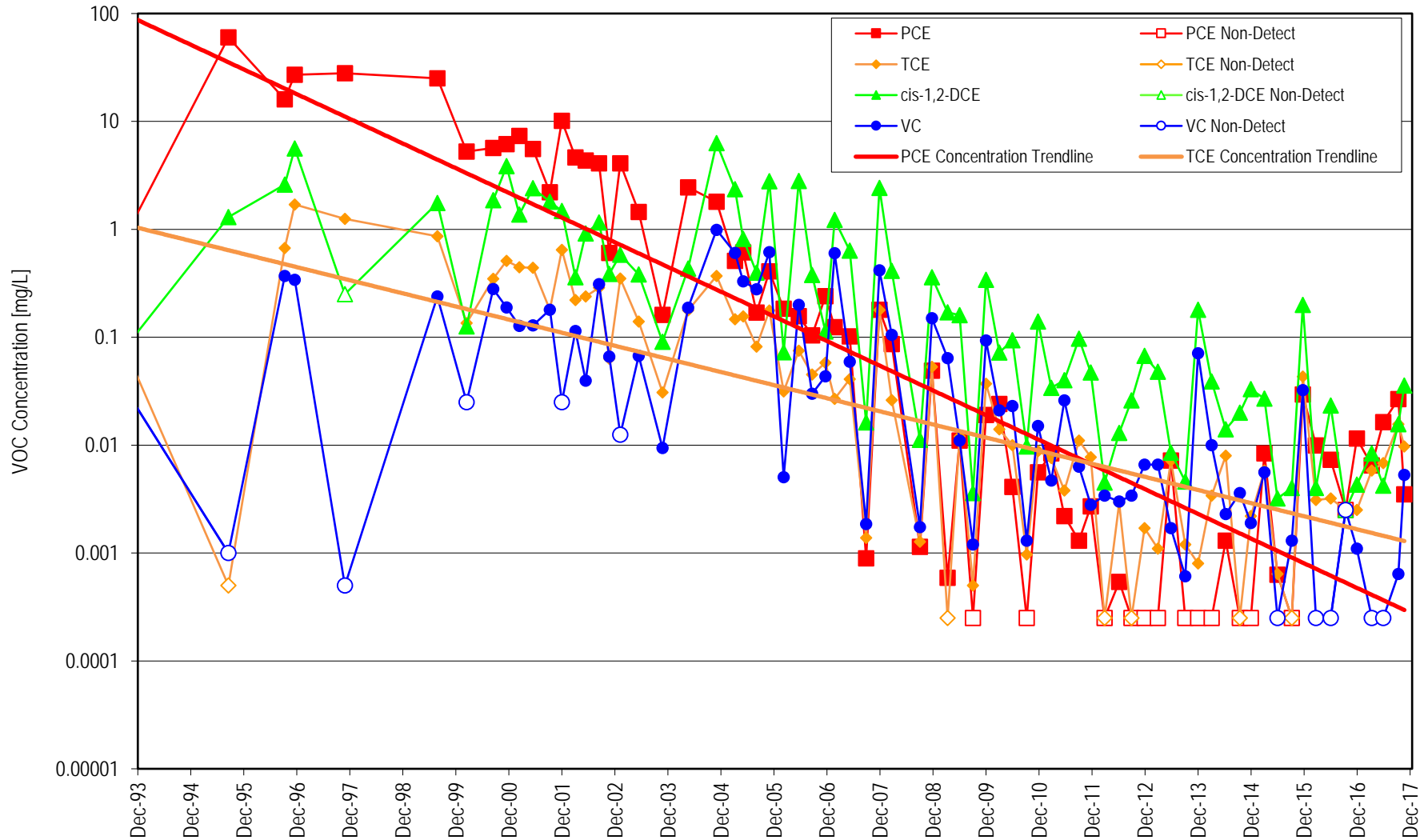
Note: Not detected values plotted at 1/2 the reporting limit.

VOC Concentrations in MW-3



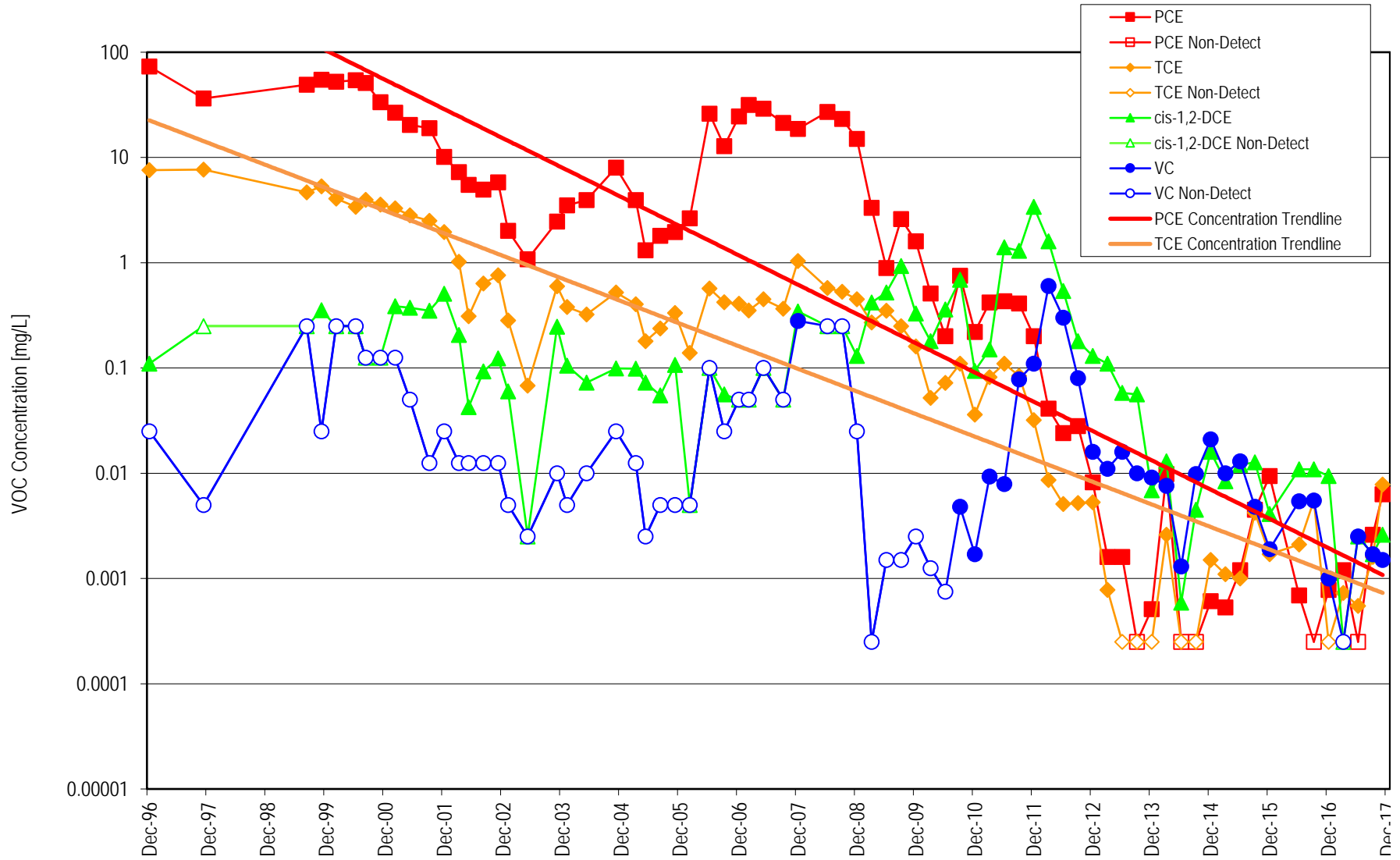
Note: Not detected values plotted at 1/2 the reporting limit.

VOC Concentrations in MW-5



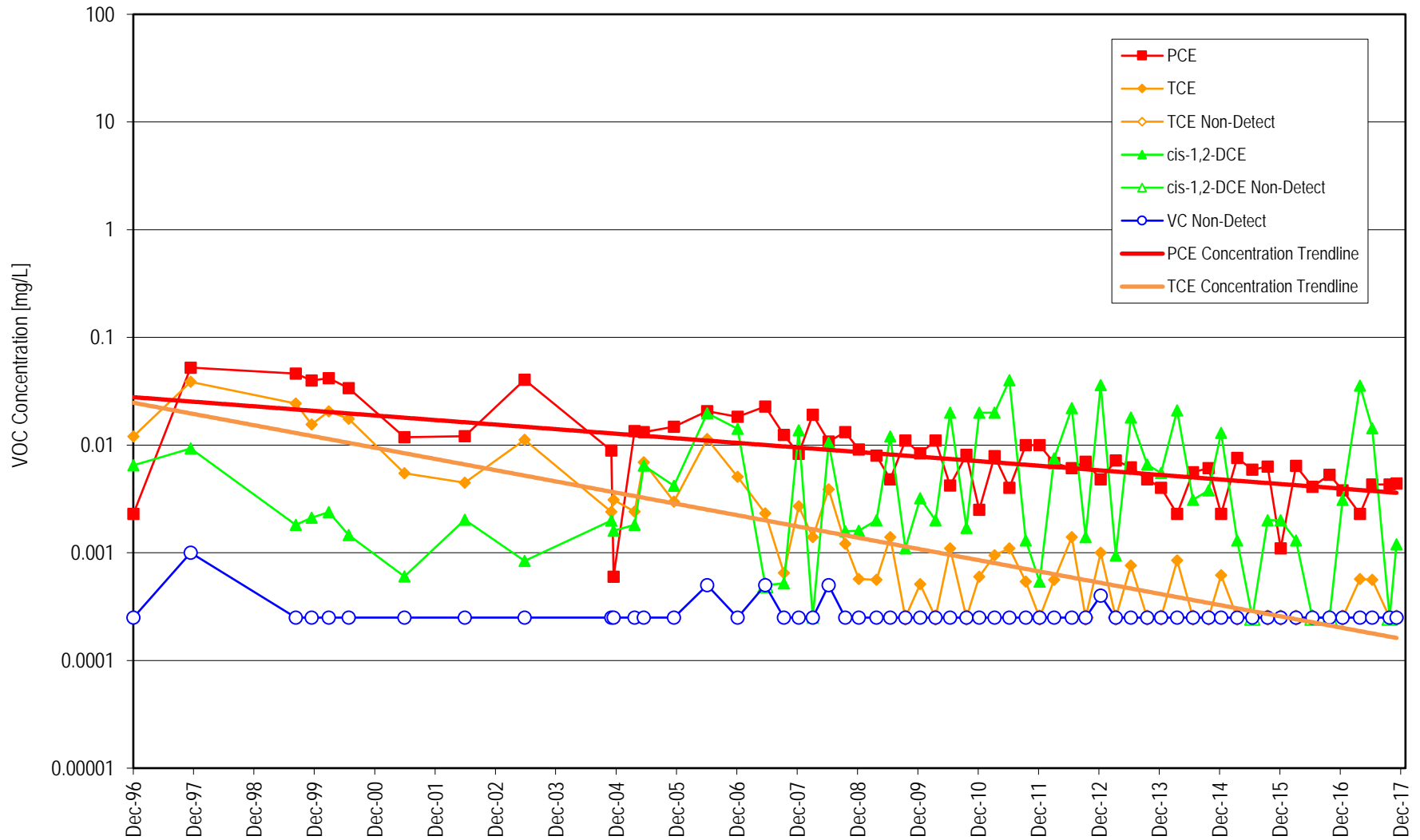
Note: Not detected values plotted at 1/2 the reporting limit.

VOC Concentrations in MW-7



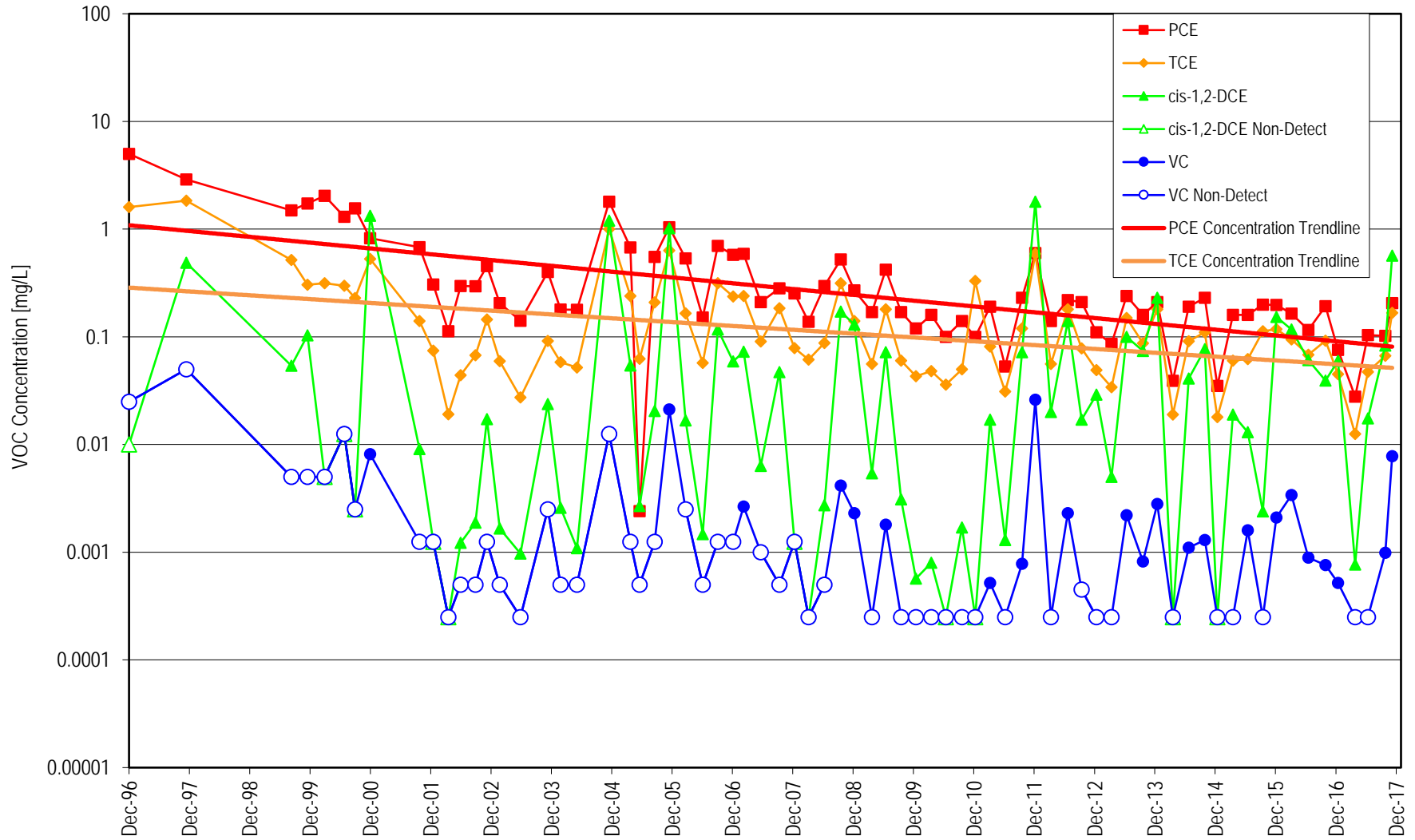
Note: Not detected values plotted at 1/2 the reporting limit.

VOC Concentrations in MW-8



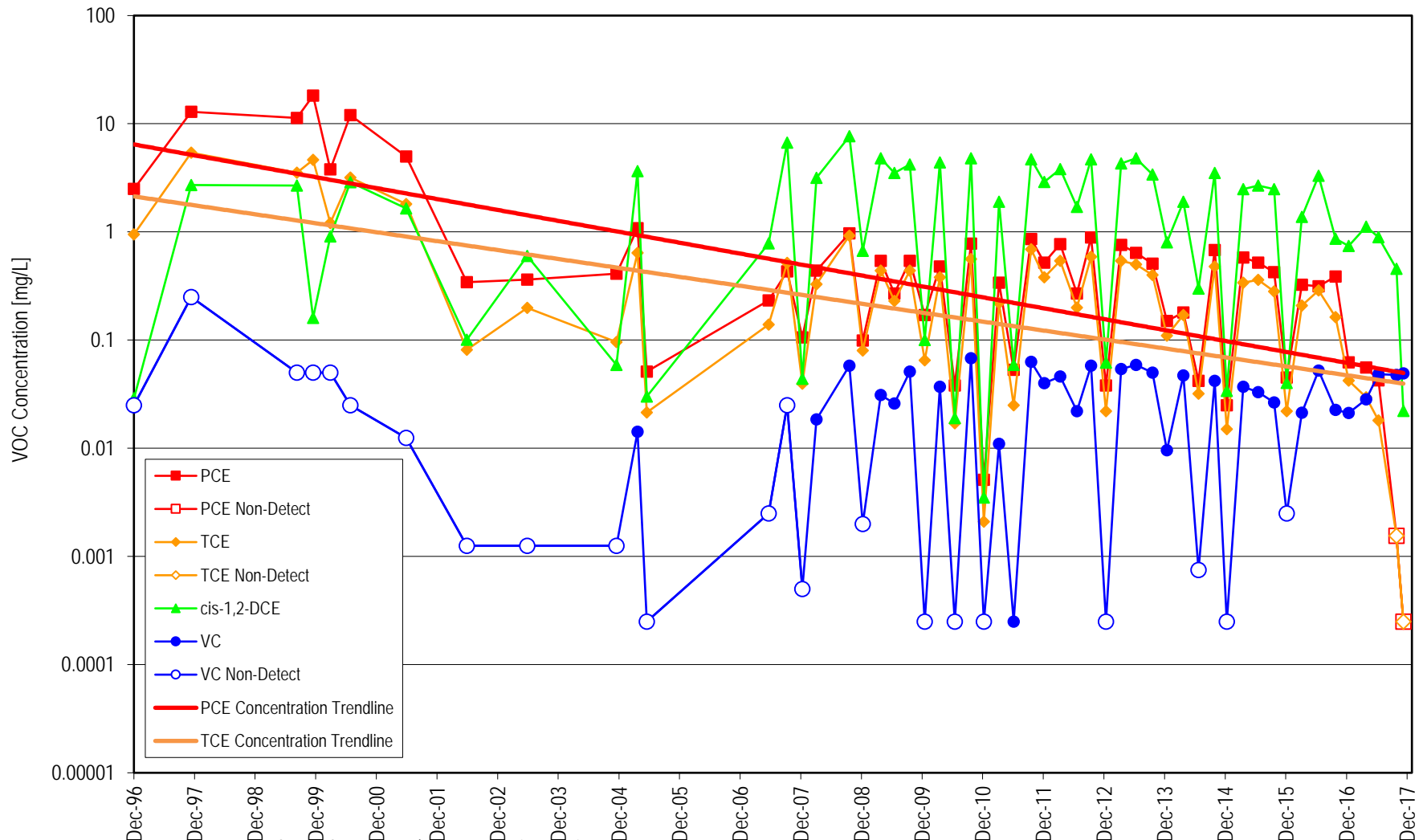
Note: Not detected values plotted at 1/2 the reporting limit.

VOC Concentrations in MW-9



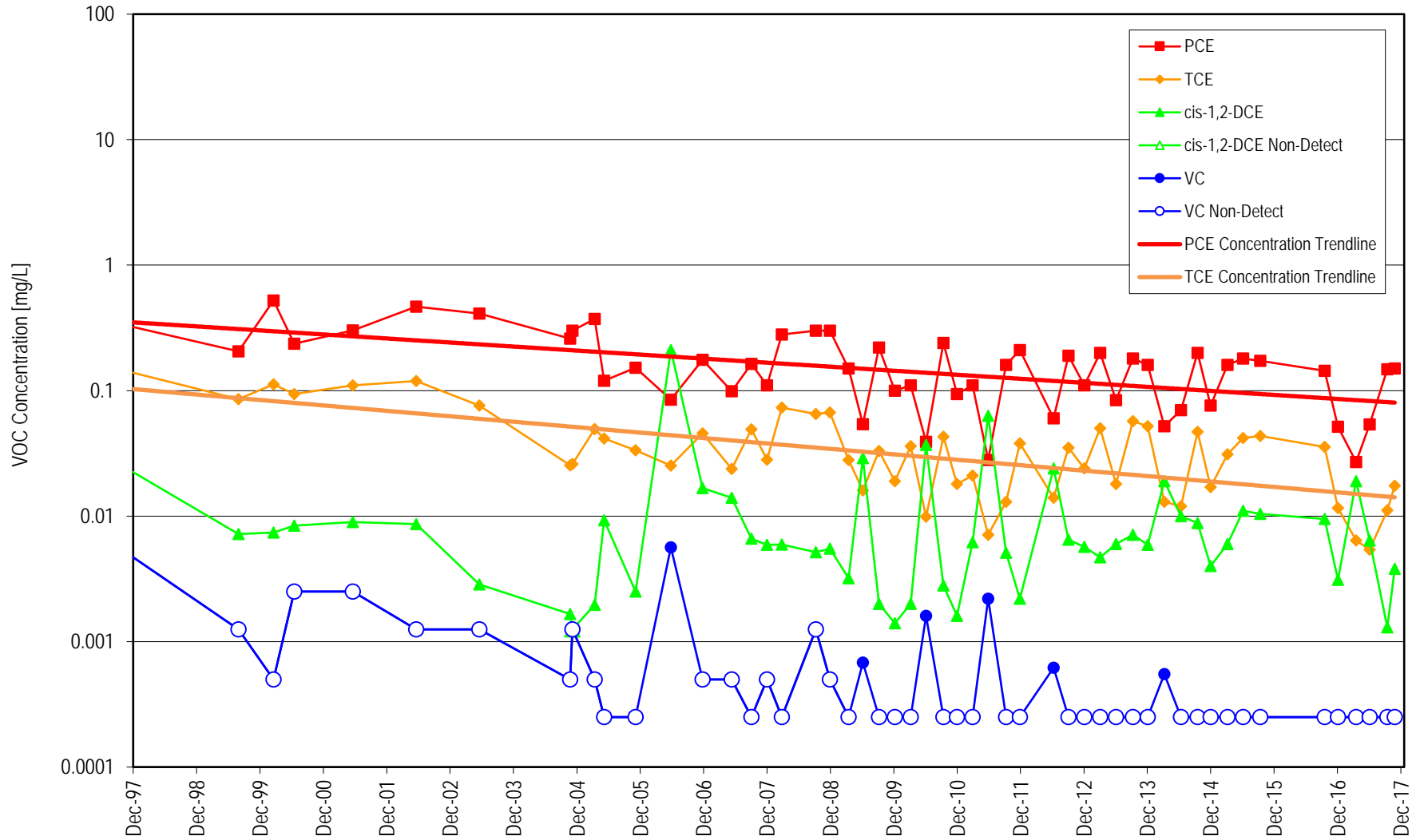
Note: Not detected values plotted at 1/2 the reporting limit.

VOC Concentrations in MW-12



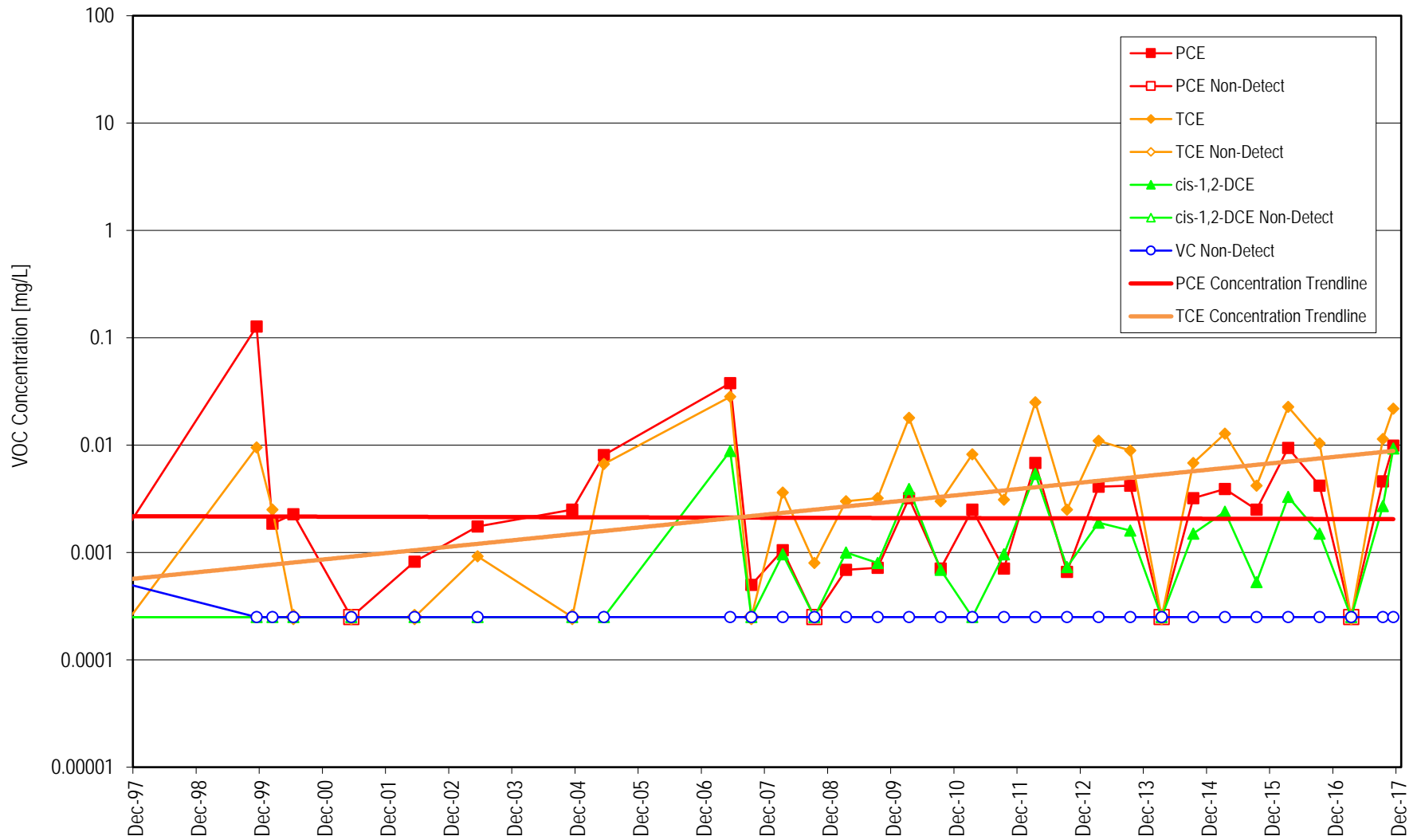
Note: Not detected values plotted at 1/2 the reporting limit.

VOC Concentrations in MW-16



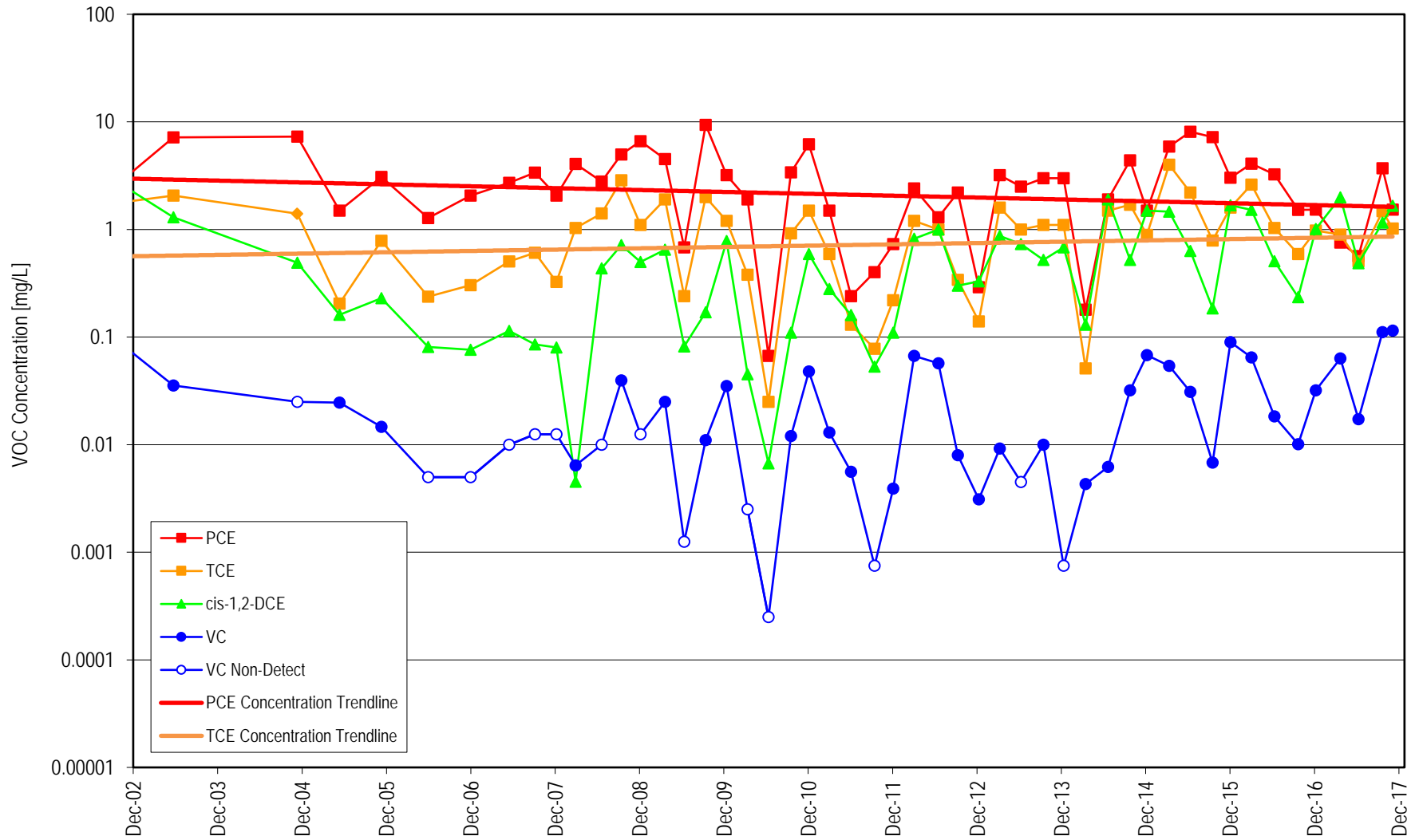
Note: Not detected values plotted at 1/2 the reporting limit.

VOC Concentrations in MW-17



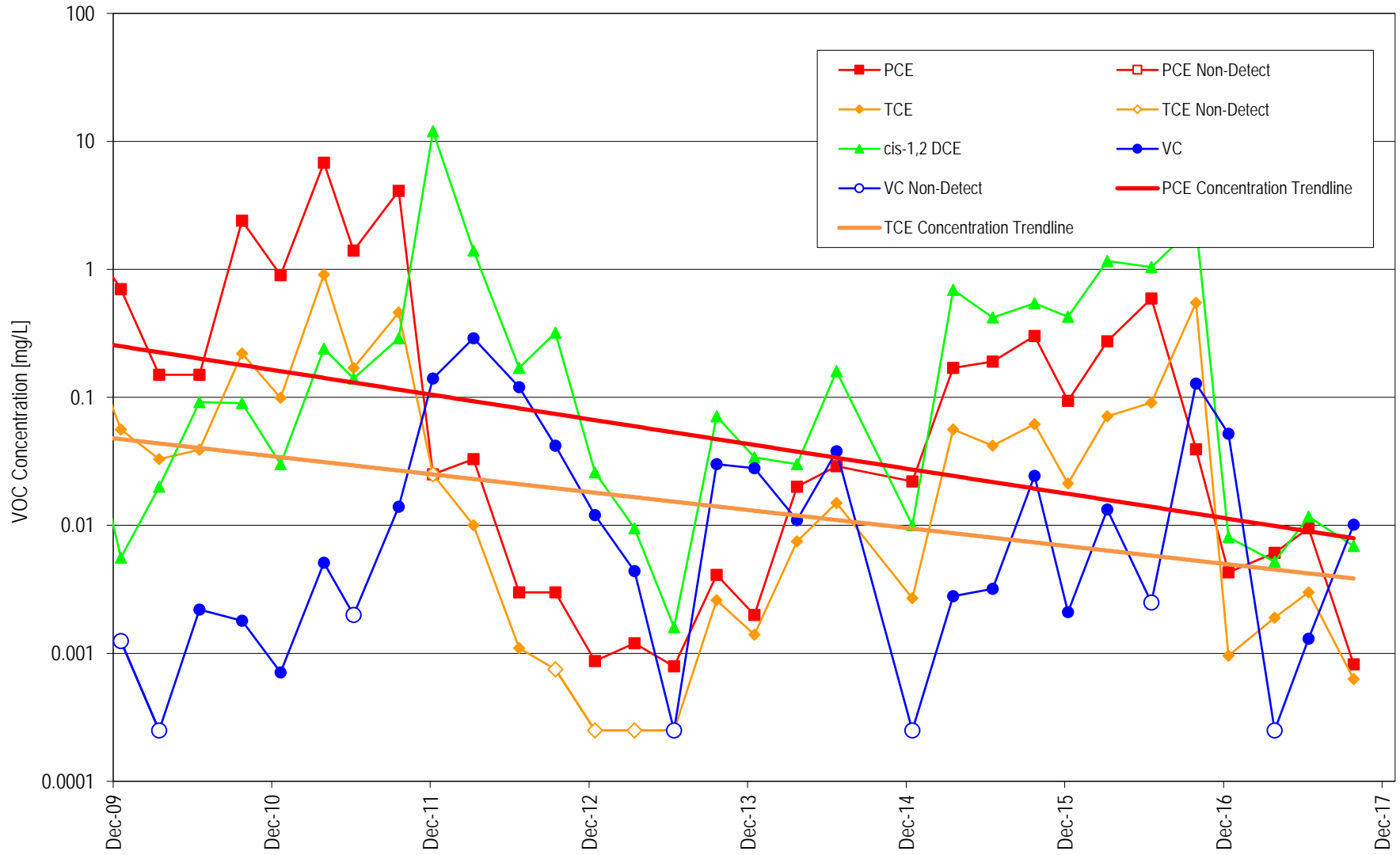
Note: Not detected values plotted at 1/2 the reporting limit.

VOC Concentrations in MW-19



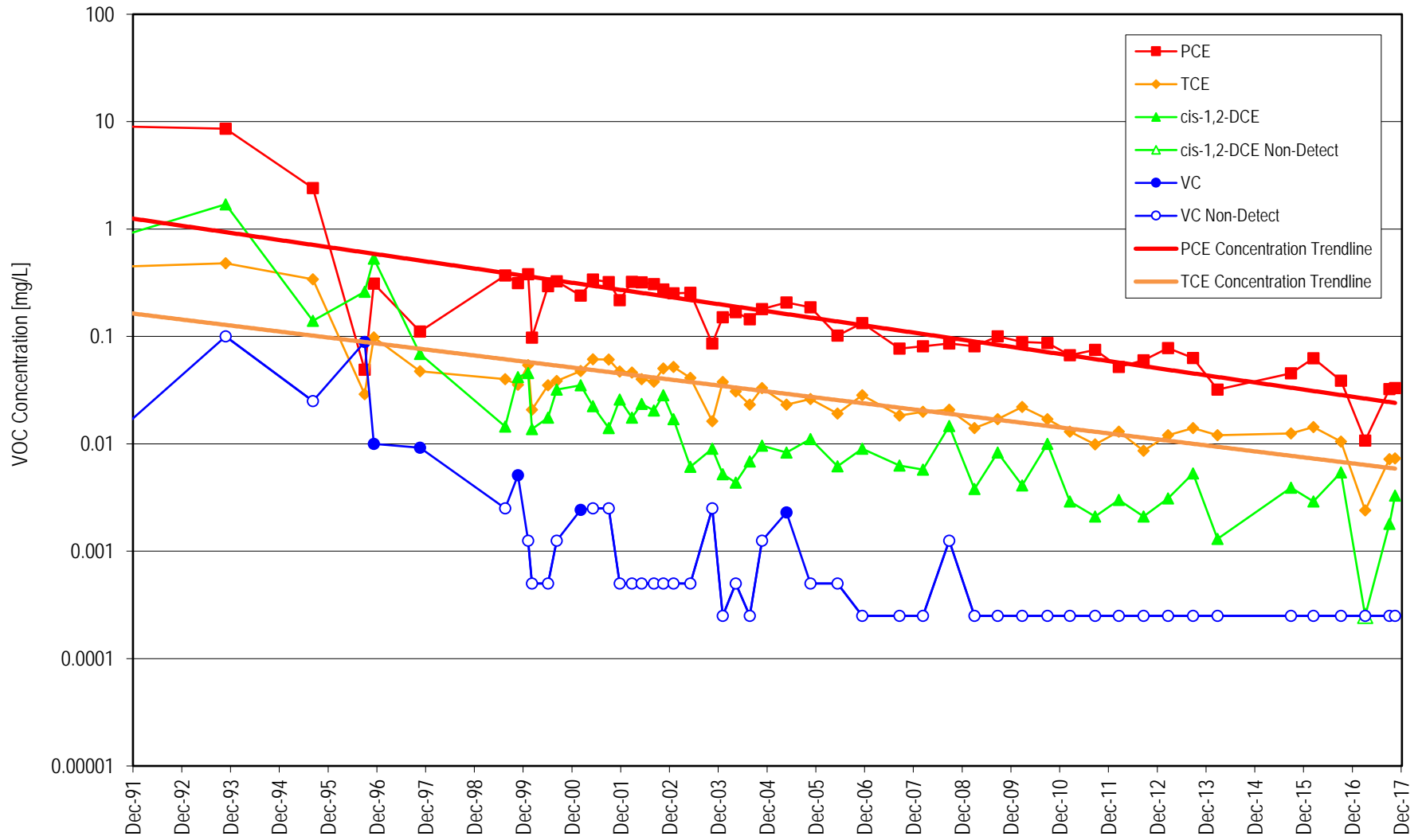
Note: Not detected values plotted at 1/2 the reporting limit.

VOC Concentrations in EX



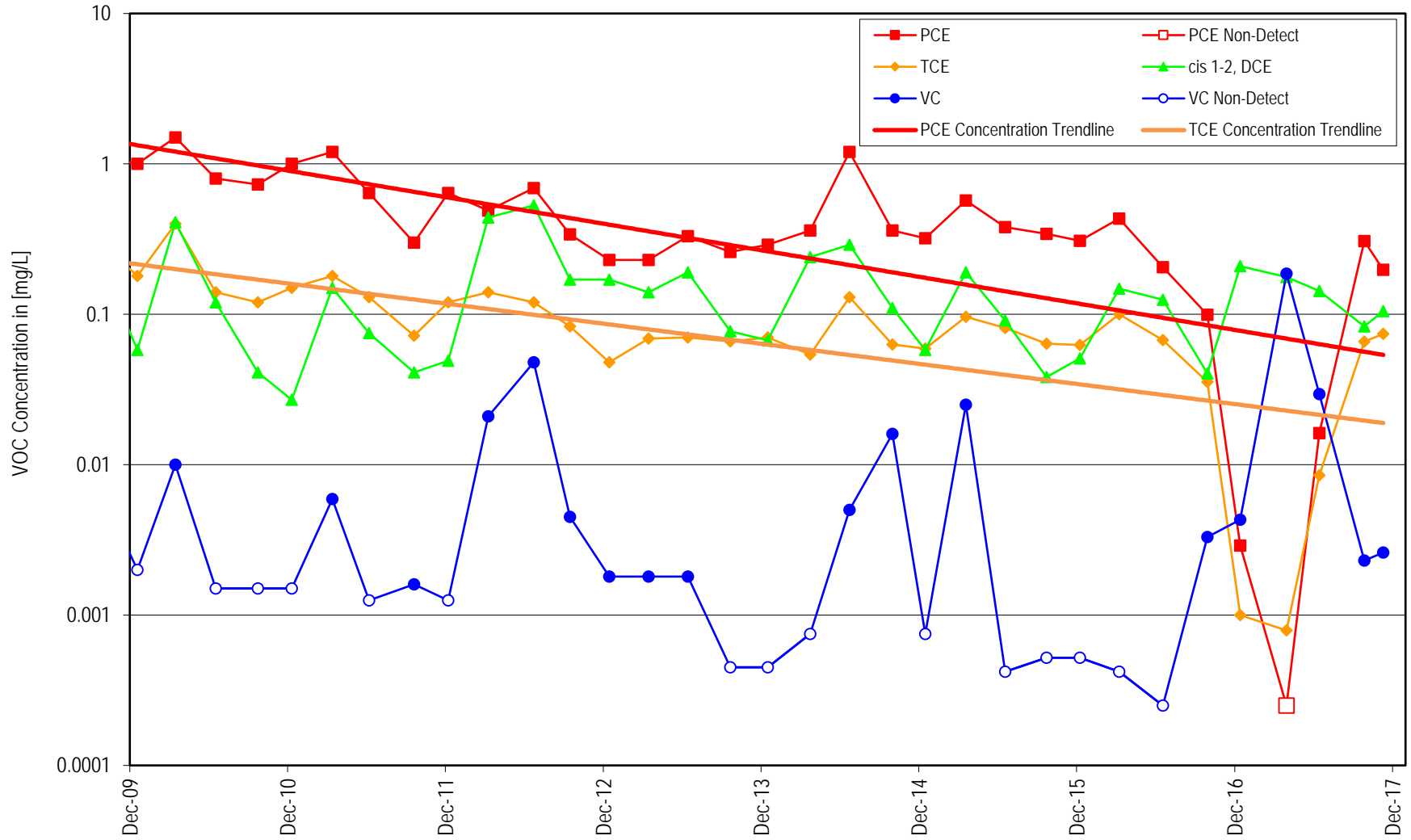
Note: Not detected values plotted at 1/2 the reporting limit.

VOC Concentrations in EW-1



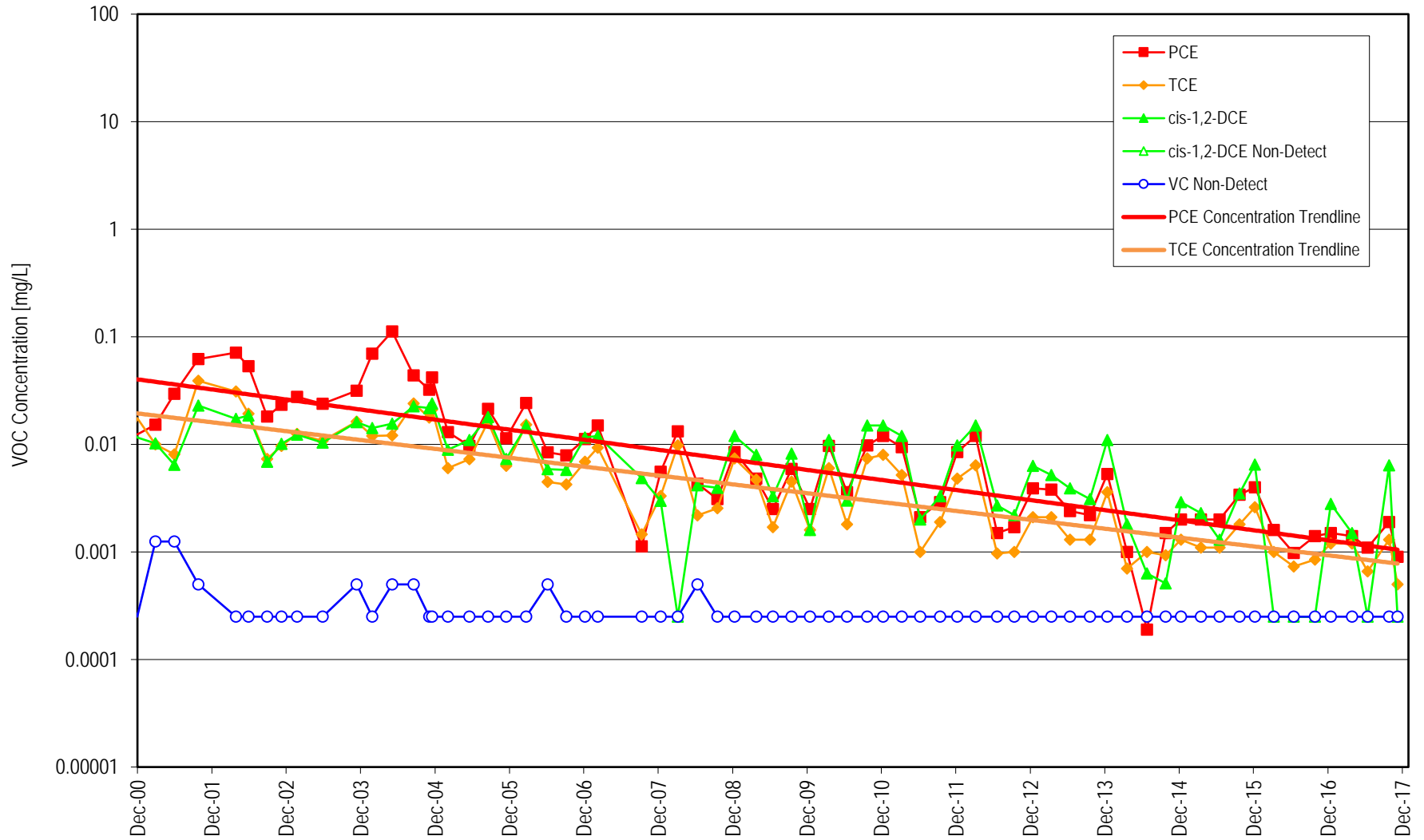
Note: Not detected values plotted at 1/2 the reporting limit.

VOC Concentrations in MP-1



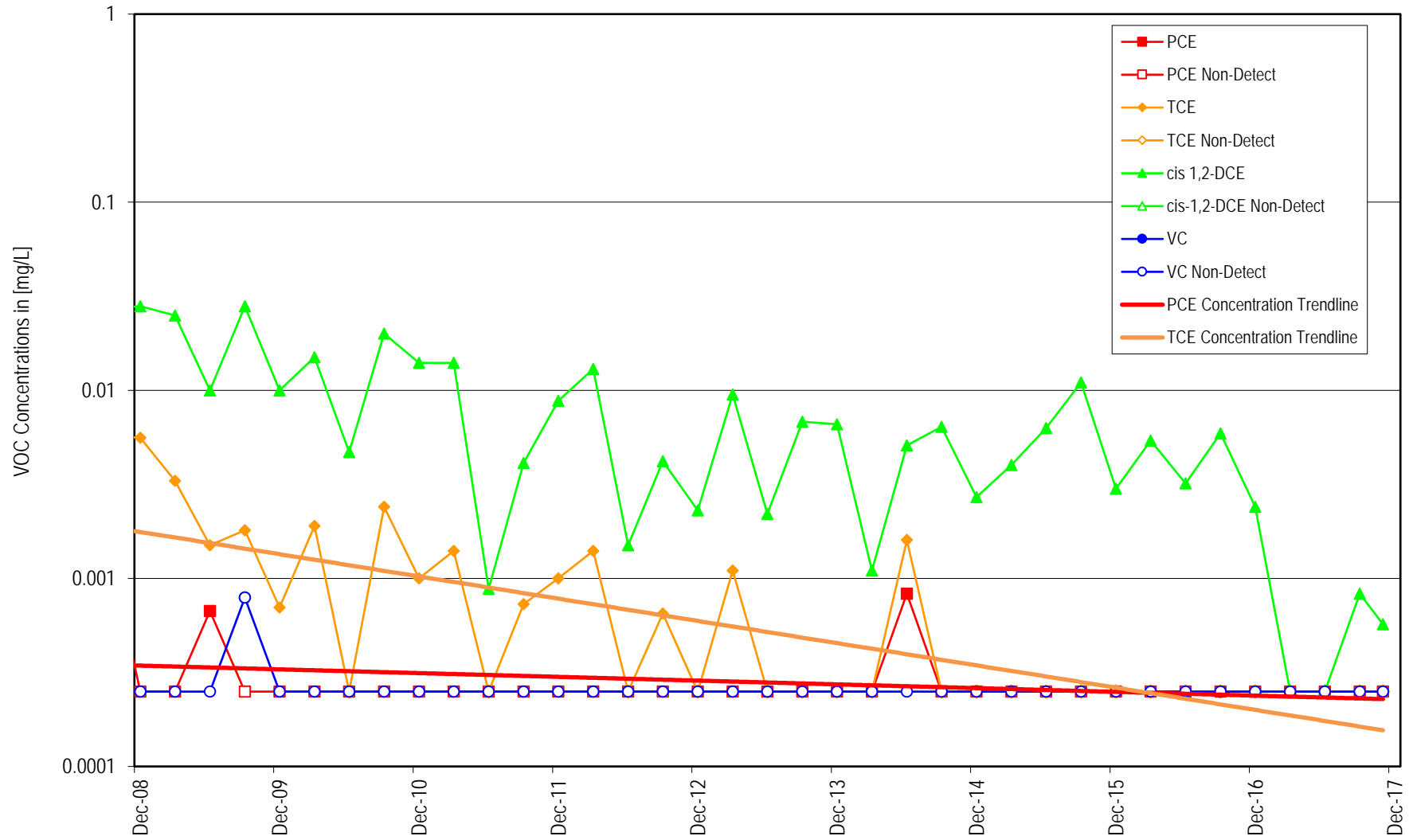
Note: Not detected values plotted at 1/2 the reporting limit.

VOC Concentrations in MW-18i



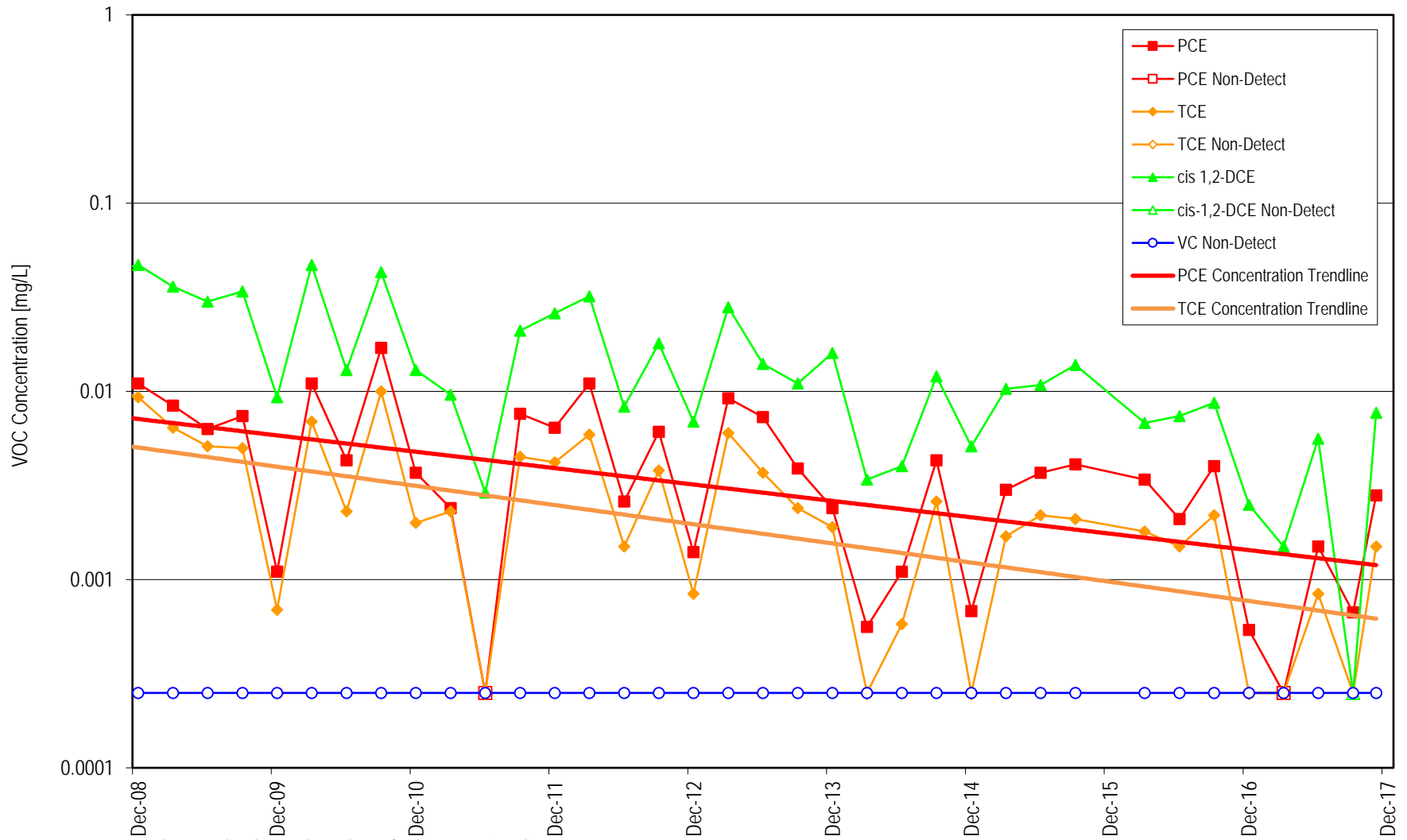
Note: Not detected values plotted at 1/2 the reporting limit.

VOC Concentrations in MW-19i

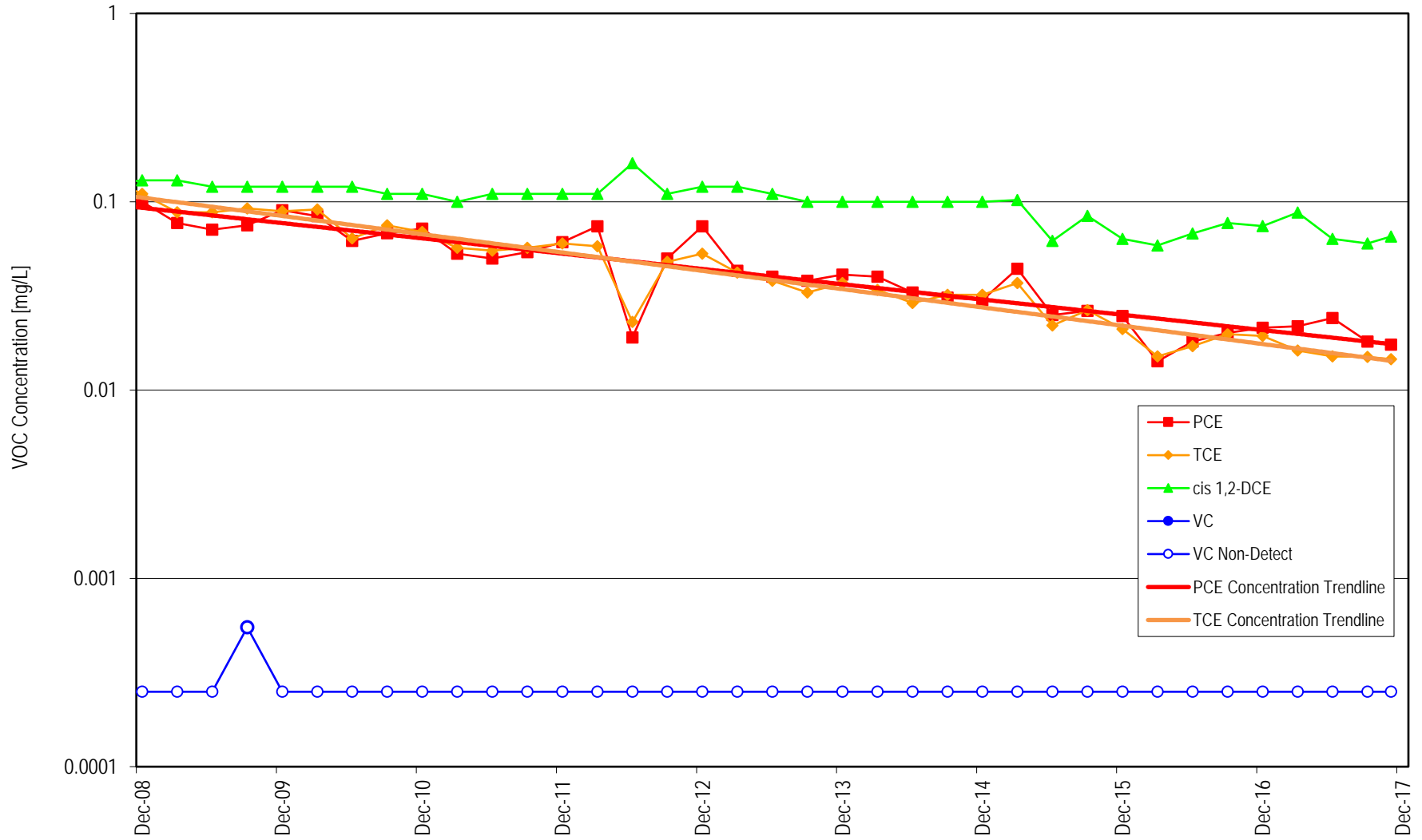


Note: Not detected values plotted at 1/2 the reporting limit.

VOC Concentrations in MW-20i

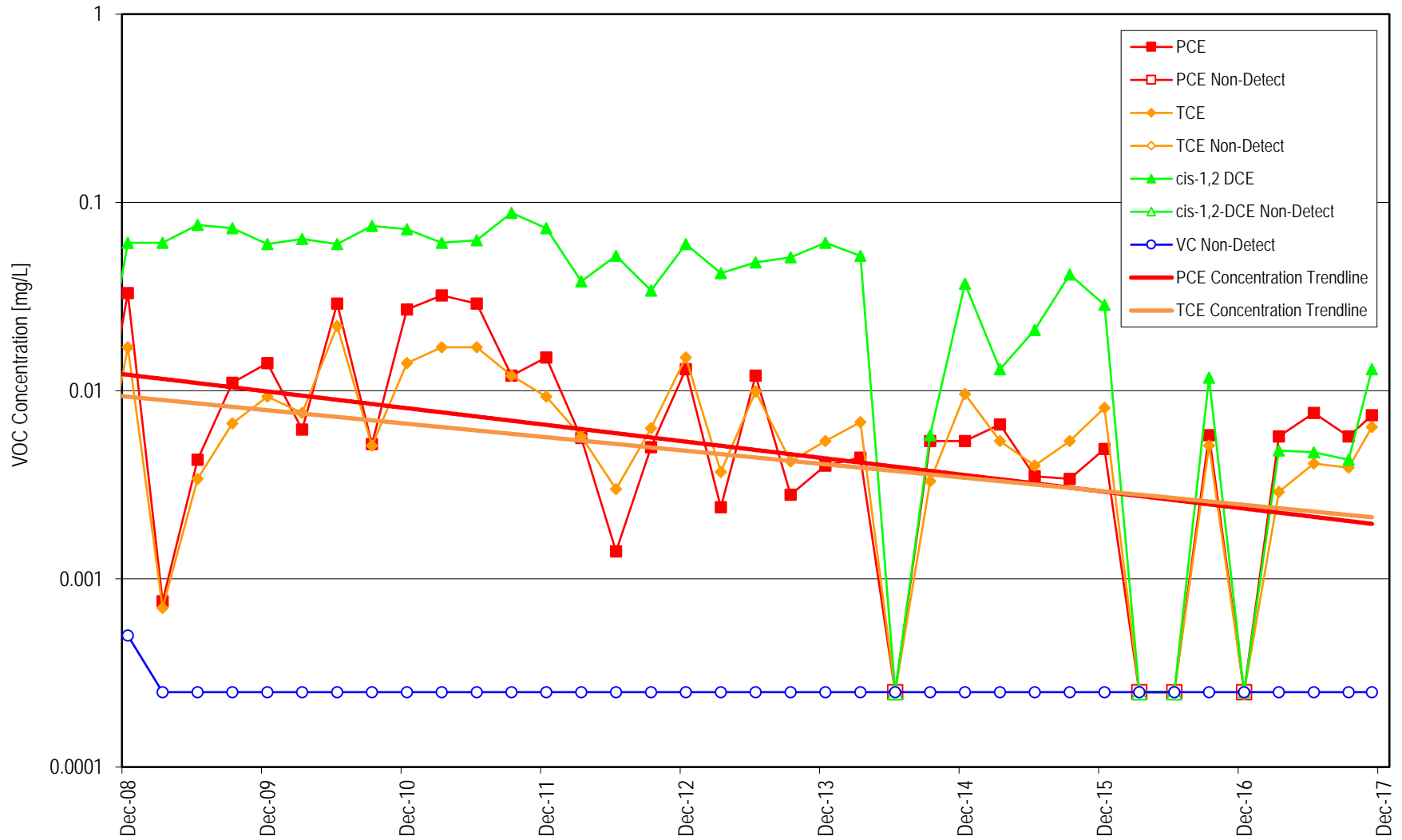


VOC Concentrations in MW-21i-40

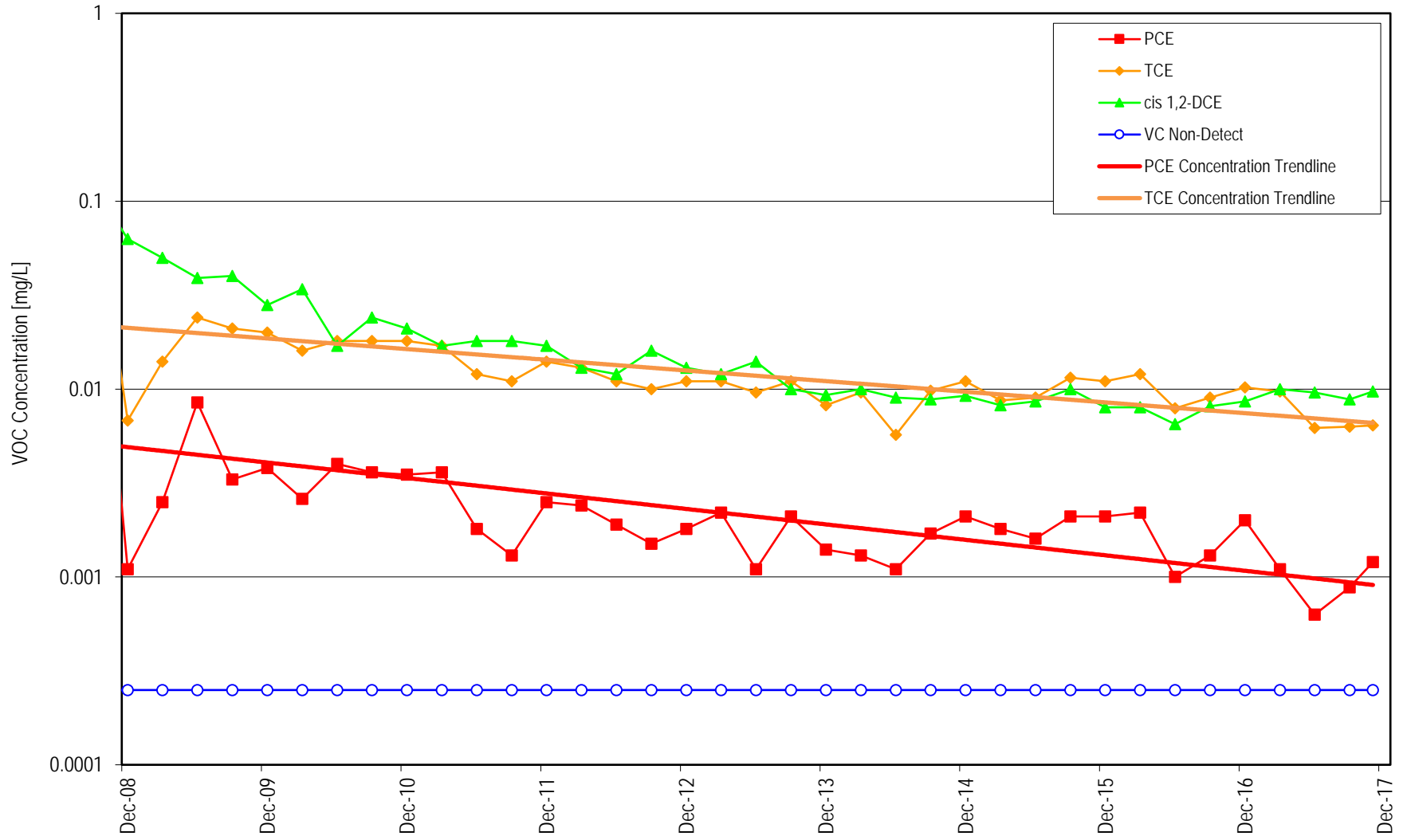


Note: Not detected values plotted at 1/2 the reporting limit.

VOC Concentrations in MW-21i-105

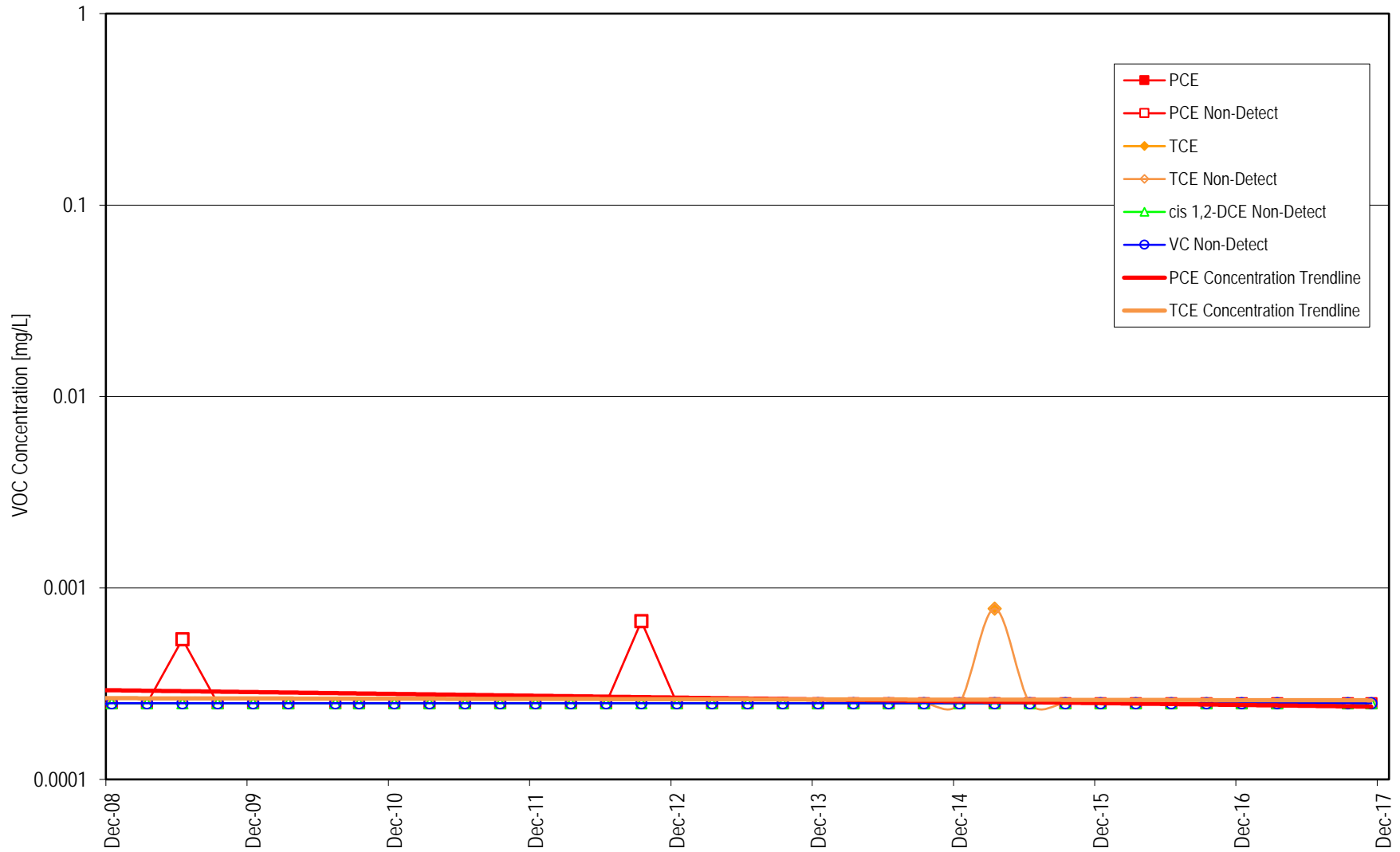


VOC Concentrations in MW-22i



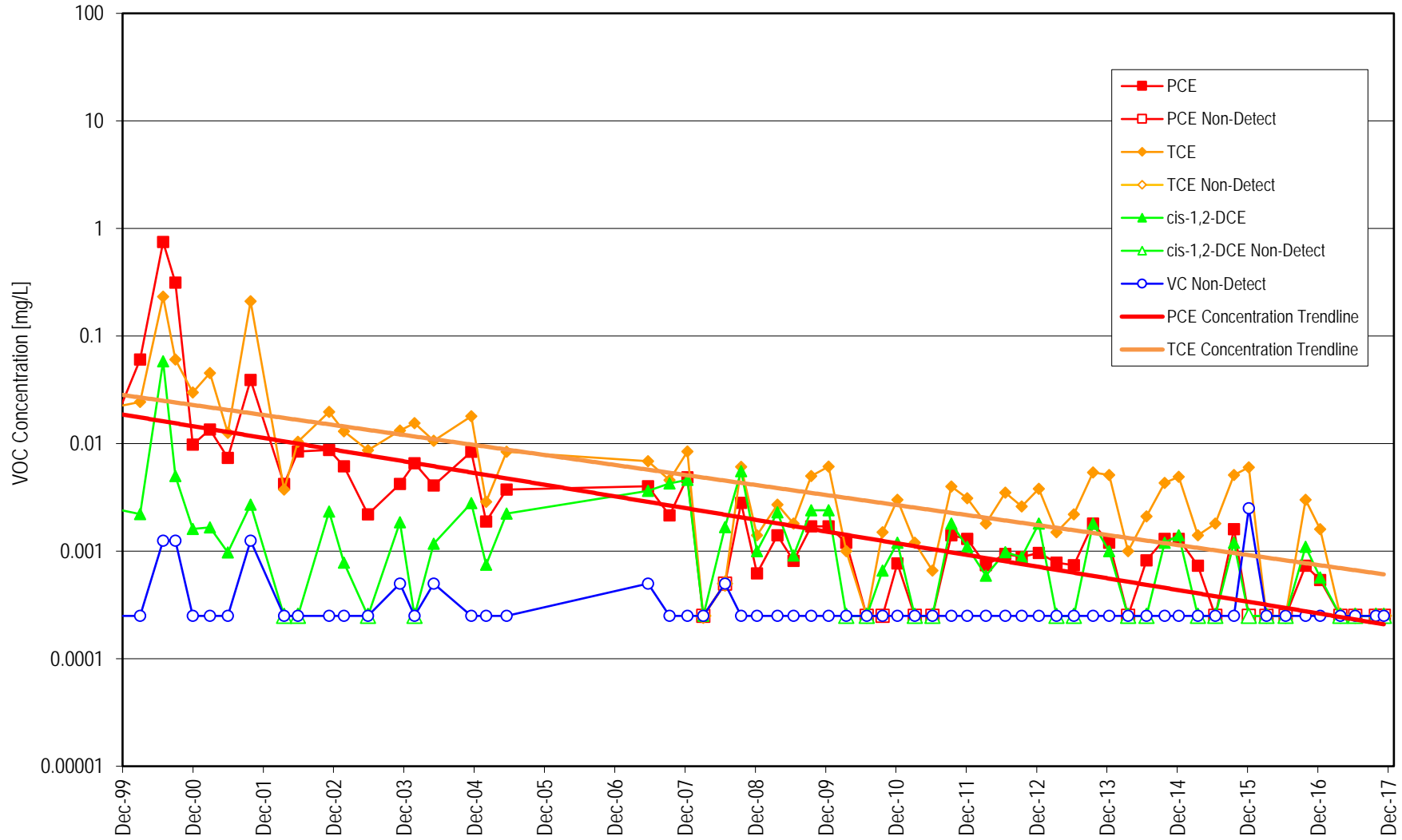
Note: Not detected values plotted at 1/2 the reporting limit.

VOC Concentrations in MW-23i



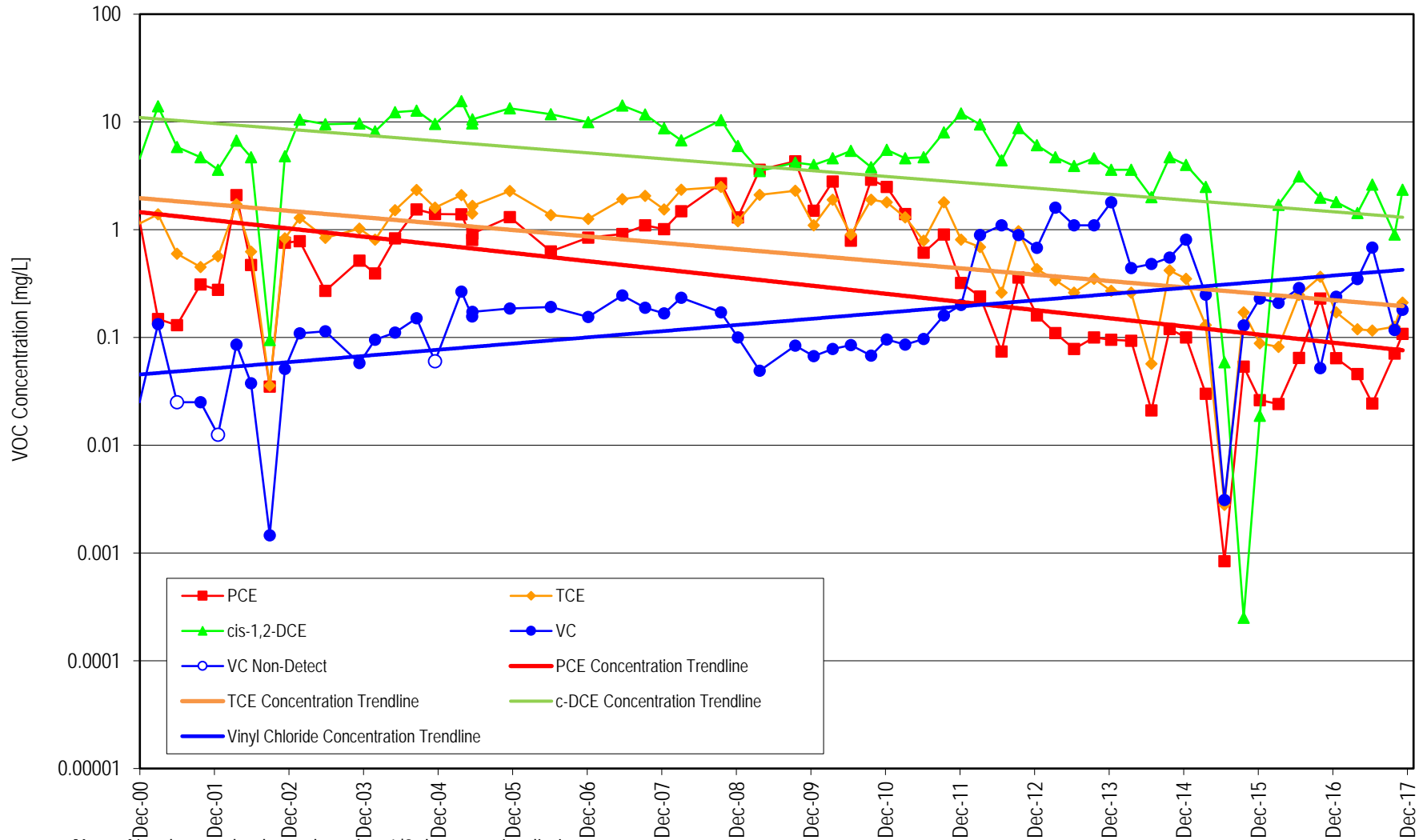
Note: Not detected values plotted at 1/2 the reporting limit.

VOC Concentrations in S-1



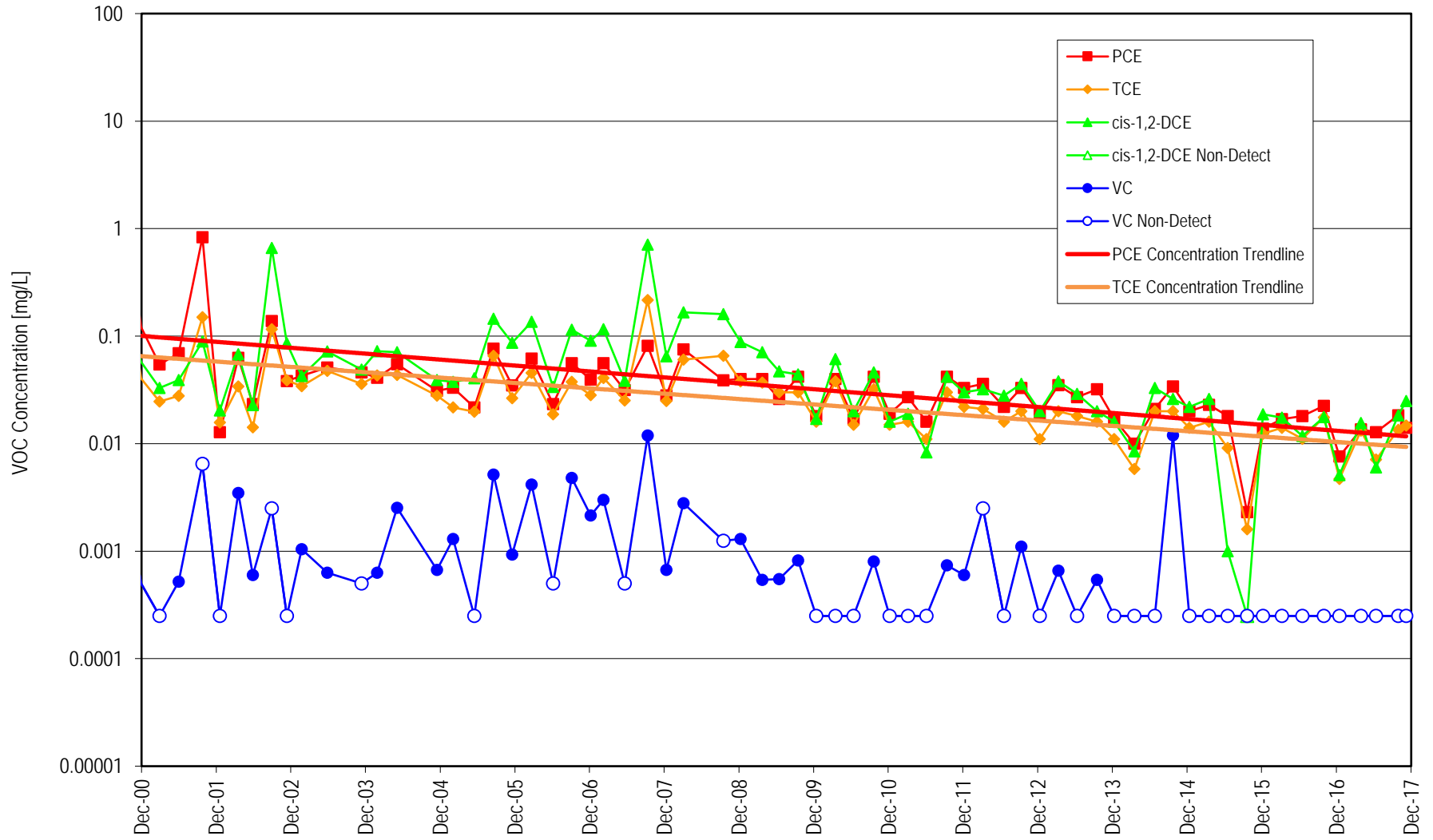
Note: Not detected values plotted at 1/2 the reporting limit.

VOC Concentrations in MGMTS1-43



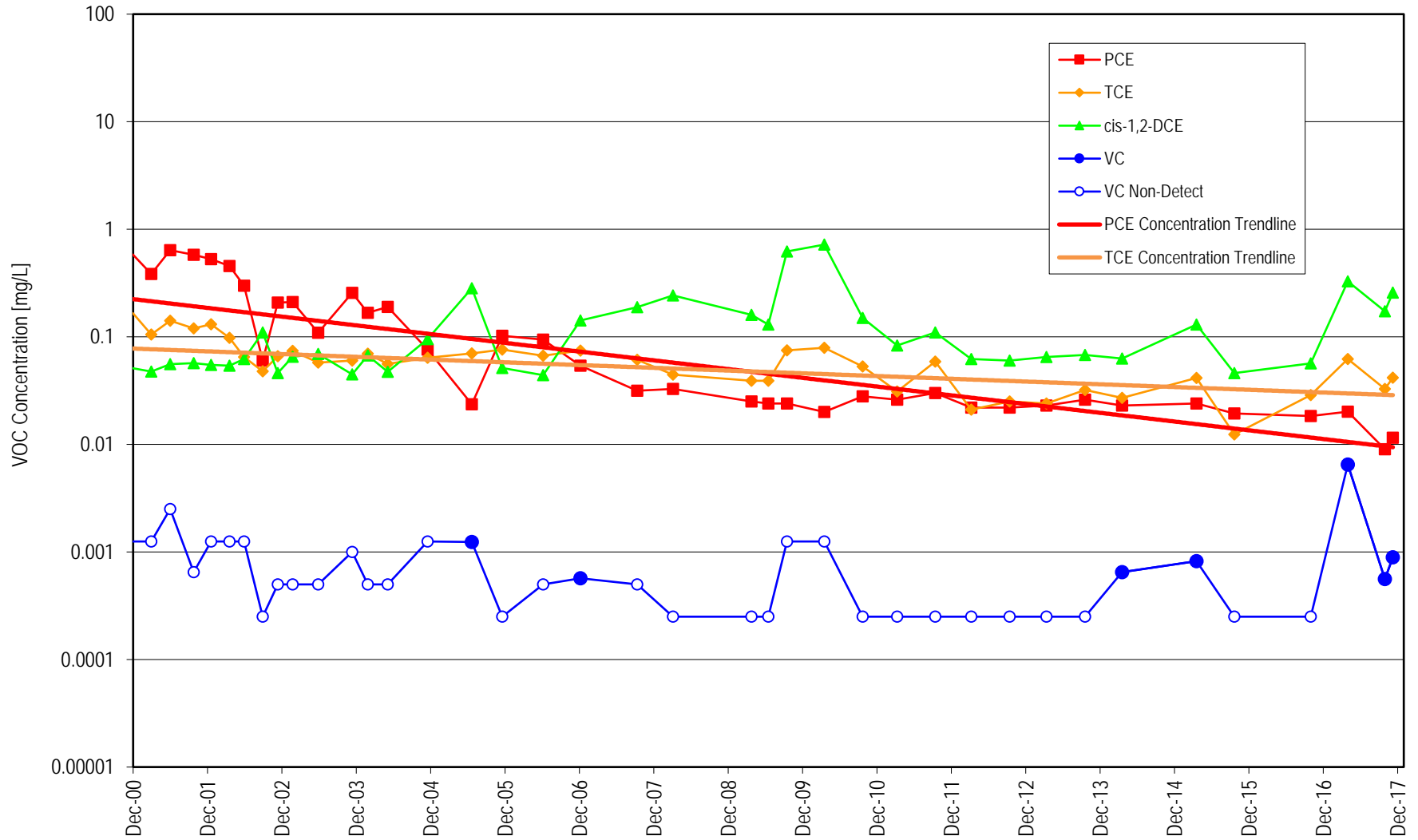
Note: Not detected values plotted at 1/2 the reporting limit.

VOC Concentrations in MGMS1-60



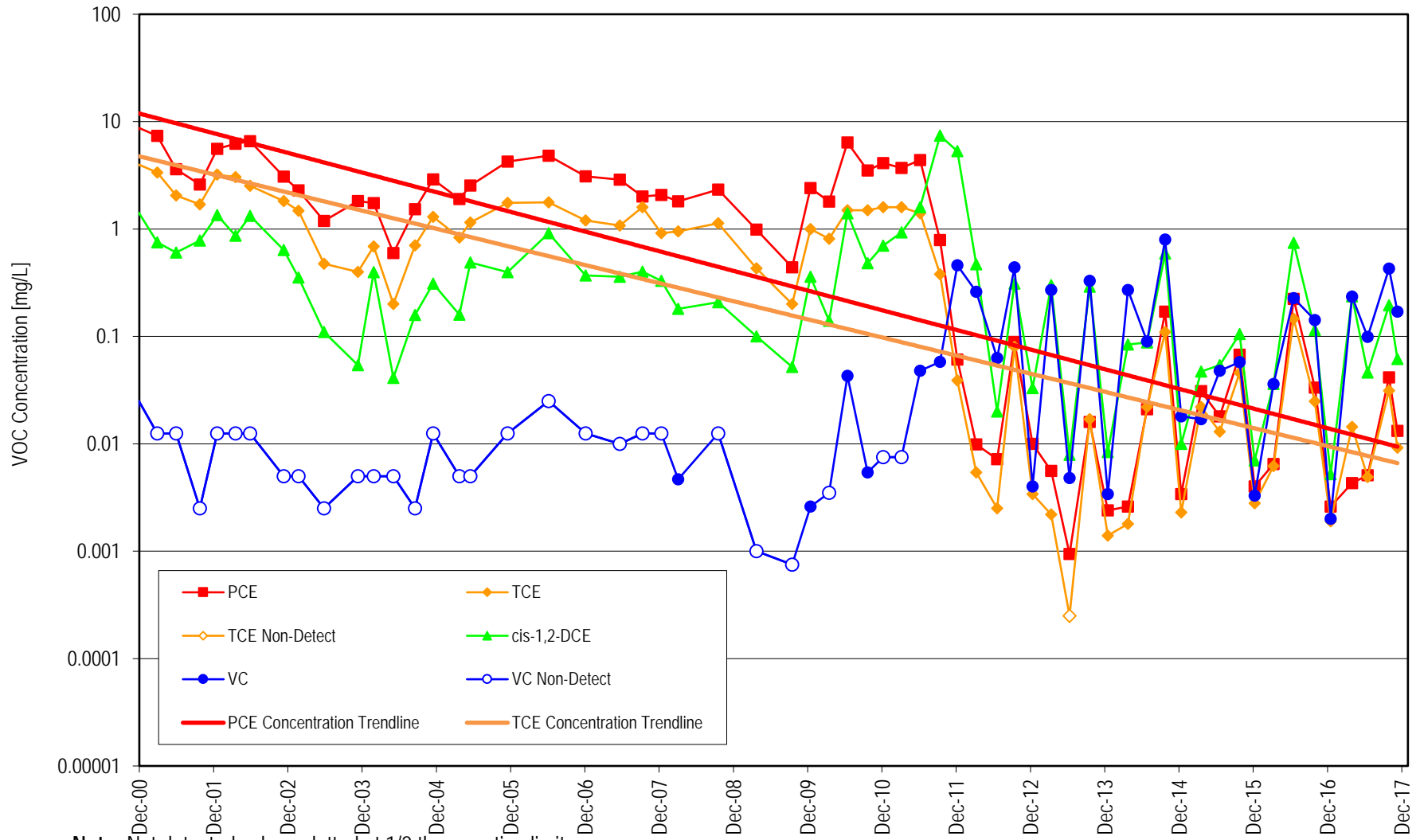
Note: Not detected values plotted at 1/2 the reporting limit.

VOC Concentrations in MGMS1-110

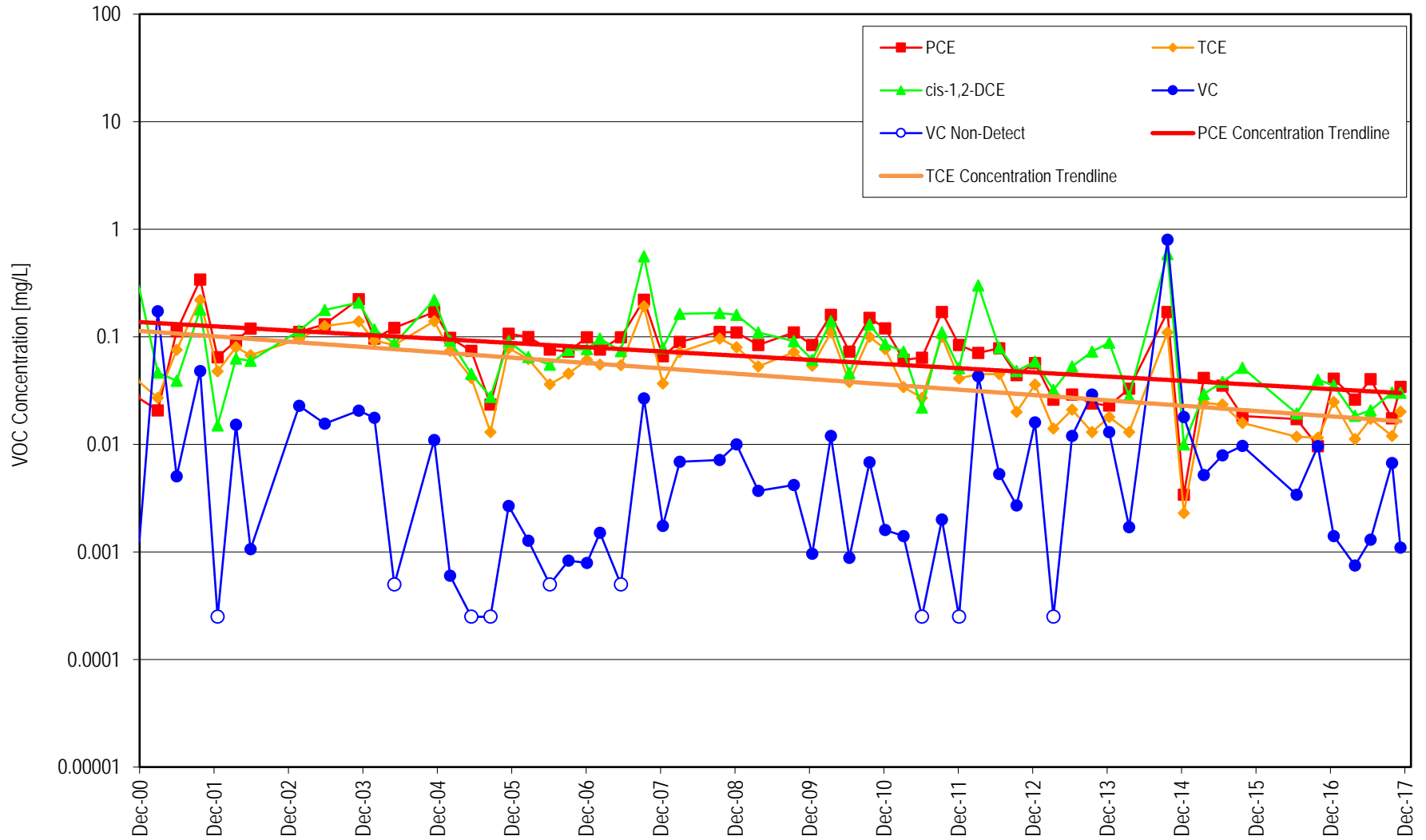


Note: Not detected values plotted at 1/2 the reporting limit.

VOC Concentrations in MGMS2-40

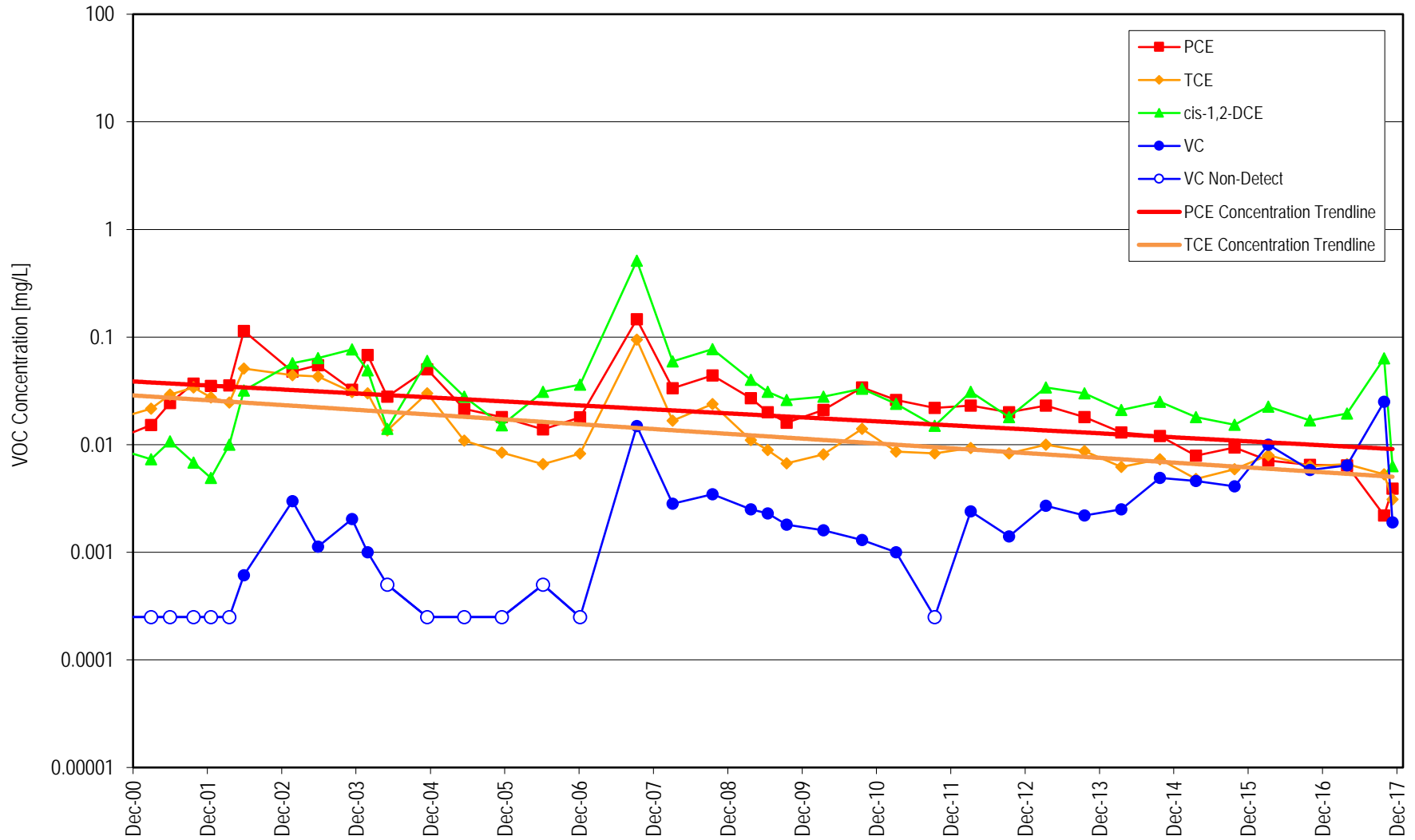


VOC Concentrations in MGMTS2-60



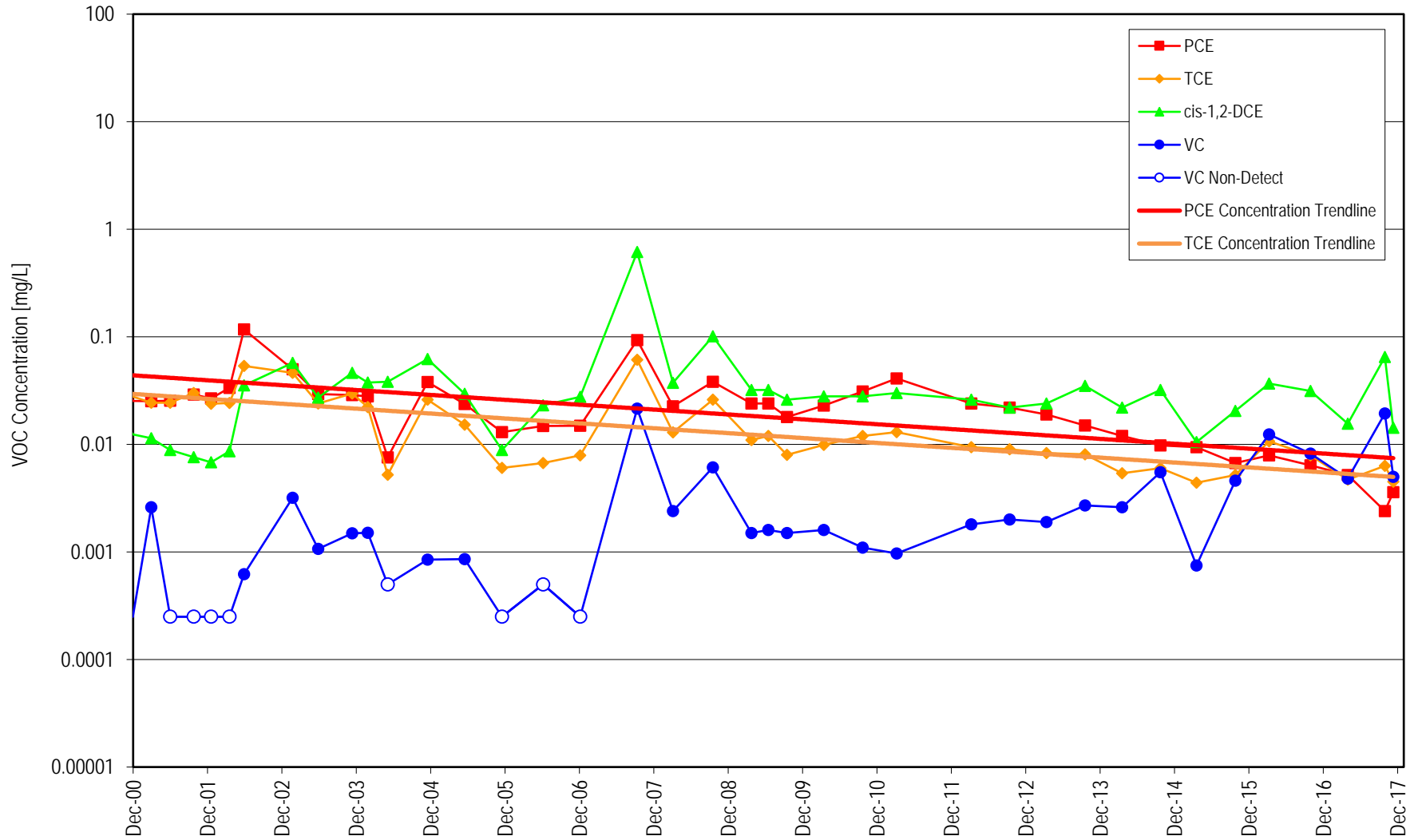
Note: Not detected values plotted at 1/2 the reporting limit.

VOC Concentrations in MGMS2-110



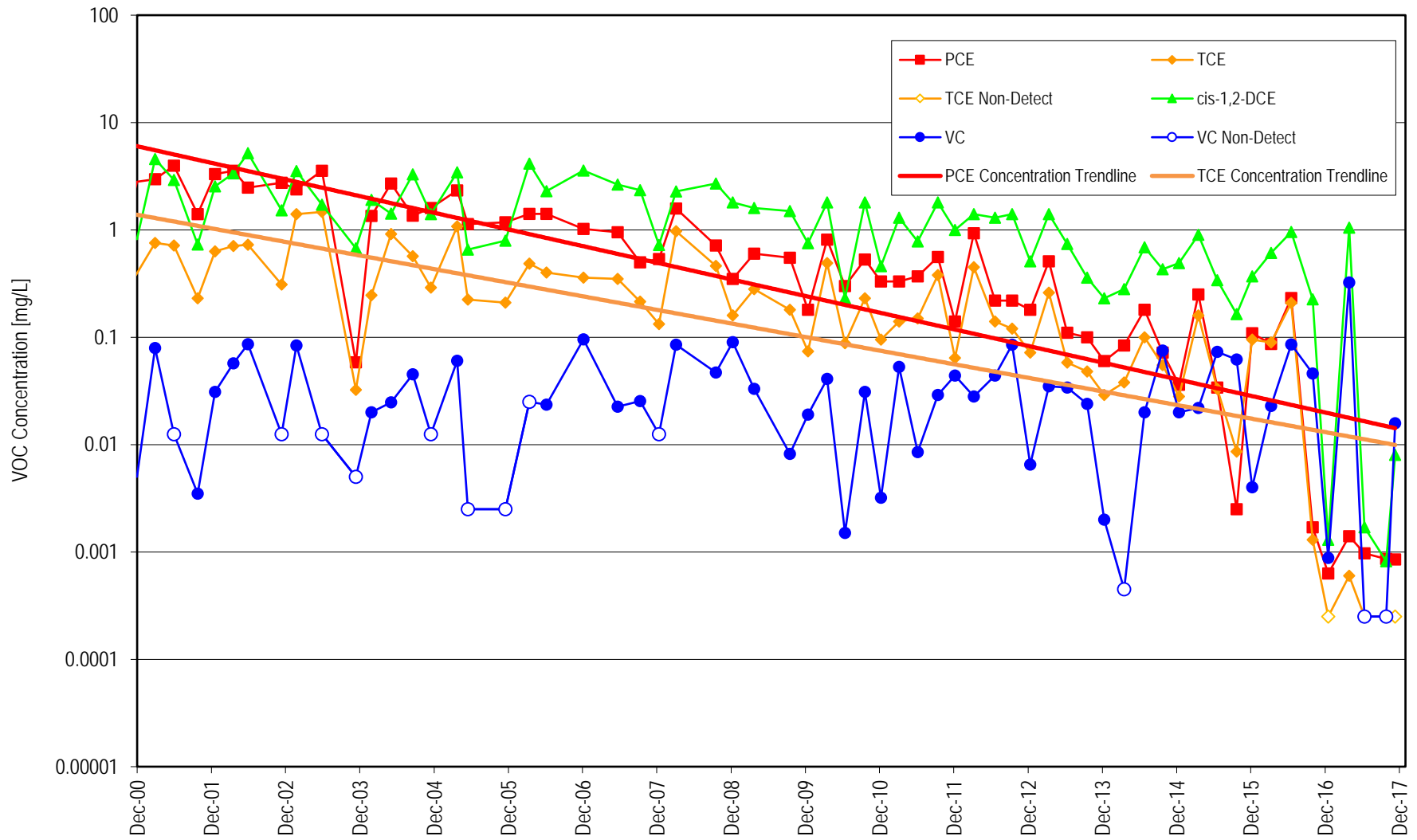
Note: Not detected values plotted at 1/2 the reporting limit.

VOC Concentrations in MGMS2-132



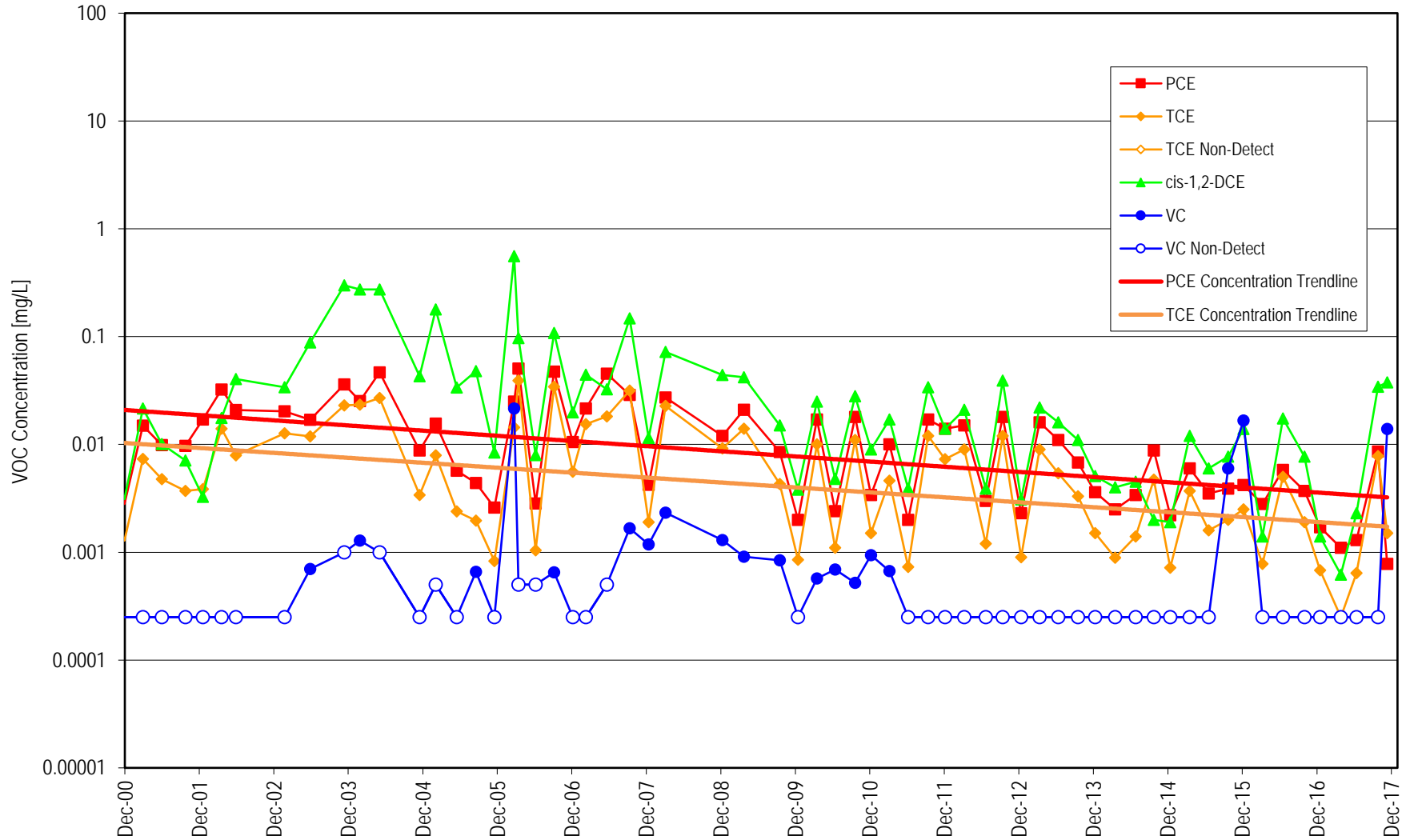
Note: Not detected values plotted at 1/2 the reporting limit.

VOC Concentrations in MGMS3-40



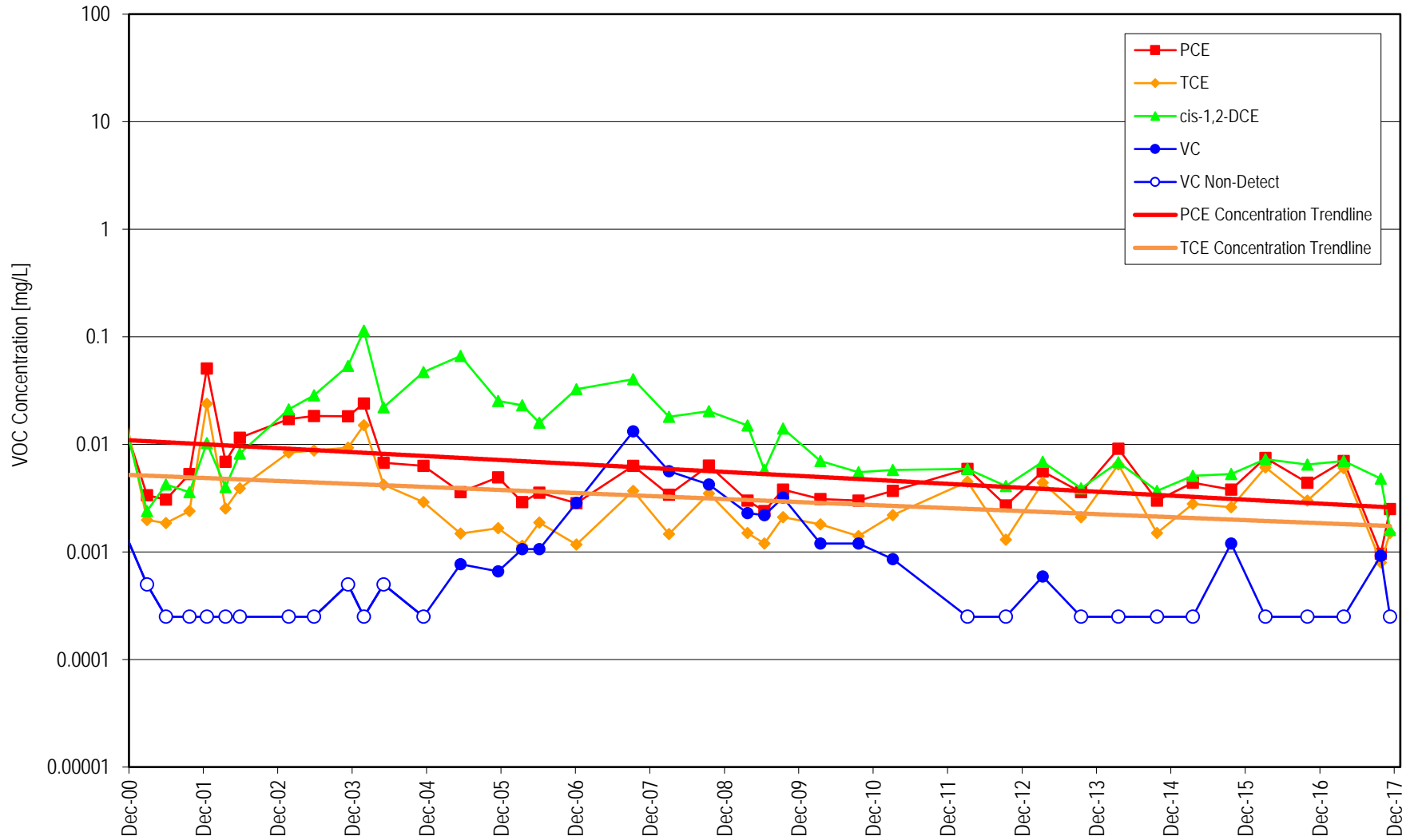
Note: Not detected values plotted at 1/2 the reporting limit.

VOC Concentrations in MGMS3-60



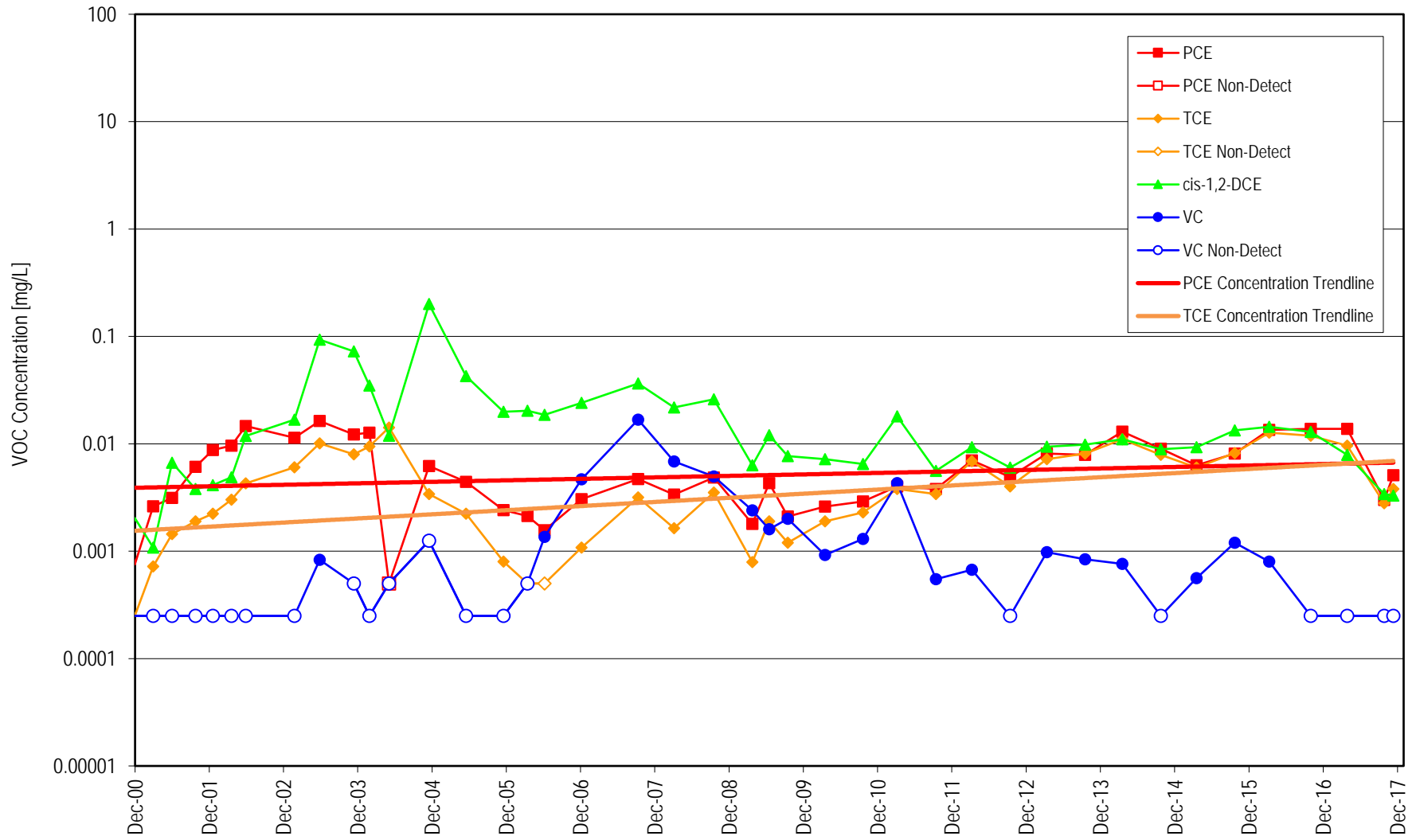
Note: Not detected values plotted at 1/2 the reporting limit.

VOC Concentrations in MGMS3-101



Note: Not detected values plotted at 1/2 the reporting limit.

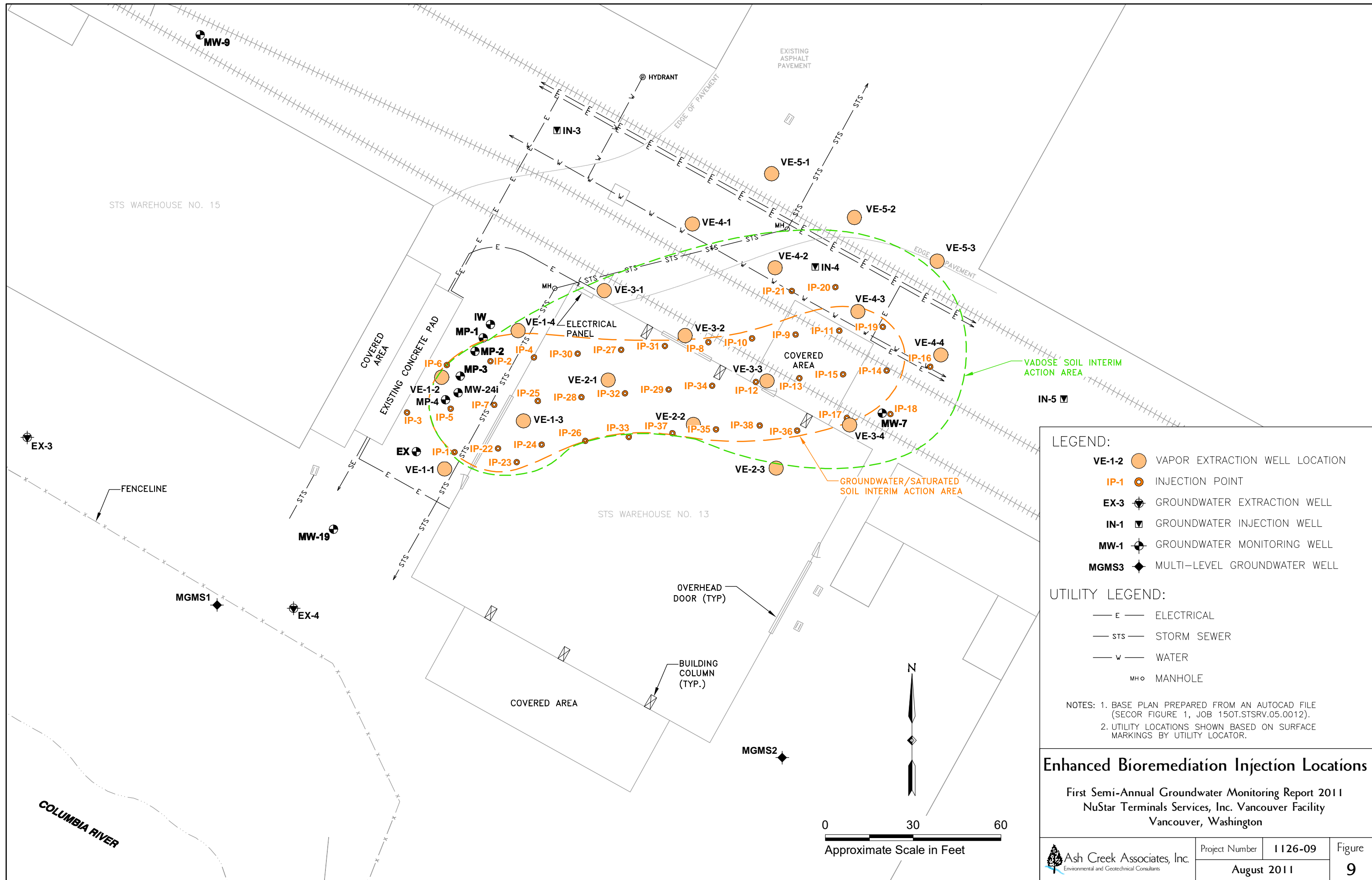
VOC Concentrations in MGMS3-132

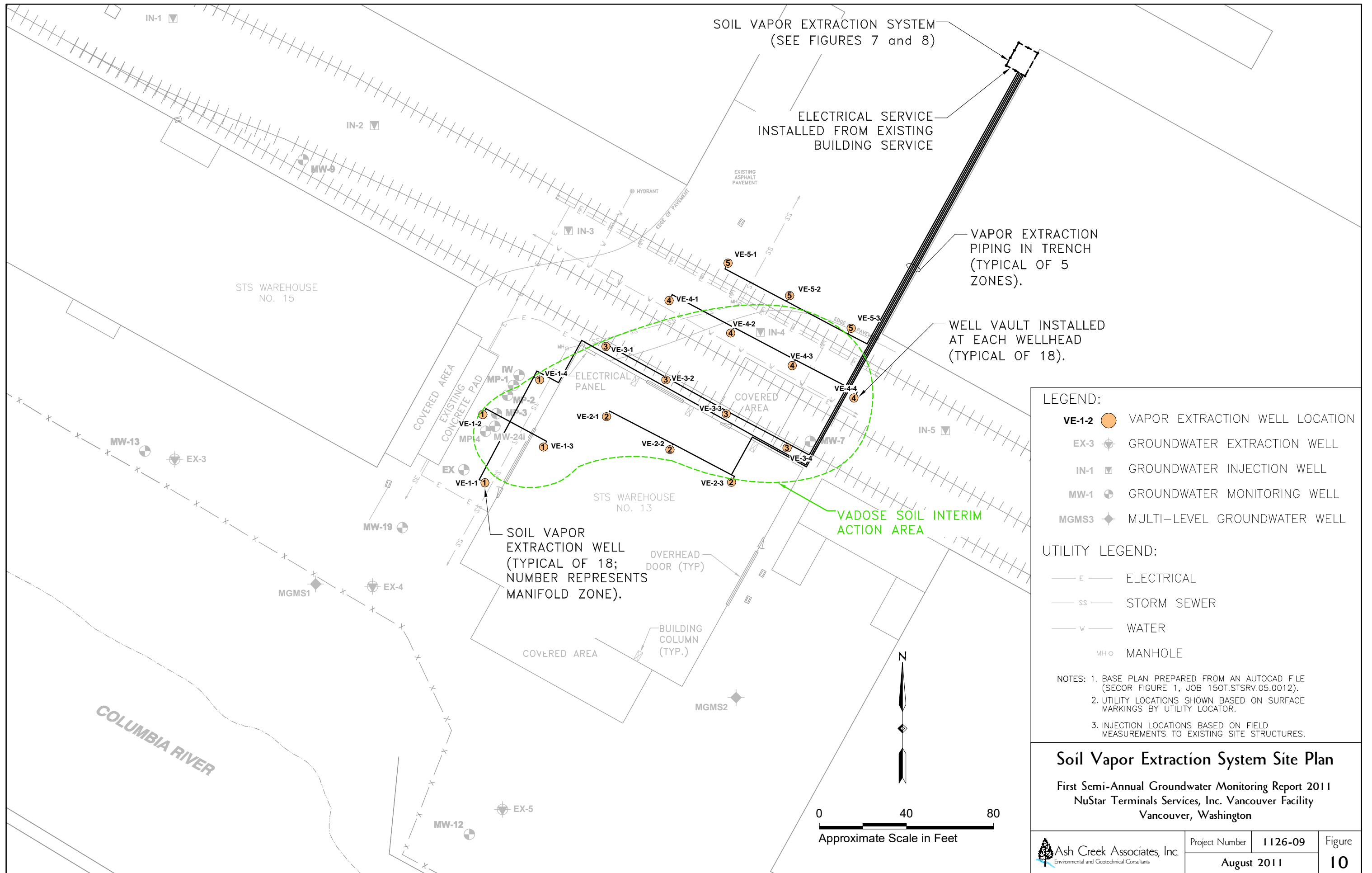


Note: Not detected values plotted at 1/2 the reporting limit.

Appendix E

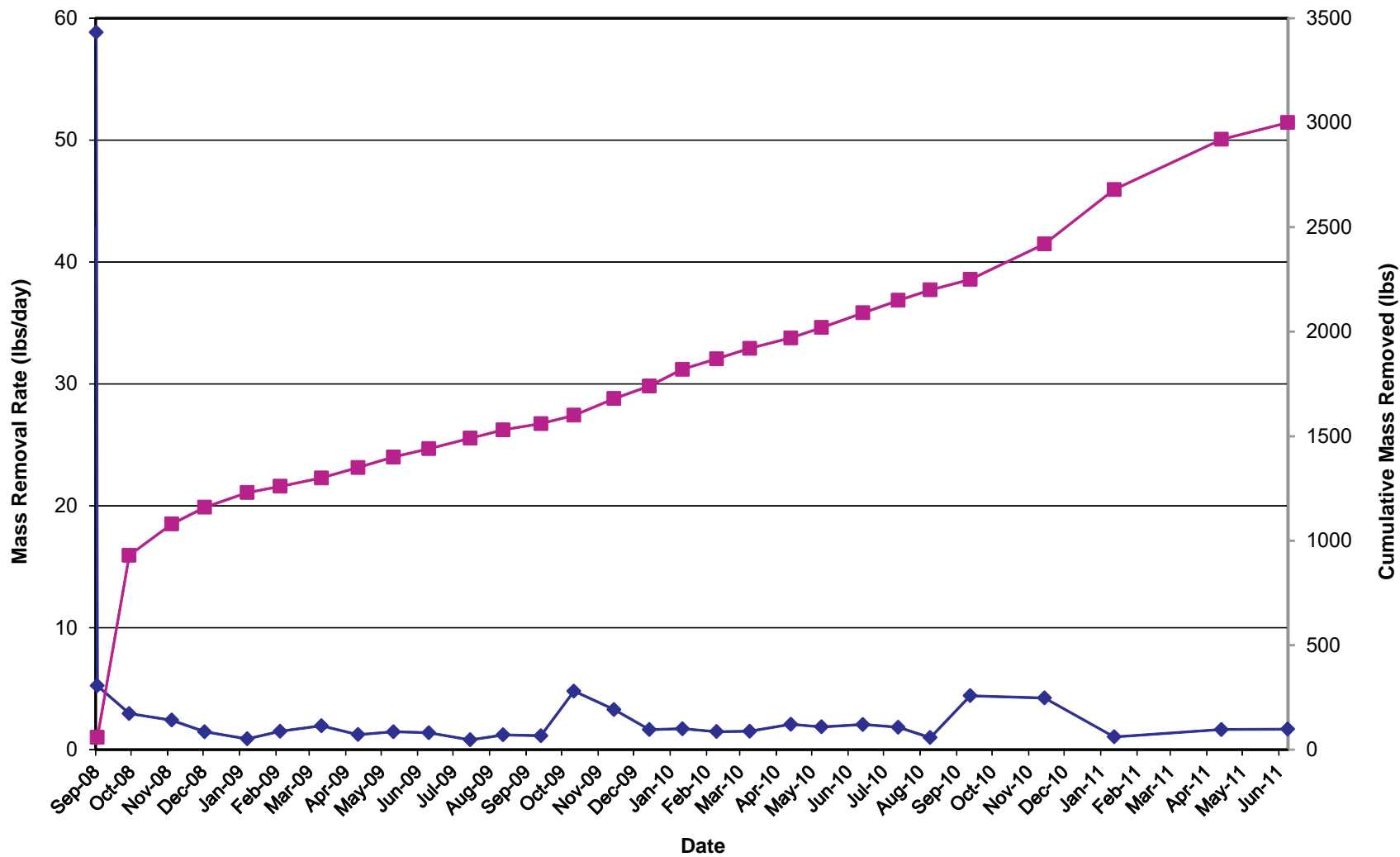
**2008 – SVE and Bioremediation Injection Layout and
Historical Monitoring Tables**





Soil Vapor Extraction System Site Plan

First Semi-Annual Groundwater Monitoring Report 2011
NuStar Terminals Services, Inc. Vancouver Facility
Vancouver, Washington



Legend:

- ◆ Removal Rate (lbs/day)
- Cumulative Mass Removal

2008 SVE System - VOC Mass Removal

Second Semi-Annual Groundwater Monitoring Report 2011
 NuStar Terminals Services, Inc. Vancouver Facility
 Vancouver, Washington



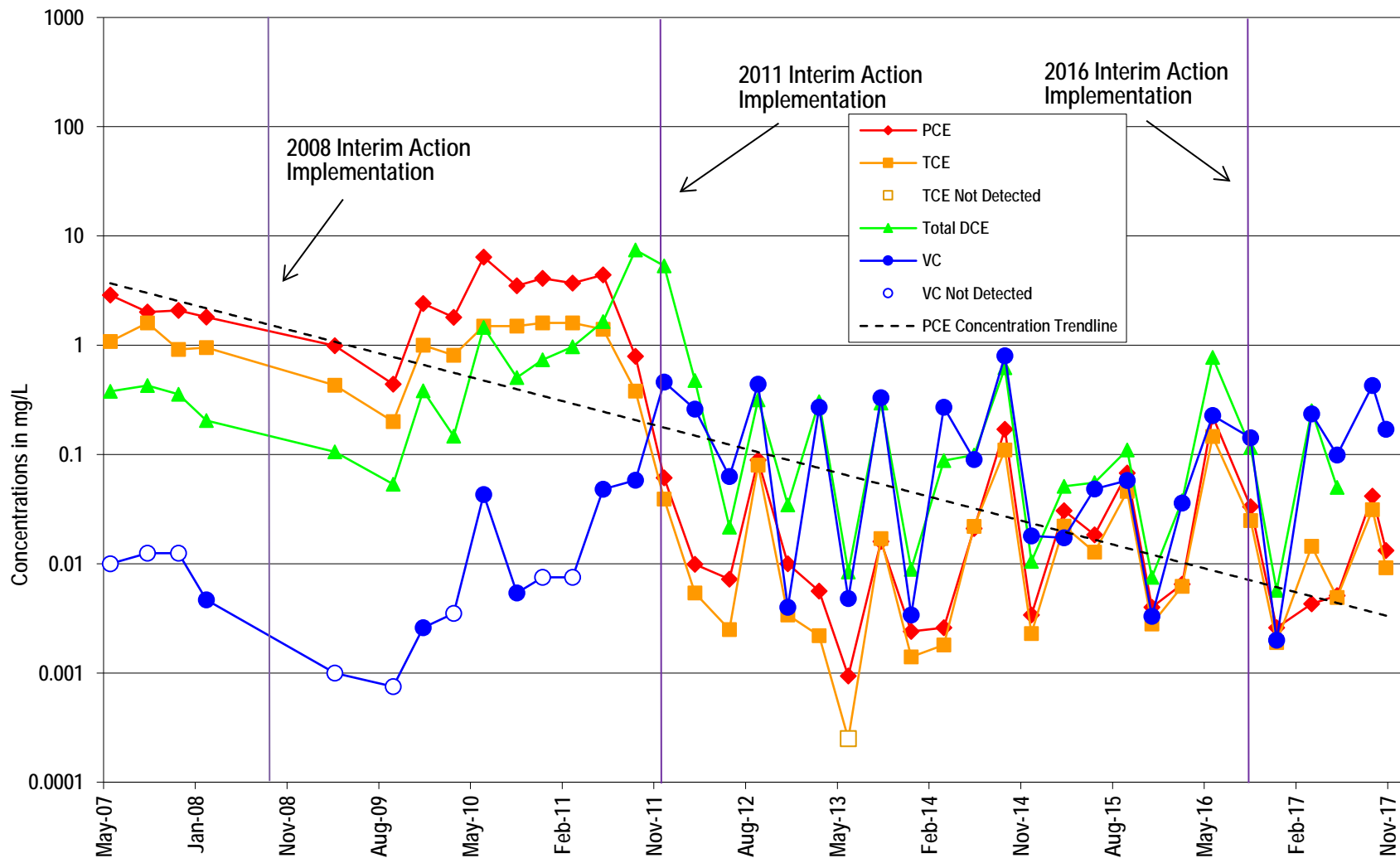
Project Number	1126-09
January 2012	

Figure
11

Appendix F

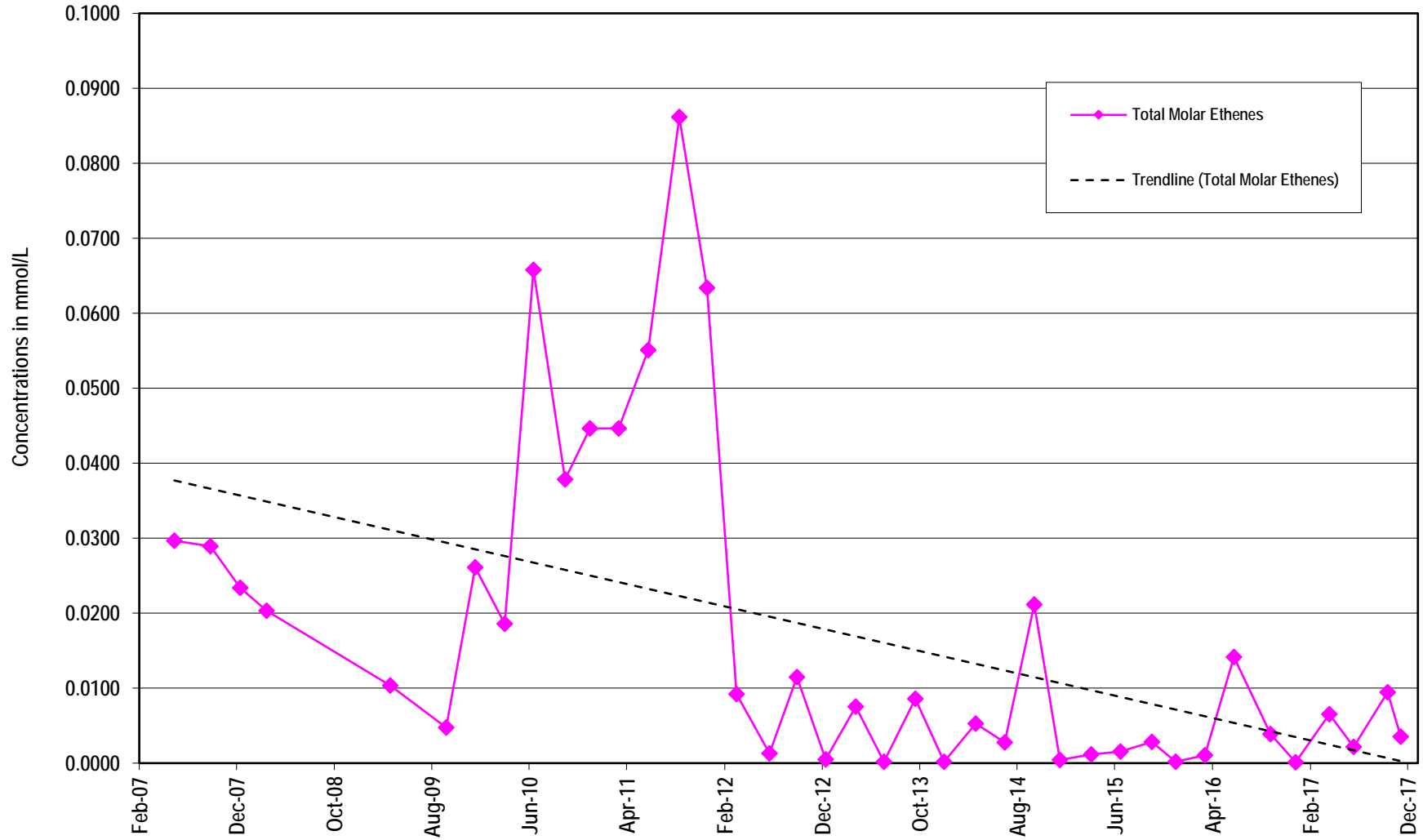
Molar Concentration Trend Plots – Interim Action Wells

Interim Action Area - VOC Trends: MGMS2-40

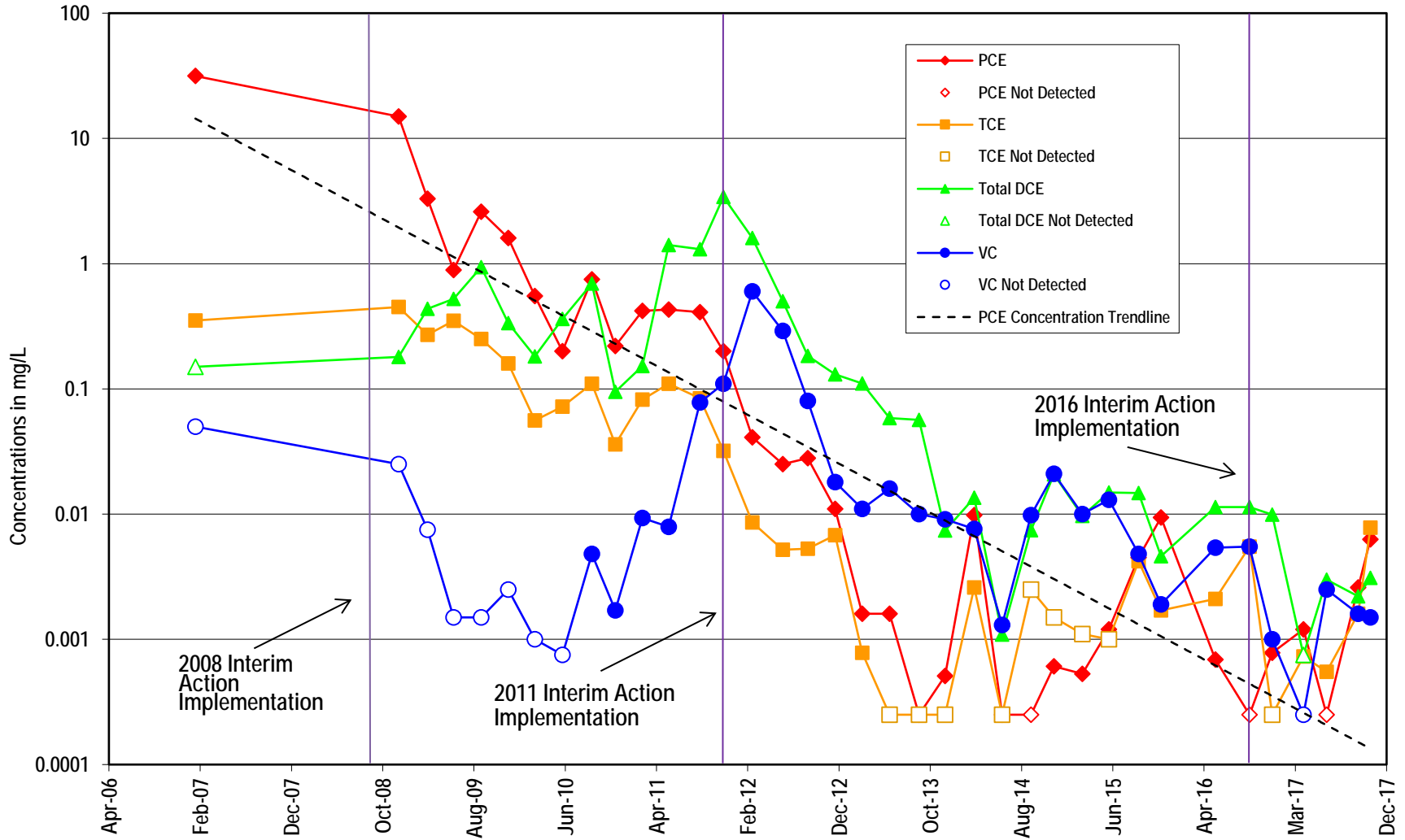


Note: Not detected values plotted at 1/2 the reporting limit.

Total Molar Ethenes in MGMS2-40

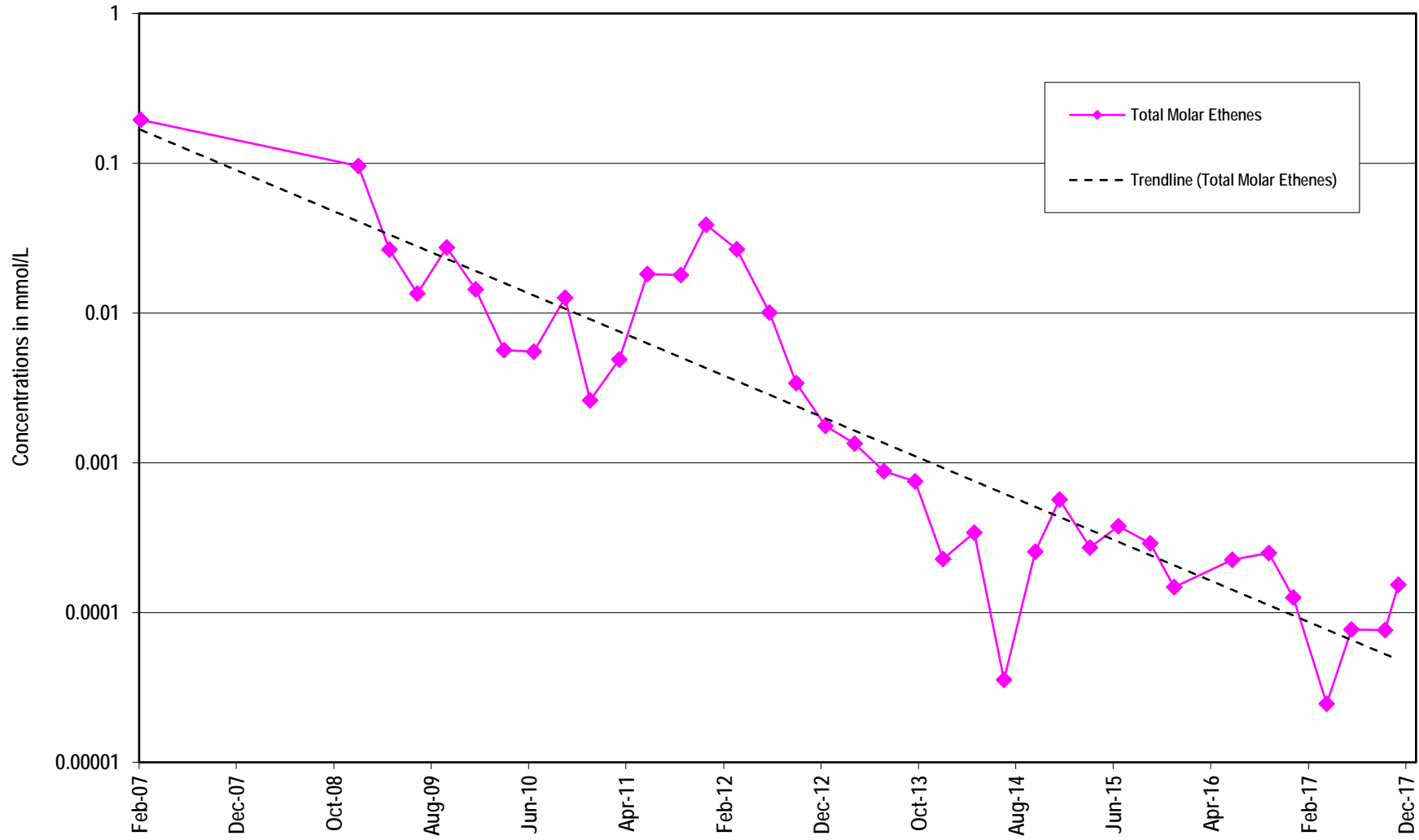


Interim Action Area - VOC Trends: MW-7

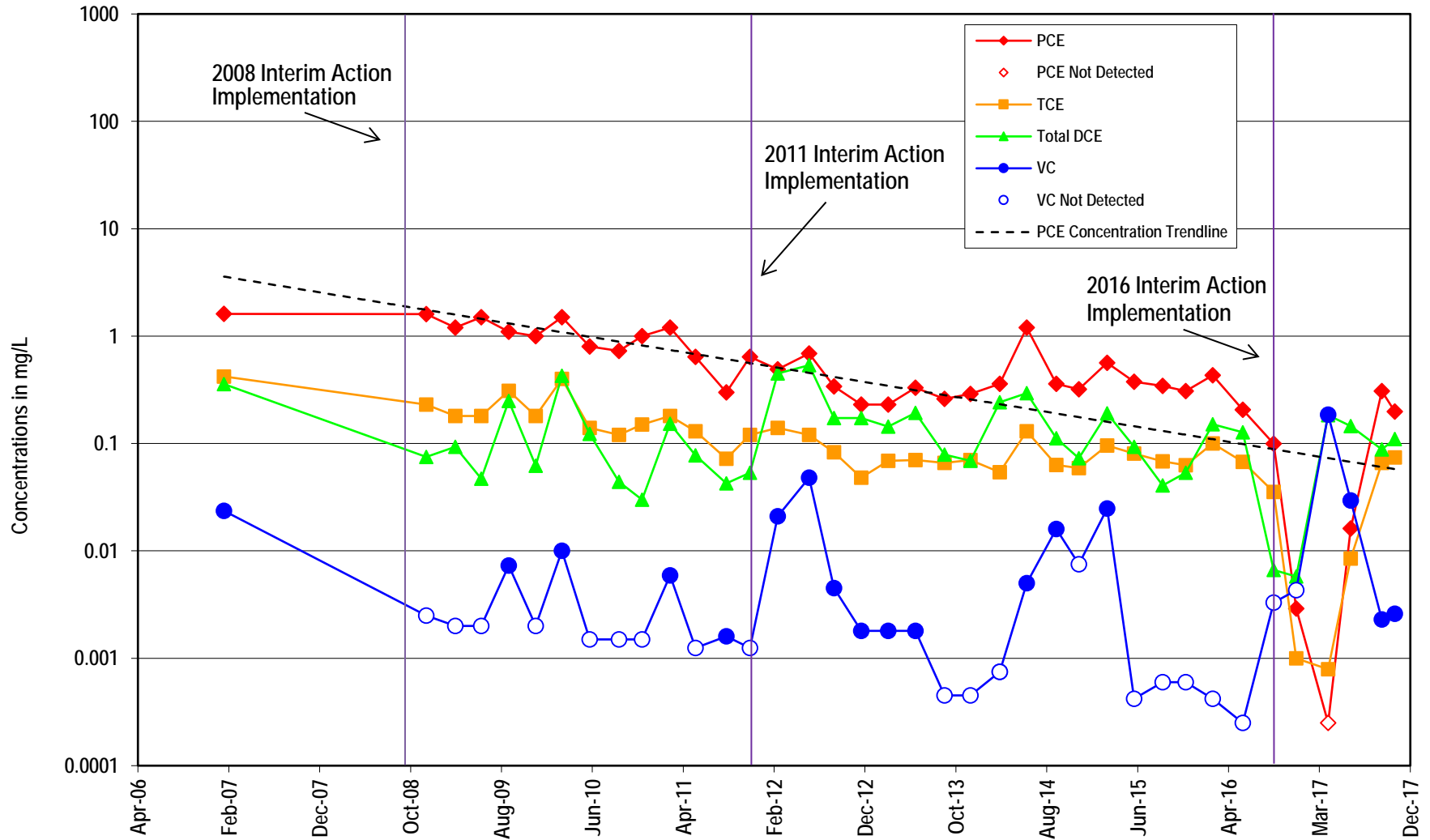


Notes: Not detected values plotted at 1/2 the reporting limit.

Total Molar Ethenes in MW-7

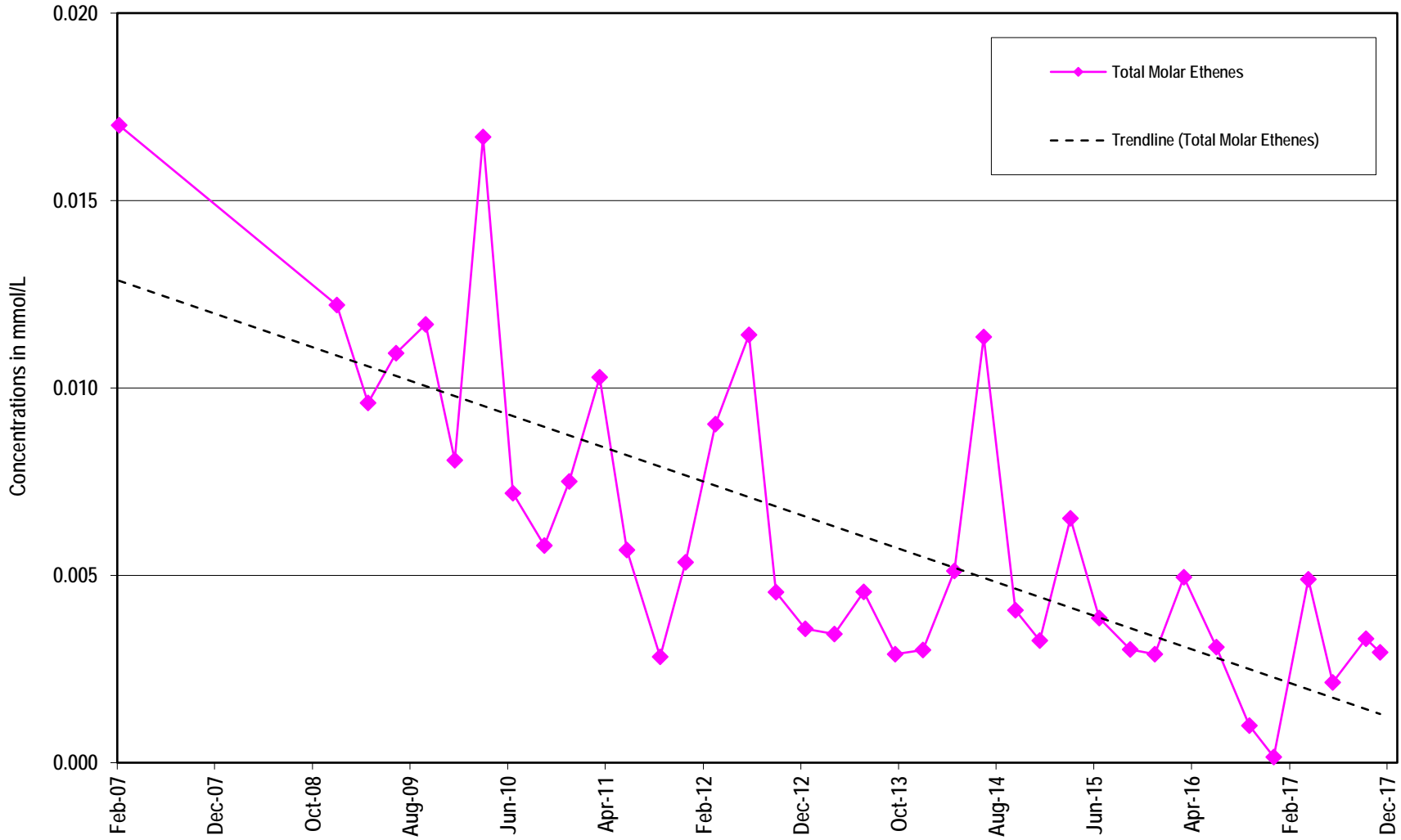


Interim Action Area - VOC Trends: MP-1

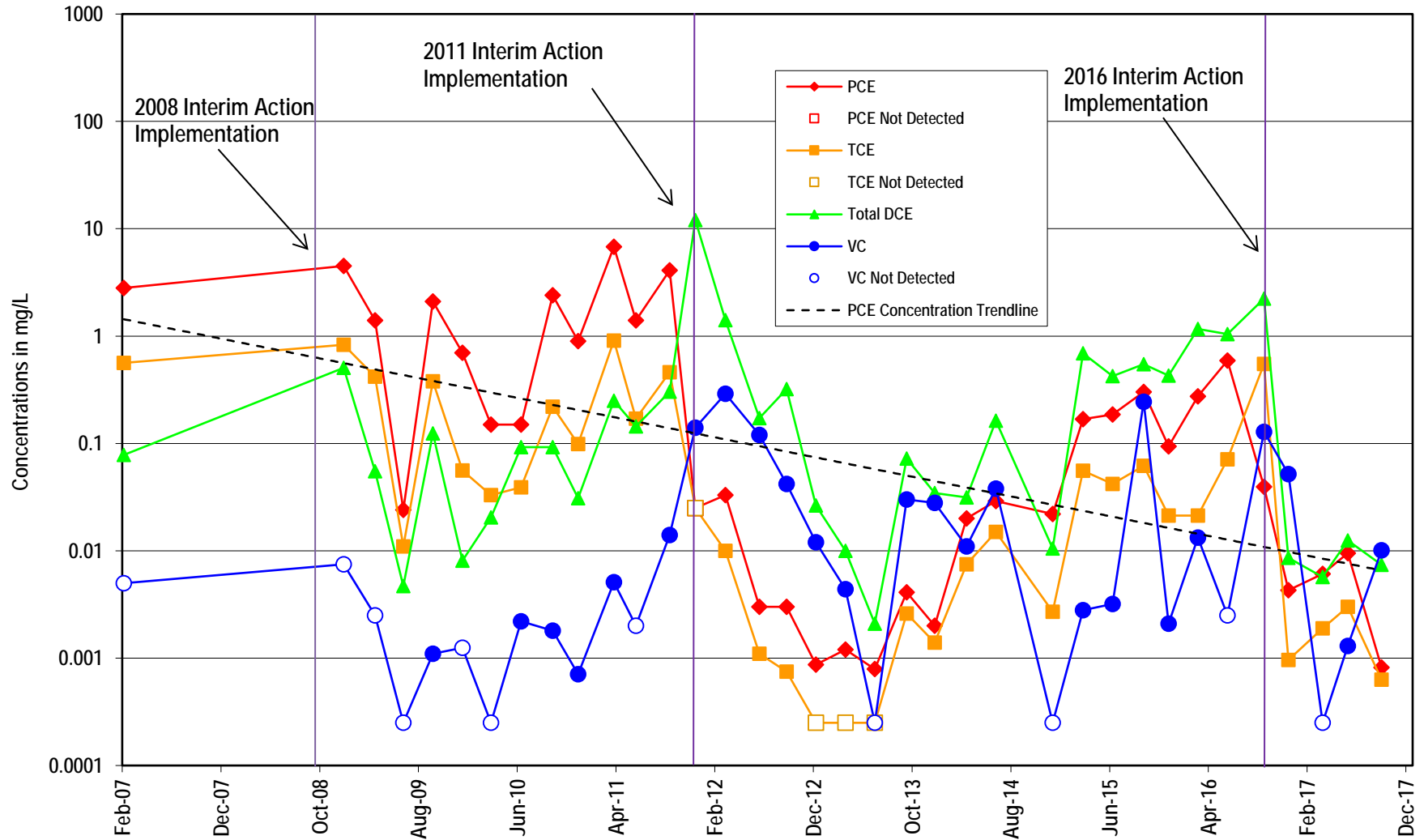


Note: Not detected values plotted at 1/2 the reporting limit.

Total Molar Ethenes in MP-1

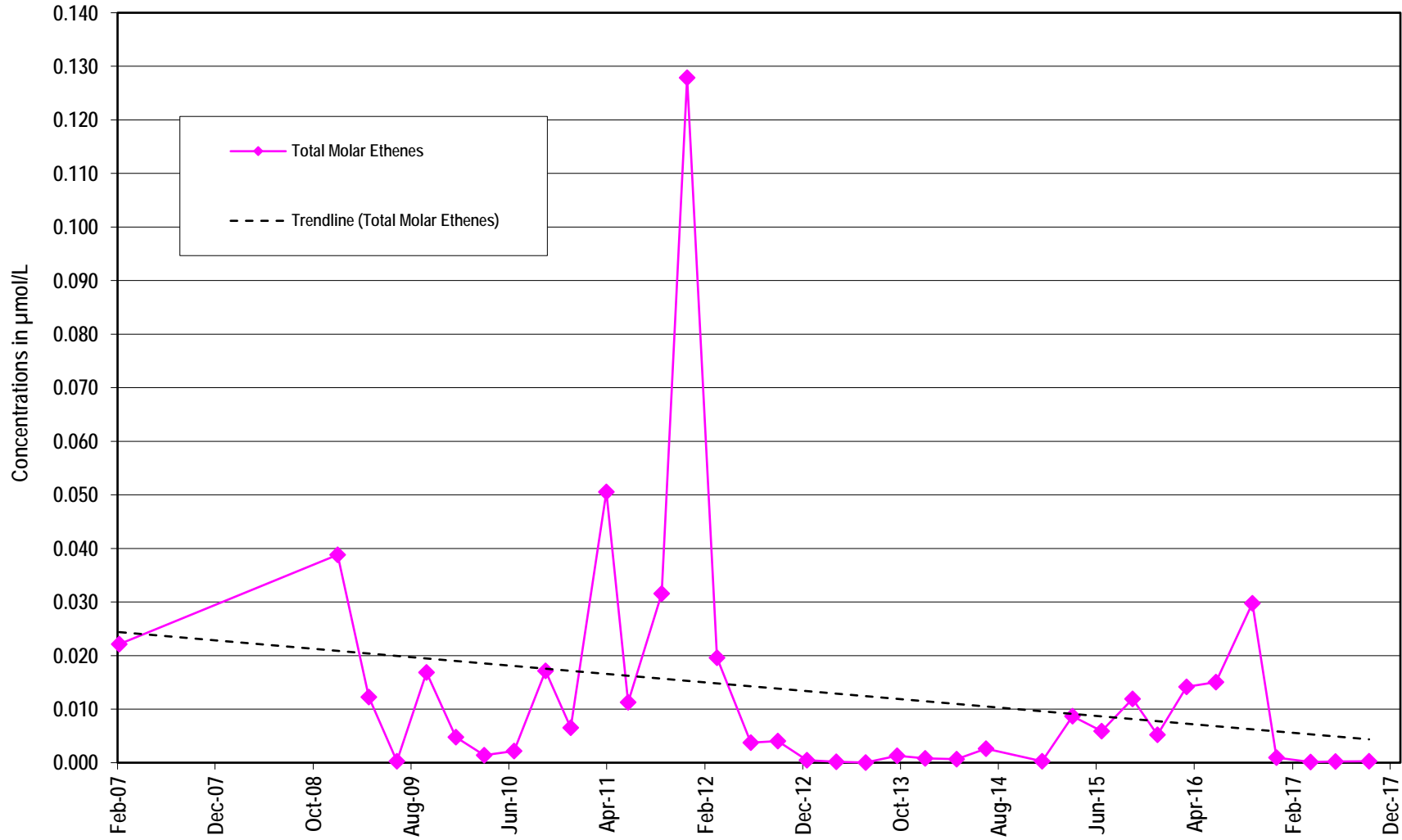


Interim Action Area - VOC Trends: EX

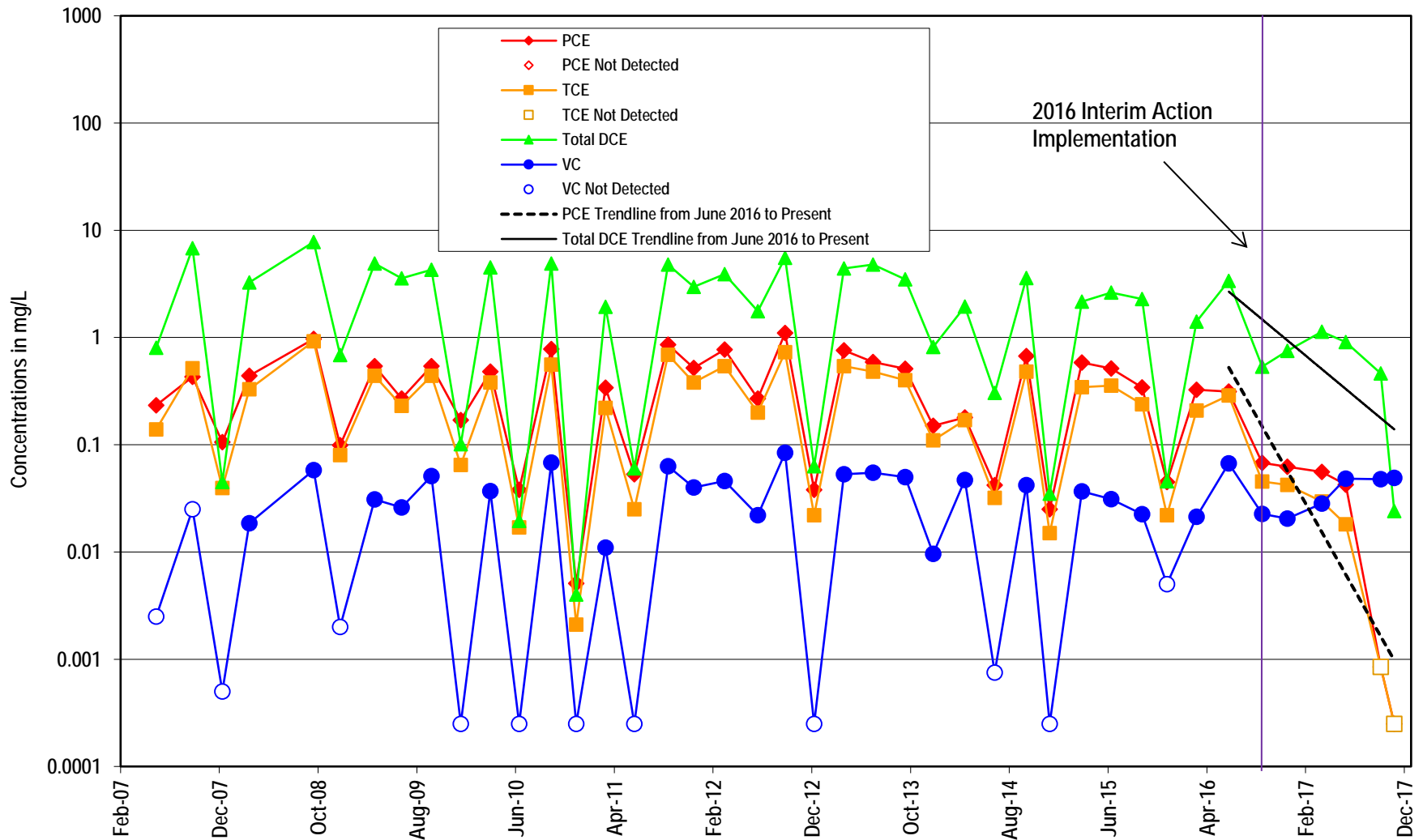


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Total Molar Ethenes in EX

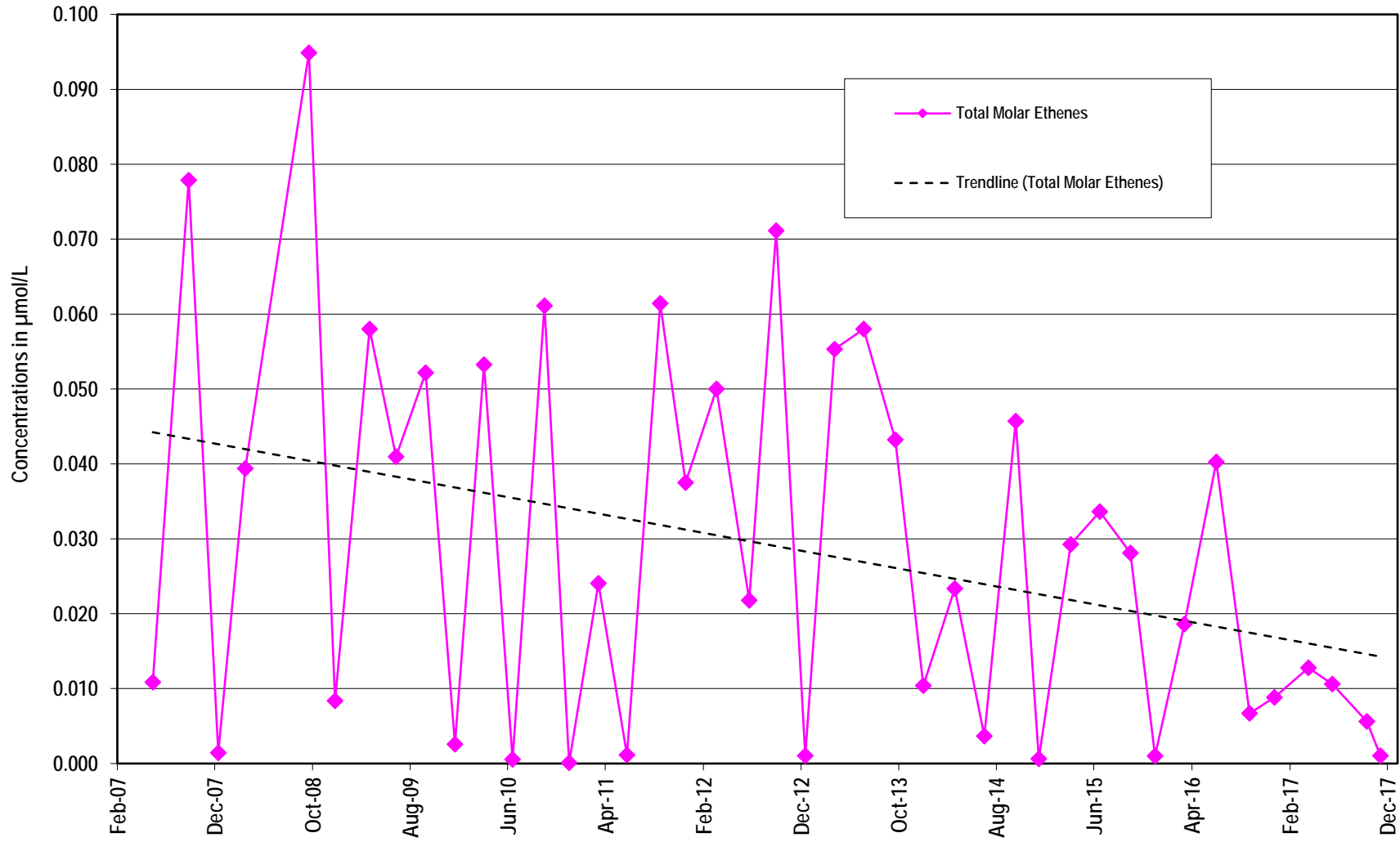


Interim Action Area - VOC Trends: MW-12

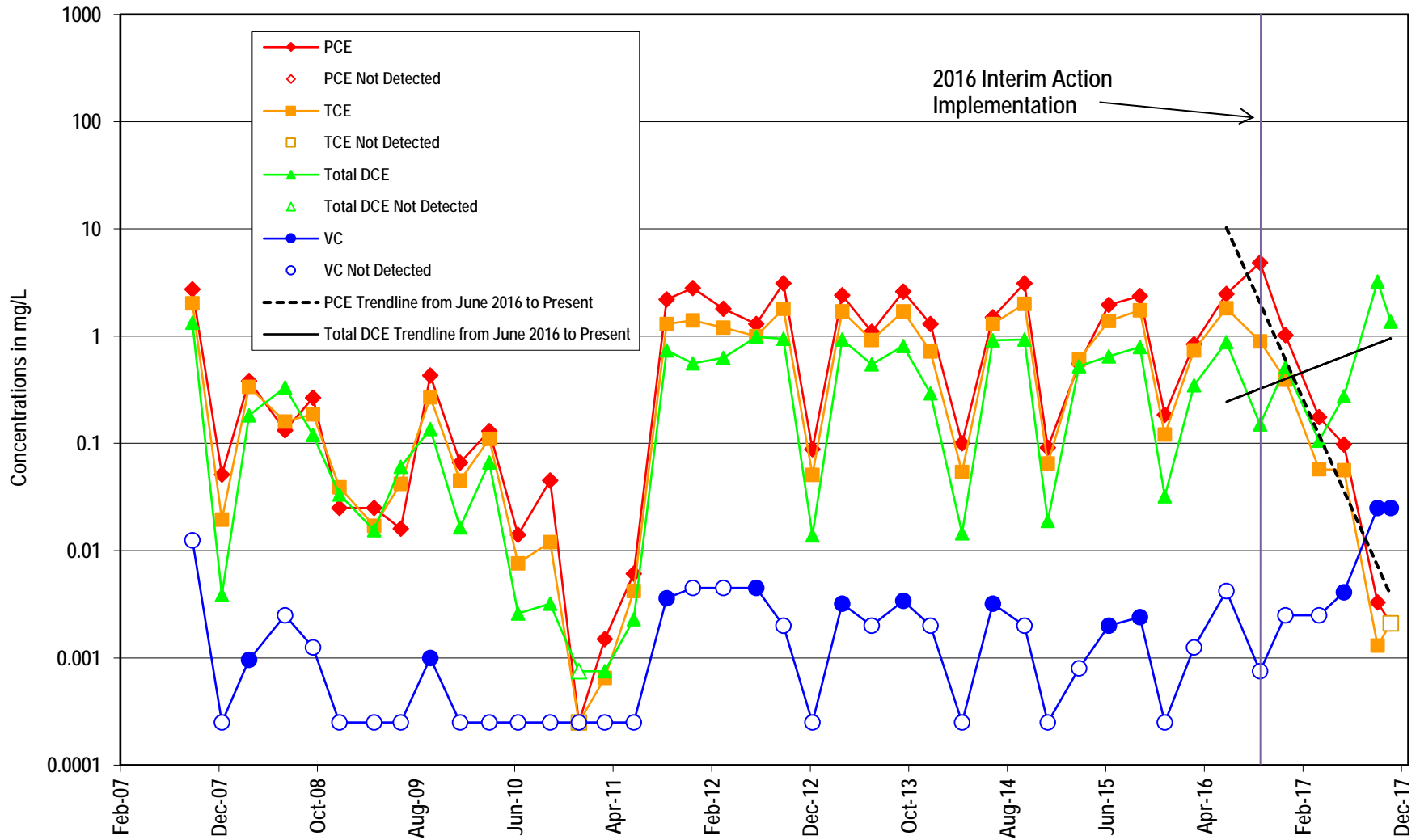


Note: Not detected values plotted at 1/2 the reporting limit.

Total Molar Ethenes in MW-12

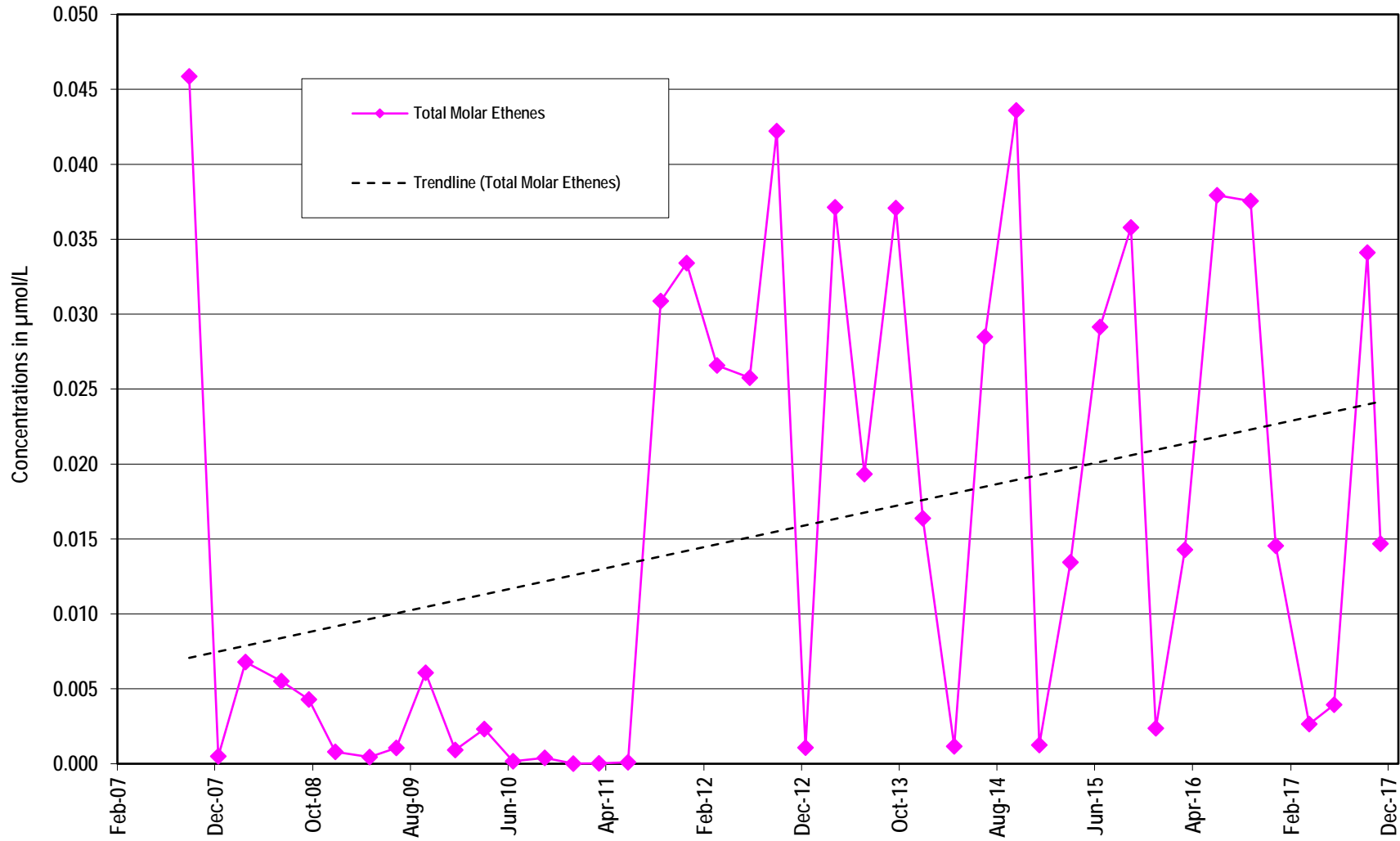


Interim Action Area - VOC Trends: MW-13

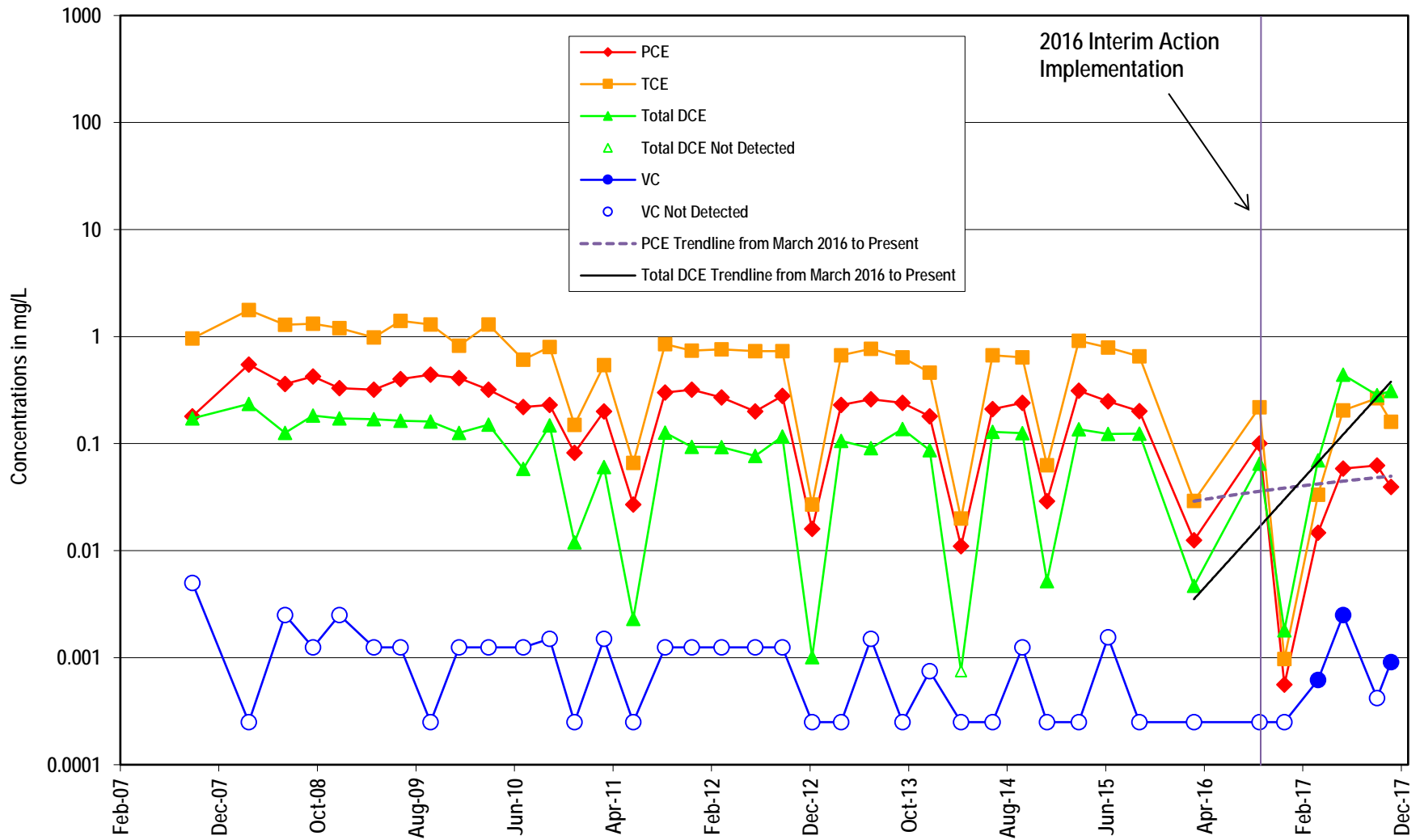


Note: Not detected values plotted at 1/2 the reporting limit.

Total Molar Ethenes in MW-13

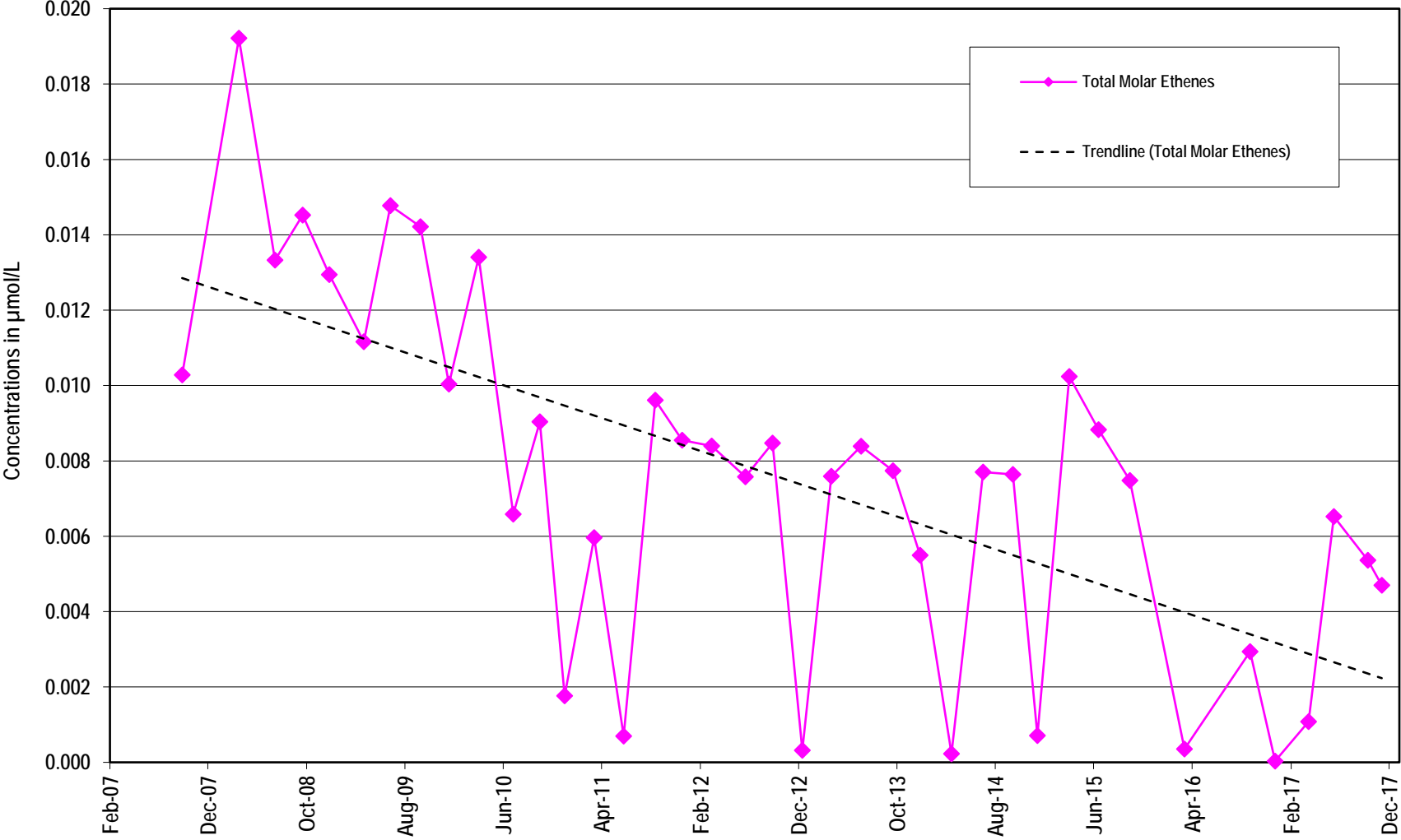


Interim Action Area - VOC Trends: MW-14

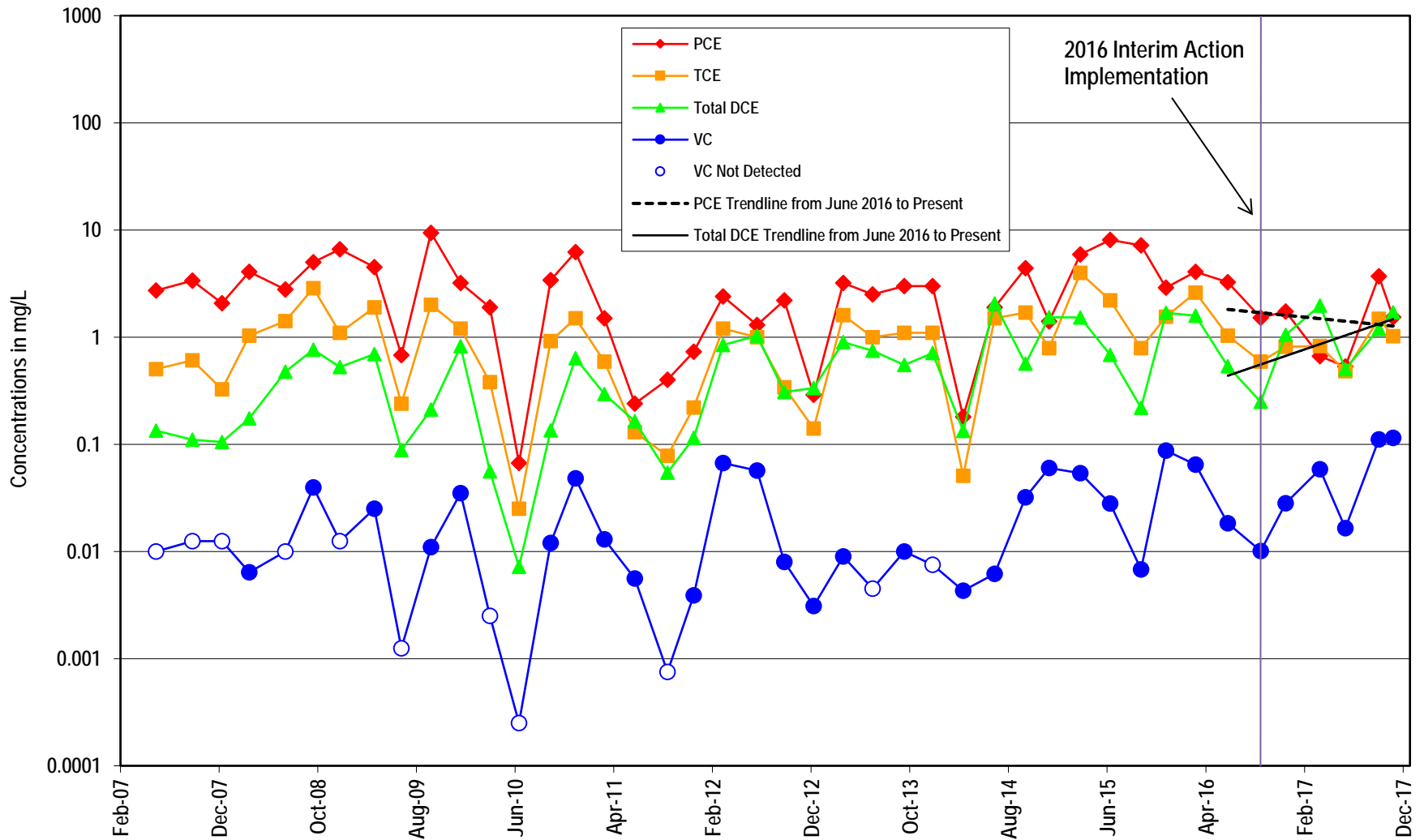


Note: Not detected values plotted at 1/2 the reporting limit.

Total Molar Ethenes in MW-14

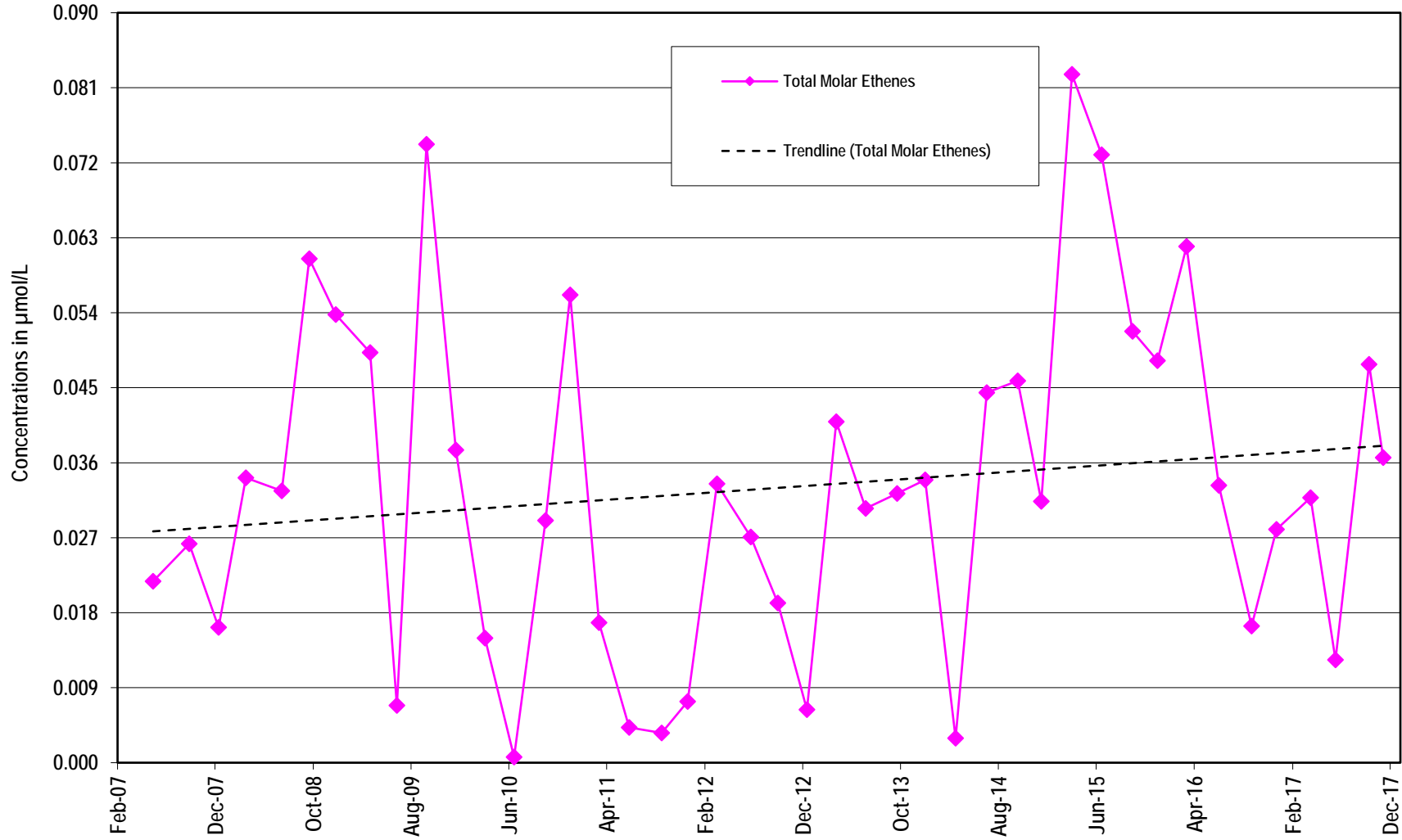


Interim Action Area - VOC Trends: MW-19

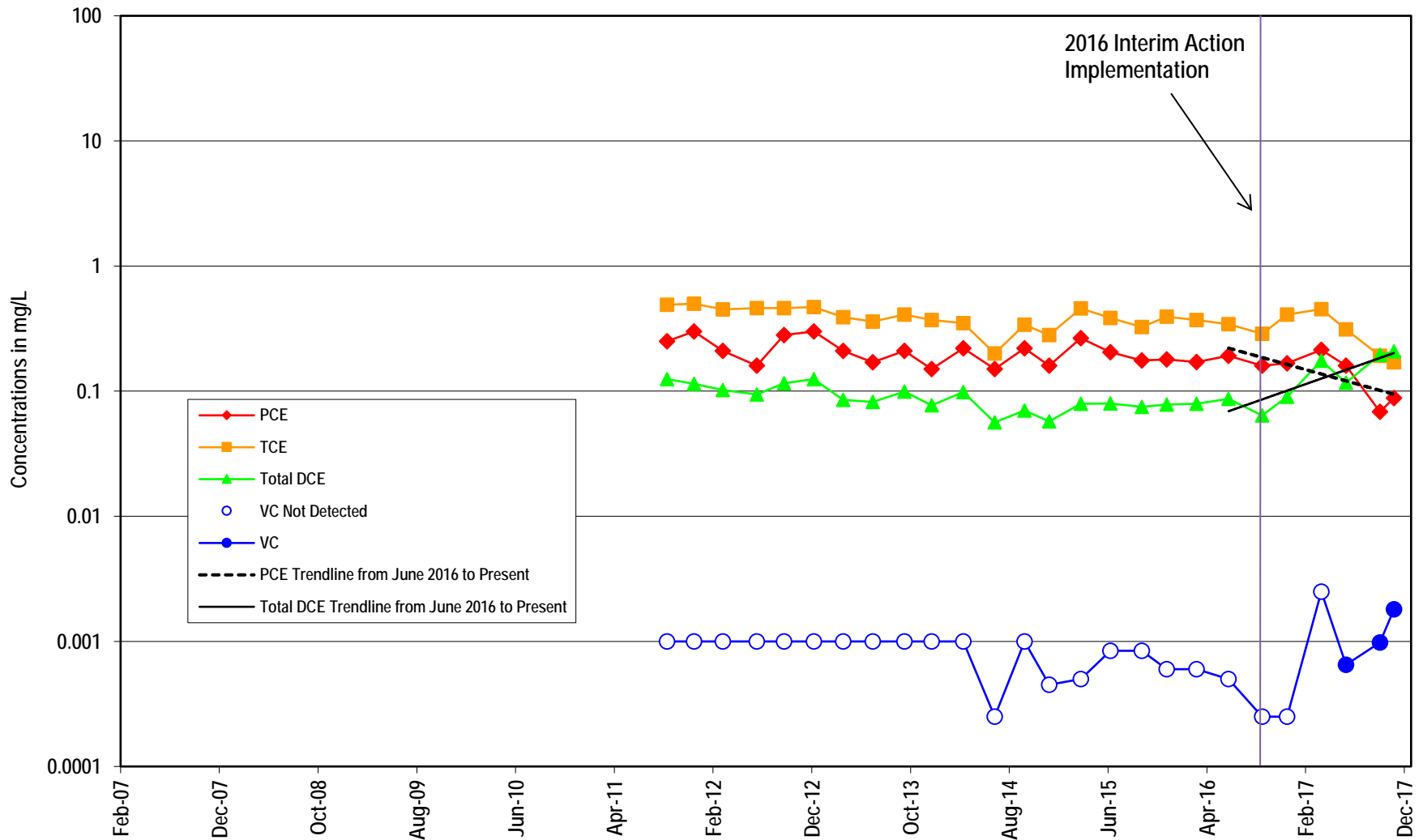


Note: Not detected values plotted at 1/2 the reporting limit.

Total Molar Ethenes in MW-19

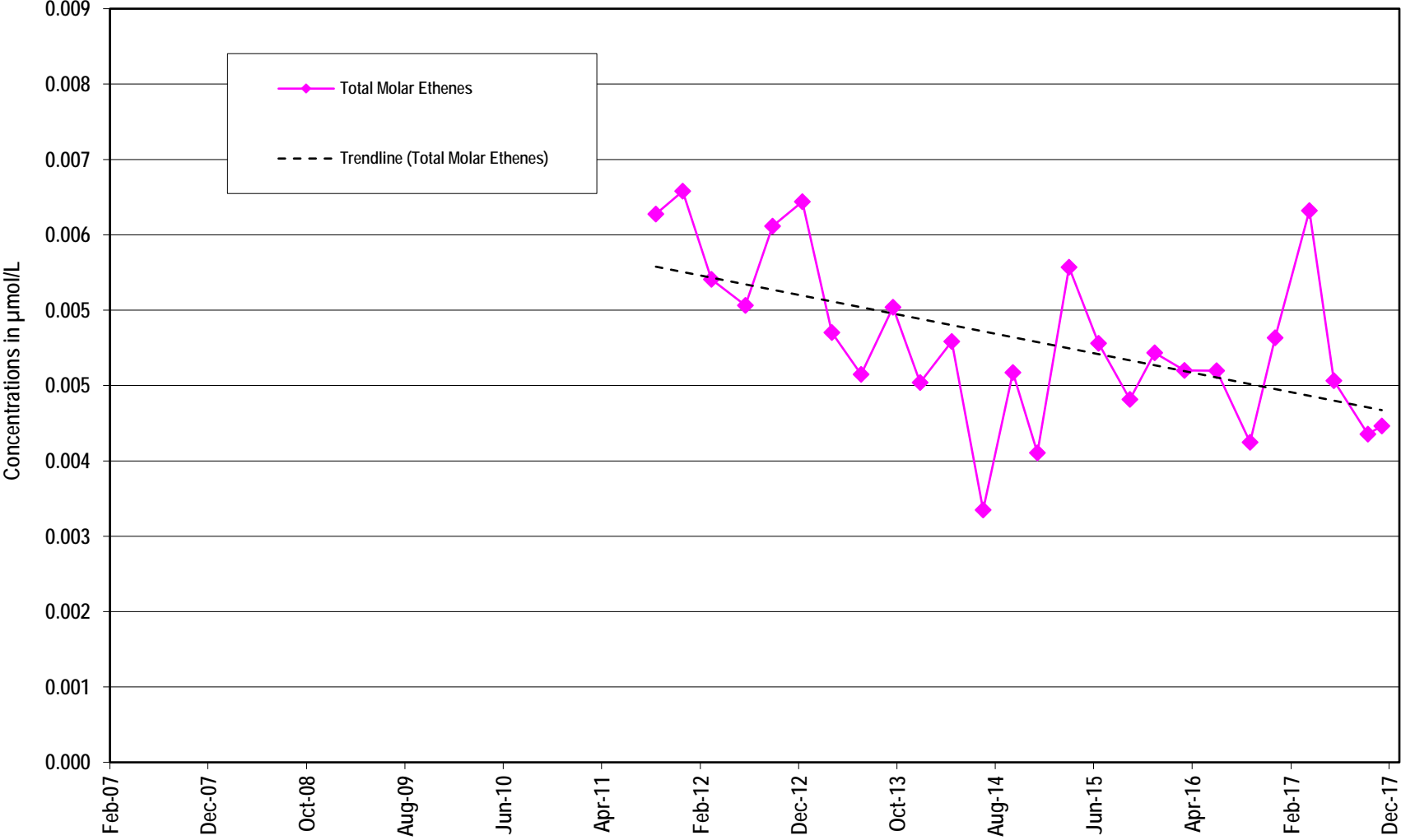


Interim Action Area - VOC Trends: MW-26

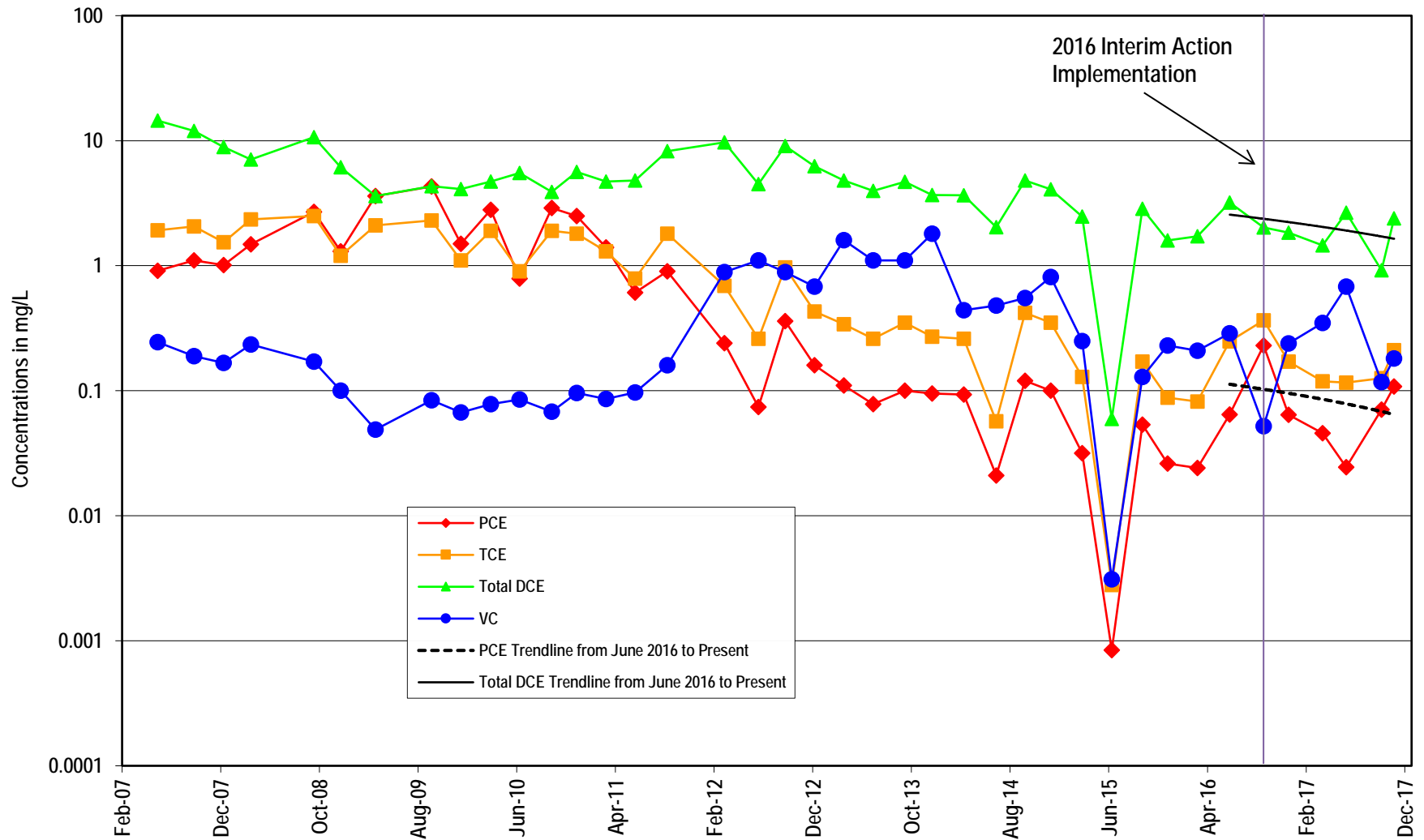


Note: Not detected values plotted at 1/2 the reporting limit.

Total Molar Ethenes in MW-26

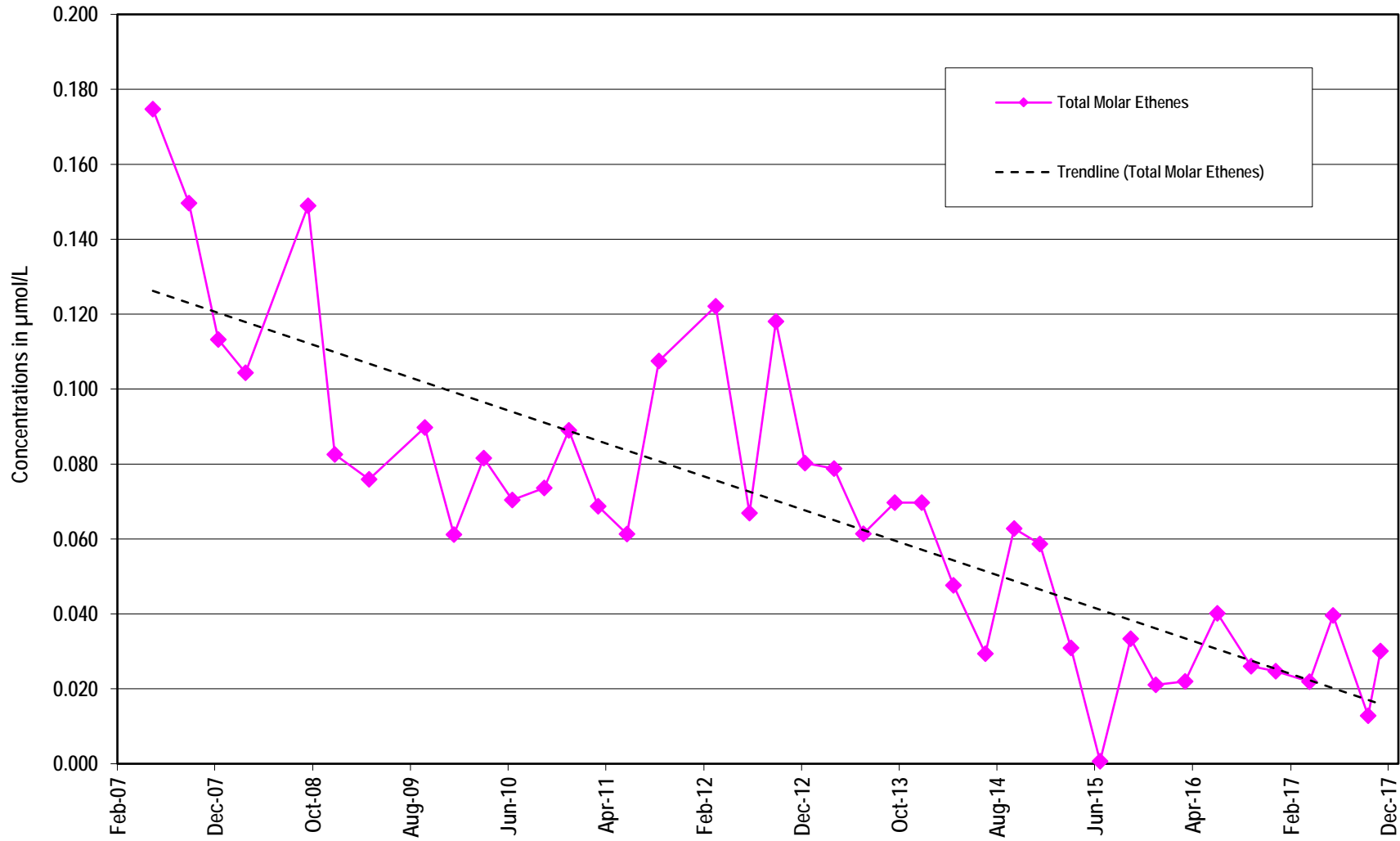


Interim Action Area - VOC Trends: MGMS1-43

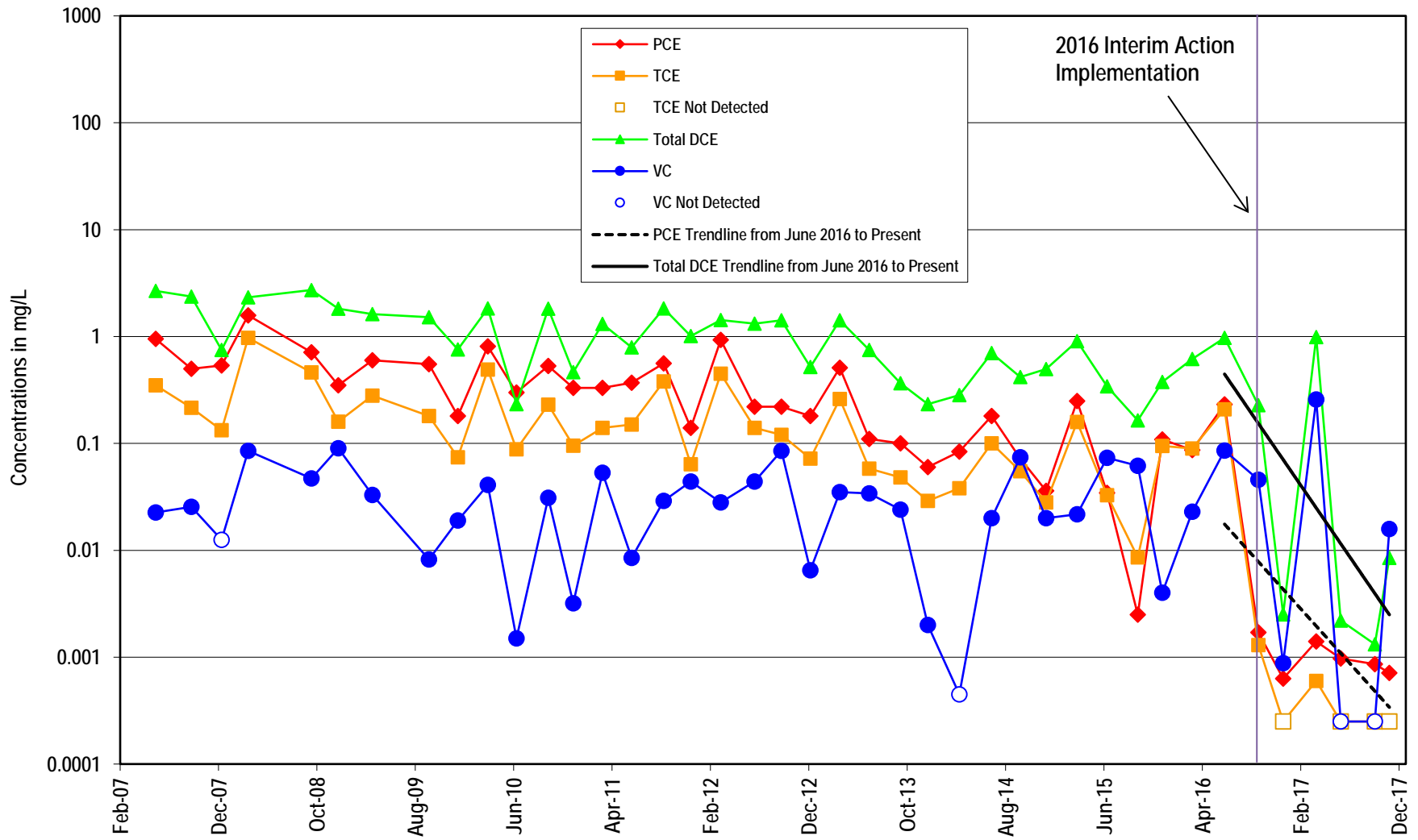


Note: Not detected values plotted at 1/2 the reporting limit.

Total Molar Ethenes in MGMS1-43



Interim Action Area - VOC Trends: MGMS3-40



Note: Not detected values plotted at 1/2 the reporting limit.

Total Molar Ethenes in MGMS3-40

