

August 10, 2020

Mr. Craig Rankine, Site Manager  
Department of Ecology  
12121 NE 99th Street, Suite 2100  
Vancouver, Washington 98682

**Subject:        Submittal of First Semi-Annual 2020 Groundwater Monitoring Report  
                  NuStar Vancouver Facility  
                  Vancouver, Washington  
                  0060-002-008**

Dear Mr. Rankine:

Enclosed, please find the *Semi-Annual Groundwater Monitoring Report: January through June 2020*. The report was prepared on behalf of NuStar Terminals Services, Inc. (NuStar) by Cascadia Associates, LLC (Cascadia) and presents data collected from January through June 2020.

If you have any questions or would like to discuss this further, please contact me at 503-906-6577 ext 110.

Sincerely,



Stephanie Bosze Salisbury, L.G.  
Senior Associate Geologist

## ENCLOSURE

Semi-Annual Groundwater Monitoring Report January through June 2020 (2 hard copies)

**cc:**     Ms. Renee Robinson, NuStar Energy, L.P. (electronic deliverable)  
         Ms. Patty Boyden, Port of Vancouver (electronic deliverable)  
         Mr. Richard Roché, Parametrix (electronic deliverable)  
         Mr. R.J. Sherman, P.G., Kinder Morgan (electronic deliverable)



**Semi-Annual Groundwater Monitoring Report –  
January through June 2020  
NuStar Vancouver Facility  
2565 NW Harborside Drive, Port of Vancouver  
Vancouver, Washington**

*Prepared for:*

**NuStar Terminals Services, Inc.**

*Prepared by:*

**Cascadia Associates, LLC  
5820 S Kelly Avenue, Suite B  
Portland, Oregon 97239**

**Project No. 0060-002-008**

**August 2020**



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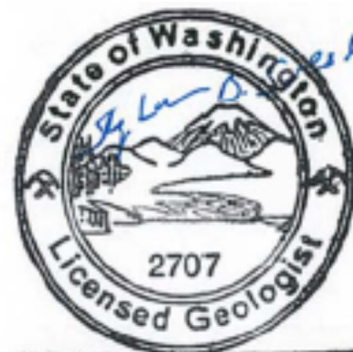
*Prepared for:*

NuStar Terminals Services, Inc.  
Project No. 0060-002-008  
August 2020

*Prepared by:*

Lindsay Wallis

Senior Staff Environmental Scientist, Cascadia Associates



Stephanie Bosze Salisbury

Stephanie Bosze Salisbury, L.G.  
Senior Associate Geologist, Cascadia Associates

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## 1.0 INTRODUCTION

This semi-annual groundwater monitoring report was prepared by Cascadia Associates, LLC (Cascadia) 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 first and second quarters of 2020. 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; the current extent of the leasehold is shown on Figure 2. The Facility is on the north shore of the Columbia River. Land adjacent to the Terminal is industrial property also owned by the POV. The Facility is approximately 19 acres in size 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 general 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 first and second quarters of 2020 is summarized in Table 1. Deviations from the Table 1 program include the exclusion of sampling monitoring well EX-1, which was decommissioned during the third quarter 2019 and awaiting replacement, as described in further detail in Section 7.0.

Two monitoring events were conducted during this period: the first quarter 2020 groundwater monitoring event was conducted from March 9 through 13, 2020, and the second quarter 2020 event was conducted from June 15 through 18, 2020.

### 2.1 WATER LEVEL MEASUREMENTS

First quarter 2020 groundwater levels were measured on March 9, 2020, and second quarter 2020 groundwater levels were measured on June 15, 2020. 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-E, MW-F, MW-G, S-1, and S-2). 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 as defined in the Remedial Investigation report for the Facility (Apex, 2013).

## 2.2 MONITORING WELL SAMPLING AND ANALYSIS

The sampling and analysis program for first and second quarter 2020 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 MW-7, MW-12, MW-19, and MGMS3-40 during the first and second quarter 2020 sampling events.

For both sampling events, the samples were uniquely labeled, stored in insulated coolers with ice, and transported under chain-of-custody protocol to Apex Laboratories of Tigard, Oregon, for laboratory analysis. Samples were analyzed for halogenated volatile organic compounds (HVOCs) by U.S. Environmental Protection Agency (EPA) Method 8260B. Select samples were analyzed for total organic carbon (TOC) by SIM 5010C. 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 directly measured in water but can be estimated by analysis of the primary urea constituents: ammonia, nitrate, and nitrite. To evaluate for urea in groundwater during the first and second quarter 2020 monitoring events, Facility monitoring wells were sampled for nitrate as nitrogen and nitrite as nitrogen by EPA Method 300.0 and ammonia as nitrogen by EPA Method 350.1.

Samples from select wells were also analyzed for ethene, ethane, and methane to assist in evaluating remedial parameters. Apex Laboratories subcontracted to Air Technology Laboratories of City of Industry, California, using chain-of-custody protocols, for laboratory analysis of ethene, ethane, and methane by RSK 175.

## 3.0 GROUNDWATER ELEVATIONS

Groundwater elevations and estimated elevation contours for the Shallow and Intermediate Zone wells for the first quarter 2020 are shown on Figures 3 and 4, respectively. Groundwater elevations and estimated elevation contours for the Shallow and Intermediate Zone wells for the second quarter 2020 are shown on Figures 5 and 6, respectively.

### 3.1 FIRST QUARTER 2020

**Shallow Zone.** On March 9, 2020, 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 25.09 to 32.23 feet below the top of casing (BTOC), and the corresponding groundwater elevations in these wells ranged from 4.91 to 8.18 feet above mean sea level (MSL; Table 2).

During the first quarter 2020 monitoring event, gauging of the Shallow Zone wells was completed between 8:15 AM and 3:03 PM. During that time interval, the water level in the adjacent Columbia



River net decreased by 0.33 foot and had a maximum river stage difference of 1.75 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 on average were 2 feet higher in March 2020 than during the previous monitoring event in December 2019. During the first quarter 2020 gauging event and consistent with previous gauging data, there was a northwest to southeastern groundwater divide between wells MW-10 located in the northwest and well MW-3 located in the southeast. To the south/southwest of the divide, groundwater flow was to the river; and to the north/northeast of the divide, groundwater flow was away from the river to the east/northeast, with the exception of a localized groundwater elevation high in the northeast near well MW-15 (Figure 3).

**Intermediate Zone.** On March 9, 2020, depth-to-groundwater measurements were made at Intermediate Zone monitoring wells in accordance with the groundwater monitoring plan provided in Table 1. Groundwater levels in Intermediate Zone wells were measured during a predicted tidal inflection to minimize the magnitude of tidal influence on water levels during the gauging event. Water levels were measured from Intermediate Zone wells between 10:42 AM and 12:30 PM on March 9, 2020. During the time interval in which Intermediate Zone wells were gauged, water levels in the adjacent Columbia River decreased by 0.55 foot.

During the March 9, 2020 water level measurements, the observed depths to groundwater in the Intermediate Zone wells ranged from 26.95 to 28.63 feet BTOC, and groundwater elevations in these wells ranged from 5.39 to 6.29 feet above MSL (Table 2). As shown in Table 2, groundwater elevations in the Intermediate Zone were approximately 0.5 foot higher in March 2020 than during the previous monitoring event in December 2019. During the March 2020 gauging event, the Intermediate Zone groundwater gradient beneath the Facility was predominantly flat, with a slight elevation high at well S-1 (Figure 4).

**Deep Zone.** Depth to groundwater was measured in well MW-24d, which is screened from 210 to 230 feet below ground surface (bgs), within the Troutdale Formation. Depth to water in well MW-24d was 28.26 feet BTOC, corresponding to an elevation of 5.65 feet above MSL. A groundwater potentiometric map was not prepared for Deep Zone groundwater.

## 3.2 SECOND QUARTER 2020

**Shallow Zone.** On June 15, 2020, 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 21.36 to 29.17 feet BTOC, with groundwater elevations ranging from 8.32 to 10.83 feet above MSL (Table 2).

During the second quarter 2020 monitoring event, gauging of the Shallow Zone wells was completed between 9:28 AM and 2:25 PM. During the gauging activities, the water level in the adjacent Columbia River increased by 0.31 foot with a maximum river stage difference of 0.34 foot. As shown

in Table 2, groundwater elevations on average were around 3 feet higher in June 2020 than the previous gauging event in March 2020.

Consistent with the first quarter gauging event, a northwest to southeast trending groundwater divide was observed in the western and central portion of the property between wells MW-10 and MW-3, as shown on Figure 5.

**Intermediate Zone.** During the June 15, 2020 gauging event, depth to groundwater was measured in Intermediate Zone wells between 11:22 AM and 2:12 PM. During the June 15, 2020 gauging event, water levels in the adjacent Columbia River increased by 0.32 foot. The observed depths to groundwater in Intermediate Zone wells ranged from 22.71 to 29.98 feet BTOC, and groundwater elevations in these wells ranged from 3.16 to 9.62 feet above MSL (Table 2). As shown in Table 2, groundwater elevations on average were around 3 feet higher in June 2020 than the previous monitoring event in March 2020. During the June 15, 2020 gauging event, groundwater flow was relatively flat, with an isolated groundwater high around well S-1, but a slight riverward gradient to the southeast of well S-1 (Figure 6).

**Deep Zone.** Depth to water in Deep Zone well MW-24d was 24.79 feet BTOC, corresponding to an elevation of 9.12 feet above MSL (Table 2).

## 4.0 GROUNDWATER SAMPLE ANALYTICAL RESULTS

Complete copies of the laboratory reports for the first and second quarter 2020 groundwater monitoring events, including the quality assurance evaluation report and chain-of-custody documentation, are included in Appendix C.

### 4.1 FIRST QUARTER 2020

The March 2020 monitoring program included the collection of groundwater samples from the wells identified in Table 1. Groundwater samples from these wells were analyzed for HVOCs, nitrate as nitrogen, nitrite as nitrogen, and ammonia as nitrogen. The HVOC and nitrate/nitrite/ammonia results for first quarter 2020 are summarized in Tables 3 and 4, respectively; VOC data are shown on Figure 7, and nitrate and ammonia results are shown on Figure 8.

### 4.2 SECOND QUARTER 2020

The June 2020 monitoring program included the collection of groundwater samples from the wells as shown in Table 1. These wells were analyzed for HVOCs, nitrate as nitrogen, nitrite as nitrogen, and ammonia as nitrogen. The sample results for second quarter 2020 are summarized in Tables 3 and 4; VOC data are shown on Figure 9, and nitrate and ammonia results are shown on Figure 10.

### 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 30 of 33 monitoring wells. VOC concentration trends were slightly increasing for trichloroethene (TCE) in wells MW-17, MW-19, and MGMS3-132 and tetrachloroethene (PCE) in wells MW-17 and MGMS3-132. The concentrations of PCE and TCE in wells MW-17 and MGMS3-132 have consistently been variable and relatively low (i.e., PCE ranging from less than 1 microgram per liter [ $\mu\text{g/L}$ ] to 16.3  $\mu\text{g/L}$  for MGMS3-132 and TCE ranging from less than 0.5  $\mu\text{g/L}$  to 28.2  $\mu\text{g/L}$  for MW-17); therefore, it is difficult to identify a discernable concentration trend for the wells. While concentrations of PCE have declined in well MW-19, concentration trends for TCE have been predominately stable to slightly increasing. The increase in TCE may be the result of the conversion of chlorinated hydrocarbon mass from PCE to TCE during reductive dechlorination. A discussion of reductive dechlorination and total molar ethene mass is discussed in Section 5.3.

Ammonia, nitrate, and nitrite results are provided in Table 4 and on Figures 8 and 10. The highest concentrations of ammonia and nitrate were found in the western area of the property in Shallow Zone groundwater. Concentrations of ammonia and nitrate in the Intermediate Zone groundwater were more similar throughout the Facility, with slightly higher concentrations being found in localized areas in the center on the Facility. Fertilizer products have historically been stored at the Facility, although the specific products and storage areas have changed over time. Historical fertilizer handling operations ceased in late August 2008. The Facility obtained a new contract in 2014, and, at that time, resumed fertilizer handling and distribution processes. Historical nitrate results are also provided in Table 4. For wells in which historical data are available, the concentrations of nitrate and ammonia in March and June 2020 are generally similar to or less than historical results. A Supplemental Remedial Investigation (SRI) will be initiated in the second semi-annual 2020 reporting period, upon Ecology approval, to further assess the nature and extent of ammonia, nitrates, and nitrites in groundwater at the Facility.

## 5.0 INTERIM ACTION MEASURE ACTIVITIES

Several interim actions have been implemented at the Facility, as listed below.

- Between 2000 and 2005, a remediation system operated at the Facility that included (1) a recirculating system to treat groundwater and (2) vapor extraction to treat soil. The interim action system pumped groundwater from extraction wells installed near the river, treated the pumped water with potassium permanganate, and then filtered and pumped the water into a series of injection wells along the railroad tracks. For soil, a soil vapor extraction (SVE) system withdrew soil vapors from wells IW-1, IN-2, IN-3, IN-4, EX-1, EX-3, EX-4, and EX-5. This SVE system was inactivated in 2005 because it no longer was removing significant VOC mass.
- Bioremediation injections for remediation of Facility groundwater and the installation of an SVE system for the remediation of HVOCs in vadose-zone soils was completed in the spring/summer of 2008. These activities are herein referred to as the 2008 interim action. This SVE system has been operating since 2008.

- The SVE system was expanded and additional bioremediation injections were completed during the summer of 2011, which is referred to herein as the 2011 interim action. 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 were completed in 2016 adjacent to the seawall at the Facility in accordance with the 2015 Interim Action Work Plan (Apex, 2016). This work is referred to as the 2016 interim action. The Interim Action Summary Report (Apex, 2017) describes the scope and preliminary results of the 2016 interim action.

The 2008, 2011, and 2016 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 shown in Appendix E. The 2008 SVE system removed approximately 3,150 pounds of HVOCs 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). The removal rate decreased to an average of 1.7 lbs/day by the third quarter of 2011. A mass removal chart for the 2008 SVE system is provided in Appendix E.

A soil and groundwater investigation in 2010 indicated that the 2008 interim action had reduced HVOCs 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 11.

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 13). The wells and piping associated with Branches 4 and 5 and the associated blower unit are herein referred to as the “North System”.

In August 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 Work Plan (Ash Creek, 2011; Figure 13). 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”.

## 5.2 SUMMARY OF 2016 INTERIM ACTION

NuStar and the POV submitted a joint Feasibility Study (FS) to Ecology in March 2014 (Apex and Parametrix, 2014). 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 (the “Northwest [NW] Area”) which has been less responsive to monitored natural attenuation than at the NuStar terminal. The NW Area bioremediation injections were completed as a joint project between NuStar and the POV.

The NW Area injections were completed 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 12 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 (diluted with water) into 72 borings along the southern portion of the Facility, adjacent to the seawall. Figure 12 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 5.3 below.

## 5.3 INTERIM ACTION MONITORING AND EVALUATION

This section summarizes the scope and results of groundwater monitoring that has been performed to evaluate the effectiveness of interim actions. Effectiveness is evaluated by reviewing HVOC and

ethene concentration trends and TOC concentrations in groundwater. Effectiveness of the SVE system is evaluated based on the mass removal rate.

### 5.3.1 Enhanced Bioremediation Injections

Groundwater samples collected from wells MP-1, MW-7, MW-12, MW-13, MW-19, MW-24i, MW-26, MGMS1-43, MGMS2-40, and MGMS3-43 during the first and second quarter 2020 events were analyzed for TOC by EPA Method 5310 D and ethene by EPA Method RSK-175M, to evaluate the performance of the bioremediation injections.

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 first and second quarter 2020 monitoring events. Table 5 shows the results of interim action groundwater monitoring from the February 2007 baseline event through the second quarter 2020 monitoring event. Wells MW-24i and MGMS2-40 are 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 presented from the second quarter 2011 baseline event through the second quarter 2020. Wells MW-13, MW-14, MW-19, MW-26, MGMS-1, and MGMS-3 are 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 presented from September 2016 through March 2020.

A discussion of reductive dechlorination of HVOCs in groundwater from prior to the 2008 interim action through the second quarter 2020 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<sup>1</sup>; bioremediation injections along the riverbank and in the NW Area were completed in 2016. Additionally, seven injection boreholes were advanced in 2016 in the area of wells MP-1 and EX-1, located on the western side of the (former) primary source 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-1, MP-1, and MGMS2-40 are provided in Appendix F. VOC data are included from the baseline monitoring event that was completed prior to the 2008 interim action (first quarter 2007; second quarter 2007 for well MGMS2-40) through June 2020. As described in Section 2.0, monitoring well EX-1 has not been sampled since the fourth quarter of 2018, but results through the fourth quarter 2018 monitoring event are included for completeness. The concentrations of PCE and TCE have decreased in each well. The concentrations of PCE and TCE in wells MW-7, EX-1, and MGMS2-40 have been reduced

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<sup>1</sup> The description of the primary source area or “source area” is detailed in the Remedial Investigation Report (Ash Creek, 2009a); the location is identified on Figure 2 of this report.

by more than 97 percent since the interim measures were initiated. The concentrations of PCE and TCE in well MP-1 have decreased by approximately 74 percent and 85 percent, respectively, between the February 2007 baseline event and the June 2020 monitoring event.

Another indicator of effective treatment 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-1, MP-1, and MGMS2-40 are provided in Appendix F. Between the February 2007 baseline event and the June 2020 monitoring event, total molar concentrations in wells MP-1, MW-7 and MGMS2-40 decreased between 77 percent (well MP-1) to over 99 percent (well MW-7). Between the February 2007 baseline event and the December 2018 monitoring event, total molar concentrations in well EX-1 decreased over 99 percent.

**Riverbank Area.** Wells MW-12, MW-13, MW-19, MGMS1-43, and MGMS3-40 are located within the 2016 riverbank interim action area and, therefore, are useful for evaluating the effectiveness of the 2016 interim action. 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 over 99 percent 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 June 2020, PCE was not detected at concentrations above the detection limit (0.400 µg/L) and TCE was detected at a concentration of 1.12 µg/L in well MW-13. DCE concentrations have also decreased. The DCE concentrations in wells MW-12, MW-13, and MGMS3-40 have all been reduced by greater than 89 percent; concentrations of DCE in well MGMS1-43 have decreased by approximately 82 percent. Unlike wells MW-12 and MW-13, VOC concentrations in well MW-19 have not shown a response to the 2016 oil injections. Well MW-19 is in an area of consistently flat groundwater gradient, and it appears based on the TOC readings from this well (see Table 5) that the oil substrate did not reach the area of this well. However, the presence of VC and ethene in the groundwater samples from the well support that reductive dechlorination is occurring near the well.

The first and second quarter 2020 results showed a continued decrease of ethenes in most of the riverbank wells suggesting that the oil substrate is rapidly becoming depleted, and enhanced reductive dechlorination has slowed significantly in response. 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, therefore, are useful for evaluating the effectiveness of the interim action in this area. Concentration trend plots for PCE, TCE, DCE, and VC in these wells are provided in Appendix F.

Response to the 2016 interim action injections was delayed and reduced in these wells, likely due to the typically flat or north/northwest groundwater gradient slowing the spread of the oil substrate. However, average concentrations of PCE and TCE pre-2016 injections remain higher than average concentrations post-2016 injections for MW-14 and MW-26, indicating that although injections were not as effective in the NW Area, there still has been moderate success at decreasing concentrations. These wells are located on the periphery of the injection area, limiting their utility in monitoring the effectiveness of the injections. 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 HVOCs at the Facility. Ethene degrades quickly in most natural environments; therefore, observing increases in ethene concentration can be difficult. During the first semi-annual 2020 monitoring period, ethene was detected in five of the eleven 2016 interim action area monitoring wells sampled (MW-13, MW-19, MGMS1-43, MGMS2-40, and MGMS3-40). Further discussion of ethene results is 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-1. 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 to below reporting limits (1.0 to 13 µg/L) in all samples collected since then (September 2017 through June 2020). These data suggest that the 2016 bioremediation substrate injected near well MP-1 was effective for stimulating reductive dechlorination; however, the mass of substrate may be diminished.

Ethene has been detected in well EX-1, with the highest concentration measured in June 2018 (99.2 µg/L). In the September 2018 monitoring event, ethene was detected an order of magnitude lower (2.9 µg/L) and not detected in well EX-1 during the December 2018 monitoring event. As described in Section 2.0, well EX-1 has not been sampled since the December 2018 sampling event due to damage to the well and was abandoned in September 2019.

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 remained elevated, although with variability through March 2018. Ethene was not detected in well MGMS2-40 in the July 2018 sample but has been detected during subsequent monitoring event samples, at concentrations ranging from 1.4 to 78 µg/L. The presence of ethene in several interim action area wells, along with decreasing PCE and TCE concentrations, indicate that reductive dechlorination has been ongoing near this well since the 2011 injections.



**Riverbank Area.** Prior to the 2016 interim action injections, ethene was not present in groundwater in wells located in the 2016 interim action area, including wells MW-12, MW-13, and MGMS3-40, as shown in Table 5. Since the completion of the 2016 interim action injections, ethene has been detected in all four 2016 interim action area wells. The presence of ethene suggests that the 2016 injections have successfully resulted in the complete reductive dechlorination of the PCE and TCE. A summary of the presence and persistence of ethene in each riverbank area interim action well is provided below; ethene concentrations are tabulated in Table 5:

- 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 have been non-detect since November 2017 (reporting limit of 1.0 to 13.0 µg/L), except for one detection in September 2019 (1.1 µg/L).
- PCE and TCE concentrations in MW-13 have decreased significantly between September 2016 and June 2020 (from 5,090 µg/L and 951 µg/L, respectively, to <0.400 µg/L and 1.12 µg/L, respectively), but it was not until November 2017 that ethene was detected in the well. Since then, concentrations of ethene continued to rise to 500 µg/L by July 2018 and then decreased to 7.1 µg/L in December 2018. Ethene concentrations have been below the reporting limit (1.0 µg/L) since then, except for a detection in March 2020 (18.0 µg/L).
- Ethene was first detected in well MW-19 during the September 2017 monitoring event and was detected in every sampling event since (except for in December 2019) with the highest concentration (271 µg/L) detected during the June 2018 sampling event. Concentrations have since decreased and were below the detection limit (1.0 µg/L) in the December 2019 sampling period and were detected at 7.5 and 5.0 µg/L in the first and second quarter 2020 sampling events, respectively. As previously stated, VC concentrations in groundwater samples collected from well MW-19 in the June 2018 monitoring event were the highest since the well was first sampled in 2002. Since then, concentrations of VC have continued to decrease, although they remain higher than 2016 levels. Collectively, these data confirm reductive dechlorination around well MW-19 and that chlorinated VOC mass is being degraded.
- Ethene was detected in well MGMS3-40 during the first monitoring event after the 2016 injections (December 2016) and has been detected during each subsequent monitoring event through June 2020, at concentrations ranging from 4.9 µg/L to 242 µg/L. The only exception being the December 2019 sampling event, when concentrations of ethene were below the detection limit (1.0 µg/L).

**NW Area.** Ethene concentrations in wells MW-14 and MW-26 have not been detected above the reporting limit (1.0 to 13 µg/L) since ethene monitoring was initiated in September 2016. As stated above, these wells are located on the periphery of the injection area, limiting their utility in monitoring the effectiveness of the injections.

### 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 HVOCs present in groundwater at the Facility. While a baseline monitoring event was not conducted prior to the 2016 injection event, TOC data are available for wells MP-1 and MW-12 (riverbank area) 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 2017 and June 2020 at select wells. TOC results are tabulated in Table 5. A discussion of the TOC results is provided below.

**Primary Source Area.** Seven bioremediation injection points 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 values remained stable from the previous event; however, TOC values decreased in June 2017 by an order of magnitude and further decreased in September 2017 by another order of magnitude before remaining stable through June 2020. At well EX-1, the TOC concentration increased by two orders of magnitude following the 2016 interim action injections, then decreased an order of magnitude during the June 2017, and has remained relatively consistent since that time at concentrations ranging between 11 and 44 mg/L. As described in Section 2.0, well EX-1 has not been sampled since the December 2018 sampling event due to damage to the well and was abandoned in September 2019. These results indicate utilization of the oil substrate in the dechlorination of HVOCs, supporting the significant decreases in VOC concentrations observed following the 2016 bioremediation injections in this area.

**Riverbank Area.** The following describes TOC results in the riverbank portion of the 2016 interim action area (wells MW-12, MW-13, MW-19, MGMS3-40, and MGMS1-43).

- In groundwater collected from well MW-12, TOC concentrations increased by over three orders of magnitude between June and September 2016, with concentrations remaining elevated during the December 2016 monitoring event. Between December 2016 and March 2017, TOC concentrations in well MW-12 decreased by an order of magnitude and then gradually decreased another order of magnitude between June 2017 and June 2018. TOC concentrations have remained stable to slightly decreasing from July 2018 to June 2020.
- At well MW-13, TOC concentrations were elevated during the September 2016 sampling event, and then decreased by three orders of magnitude by the November 2017 event. TOC concentrations have remained relatively stable in well MW-13 through the June 2020 sampling event.
- At well MW-19, TOC values were low (one to two orders of magnitude below concentrations observed in wells MP-1 and MW-12) from September 2016 through November 2017, then increased by an order of magnitude in the March 2018 through June 2018 results. TOC concentrations decreased from June to September 2018, where they remained relatively

stable (between 5.38 and 19.1 µg/L) through March 2020. Concentrations of TOC increased slightly in the June 2020 sampling event to 40.1 µg/L.

- At well MGMS3-40, TOC concentrations increased during the September and December 2016 groundwater monitoring events, then decreased by an order of magnitude during the March 2017 event and have remained stable through June 2020.
- At well MGMS1-43, the TOC concentration in groundwater has remained relatively low and steady from September 2016 through June 2020 and does not appear to be significantly influenced from the oil injections in 2016.

With the exception of well MGMS1-43, TOC concentrations in riverbank area wells indicate utilization of the oil substrate in the dechlorination of HVOCs, which is supported by decreasing VOC concentrations in most riverbank area wells.

**NW Area.** In wells MW-14 and MW-26, TOC concentrations did not increase after the September 2016 injections. TOC levels in these wells have historically been low and stable. Concentrations of TOC in well MW-14 increased an order of magnitude, from 5.06 mg/L in September 2018 to 50.0 mg/L in December 2019 before decreasing to 4.22 mg/L in June 2020. TOC concentrations in this well will continue to be monitored to better assess the accuracy of the increased TOC measurement.

**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 at the NuStar Facility and 30 bioremediation injections at the off-facility Northwest Area. Since implementation, groundwater in the 2016 interim action area has been monitored for 16 quarters for indicators of reductive dechlorination. The results from the first and second quarter 2020 sampling events are consistent with previous events and indicate that reductive dechlorination is occurring. Specifically:

- Up to three orders of magnitude reduction of PCE and TCE concentrations have been observed between the September 2016 and June 2020 monitoring events in some of the 2016 interim action area wells.
- Observed trends in breakdown product concentrations are consistent with reductive dechlorination of chlorinated ethene compounds.
- After the 2016 injections, ethene was first detected in four riverbank interim action monitoring wells in March 2017. Detections of ethene in Facility wells have continued through June 2020, although concentrations are starting to taper off in many of the wells. TOC concentrations are also decreasing and are below 10 mg/L in the majority of wells, indicating that an additional injection event may be needed in the area to further reduce VOC concentrations and achieve site goals.

As identified above, wells MW-14 and MW-26 are located on the periphery of the injection area in the Northwest Area and provide limited utility in evaluating the effectiveness of the 2016 interim action in this area. However, VOC and ethene concentrations in these wells have continued to decrease supporting that reductive dechlorination is occurring in this area.

### 5.3.2 SVE Systems – Monitoring and Mass Removal 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 Eurofins Air Toxics Inc. in Folsom, California, for analysis of HVOCs by EPA Method TO-15.

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 SVE system. As of June 2020, the modifications to the terminal infrastructure have not been initiated and the North SVE system remains non-operational.

Starting in May 2018, SVE monitoring events have occurred on a bi-monthly, rather than monthly basis after it was deemed frequent enough to sufficiently maintain the system and quantify mass removal. An SVE monitoring event of the South SVE system was conducted January 10, 2020. During the January 2020 SVE monitoring event, corrosion was identified in the outlet from the knockout drum and the South SVE system was turned off to prevent the potential for leakage of effluent water. The South SVE system remains offline until repairs are made. As detailed in Section 6.1, repairs were planned for second quarter 2020, but were postponed due to health and safety concerns associated with the Covid-19 pandemic.

North SVE System operating and analytical data are provided in Tables 6 and 7, respectively. As discussed above, the North SVE system was not operational during this reporting period; therefore, data are from the period prior to May 2017. South SVE System operating and analytical data are provided in Tables 8 and 9, respectively.

**SVE System Mass Removal.** The approximate VOC mass removed by the North and South SVE Systems is presented in Tables 10 and 11 and on Figures 14 and 15, respectively. The North and South Systems have removed approximately 232 and 4,359 pounds of HVOCs, 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 7,811 pounds.

## 6.0 INFRASTRUCTURE MAINTENANCE

The following sections describe maintenance on the SVE and monitoring well systems infrastructure conducted up to and during the reporting period.

### 6.1 SVE SYSTEM

In November 2017, blue water was observed in the knockout drum for the south SVE system and has been observed intermittently since that time. Troubleshooting to find the source of the blue water has been ongoing. As detailed in previous groundwater monitoring reports prepared for the Facility since 2017, the condition of the SVE wells and piping, and the SVE system has been continuously assessed to identify the source of the blue water.

During the January 10, 2020 SVE monitoring event, approximately 20 gallons of blue water were observed in the knockout drum and subsequently removed. At this time, the outlet spout from the knockout drum was observed to be corroded through. When the system was on, no leaking was observed; however, when the system was turned off, effluent water was observed to leak from the corroded hole in the knockout drum outlet. To prevent potential leaks, the system was turned off until repairs could be completed. Because of this, additional SVE sampling was ceased until the system was repaired and put back online. The repair of the SVE system knockout valve was planned for second quarter 2020 but was postponed due to health and safety concerns associated with the Covid-19 pandemic. Barring any facility or government mandates restricting fieldwork due to the pandemic, the SVE system knockout drum will be repaired during third quarter 2020.

## 7.0 FUTURE ACTIVITIES

Groundwater monitoring on a quarterly basis and reporting on a semi-annual basis will continue in accordance with the Groundwater Monitoring Plan approved by Ecology in 2008 (Ash Creek, 2008).

As initially presented to Ecology in the *Well Decommissioning, Well Installation, and Well Monument Replacement Work Plan* that was submitted to Ecology on May 17, 2019 (Cascadia, 2019) and detailed further in the *Response to Ecology Letter Regarding the May 17, 2019 Well Decommissioning, Well Installation, and Well Monument Replacement Work Plan* (Cascadia, 2020a), NuStar plans to install the replacement monitoring well EX-1 adjacent to its former location and upgrade 16 flush monuments to utility vault style monuments. These upgraded monuments are designed to withstand heavy and high-volume truck traffic. At the request of Ecology, NuStar presented the utility vault specifications and installation procedures to Ecology in an email on June 23, 2020. After NuStar provided additional supporting information, Ecology approved the vault specifications and installation procedures in an email on July 14, 2020.

In 2019, Ecology issued Agreed Order DE 15806 for a supplemental remedial investigation for the presence of metals in site media due to operations at the adjacent Kinder Morgan Bulk Terminal and ammonia, nitrates, and nitrites due to fertilizer operations at NuStar. NuStar will continue to

analyze groundwater samples collected during the VOC monitoring program to support the assessments for Order DE 15806.

As a requirement of the Agreed Order, NuStar, the POV, and Kinder Morgan (a.k.a. the “Parties”) submitted a *Draft Supplemental Remedial Investigation Work Plan (SRIWP)* to Ecology in February 2020 (Cascadia, 2020b), proposing a soil, groundwater and sediment investigation to evaluate the nature and extent of metals and fertilizer constituents in site media. The Parties are currently resolving comments from Ecology on the SRIWP. Upon Ecology approval of the SRIWP, the Parties will implement the field investigation.

Once the South SVE system is repaired and operational, SVE operations and maintenance will resume bi-monthly in accordance with the schedule proposed in the *2011 Interim Action Evaluation Report* (Ash Creek, 2012). Operations at the North SVE system will resume once the planned rail alignment work is completed and the North SVE system is repaired.

## 8.0 REFERENCES

Apex Companies, LLC (Apex), 2013. *Final 2013 Remedial Investigation Report. NuStar Terminals Services, Inc. Vancouver Terminal Vancouver, Washington.* August 14, 2013.

Apex, 2016. *2015 Interim Action Work Plan.* NuStar Vancouver Facility. Vancouver, Washington. April 15, 2016.

Apex, 2017. *Interim Action Summary Report.* NuStar Vancouver Facility. Vancouver, Washington. June 29, 2017.

Apex and Parametrix Inc., 2014. *Feasibility Study Report NuStar, Cadet, and Swan Manufacturing Company Sites.* March 14, 2004.

Ash Creek Associates, Inc. (Ash Creek), 2008. *Groundwater Monitoring Plan, NuStar Vancouver Facility, Vancouver, Washington.* May 1, 2008.

Ash Creek, 2009a. *Revised Remedial Investigation Report, NuStar Terminals Services, Inc. Vancouver Main Terminal.* October 1, 2009.

Ash Creek, 2009b. *Interim Action Installation Report. NuStar Terminals Services, Inc., Vancouver Washington.* May 5, 2009.

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.

Cascadia Associates, LLC (Cascadia), 2019. *Well Decommissioning, Well Installation and Well Monument Replacement Work Plan NuStar Terminals Services, Inc. Vancouver Main Terminal, Vancouver, Washington.* May 17, 2019.

Cascadia, 2020a. *Response to Ecology Letter Regarding the May 17, 2019 Well Decommissioning, Well Installation, and Well Monument Replacement Work Plan NuStar Terminals Services, Inc. Vancouver Main Terminal, Vancouver, Washington.* January 6, 2020.

Cascadia, 2020b. *Draft Supplemental Remedial Investigation Work Plan NuStar Terminals Services, Inc. Vancouver Main Terminal, Vancouver, Washington.* February 14, 2020.

## **TABLES**



**Table 1**  
**Groundwater Monitoring Plan: First and Second Quarters 2020**  
**NuStar Vancouver Facility**  
**Vancouver, Washington**

Monitoring Program	Well ID	Included Monitoring Wells		Notes
		First Quarter	Second Quarter	
Groundwater monitoring includes depth-to-water measurement.	MW-1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	MW-2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	MW-3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	MW-5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	MW-6	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	MW-7	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	MW-8	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	MW-9	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	MW-10	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	MW-12	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	MW-13	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	MW-14	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	MW-15	<input type="checkbox"/>	<input type="checkbox"/>	
	MW-16	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	MW-17	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	MW-18i	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	MW-19	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	MW-19i	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	MW-20i	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	MW-21i-40	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	MW-21i-105	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	MW-22i	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	MW-23i	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	MW-24i	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	MW-24d	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	MW-25i	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	MW-26	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	MW-30i	<input type="checkbox"/>	<input type="checkbox"/>	
	MW-31i	<input type="checkbox"/>	<input type="checkbox"/>	
	MW-32s	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	MW-32i	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Please refer to notes at end of table.

**Table 1**  
**Groundwater Monitoring Plan: First and Second Quarters 2020**  
**NuStar Vancouver Facility**  
**Vancouver, Washington**

Monitoring Program	Well ID	Included Monitoring Wells		Notes
		First Quarter	Second Quarter	
Groundwater monitoring includes depth-to-water measurement.	MGMS1-3(43)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	MGMS1-2 (60)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	MGMS1-1(110)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	MGMS2-4(40)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	MGMS2-3 (60)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	MGMS2-2(110)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	MGMS2-1(132)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	MGMS3-4(40)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	MGMS3-3(60)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	MGMS3-2(101)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	MGMS3-1(132)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	MW-E	<input type="checkbox"/>	<input type="checkbox"/>	
	MW-F	<input type="checkbox"/>	<input type="checkbox"/>	
	MW-G	<input type="checkbox"/>	<input type="checkbox"/>	
	EW-1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	EX-1	<input type="checkbox"/>	<input type="checkbox"/>	
	MP-1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	MP-2	<input type="checkbox"/>	<input type="checkbox"/>	
	MP-3	<input type="checkbox"/>	<input type="checkbox"/>	
	MP-4	<input type="checkbox"/>	<input type="checkbox"/>	
S-1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
S-2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		

**Notes:**

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

**Table 2**  
**Groundwater Elevation Data: 2019 - 2020**  
**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)	9/23/2019	NM	NM
	12/2/2019	27.69	4.91
	3/9/2020	26.34	6.26
	6/15/2020	23.22	9.38
MW-2 (34.04)	9/23/2019	30.21	3.83
	12/2/2019	29.08	4.96
	3/9/2020	28.26	5.78
	6/15/2020	24.61	9.43
MW-3 (34.41)	9/23/2019	30.12	4.29
	12/2/2019	28.82	5.59
	3/9/2020	27.65	6.76
	6/15/2020	24.11	10.30
MW-5 (33.86)	9/23/2019	29.33	4.53
	12/2/2019	28.81	5.05
	3/9/2020	27.15	6.71
	6/15/2020	23.40	10.46
MW-6 (32.83)	9/23/2019	28.32	4.51
	12/2/2019	27.61	5.22
	3/9/2020	27.26	5.57
	6/15/2020	22.89	9.94
MW-7 (33.74)	9/23/2019	29.14	4.60
	12/2/2019	28.83	4.91
	3/9/2020	26.94	6.80
	6/15/2020	23.18	10.56
MW-8 (33.97)	9/23/2019	28.80	5.17
	12/2/2019	28.59	5.38
	3/9/2020	26.71	7.26
	6/15/2020	23.92	10.05
MW-9 (33.86)	9/23/2019	29.22	4.64
	12/2/2019	29.00	4.86
	3/9/2020	26.99	6.87
	6/15/2020	23.36	10.50
MW-10 (34.83)	9/23/2019	28.90	5.93
	12/2/2019	28.79	6.04
	3/9/2020	26.65	8.18
	6/15/2020	24.19	10.64

*Please refer to notes at end of table.*

**Table 2**  
**Groundwater Elevation Data: 2019 - 2020**  
**NuStar Vancouver Facility**  
**Vancouver, Washington**

Well Number/ (TOC Elevation)	Date of Measurement	Depth to Water (feet BTOC)	Groundwater Elevation (feet)
MW-12 (31.43)	9/23/2019	27.76	3.67
	12/2/2019	26.60	4.83
	3/9/2020	25.16	6.27
	6/15/2020	21.36	10.07
MW-13 (33.15)	9/23/2019	28.01	5.14
	12/2/2019	28.26	4.89
	3/9/2020	26.66	6.49
	6/15/2020	23.45	9.70
MW-14 (33.81)	9/23/2019	28.92	4.89
	12/2/2019	29.00	4.81
	3/9/2020	27.03	6.78
	6/15/2020	22.98	10.83
MW-15 (39.13)	9/23/2019	34.22	4.91
	12/2/2019	33.86	5.27
	3/9/2020	32.23	6.90
	6/15/2020	29.17	9.96
MW-16 (33.05)	9/23/2019	29.55	3.50
	12/2/2019	27.94	5.11
	3/9/2020	27.13	5.92
	6/15/2020	23.76	9.29
MW-17 (32.65)	9/23/2019	28.49	4.16
	12/2/2019	27.86	4.79
	3/9/2020	27.20	5.45
	6/15/2020	22.71	9.94
MW-18i (33.40)	9/23/2019	30.44	2.96
	12/2/2019	28.19	5.21
	3/9/2020	27.60	5.80
	6/15/2020	24.18	9.22
MW-19 (33.59)	9/23/2019	29.18	4.41
	12/2/2019	28.71	4.88
	3/9/2020	27.03	6.56
	6/15/2020	23.43	10.16
MW-19i (33.62)	9/23/2019	30.72	2.90
	12/2/2019	28.43	5.19
	3/9/2020	27.98	5.64
	6/15/2020	24.24	9.38

*Please refer to notes at end of table.*

**Table 2**  
**Groundwater Elevation Data: 2019 - 2020**  
**NuStar Vancouver Facility**  
**Vancouver, Washington**

Well Number/ (TOC Elevation)	Date of Measurement	Depth to Water (feet BTOC)	Groundwater Elevation (feet)
MW-20i (33.14)	9/23/2019	30.23	2.91
	12/2/2019	28.01	5.13
	3/9/2020	27.75	5.39
	6/15/2020	29.98	3.16
MW21i-40 (34.10)	9/23/2019	30.78	3.32
	12/2/2019	28.94	5.16
	3/9/2020	28.30	5.80
	6/15/2020	24.93	9.17
MW-21i-105 (33.99)	9/23/2019	30.96	3.03
	12/2/2019	28.83	5.16
	3/9/2020	28.16	5.83
	6/15/2020	24.82	9.17
MW-22i (34.39)	9/23/2019	NM	NM
	12/2/2019	29.29	5.10
	3/9/2020	28.58	5.81
	6/15/2020	25.21	9.18
MW-23i (33.80)	9/23/2019	30.24	3.56
	12/2/2019	28.56	5.24
	3/9/2020	27.99	5.81
	6/15/2020	24.61	9.19
MW-24i (33.47)	9/23/2019	30.75	2.72
	12/2/2019	28.19	5.28
	3/9/2020	27.92	5.55
	6/15/2020	24.31	9.16
MW-25i (33.58)	9/23/2019	30.80	2.78
	12/2/2019	28.42	5.16
	3/9/2020	27.74	5.84
	6/15/2020	24.46	9.12
MW-26 (33.73)	9/23/2019	29.06	4.67
	12/2/2019	28.93	4.80
	3/9/2020	26.81	6.92
	6/15/2020	23.20	10.53
MW-24d (33.91)	9/23/2019	29.74	4.17
	12/2/2019	28.70	5.21
	3/9/2020	28.26	5.65
	6/15/2020	24.79	9.12

*Please refer to notes at end of table.*

**Table 2**  
**Groundwater Elevation Data: 2019 - 2020**  
**NuStar Vancouver Facility**  
**Vancouver, Washington**

Well Number/ (TOC Elevation)	Date of Measurement	Depth to Water (feet BTOC)	Groundwater Elevation (feet)
EW-1 (31.40)	9/23/2019	27.54	3.86
	12/2/2019	26.45	4.95
	3/9/2020	25.09	6.31
	6/15/2020	22.08	9.32
<i>Secor Interim Action Pilot Study Wells</i>			
S-1 (33.24)	9/23/2019	30.02	3.22
	12/2/2019	27.53	5.71
	3/9/2020	26.95	6.29
	6/15/2020	23.62	9.62
S-2 (33.15)	9/23/2019	30.31	2.84
	12/2/2019	28.05	5.10
	3/9/2020	27.34	5.81
	6/15/2020	23.69	9.46
<i>Multi-Level Monitoring Wells</i>			
MGMS1-3 (43)* (32.86)	9/23/2019	29.11	3.75
	12/2/2019	28.31	4.55
	3/9/2020	NM	NM
	6/15/2020	23.30	9.56
MGMS1-2(60)* (32.86)	9/23/2019	29.79	3.07
	12/2/2019	27.79	5.07
	3/9/2020	NM	NM
	6/15/2020	23.85	8.74
MGMS1-1(110)* (32.86)	9/23/2019	29.78	3.08
	12/2/2019	27.72	5.14
	3/9/2020	NM	NM
	6/15/2020	23.91	8.68
MGMS2-4(40)* (32.59)	9/23/2019	28.28	4.31
	12/2/2019	28.10	4.49
	3/9/2020	NM	NM
	6/15/2020	22.71	9.88
MGMS2-3(60)* (32.59)	9/23/2019	29.37	3.22
	12/2/2019	27.77	4.82
	3/9/2020	NM	NM
	6/15/2020	23.79	8.80
MGMS2-2(110)* (32.59)	9/23/2019	29.38	3.21
	12/2/2019	27.75	4.84
	3/9/2020	NM	NM
	6/15/2020	23.90	8.69

*Please refer to notes at end of table.*

**Table 2**  
**Groundwater Elevation Data: 2019 - 2020**  
**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)	9/23/2019	29.38	3.21
	12/2/2019	27.78	4.81
	3/9/2020	NM	NM
	6/15/2020	23.84	8.75
MGMS3-4(40)* (31.65)	9/23/2019	28.18	3.47
	12/2/2019	26.64	5.01
	3/9/2020	NM	NM
	6/15/2020	22.56	9.09
MGMS3-3(60)* (31.65)	9/23/2019	28.41	3.24
	12/2/2019	26.45	5.20
	3/9/2020	NM	NM
	6/15/2020	22.71	8.94
MGMS3-2(101)* (31.65)	9/23/2019	28.39	3.26
	12/2/2019	26.50	5.15
	3/9/2020	NM	NM
	6/15/2020	22.89	8.76
MGMS3-1(132)* (31.65)	9/23/2019	28.45	3.20
	12/2/2019	26.52	5.13
	3/9/2020	NM	NM
	6/15/2020	22.81	8.84
<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)	9/23/2019	NM	NM
	12/2/2019	NM	NM
	3/9/2020	NM	NM
	6/15/2020	NM	NM
MW-32s (34.34)	9/23/2019	30.24	4.10
	12/2/2019	29.27	5.07
	3/9/2020	28.14	6.20
	6/15/2020	24.45	9.89
MW-32i (34.41)	9/23/2019	31.45	2.96
	12/2/2019	29.36	5.05
	3/9/2020	28.63	5.78
	6/15/2020	25.21	9.20

*Please refer to notes at end of table.*

**Table 2**  
**Groundwater Elevation Data: 2019 - 2020**  
**NuStar Vancouver Facility**  
**Vancouver, Washington**

Well Number/ (TOC Elevation)	Date of Measurement	Depth to Water (feet BTOC)	Groundwater Elevation (feet)
MW-E ** (30.64)	9/23/2019	NM	NM
	12/2/2019	NM	NM
	3/9/2020	NM	NM
	6/15/2020	NM	NM
MW-F (33.48)	9/23/2019	30.47	3.01
	12/2/2019	29.11	4.37
	3/9/2020	28.57	4.91
	6/15/2020	25.16	8.32
MW-G (31.50)	9/23/2019	NM	NM
	12/2/2019	NM	NM
	3/9/2020	NM	NM
	6/15/2020	NM	NM

**Notes:**

1. TOC = Top of casing; BTOC = Below top of casing.
2. Utilizes new survey information from June 2010. NGVD29 datum (feet mean sea level).
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.
6. The casing for well MW-10 was lowered during a recent monument replacement event. Top of casing information will be updated once the well is resurveyed.



**Table 3**  
**Groundwater Analytical Results: 2019-2020**  
**NuStar Vancouver Facility**  
**Vancouver, Washington**

Well Number	Sample Date	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
		Concentrations in µg/L (ppb)										
MW-1	9/27/2019	<b>8.66</b>	<0.400	<b>0.569</b>	<b>106</b>	<b>1.78</b>	<b>0.703</b>	<b>19.1</b>	<b>0.448</b>	<0.500	<b>18.4</b>	<b>2.97</b>
	12/4/2019	<b>3.22</b>	<0.400	<0.400	<b>26.6</b>	<b>0.494</b>	<0.500	<b>10.6</b>	<0.400	<0.500	<b>7.39</b>	<b>0.670</b>
	3/10/2020	<b>4.45</b>	<0.400	<0.400	<b>13.4</b>	<0.400	<0.500	<b>5.96</b>	<0.400	<0.500	<b>5.22</b>	<0.400
	6/17/2020	<b>2.95</b>	<0.400	<b>0.420</b>	<b>23.5</b>	<b>0.520</b>	<0.500	<b>12.1</b>	<0.400	<0.500	<b>7.75</b>	<b>0.460</b>
MW-2	9/27/2019	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	12/5/2019	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	3/12/2020	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	6/17/2020	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
MW-3	9/27/2019	<b>7.00</b>	<b>0.472</b>	<0.400	<b>72.3</b>	<b>1.25</b>	<b>1.32</b>	<b>130</b>	<b>1.70</b>	<0.500	<b>32.9</b>	<0.400
	12/4/2019	<b>1.54</b>	<0.400	<0.400	<b>36.5</b>	<b>1.07</b>	<b>0.634</b>	<b>136</b>	<b>1.33</b>	<0.500	<b>36.4</b>	<0.400
	3/10/2020	<b>1.77</b>	<0.400	<0.400	<b>48.9</b>	<b>1.97</b>	<b>1.03</b>	<b>192</b>	<b>2.74</b>	<0.500	<b>50.9</b>	<0.400
	6/17/2020	<0.800	<0.400	<0.400	<b>18.6</b>	<b>1.16</b>	<1.00	<b>115</b>	<b>1.38</b>	<1.00	<b>22.8</b>	<0.800
MW-5	9/26/2019	<0.4	<0.400	<0.400	<b>10.7</b>	<0.400	<0.500	<b>0.972</b>	<0.400	<0.500	<b>1.35</b>	<b>1.1</b>
	12/4/2019	<b>0.817</b>	<0.400	<b>1.60</b>	<b>632</b>	<b>1.11</b>	<0.500	<b>0.925</b>	<0.400	<0.500	<b>9.85</b>	<b>10.7</b>
	3/12/2020	<0.400	<0.400	<0.400	<b>14.3</b>	<0.400	<0.500	<b>18.7</b>	<0.400	<0.500	<b>7.11</b>	<b>2.58</b>
	6/18/2020	<0.400	<0.400	<0.400	<b>10.4</b>	<0.400	<0.500	<b>17.3</b>	<0.400	<0.500	<b>18.3</b>	<b>0.410</b>
MW-6	9/27/2019	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	12/5/2019	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	3/12/2020	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	6/17/2020	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
MW-7	9/26/2019	<b>2.98</b>	<0.400	<b>0.650</b>	<b>20.1</b>	<0.400	<0.500	<b>41.7</b>	<0.400	<0.500	<b>17.9</b>	<b>0.420</b>
	9/26/2019 DUP	<b>2.95</b>	<0.400	<b>0.672</b>	<b>21.0</b>	<0.400	<0.500	<b>39.6</b>	<0.400	<0.500	<b>17.8</b>	<0.400
	12/3/2019	<b>4.61</b>	<0.400	<b>0.837</b>	<b>29.4</b>	<0.400	<0.500	<b>65.8</b>	<0.400	<0.500	<b>31.0</b>	<0.400
	12/3/2019 DUP	<b>4.58</b>	<0.400	<b>0.839</b>	<b>29.7</b>	<0.400	<0.500	<b>66.1</b>	<0.400	<0.500	<b>31.8</b>	<0.400
	3/11/2020	<b>0.936</b>	<0.400	<0.400	<b>26.5</b>	<0.400	<0.500	<b>45.8</b>	<0.400	<0.500	<b>14.1</b>	<b>0.476</b>
	3/11/2020 DUP	<b>0.912</b>	<0.400	<0.400	<b>25.7</b>	<0.400	<0.500	<b>47.4</b>	<0.400	<0.500	<b>14.3</b>	<b>0.440</b>
	6/18/2020	<b>0.780</b>	<0.400	<0.400	<b>10.2</b>	<0.400	<0.500	<b>43.0</b>	<0.400	<0.500	<b>10.0</b>	<0.400
	6/18/2020 DUP	<b>0.850</b>	<0.400	<0.400	<b>11.1</b>	<0.400	<0.500	<b>40.8</b>	<0.400	<0.500	<b>10.1</b>	<0.400
MW-8	9/26/2019	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<b>4.20</b>	<0.400	<0.500	<0.400	<0.400
	12/3/2019	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<b>4.06</b>	<0.400	<0.500	<0.400	<0.400
	3/11/2020	<0.400	<0.400	<0.400	<b>3.44</b>	<0.400	<0.500	<b>0.929</b>	<0.400	<0.500	<0.400	<0.400
	6/17/2020	<b>0.770</b>	<0.400	<0.400	<b>12.1</b>	<b>0.450</b>	<0.500	<b>3.51</b>	<0.400	<0.500	<b>0.430</b>	<0.400

Please refer to notes at end of table.

**Table 3**  
**Groundwater Analytical Results: 2019-2020**  
**NuStar Vancouver Facility**  
**Vancouver, Washington**

Well Number	Sample Date	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,2-Dichloropropane	Tetrachloroethene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Vinyl Chloride
		Concentrations in µg/L (ppb)										
MW-9	9/26/2019	<0.400	<0.400	<0.400	<b>3.34</b>	<0.400	<0.500	<b>81.3</b>	<b>2.34</b>	<0.501	<b>25.4</b>	<0.401
	12/3/2019	<0.400	<0.400	<0.400	<b>2.34</b>	<0.400	<0.500	<b>67.5</b>	<b>1.46</b>	<0.502	<b>24.3</b>	<0.402
	3/11/2020	<0.400	<0.400	<0.400	<b>5.21</b>	<0.400	<0.500	<b>55.4</b>	<b>1.41</b>	<0.500	<b>18.1</b>	<0.400
	6/18/2020	<0.400	<0.400	<0.400	<b>5.27</b>	<0.400	<0.500	<b>109</b>	<b>1.44</b>	<0.500	<b>45.9</b>	<0.400
MW-10	9/25/2019	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<b>2.03</b>	<0.400	<0.500	<b>1.35</b>	<0.400
	12/4/2019	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<b>1.65</b>	<0.400	<0.500	<b>1.15</b>	<0.400
	3/11/2020	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<b>1.97</b>	<0.400	<0.500	<b>1.53</b>	<0.400
	6/17/2020	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<b>9.74</b>	<0.400	<0.500	<b>5.00</b>	<0.400
MW-12	9/26/2019	<b>6.26</b>	<0.400	<0.400	<b>5.31</b>	<b>0.565</b>	<0.500	<0.400	<0.400	<0.500	<b>0.442</b>	<b>6.82</b>
	9/26/2019 DUP	<b>6.12</b>	<0.400	<0.400	<b>5.06</b>	<b>0.550</b>	<0.500	<0.400	<0.400	<0.500	<b>0.459</b>	<b>6.45</b>
	12/5/2019	<0.400	<0.400	<0.400	<b>2.61</b>	<0.400	<0.500	<b>2.37</b>	<0.400	<0.500	<b>1.41</b>	<b>0.413</b>
	12/5/2019 DUP	<0.400	<0.400	<0.400	<b>2.51</b>	<0.400	<0.500	<b>2.18</b>	<0.400	<0.500	<b>1.23</b>	<0.400
	3/11/2020	<b>0.803</b>	<0.400	<0.400	<b>8.18</b>	<b>0.515</b>	<0.500	<b>7.01</b>	<0.400	<0.500	<b>4.17</b>	<b>0.423</b>
	3/11/2020 DUP	<b>0.806</b>	<0.400	<0.400	<b>8.47</b>	<b>0.561</b>	<0.500	<b>6.95</b>	<0.400	<0.500	<b>4.25</b>	<0.400
	6/18/2020	<b>1.25</b>	<0.400	<0.400	<b>14.2</b>	<b>0.410</b>	<0.500	<b>2.49</b>	<0.400	<0.500	<b>2.60</b>	<b>1.10</b>
6/18/2020 DUP	<b>1.30</b>	<0.400	<0.400	<b>14.1</b>	<0.400	<0.500	<b>2.59</b>	<0.400	<0.500	<b>2.68</b>	<b>1.04</b>	
MW-13	9/26/2019	<b>1.07</b>	<0.400	<0.400	<b>1.94</b>	<b>0.439</b>	<0.500	<0.400	<0.400	<0.500	<0.400	<b>2.01</b>
	12/3/2019	<b>1.50</b>	<0.400	<0.400	<b>1.06</b>	<b>0.488</b>	<0.500	<0.400	<0.400	<0.500	<0.400	<b>1.42</b>
	3/10/2020	<b>9.19</b>	<0.400	<b>1.97</b>	<b>72.5</b>	<b>2.04</b>	<0.500	<0.400	<0.400	<0.500	<b>7.59</b>	<b>134</b>
	6/18/2020	<b>0.610</b>	<0.400	<0.400	<b>1.15</b>	<0.400	<0.500	<0.400	<0.400	<0.500	<b>1.12</b>	<b>5.28</b>
MW-14	9/25/2019	<b>12.5</b>	<0.400	<b>4.58</b>	<b>264</b>	<b>3.60</b>	<0.500	<b>91.8</b>	<b>1.47</b>	<0.500	<b>327</b>	<b>0.482</b>
	12/4/2019	<b>7.81</b>	<0.400	<b>3.17</b>	<b>242</b>	<b>2.88</b>	<0.500	<b>107</b>	<b>0.704</b>	<0.500	<b>351</b>	<0.400
	3/11/2020	<b>6.80</b>	<2.00	<b>2.72</b>	<b>186</b>	<b>2.45</b>	<2.50	<b>85.9</b>	<2.00	<2.50	<b>294</b>	<2.00
	6/17/2020	<b>3.50</b>	<2.00	<2.00	<b>82.6</b>	<2.00	<2.50	<b>62.6</b>	<2.00	<2.50	<b>197</b>	<2.00
MW-15	11/6/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<b>0.64</b>	<0.50	<0.50	<0.50	<0.50
	7/2/2018	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<b>0.596</b>	<0.500	<0.500	<0.500	<0.500
	6/6/2019	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<b>0.531</b>	<0.500	<0.500	<0.500	<0.500
	6/18/2020	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<b>0.540</b>	<0.400	<0.500	<0.400	<0.400
MW-16	9/25/2019	<0.400	<0.400	<0.400	<b>14.4</b>	<0.400	<0.500	<b>136</b>	<b>0.658</b>	<0.500	<b>23.9</b>	<0.400
	12/3/2019	<0.400	<0.400	<0.400	<b>8.75</b>	<0.400	<0.500	<b>102</b>	<b>0.598</b>	<0.500	<b>19.9</b>	<0.400
	3/11/2020	<0.400	<0.400	<0.400	<b>8.67</b>	<0.400	<0.500	<b>79.0</b>	<b>0.552</b>	<0.500	<b>12.7</b>	<0.400
	6/18/2020	<b>1.07</b>	<0.400	<0.400	<b>23.8</b>	<0.400	<0.500	<b>27.3</b>	<0.400	<0.500	<b>5.89</b>	<b>0.420</b>

Please refer to notes at end of table.

**Table 3**  
**Groundwater Analytical Results: 2019-2020**  
**NuStar Vancouver Facility**  
**Vancouver, Washington**

Well Number	Sample Date	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,2-Dichloropropane	Tetrachloroethene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Vinyl Chloride
		Concentrations in µg/L (ppb)										
MW-17	9/26/2019	<0.400	<0.400	<0.400	<b>3.87</b>	<0.400	<0.500	<b>2.41</b>	<0.400	<0.500	<b>4.62</b>	<0.400
	12/3/2019	<b>0.829</b>	<0.400	<0.400	<b>26.8</b>	<0.400	<0.500	<b>5.54</b>	<0.400	<0.500	<b>15.1</b>	<0.400
	3/10/2020	<b>1.06</b>	<0.400	<0.400	<b>18.7</b>	<0.400	<0.500	<b>4.74</b>	<0.400	<0.500	<b>11.6</b>	<0.400
	6/17/2020	<0.400	<0.400	<0.400	<b>5.11</b>	<0.400	<0.500	<b>4.06</b>	<0.400	<0.500	<b>7.40</b>	<0.400
MW-18i	9/25/2019	<0.400	<0.400	<0.400	<b>0.630</b>	<0.400	<0.500	<b>0.920</b>	<0.400	<0.500	<b>0.647</b>	<0.400
	12/3/2019	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<b>1.30</b>	<0.400	<0.500	<b>0.589</b>	<0.400
	3/11/2020	<0.400	<0.400	<0.400	<b>1.60</b>	<0.400	<0.500	<b>0.896</b>	<0.400	<0.500	<b>0.502</b>	<0.400
	6/17/2020	<0.400	<0.400	<0.400	<b>0.940</b>	<0.400	<0.500	<b>0.880</b>	<0.400	<0.500	<b>0.400</b>	<0.400
MW-19	9/26/2019	<b>33.3</b>	<4	<b>35.1</b>	<b>958</b>	<b>9.59</b>	<5	<b>4,340</b>	<b>26.9</b>	<5	<b>1,430</b>	<b>35.4</b>
	9/26/2019 DUP	<b>41.9</b>	<4	<b>40.2</b>	<b>1,160</b>	<b>12.1</b>	<5	<b>4,010</b>	<b>30.6</b>	<5	<b>1,620</b>	<b>39.1</b>
	12/3/2019	<b>57.4</b>	<20.0	<b>28.6</b>	<b>1,250</b>	<20.0	<25.0	<b>1,670</b>	<20.0	<25.0	<b>1,190</b>	<b>25.6</b>
	12/3/2019 DUP	<b>53.4</b>	<20.0	<b>27.2</b>	<b>1,190</b>	<20.0	<25.0	<b>1,650</b>	<20.0	<25.0	<b>1,200</b>	<b>23.2</b>
	3/11/2020	<b>31.8</b>	<10.0	<b>55.4</b>	<b>1,290</b>	<10.0	<12.5	<b>4,600</b>	<b>28.8</b>	<12.5	<b>1,800</b>	<b>143</b>
	3/11/2020 DUP	<b>35.4</b>	<10.0	<b>60.4</b>	<b>1,450</b>	<b>14.8</b>	<12.5	<b>4,730</b>	<b>29.1</b>	<12.5	<b>2,010</b>	<b>154</b>
	6/18/2020	<b>25.7</b>	<4.00	<b>21.1</b>	<b>1,060</b>	<b>5.60</b>	<5.00	<b>1,000</b>	<b>9.40</b>	<5.00	<b>580</b>	<b>96.3</b>
	6/18/2020 DUP	<b>32.5</b>	<20.0	<b>27.5</b>	<b>956</b>	<20.0	<25.0	<b>1,080</b>	<20.0	<25.0	<b>697</b>	<b>95.0</b>
MW-19i	9/26/2019	<0.400	<0.400	<0.400	<b>0.433</b>	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	12/4/2019	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	3/12/2020	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	6/18/2020	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
MW-20i	9/25/2019	<b>0.461</b>	<0.400	<0.400	<b>9.43</b>	<0.400	<0.500	<b>2.34</b>	<0.400	<0.500	<b>1.44</b>	<0.400
	12/3/2019	<0.400	<0.400	<0.400	<b>8.68</b>	<0.400	<0.500	<b>1.37</b>	<0.400	<0.500	<b>0.897</b>	<0.400
	3/11/2020	<0.400	<0.400	<0.400	<b>9.21</b>	<0.400	<0.500	<b>2.32</b>	<0.400	<0.500	<b>1.26</b>	<0.400
	6/17/2020	<0.400	<0.400	<0.400	<b>1.93</b>	<0.400	<0.500	<b>0.410</b>	<0.400	<0.500	<0.400	<0.400
MW-21i-105	9/25/2019	<0.400	<0.400	<0.400	<b>4.08</b>	<0.400	<0.500	<b>4.93</b>	<0.400	<0.500	<b>2.62</b>	<0.400
	12/4/2019	<0.400	<0.400	<0.400	<b>3.09</b>	<0.400	<0.500	<b>5.61</b>	<0.400	<0.500	<b>2.79</b>	<0.400
	3/12/2020	<0.400	<0.400	<0.400	<b>2.48</b>	<0.400	<0.500	<b>3.60</b>	<0.400	<0.500	<b>2.02</b>	<0.400
	6/18/2020	<0.400	<0.400	<0.400	<b>1.59</b>	<0.400	<0.500	<b>3.08</b>	<0.400	<0.500	<b>1.49</b>	<0.400
MW-21i-40	9/25/2019	<b>2.48</b>	<0.400	<b>0.768</b>	<b>55.5</b>	<b>0.657</b>	<0.500	<b>22.5</b>	<0.400	<0.500	<b>14.9</b>	<0.400
	12/3/2019	<b>2.50</b>	<0.400	<b>0.614</b>	<b>56.3</b>	<b>0.521</b>	<0.500	<b>32.1</b>	<0.400	<0.500	<b>19.1</b>	<0.400
	3/11/2020	<b>1.95</b>	<0.400	<b>0.626</b>	<b>47.4</b>	<b>0.411</b>	<0.500	<b>31.2</b>	<0.400	<0.500	<b>17.6</b>	<0.400
	6/17/2020	<b>1.95</b>	<0.400	<b>0.540</b>	<b>45.9</b>	<b>0.400</b>	<0.500	<b>31.1</b>	<0.400	<0.500	<b>14.6</b>	<0.400

Please refer to notes at end of table.

**Table 3**  
**Groundwater Analytical Results: 2019-2020**  
**NuStar Vancouver Facility**  
**Vancouver, Washington**

Well Number	Sample Date	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,2-Dichloropropane	Tetrachloroethene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Vinyl Chloride
		Concentrations in µg/L (ppb)										
MW-22i	9/25/2019	<b>0.577</b>	<0.400	<0.400	<b>15.5</b>	<0.400	<0.500	<b>3.12</b>	<0.400	<0.500	<b>6.88</b>	<0.400
	12/4/2019	<b>0.461</b>	<0.400	<0.400	<b>15.2</b>	<0.400	<0.500	<b>1.94</b>	<0.400	<0.500	<b>7.35</b>	<0.400
	3/12/2020	<b>0.587</b>	<0.400	<0.400	<b>16.1</b>	<0.400	<0.500	<b>3.32</b>	<0.400	<0.500	<b>8.23</b>	<0.400
	6/18/2020	<b>0.580</b>	<0.400	<0.400	<b>13.6</b>	<0.400	<0.500	<b>3.17</b>	<0.400	<0.500	<b>7.62</b>	<0.400
MW-23i	9/26/2019	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<b>0.589</b>	<0.400	<0.500	<0.400	<0.400
	12/5/2019	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	3/12/2020	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	6/17/2020	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
MW-24i	9/27/2019	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	12/3/2019	<b>0.775</b>	<0.400	<0.400	<b>3.82</b>	<0.400	<0.500	<b>8.78</b>	<0.400	<0.500	<b>3.72</b>	<0.400
	3/12/2020	<b>1.30</b>	<0.400	<0.400	<b>15.4</b>	<0.400	<0.500	<b>17.0</b>	<0.400	<0.500	<b>8.42</b>	<0.400
	6/18/2020	<b>0.610</b>	<0.400	<0.400	<b>2.91</b>	<0.400	<0.500	<b>6.24</b>	<0.400	<0.500	<b>2.84</b>	<0.400
MW-24d	9/27/2019	<b>0.415</b>	<0.400	<0.400	<b>0.995</b>	<0.400	<0.500	<b>1.62</b>	<0.400	<0.500	<b>0.845</b>	<0.400
	12/3/2019	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	3/12/2020	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	6/18/2020	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
MW-25i	9/25/2019	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	12/3/2019	<0.400	<0.400	<0.400	<b>0.536</b>	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	3/12/2020	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	6/18/2020	<0.400	<0.400	<0.400	<b>0.440</b>	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
MW-26	9/26/2019	<b>5.14</b>	<2.00	<2.00	<b>104</b>	<b>2.60</b>	<2.50	<b>133</b>	<2.00	<2.50	<b>272</b>	<2.00
	12/3/2019	<b>2.63</b>	<2.00	<2.00	<b>95.0</b>	<2.00	<2.50	<b>137</b>	<2.00	<2.50	<b>216</b>	<2.00
	3/11/2020	<b>3.65</b>	<2.00	<2.00	<b>59.7</b>	<2.00	<2.50	<b>79.1</b>	<2.00	<2.50	<b>205</b>	<2.00
	6/17/2020	<b>5.16</b>	<0.800	<b>1.38</b>	<b>64.2</b>	<b>1.90</b>	<1.00	<b>143</b>	<b>2.20</b>	<1.00	<b>299</b>	<0.800
MW-32s	12/10/2018	<b>0.860</b>	<0.400	<0.400	<b>16.5</b>	<0.400	<0.500	<b>14.7</b>	<0.400	<0.500	<b>5.99</b>	<0.400
	3/25/2019	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	9/26/2019	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	3/13/2020	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
EW-1	9/26/2019	<0.400	<0.4	<0.400	<b>2.39</b>	<0.400	<0.500	<b>24.4</b>	<b>0.482</b>	<0.500	<b>7.40</b>	<0.400
	12/4/2019	<0.400	<b>0.552</b>	<0.400	<b>3.34</b>	<0.400	<0.500	<b>28.3</b>	<b>0.488</b>	<0.500	<b>9.99</b>	<0.400
	3/11/2020	<0.400	<0.400	<0.400	<b>0.811</b>	<0.400	<0.500	<b>15.0</b>	<0.400	<0.500	<b>5.04</b>	<0.400
	6/17/2020	<0.400	<0.400	<0.400	<b>1.20</b>	<0.400	<0.500	<b>29.9</b>	<b>0.900</b>	<0.500	<b>6.78</b>	<0.400

Please refer to notes at end of table.

**Table 3**  
**Groundwater Analytical Results: 2019-2020**  
**NuStar Vancouver Facility**  
**Vancouver, Washington**

Well Number	Sample Date	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,2-Dichloropropane	Tetrachloroethene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Vinyl Chloride
		Concentrations in µg/L (ppb)										
S-1	9/25/2019	<0.400	<0.400	<0.400	<b>1.86</b>	<0.400	<0.500	<b>1.10</b>	<0.400	<0.500	<b>2.71</b>	<0.400
	12/4/2019	<0.400	<0.400	<0.400	<b>0.988</b>	<0.400	<0.500	<b>0.971</b>	<0.400	<0.500	<b>2.86</b>	<0.400
	3/10/2020	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<b>1.06</b>	<0.400
	6/17/2020	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<b>0.440</b>	<0.400
S-2	9/25/2019	<b>8.88</b>	<0.400	<0.400	<b>49.6</b>	<b>0.638</b>	<0.500	<0.400	<b>0.942</b>	<0.500	<b>2.85</b>	<0.400
	12/4/2019	<b>7.12</b>	<0.400	<0.400	<b>30.5</b>	<0.400	<0.500	<0.400	<0.400	<0.500	<b>1.75</b>	<0.400
	3/10/2020	<b>6.54</b>	<0.400	<0.400	<b>26.4</b>	<b>0.516</b>	<0.500	<0.400	<0.400	<0.500	<b>1.15</b>	<0.400
	6/17/2020	<b>4.24</b>	<0.400	<0.400	<b>15.5</b>	<0.400	<0.500	<0.400	<0.400	<0.500	<b>0.580</b>	<0.400
MGMS1-3(43)	9/27/2019	<b>156</b>	<8.00	<b>30.5</b>	<b>3,240</b>	<b>53.9</b>	<10.0	<b>212</b>	<8.00	<10.0	<b>434</b>	<b>113</b>
	12/4/2019	<b>124</b>	<8.00	<b>17.5</b>	<b>2,860</b>	<b>40.9</b>	<10.0	<b>162</b>	<8.00	<10.0	<b>398</b>	<b>11.8</b>
	3/11/2020	<b>157</b>	<10.0	<b>29.7</b>	<b>3,230</b>	<b>60.4</b>	<12.5	<b>228</b>	<10.0	<12.5	<b>495</b>	<b>157</b>
	6/16/2020	<b>114</b>	<10.0	<b>21.8</b>	<b>2,520</b>	<b>31.5</b>	<12.5	<b>116</b>	<10.0	<12.5	<b>264</b>	<b>152</b>
MGMS1-2(60)	9/27/2019	<b>4.58</b>	<0.400	<b>0.443</b>	<b>27.9</b>	<0.400	<0.500	<b>33.2</b>	<0.400	<0.500	<b>19.0</b>	<b>7.89</b>
	12/4/2019	<b>0.465</b>	<0.400	<0.400	<b>8.86</b>	<0.400	<0.500	<b>16.8</b>	<0.400	<0.500	<b>9.35</b>	<0.400
	3/12/2020	<b>1.32</b>	<0.400	<0.400	<b>15.6</b>	<0.400	<0.500	<b>26.5</b>	<0.400	<0.500	<b>11.8</b>	<0.400
	6/16/2020	<0.400	<0.400	<0.400	<b>4.23</b>	<0.400	<0.500	<b>12.4</b>	<0.400	<0.500	<b>6.01</b>	<0.400
MGMS1-1(110)	10/1/2018	<b>6.12</b>	<0.400	<b>0.723</b>	<b>153</b>	<b>0.485</b>	<0.500	<b>13.0</b>	<0.400	<0.500	<b>39.3</b>	<b>0.657</b>
	6/7/2019	<b>3.55</b>	<0.400	<0.400	<b>102</b>	<0.400	<0.500	<b>13.8</b>	<0.400	<0.500	<b>24.2</b>	<0.400
	12/4/2019	<b>4.61</b>	<0.400	<0.400	<b>134</b>	<0.400	<0.500	<b>14.0</b>	<0.400	<0.500	<b>31.9</b>	<0.400
	6/16/2020	<b>4.22</b>	<0.400	<b>0.450</b>	<b>141</b>	<0.400	<0.500	<b>17.6</b>	<0.400	<0.500	<b>33.2</b>	<0.400
MGMS2-4(40)	9/27/2019	<b>11.2</b>	<0.400	<b>0.729</b>	<b>73.8</b>	<0.400	<0.500	<b>17.0</b>	<0.400	<0.500	<b>13.1</b>	<b>101</b>
	12/4/2019	<b>20.6</b>	<0.400	<b>0.778</b>	<b>40.5</b>	<0.400	<0.500	<b>32.3</b>	<0.400	<0.500	<b>17.9</b>	<b>65.4</b>
	3/12/2020	<b>24.1</b>	<0.400	<b>2.73</b>	<b>105</b>	<b>0.641</b>	<0.500	<b>86.3</b>	<b>0.453</b>	<0.500	<b>43.3</b>	<b>134</b>
	6/16/2020	<b>27.3</b>	<0.400	<b>1.25</b>	<b>85.0</b>	<0.400	<0.500	<b>14.8</b>	<0.400	<0.500	<b>9.09</b>	<b>138</b>
MGMS2-3(60)	9/27/2019	<b>1.59</b>	<0.400	<0.400	<b>35.2</b>	<b>0.470</b>	<0.500	<b>25.0</b>	<0.400	<0.500	<b>13.8</b>	<b>3.08</b>
	12/4/2019	<b>2.03</b>	<0.400	<b>0.427</b>	<b>54.5</b>	<b>0.422</b>	<0.500	<b>28.9</b>	<0.400	<0.500	<b>19.4</b>	<b>2.85</b>
	3/12/2020	<b>0.541</b>	<0.400	<0.400	<b>12.3</b>	<0.400	<0.500	<b>21.7</b>	<0.400	<0.500	<b>9.24</b>	<b>0.642</b>
	6/16/2020	<b>0.820</b>	<0.400	<0.400	<b>16.5</b>	<0.400	<0.500	<b>23.7</b>	<0.400	<0.500	<b>10.4</b>	<b>0.850</b>
MGMS2-2(110)	9/28/2018	<b>0.410</b>	<0.400	<0.400	<b>11.3</b>	<0.400	<0.500	<b>4.98</b>	<0.400	<0.500	<b>4.27</b>	<b>4.63</b>
	6/4/2019	<0.400	<0.400	<0.400	<b>2.37</b>	<0.400	<0.500	<b>3.44</b>	<0.400	<0.500	<b>2.04</b>	<b>0.770</b>
	12/4/2019	<0.400	<0.400	<0.400	<b>5.49</b>	<0.400	<0.500	<b>4.29</b>	<0.400	<0.500	<b>2.73</b>	<b>2.32</b>
	6/16/2020	<0.400	<0.400	<0.400	<b>2.91</b>	<0.400	<0.500	<b>4.19</b>	<0.400	<0.500	<b>2.50</b>	<b>1.17</b>
MGMS2-1(132)	9/28/2018	<b>0.520</b>	<0.400	<0.400	<b>17.8</b>	<0.400	<0.500	<b>4.82</b>	<0.400	<0.500	<b>5.63</b>	<b>6.71</b>
	6/4/2019	<0.400	<0.400	<0.400	<b>5.43</b>	<0.400	<0.500	<b>2.76</b>	<0.400	<0.500	<b>2.13</b>	<b>2.07</b>
	12/4/2019	<0.400	<0.400	<0.400	<b>7.96</b>	<0.400	<0.500	<b>3.66</b>	<0.400	<0.500	<b>3.07</b>	<b>3.29</b>
	6/16/2020	<0.400	<0.400	<0.400	<b>4.37</b>	<0.400	<0.500	<b>3.79</b>	<0.400	<0.500	<b>2.50</b>	<b>1.99</b>

Please refer to notes at end of table.

**Table 3**  
**Groundwater Analytical Results: 2019-2020**  
**NuStar Vancouver Facility**  
**Vancouver, Washington**

Well Number	Sample Date	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
		Concentrations in µg/L (ppb)										
MGMS3-4(40)	9/27/2019	<b>5.09</b>	<0.400	<0.400	<b>80.5</b>	<0.400	<0.500	<b>0.497</b>	<0.400	<0.500	<0.400	<b>106</b>
	9/27/2019 DUP	<b>5.09</b>	<0.400	<b>0.413</b>	<b>80.4</b>	<0.400	<0.500	<b>0.578</b>	<0.400	<0.500	<0.400	<b>104</b>
	12/4/2019	<b>1.63</b>	<0.400	<0.400	<b>2.57</b>	<0.400	<0.500	<b>1.35</b>	<0.400	<0.500	<b>0.454</b>	<b>4.50</b>
	12/4/2019 DUP	<b>1.67</b>	<0.400	<0.400	<b>2.66</b>	<0.400	<0.500	<b>1.13</b>	<0.400	<0.500	<0.400	<b>5.79</b>
	3/12/2020	<b>12.8</b>	<0.400	<b>2.43</b>	<b>418</b>	<b>0.638</b>	<0.500	<b>0.529</b>	<0.400	<0.500	<b>0.439</b>	<b>330</b>
	6/16/2020	<b>3.54</b>	<0.400	<0.400	<b>135</b>	<0.400	<b>0.670</b>	<b>0.660</b>	<0.400	<0.500	<0.400	<b>129</b>
6/16/2020 DUP	<b>3.71</b>	<0.400	<0.400	<b>138</b>	<0.400	<b>0.700</b>	<b>0.600</b>	<0.400	<0.500	<0.400	<b>134</b>	
MGMS3-3(60)	9/27/2019	<b>1.13</b>	<0.4	<0.4	<b>21.8</b>	<0.400	<0.500	<b>1.03</b>	<0.400	<0.500	<b>1.23</b>	<b>3.98</b>
	12/4/2019	<0.400	<0.400	<0.400	<b>3.62</b>	<0.400	<0.500	<b>1.17</b>	<0.400	<0.500	<b>0.634</b>	<0.400
	3/12/2020	<b>0.761</b>	<0.400	<0.400	<b>14.7</b>	<0.400	<0.500	<b>1.66</b>	<0.400	<0.500	<b>1.72</b>	<b>0.659</b>
	6/16/2020	<0.400	<0.400	<0.400	<b>3.92</b>	<0.400	<0.500	<b>1.17</b>	<0.400	<0.500	<b>0.510</b>	<0.400
MGMS3-2(110)	9/28/2018	<0.400	<0.400	<0.400	<b>1.52</b>	<0.400	<0.500	<b>1.98</b>	<0.400	<0.500	<b>1.11</b>	<0.400
	6/3/2019	<0.400	<0.400	<0.400	<b>0.930</b>	<0.400	<0.500	<b>1.89</b>	<0.400	<0.500	<b>1.11</b>	<0.400
	12/4/2019	<0.400	<0.400	<0.400	<b>0.852</b>	<0.400	<0.500	<b>1.84</b>	<0.400	<0.500	<b>0.958</b>	<0.400
	6/16/2020	<0.400	<0.400	<0.400	<b>1.00</b>	<0.400	<0.500	<b>3.01</b>	<0.400	<0.500	<b>1.33</b>	<0.400
MGMS3-1(132)	9/28/2018	<0.400	<0.400	<0.400	<b>3.45</b>	<0.400	<0.500	<b>3.82</b>	<0.400	<0.500	<b>3.24</b>	<0.400
	6/5/2019	<b>0.412</b>	<0.400	<0.400	<b>5.97</b>	<0.400	<0.500	<b>9.45</b>	<0.400	<0.500	<b>6.79</b>	<0.400
	12/4/2019	<0.400	<0.400	<0.400	<b>5.34</b>	<0.400	<0.500	<b>8.69</b>	<0.400	<0.500	<b>6.21</b>	<0.400
	6/16/2020	<b>0.430</b>	<0.400	<0.400	<b>4.61</b>	<0.400	<0.500	<b>9.87</b>	<0.400	<0.500	<b>6.01</b>	<0.400
EX-1	3/21/2018	<b>1.3</b>	<0.500	<0.500	<b>22.6</b>	<0.500	<0.500	<b>1.5</b>	<0.500	<0.500	<b>2.7</b>	<b>10.8</b>
	6/28/2018	<b>4.6</b>	<0.500	<b>1.11</b>	<b>722.0</b>	<b>8.72</b>	<0.500	<b>1.9</b>	<0.500	<0.500	<b>0.8</b>	<b>424.0</b>
	9/24/2018	<b>1.42</b>	<0.400	<0.400	<b>3.38</b>	<b>0.751</b>	<0.500	<b>3.07</b>	<0.400	<0.500	<b>2.42</b>	<b>7.56</b>
	12/4/2018	<b>0.876</b>	<0.400	<0.400	<b>8.18</b>	<0.400	<0.500	<b>6.35</b>	<0.400	<0.500	<b>3.60</b>	<b>1.88</b>
MP-1	9/26/2019	<b>1.36</b>	<0.800	<b>1.14</b>	<b>37.1</b>	<0.800	<1.00	<b>176</b>	<0.800	<1.00	<b>26.8</b>	<0.800
	12/3/2019	<b>1.57</b>	<0.800	<b>1.80</b>	<b>40.6</b>	<0.800	<1.00	<b>306</b>	<0.800	<1.00	<b>57.8</b>	<0.800
	3/11/2020	<b>3.94</b>	<0.800	<b>5.63</b>	<b>177</b>	<b>1.14</b>	<1.00	<b>1,370</b>	<b>1.77</b>	<1.00	<b>190</b>	<0.800
	6/17/2020	<4.00	<4.00	<4.00	<b>72.0</b>	<4.00	<5.00	<b>427</b>	<4.00	<5.00	<b>61.2</b>	<4.00
MP-3	6/28/2018	<b>5.24</b>	<0.500	<b>1.78</b>	<b>203</b>	<b>1.31</b>	<0.500	<b>398</b>	<b>1.82</b>	<0.500	<b>65.1</b>	<b>8.96</b>
	9/27/2018	<b>4.06</b>	<0.400	<b>3.52</b>	<b>187</b>	<b>1.60</b>	<0.500	<b>721</b>	<b>0.950</b>	<0.500	<b>148</b>	<b>0.730</b>

**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. Halogenated volatile organic compounds (HVOCs) analysis by U.S. Environmental Protection Agency (EPA) Method 8260B.

**Table 4**  
**Groundwater Analytical Results - Ammonia, Nitrate, and Nitrite**  
**NuStar Vancouver Facility**  
**Vancouver, Washington**

Well Number	Sample Date	Ammonia (as Nitrogen)	Nitrate-Nitrogen	Nitrite-Nitrogen
		Concentrations in mg/L (ppm)		
<b>EX</b>	2/6/2007	<b>26.7</b>	<b>108</b>	<b>0.49</b>
	3/23/2009	<b>14</b>	<b>43</b>	<b>0.54</b>
	3/16/2010	<b>3.4</b>	<b>89</b>	<b>0.71</b>
	6/7/2011	--	<b>150</b>	<0.10
	12/9/2011	--	<0.50	<0.10
	3/21/2018	<b>302</b>	<b>1.22</b>	<b>0.47</b>
	6/28/2018	<b>119</b>	<0.10	<0.050
	9/24/2018	<b>132</b>	<b>0.461</b>	<0.250
	12/4/2018	<b>117</b>	<b>24.1</b>	<0.250
<b>MW-1</b>	11/9/2017	<b>3.96</b>	<b>46.4</b>	<1.0
	3/20/2018	<b>6.20</b>	<b>1.84</b>	<0.10
	7/1/2018	<b>1.47</b>	<0.10	<0.10
	9/25/2018	<b>5.79</b>	<0.250	<0.250
	12/4/2018	<b>3.38</b>	<b>79.4</b>	<0.250
	3/21/2019	<b>22.0</b>	<b>2.8</b>	<0.250
	6/5/2019	<b>176</b>	<b>32.8</b>	<b>0.802</b>
	9/27/2019	<b>56.9</b>	<b>44.0</b>	<0.250
	12/4/2019	<b>112</b>	<b>134</b>	<0.250
	3/10/2020	<b>14.4</b>	<b>0.393</b>	<0.250
6/17/2020	<b>38.0</b>	<b>7.45</b>	<0.250	
<b>MW-2</b>	11/6/2017	<b>6.34</b>	<b>0.26</b>	<0.10
	7/2/2018	<b>9.85</b>	<0.10	<0.10
	3/21/2019	<b>11.0</b>	<0.250	<0.250
	6/5/2019	<b>9.86</b>	<0.250	<0.250
	9/27/2019	<b>9.82</b>	<0.250	<0.250
	12/4/2019	<b>9.72</b>	<0.250	<0.250
	3/12/2020	<b>9.04</b>	<0.250	<0.250
	6/17/2020	<b>10.9</b>	<0.250	<0.250
<b>MW-3</b>	11/8/2017	<b>1.68</b>	<b>2.7</b>	<1.0
	3/20/2018	<0.40	<b>19.7</b>	<0.10
	7/2/2018	<b>0.569</b>	<b>15.4</b>	<b>1.49</b>
	9/26/2018	<b>1.56</b>	<b>5.64</b>	<0.250
	12/7/2018	<b>1.18</b>	<b>10.2</b>	<0.250
	3/20/2019	<0.0200	<b>17.1</b>	<0.250
	6/7/2019	<0.0200	<b>15.1</b>	<0.250
	9/27/2019	<b>2.04</b>	<b>3.90</b>	<0.250
	12/4/2019	<b>0.212</b>	<b>11.5</b>	<0.250
	3/10/2020	<b>0.0210</b>	<b>14.7</b>	<0.250
	6/17/2020	<0.0200	<b>7.92</b>	<0.250

*Please refer to notes at end of table*

**Table 4**  
**Groundwater Analytical Results - Ammonia, Nitrate, and Nitrite**  
**NuStar Vancouver Facility**  
**Vancouver, Washington**

Well Number	Sample Date	Ammonia (as Nitrogen)	Nitrate-Nitrogen	Nitrite-Nitrogen
		Concentrations in mg/L (ppm)		
MW-5	11/7/2017	2.86	<0.10	<0.10
	3/21/2018	<0.05	2.63	<0.10
	6/29/2018	0.819	<0.10	<0.10
	9/27/2018	9.55	<0.250	<0.250
	12/7/2018	1.22	<0.250	<0.250
	3/26/2019	2.40	0.866	<0.250
	6/7/2019	2.94	<0.250	<0.250
	12/4/2019	0.570	<0.250	<0.250
	3/12/2020	0.114	<0.250	<0.250
	6/18/2020	0.114	<0.250	<0.250
MW-6	11/7/2017	0.608	0.35	<0.10
	7/1/2018	4.17	<0.10	<0.10
	9/25/2018	4.30	<0.250	<0.250
	3/20/2019	5.17	0.738	<0.250
	6/5/2019	0.964	0.883	<0.250
	9/27/2019	6.36	<0.250	<0.250
	12/4/2019	2.18	<0.250	<0.250
	3/12/2020	9.42	<0.250	<0.250
	6/17/2020	1.87	<0.250	<0.250
	MW-7	2/6/2007	3.00	60.7
6/10/2008		4.89	67.5	0.1
3/23/2009		11	56	<0.10
3/16/2010		2.4	99	<0.50
6/7/2011		--	140	<0.10
12/9/2011		--	<0.50	<0.10
11/7/2017		9.09	<0.10	<0.10
3/21/2018		13.4	<0.10	<0.10
3/21/2018 DUP		16.9	<0.10	<0.10
6/29/2018		7.9	10.8	0.10
9/27/2018		16.7	<0.250	<0.250
12/7/2018		22.4	13.3	<0.250
12/7/2018 DUP		22.1	13.5	<0.250
3/20/2019		34.5	13.1	<0.250
3/20/2019 DUP		33.7	13.4	<0.250
6/5/2019		16.6	30.4	<0.250
6/5/2019 DUP	17.0	30.3	<0.250	

*Please refer to notes at end of table*



**Table 4**  
**Groundwater Analytical Results - Ammonia, Nitrate, and Nitrite**  
**NuStar Vancouver Facility**  
**Vancouver, Washington**

Well Number	Sample Date	Ammonia (as Nitrogen)	Nitrate-Nitrogen	Nitrite-Nitrogen
		Concentrations in mg/L (ppm)		
<b>MW-7</b> <b>(cont.)</b>	9/26/2019	<b>19.8</b>	<b>11.5</b>	<0.250
	9/26/2019 DUP	<b>20.3</b>	<b>11.5</b>	<0.250
	12/3/2019	<b>33.1</b>	<b>47.4</b>	<0.250
	12/3/19 DUP	<b>34.9</b>	<b>49.7</b>	<0.250
	3/11/2020	<b>6.89</b>	<b>18.7</b>	<0.250
	3/11/2020 DUP	<b>6.89</b>	<b>18.7</b>	<0.250
	6/18/2020	<b>5.21</b>	<b>27.6</b>	<0.250
	6/18/2020 DUP	<b>6.33</b>	<b>27.6</b>	<0.250
<b>MW-8</b>	6/10/2008	<0.0500	<b>167</b>	<0.1
	11/6/2017	<0.050	<b>207</b>	<0.10
	3/19/2018	<0.40	<b>284</b>	<0.10
	6/29/2018	<0.050	<b>333</b>	<0.10
	9/25/2018	<0.0200	<b>235</b>	<0.250
	12/7/2018	<b>0.0230</b>	<b>260</b>	<0.250
	3/22/2019	<b>0.0350</b>	<b>544</b>	<0.250
	6/3/2019	<0.0200	<b>176</b>	<0.250
	12/3/2019	<0.0200	<b>276 E</b>	<0.250
	3/11/2020	<b>0.732</b>	<b>311</b>	<1.25
6/17/2020	<0.0200	<b>108 H-01</b>	<0.250	
<b>MW-9</b>	9/21/2010	<b>1.4</b>	<b>89</b>	<0.10
	11/9/2017	<b>17.4</b>	<b>559</b>	<0.10
	3/21/2018	<0.050	<b>230</b>	<0.10
	6/29/2018	<b>14.2</b>	<b>382</b>	<b>0.61</b>
	9/27/2018	<b>17.0</b>	<b>468</b>	<0.250
	12/7/2018	<b>5.60</b>	<b>311</b>	<0.250
	3/20/2019	<b>0.198</b>	<b>173</b>	<0.250
	6/7/2019	<b>0.022</b>	<b>125</b>	<0.250
	9/26/2019	<b>0.680</b>	<b>138</b>	<0.250
	12/3/2019	<b>0.618</b>	<b>101</b>	<0.250
	3/11/2020	<b>0.0850</b>	<b>264</b>	<0.250
	6/18/2020	<0.0200	<b>128</b>	<0.250
	<b>MW-10</b>	11/6/2017	<b>35.6</b>	<b>333</b>
6/29/2018		<b>29.0</b>	<b>486</b>	<0.10
9/25/2018		<b>37.2</b>	<b>413</b>	<0.250
9/25/2018 DUP		<b>38.0</b>	<b>412</b>	<0.250
3/21/2019		<b>45.0</b>	<b>412</b>	<0.250
6/6/2019		<b>36.5</b>	<b>363</b>	<b>0.463</b>
9/25/2019		<b>37.3</b>	<b>429</b>	<0.5
12/4/2019		<b>36.6</b>	<b>460</b>	<0.250
3/11/2020		<b>18.2</b>	<b>491</b>	<1.25
6/17/2020		<b>13.2</b>	<b>489 H-01</b>	<0.250 H-01

*Please refer to notes at end of table*

**Table 4**  
**Groundwater Analytical Results - Ammonia, Nitrate, and Nitrite**  
**NuStar Vancouver Facility**  
**Vancouver, Washington**

Well Number	Sample Date	Ammonia (as Nitrogen)	Nitrate-Nitrogen	Nitrite-Nitrogen
		Concentrations in mg/L (ppm)		
<b>MW-12</b>	10/19/2010	--	<b>59</b>	--
	6/7/2011	--	<b>1.1</b>	<0.10
	12/7/2011	--	<b>67</b>	<0.10
	9/22/2015	<b>110</b>	<b>47</b>	--
	11/9/2017	<b>55.4</b>	<b>0.57</b>	<0.25
	3/20/2018	<b>39.4</b>	<0.10	<0.10
	3/20/2018 DUP	<b>39.9</b>	<0.10	<0.10
	7/1/2018	<b>33.0</b>	<0.10	<0.10
	9/25/2018	<b>126</b>	<0.250	<0.250
	9/25/2018 DUP	<b>129</b>	<0.250	<0.250
	12/4/2018	<b>37.2</b>	<b>82.2</b>	<b>0.487</b>
	12/4/2018 DUP	<b>37.1</b>	<b>80.0</b>	<b>0.526</b>
	3/20/2019	<b>53.2</b>	<0.250	<0.250
	3/20/2019 DUP	<b>48.2</b>	<0.250	<0.250
	6/5/2019	<b>19.8</b>	<b>2.34</b>	<0.250
	6/5/2019 DUP	<b>22.4</b>	<b>2.32</b>	<0.250
	9/26/2019	<b>107</b>	<b>0.371</b>	<0.250
	9/26/2019 DUP	<b>122</b>	<b>0.383</b>	<0.250
	12/4/2019	<b>22.8</b>	<b>36.4</b>	<0.250
	12/4/2019 DUP	<b>20.2</b>	<b>35.6</b>	<0.250
3/11/2020	<b>26.6</b>	<b>12.0</b>	<0.250	
3/11/2020 DUP	<b>25.6</b>	<b>11.9</b>	<0.250	
6/18/2020	<b>12.2</b>	<b>1.66</b>	<0.250	
6/18/2020 DUP	<b>12.3</b>	<b>1.61</b>	<0.250	
<b>MW-13</b>	9/22/2015	<b>48</b>	<b>135</b>	--
	11/7/2017	<b>35.0</b>	<b>0.52</b>	<0.10
	3/20/2018	<b>191</b>	<0.10	<0.10
	7/1/2018	<b>23.5</b>	<0.10	<0.10
	9/25/2018	<b>37.7</b>	<0.250	<0.250
	12/5/2018	<b>49.8</b>	<0.250	<0.250
	3/19/2019	<b>110</b>	<0.250	<0.250
	6/6/2019	<b>78.5</b>	<0.250	<0.250
	9/26/2019	<b>76.2</b>	<0.250	<0.250
	12/3/2019	<b>63.2</b>	<0.250	<0.250
	3/10/2020	<b>52.0</b>	<0.250	<0.250
6/18/2020	<b>18.1</b>	<0.250	<0.250	

*Please refer to notes at end of table*

**Table 4**  
**Groundwater Analytical Results - Ammonia, Nitrate, and Nitrite**  
**NuStar Vancouver Facility**  
**Vancouver, Washington**

Well Number	Sample Date	Ammonia (as Nitrogen)	Nitrate-Nitrogen	Nitrite-Nitrogen
		Concentrations in mg/L (ppm)		
<b>MW-14</b>	11/8/2017	<b>34.7</b>	<b>50.3</b>	<1.0
	3/20/2018	<b>50.7</b>	<b>17.1</b>	<0.10
	6/28/2018	<b>31.6</b>	<b>104</b>	<2.5
	9/26/2018	<b>41.0</b>	<b>150</b>	<0.250
	12/5/2018	<b>53.7</b>	<b>75.5</b>	<0.250
	3/19/2019	<b>190</b>	<b>51.3</b>	<0.250
	6/6/2019	<b>33.9</b>	<b>28.6</b>	<b>0.958</b>
	9/25/2019	<b>29.6</b>	<b>145</b>	<0.250
	12/4/2019	<b>245</b>	<b>85.5</b>	<0.250
	3/11/2020	<b>32.0</b>	<b>137</b>	<0.250
	6/17/2020	<b>23.9</b>	<b>118 H-01</b>	<0.250
<b>MW-15</b>	11/6/2017	<0.050	<b>9.78</b>	<0.10
	7/2/2018	<0.050	<b>6.06</b>	<0.10
	6/6/2019	<0.0200	<b>2.42</b>	<0.250
	6/18/2020	<0.0200	<b>1.34</b>	<0.250
<b>MW-16</b>	11/6/2017	<0.050	<b>9.95</b>	<0.10
	3/19/2018	<0.40	<b>15.7</b>	<0.10
	7/2/2018	<0.050	<b>19.4</b>	<0.10
	9/25/2018	<0.0200	<b>6.10</b>	<0.250
	12/6/2018	<0.0200	<b>10.2</b>	<0.250
	3/22/2019	<b>5.31</b>	<b>7.90</b>	<0.250
	6/4/2019	<0.0200	<b>8.58</b>	<0.250
	9/25/2019	<0.0200	<b>7.15</b>	<0.250
	12/3/2019	<0.0200	<b>7.93</b>	<0.250
	3/11/2020	<b>0.465</b>	<b>10.5</b>	<0.250
6/18/2020	<0.0200	<b>2.44</b>	<0.250	
<b>MW-17</b>	11/8/2017	<b>0.634</b>	<b>43.4</b>	<1.0
	6/28/2018	<0.050	<b>7.84</b>	<0.10
	9/26/2018	<b>2.13</b>	<b>0.760</b>	<0.250
	3/19/2019	<b>5.77</b>	<b>25.3</b>	<0.250
	6/6/2019	<b>0.119</b>	<b>24.7</b>	<0.250
	9/26/2019	<b>2.12</b>	<b>1.10</b>	<0.250
	12/3/2019	<b>0.353</b>	<b>15.9</b>	<0.250
	3/10/2020	<b>1.21</b>	<b>11.5</b>	<0.250
	6/17/2020	<0.0200	<b>10.6 H-01</b>	<0.250

*Please refer to notes at end of table*

**Table 4**  
**Groundwater Analytical Results - Ammonia, Nitrate, and Nitrite**  
**NuStar Vancouver Facility**  
**Vancouver, Washington**

Well Number	Sample Date	Ammonia (as Nitrogen)	Nitrate-Nitrogen	Nitrite-Nitrogen
		Concentrations in mg/L (ppm)		
<b>MW-18i</b>	6/10/2008	<0.0500	<b>0.35</b>	<0.1
	11/7/2017	<0.050	<b>1.07</b>	<0.10
	3/21/2018	<0.050	<b>0.75</b>	<0.10
	7/2/2018	<0.050	<b>1.13</b>	<0.10
	9/27/2018	<0.0200	<b>1.00</b>	<0.250
	12/6/2018	<0.0200	<b>0.715</b>	<0.250
	3/21/2019	<0.0200	<b>0.509</b>	<0.250
	6/3/2019	<0.0200	<b>0.755</b>	<0.250
	9/25/2019	<0.0200	<b>0.831</b>	<0.250
	12/3/2019	<0.0200	<b>0.846</b>	<0.250
	3/11/2020	<0.0200	<b>0.445</b>	<0.250
	6/17/2020	<0.0200	<b>0.420</b>	<0.250
<b>MW-19</b>	10/19/2010	--	<b>19</b>	--
	9/22/2015	<b>46</b>	<b>135</b>	--
	11/9/2017	<b>80</b>	<b>41</b>	<1.0
	3/21/2018	<b>150</b>	<b>47.8</b>	<0.10
	3/21/2018 DUP	<b>152</b>	<b>46.5</b>	<0.10
	6/28/2018	<b>194</b>	<0.10	<0.10
	9/25/2018	<b>122</b>	<b>120</b>	<0.250
	9/25/2018 DUP	<b>125</b>	<b>121</b>	<0.250
	12/5/2018	<b>188</b>	<b>118</b>	<0.250
	12/5/2018 DUP	<b>188</b>	<b>119</b>	<0.250
	3/20/2019	<b>242</b>	<b>195</b>	<0.250
	3/20/2019 DUP	<b>192</b>	<b>191</b>	<0.250
	6/7/2019	<b>145</b>	<b>34.8</b>	<b>1.06</b>
	9/26/2019	<b>113</b>	<b>232</b>	<0.250
	9/26/2019 DUP	<b>119</b>	<b>233</b>	<0.250
	12/3/2019	<b>131</b>	<b>129</b>	<0.250
	12/3/2019 DUP	<b>125</b>	<b>136</b>	<0.250
	3/11/2020	<b>109</b>	<b>213</b>	<1.25
	3/11/2020 DUP	<b>107</b>	<b>205</b>	<1.25
	6/18/2020	<b>88.0</b>	<b>30.8</b>	<0.250
6/18/2020 DUP	<b>90.4</b>	<b>27.2</b>	<0.250	

*Please refer to notes at end of table*

**Table 4**  
**Groundwater Analytical Results - Ammonia, Nitrate, and Nitrite**  
**NuStar Vancouver Facility**  
**Vancouver, Washington**

Well Number	Sample Date	Ammonia (as Nitrogen)	Nitrate-Nitrogen	Nitrite-Nitrogen
		Concentrations in mg/L (ppm)		
<b>MW-19i</b>	11/8/2017	<b>0.236</b>	<0.10	<0.10
	3/20/2018	<0.40	<0.10	<0.10
	7/2/2018	<b>0.158</b>	<0.10	<0.10
	9/27/2018	<b>0.213</b>	<0.250	<0.250
	12/6/2018	<b>0.240</b>	<0.250	<0.250
	3/25/2019	<b>0.212</b>	<0.250	<0.250
	6/3/2019	<b>0.178</b>	<0.250	<0.250
	12/4/2019	<b>0.169</b>	<0.250	<0.250
	3/12/2020	<0.0200	<0.250	<0.250
	6/18/2020	<b>0.191</b>	<0.250	<0.250
<b>MW-20i</b>	11/7/2017	<b>0.125</b>	<b>0.28</b>	<0.10
	3/21/2018	<b>1.01</b>	<b>1.06</b>	<0.10
	7/2/2018	<b>0.115</b>	<b>0.37</b>	<0.10
	9/25/2018	<b>0.244</b>	<b>1.11</b>	<0.250
	12/6/2018	<0.0200	<0.250	<0.250
	3/22/2019	<b>0.0270</b>	<b>0.261</b>	<0.250
	6/3/2019	<b>0.353</b>	<b>1.77</b>	<0.250
	9/25/2019	<0.0200	<b>0.617</b>	<0.250
	12/3/2019	<b>0.0300</b>	<b>1.84</b>	<0.250
	3/11/2020	<0.0200	<b>0.332</b>	<0.250
6/17/2020	<0.0200	<b>0.585</b>	<0.250	
<b>MW-21i-40</b>	6/10/2008	<b>0.0594</b>	<0.100	<0.100
	11/8/2017	<0.050	<b>1.90</b>	<1.0
	3/22/2018	<b>0.071</b>	<b>1.70</b>	<0.10
	6/29/2018	<0.050	<b>5.12</b>	<1.0
	9/27/2018	<0.0200	<b>3.61</b>	<0.250
	12/6/2018	<0.0200	<b>3.16</b>	<0.250
	3/21/2019	<b>0.0360</b>	<b>3.41</b>	<0.250
	6/3/2019	<0.0200	<b>1.49</b>	<0.250
	9/25/2019	<0.0200	<b>3.49</b>	<0.250
	12/3/2019	<0.0200	<b>4.61</b>	<0.250
3/11/2020	<0.0200	<b>2.90</b>	<0.250	
6/17/2020	<0.0200	<b>2.11</b>	<0.250	

*Please refer to notes at end of table*

**Table 4**  
**Groundwater Analytical Results - Ammonia, Nitrate, and Nitrite**  
**NuStar Vancouver Facility**  
**Vancouver, Washington**

Well Number	Sample Date	Ammonia (as Nitrogen)	Nitrate-Nitrogen	Nitrite-Nitrogen
		Concentrations in mg/L (ppm)		
<b>MW-21i-105</b>	6/10/2008	<b>0.0645</b>	<0.100	<0.100
	11/8/2017	<0.050	<b>1.6</b>	<1.0
	3/22/2018	<b>13.0</b>	<b>15.8</b>	<b>0.10</b>
	6/29/2018	<b>12.3</b>	<b>13.1</b>	<0.10
	9/26/2018	<b>0.409</b>	<b>0.759</b>	<0.250
	12/6/2018	<b>3.05</b>	<b>5.29</b>	<0.250
	3/21/2019	<b>49.6</b>	<b>0.755</b>	<0.250
	6/6/2019	<b>45.7</b>	<b>7.57</b>	<b>1.25</b>
	9/25/2019	<b>28.3</b>	<b>4.46</b>	<b>1.81</b>
	12/4/2019	<b>42.5</b>	<b>4.15</b>	<b>2.11</b>
	3/12/2020	<b>32.6</b>	<b>3.54</b>	<b>4.79</b>
6/18/2020	<b>44.6</b>	<b>4.18</b>	<b>12.1</b>	
<b>MW-22i</b>	11/7/2017	<b>0.354</b>	<1.0	<1.0
	3/22/2018	<b>1.25</b>	<b>0.63</b>	<0.10
	6/29/2018	<b>0.469</b>	<1.0	<1.0
	9/26/2018	<b>0.369</b>	<0.250	<0.250
	12/5/2018	<b>0.378</b>	<0.250	<0.250
	3/21/2019	<b>0.448</b>	<0.250	<0.250
	6/6/2019	<b>0.329</b>	<0.250	<0.250
	9/25/2019	<b>0.339</b>	<0.250	<0.250
	12/4/2019	<b>0.395</b>	<0.250	<0.250
	3/12/2020	<b>0.111</b>	<0.250	<0.250
	6/18/2020	<b>0.331</b>	<0.250	<0.250
<b>MW-23i</b>	6/10/2008	<0.0500	<b>0.440</b>	<0.100
	11/8/2017	<0.0500	<b>0.78</b>	<0.100
	3/21/2018	<0.0500	<b>0.72</b>	<0.100
	6/28/2018	<0.0500	<b>0.53</b>	<0.100
	9/27/2018	<0.0200	<b>1.04</b>	<0.250
	12/6/2018	<0.0200	<b>0.520</b>	<0.250
	3/22/2019	<0.0200	<b>0.592</b>	<0.250
	6/3/2019	<0.0200	<b>0.604</b>	<0.250
	12/4/2019	<0.0200	<b>0.534</b>	<0.250
	3/12/2020	<0.0200	<b>0.639</b>	<0.250
	6/17/2020	<0.0200	<b>0.372</b>	<0.250

*Please refer to notes at end of table*

**Table 4**  
**Groundwater Analytical Results - Ammonia, Nitrate, and Nitrite**  
**NuStar Vancouver Facility**  
**Vancouver, Washington**

Well Number	Sample Date	Ammonia (as Nitrogen)	Nitrate-Nitrogen	Nitrite-Nitrogen
		Concentrations in mg/L (ppm)		
MW-24i	6/7/2011	--	<b>0.50</b>	<0.10
	12/7/2011	--	<b>1.60</b>	<0.10
	11/9/2017	<0.050	<b>3.09</b>	<0.10
	3/21/2018	<b>0.687</b>	<b>7.36</b>	<0.10
	6/28/2018	<0.050	<b>2.37</b>	<0.050
	9/27/2018	<0.0200	<b>7.56</b>	<0.250
	12/4/2018	<b>0.0670</b>	<b>2.97</b>	<0.250
	3/25/2019	<b>0.0200</b>	<b>4.07</b>	<0.250
	6/7/2019	<0.0200	<b>2.19</b>	<0.250
	9/27/2019	<b>0.116</b>	<0.250	<0.250
	12/3/2019	<0.0200	<b>2.86</b>	<0.250
	3/12/2020	<0.0200	<b>4.87</b>	<0.250
	6/18/2020	<0.0200	<b>2.70</b>	<0.250
MW-24d	11/6/2017	<b>0.153</b>	<0.10	<0.10
	3/20/2018	<0.40	<0.10	<0.10
	6/27/2018	<b>0.160</b>	<0.10	<0.050
	9/28/2018	<b>0.145</b>	<0.250	<0.250
	12/10/2018	<b>0.993</b>	<0.250	<0.250
	3/25/2019	<b>0.147</b>	<0.250	<0.250
	6/4/2019	<b>0.131</b>	<0.250	<0.250
	9/27/2019	<b>0.050</b>	<b>3.76</b>	<0.250
	12/3/2019	<b>0.142</b>	<0.250	<0.250
	3/12/2020	<b>0.130</b>	<0.250	<0.250
	6/18/2020	<b>0.211</b>	<0.250	<0.250
MW-25i	11/8/2017	<b>0.138</b>	<b>0.53</b>	<0.25
	3/21/2018	<0.050	<b>0.40</b>	<0.10
	6/29/2018	<0.050	<b>0.27</b>	<0.10
	9/27/2018	<0.0200	<b>0.775</b>	<0.250
	12/6/2018	<0.0200	<b>0.541</b>	<0.250
	3/22/2019	<b>0.0250</b>	<b>0.0389</b>	<0.250
	6/3/2019	<0.0200	<b>0.383</b>	<0.250
	9/25/2019	<0.0200	<b>0.710</b>	<0.250
	12/3/2019	<0.0200	<b>0.405</b>	<0.250
	3/12/2020	<0.0200	<b>0.453</b>	<0.250
	6/18/2020	<0.0200	<b>0.357</b>	<0.250

*Please refer to notes at end of table*

**Table 4**  
**Groundwater Analytical Results - Ammonia, Nitrate, and Nitrite**  
**NuStar Vancouver Facility**  
**Vancouver, Washington**

Well Number	Sample Date	Ammonia (as Nitrogen)	Nitrate-Nitrogen	Nitrite-Nitrogen
		Concentrations in mg/L (ppm)		
<b>MW-26</b>	11/8/2017	<b>34.1</b>	<b>101</b>	<2.5
	3/20/2018	<b>30.0</b>	<b>271</b>	<0.25
	6/29/2018	<b>22.4</b>	<b>213</b>	<0.10
	9/24/2018	<b>30.2</b>	<b>212</b>	<0.250
	12/5/2018	<b>35.3</b>	<b>152</b>	<0.250
	3/22/2019	<b>60.6</b>	<b>544</b>	<0.250
	6/3/2019	<b>41.3</b>	<b>476</b>	<0.250
	9/26/2019	<b>32.4</b>	<b>383</b>	<0.500
	12/3/2019	<b>24.7</b>	<b>279</b>	<0.250
	3/11/2020	<b>48.9</b>	<b>628</b>	<1.25
	6/17/2020	<b>42.9</b>	<b>573 H-01</b>	<0.250 H-01
<b>MW-32i</b>	11/10/2017	<0.050	<b>1.33</b>	<0.10
<b>MW-32s</b>	11/10/2017	<b>0.235</b>	<b>0.58</b>	<0.10
	3/22/2018	<0.050	<b>0.16</b>	<0.10
	10/1/2018	<0.0200	<0.250	<0.250
	12/10/2018	<b>0.0690</b>	<b>1.81</b>	<0.250
	3/25/2019	<0.0200	<0.250	<0.250
	9/26/2019	<b>0.0630</b>	<0.250	<0.25
	3/13/2020	<0.0200	<0.250	<0.250
<b>EW-1</b>	11/9/2017	<0.050	<b>0.50</b>	<0.10
	7/1/2018	<0.050	<b>2.91</b>	<0.10
	9/27/2018	<0.0200	<b>0.686</b>	<0.250
	3/25/2019	<0.0200	<b>3.69</b>	<0.250
	6/4/2019	<0.0200	<b>3.42</b>	<0.250
	12/4/2019	<0.0200	<b>0.708</b>	<0.250
	3/11/2020	<0.0200	<b>2.56</b>	<0.250
	6/17/2020	<0.0200	<b>4.24</b>	<0.250
<b>S-1</b>	11/8/2017	<b>7.13</b>	<b>4.14</b>	<0.10
	3/20/2018	<b>35.5</b>	<b>11.4</b>	<b>0.24</b>
	6/28/2018	<1.3	<b>3.02</b>	<0.10
	9/26/2018	<b>0.259</b>	<b>3.03</b>	<0.250
	12/5/2018	<0.0200	<b>2.16</b>	<0.250
	3/19/2019	<b>0.846</b>	<b>3.35</b>	<0.250
	6/5/2019	<b>0.141</b>	<b>1.95</b>	<0.250
	9/25/2019	<0.0200	<b>3.72</b>	<0.250
	12/4/2019	<0.0200	<b>2.04</b>	<0.250
	3/10/2020	<0.0200	<b>1.08</b>	<0.250
	6/17/2020	<0.0200	<b>1.13</b>	<0.250

*Please refer to notes at end of table*



**Table 4**  
**Groundwater Analytical Results - Ammonia, Nitrate, and Nitrite**  
**NuStar Vancouver Facility**  
**Vancouver, Washington**

Well Number	Sample Date	Ammonia (as Nitrogen)	Nitrate-Nitrogen	Nitrite-Nitrogen
		Concentrations in mg/L (ppm)		
S-2	11/8/2017	5.64	1.05	<0.10
	3/20/2018	6.1	1.25	<0.10
	6/28/2018	8.05	3.28	0.054
	9/26/2018	7.55	5.93	<0.250
	12/5/2018	7.76	<0.250	<0.250
	3/19/2019	25.6	3.23	0.259
	6/5/2019	6.06	<0.250	<0.250
	9/25/2019	0.691	1.77	<0.250
	12/4/2019	6.83	0.408	<0.250
	3/10/2020	6.96	0.906	<0.250
	6/17/2020	6.34	<0.250	<0.250
MGMS1-3(43)	10/19/2010	--	390	--
	11/7/2017	217	120	<1.0
	3/22/2018	214	<0.10	<0.10
	7/1/2018	198	<0.10	<0.10
	9/28/2018	240	75.8	<0.250
	12/4/2018	246	30.6	<0.250
	3/26/2019	238	13.5	<0.250
	6/7/2019	209	<0.25	<0.250
	9/27/2019	233	84.1	<0.250
	12/4/2019	216	45.3	<0.250
	3/11/2020	199	12.3	<0.250
6/16/2020	157	<0.250	<0.250	
MGMS1-2(60)	11/7/2017	<0.050	1.91	<0.10
	3/22/2018	0.054	3.18	<0.10
	7/1/2018	<0.050	1.83	<0.10
	10/1/2018	<0.0200	3.65	<0.250
	12/4/2018	0.104	0.697	<0.250
	3/26/2019	<0.0200	1.39	<0.250
	6/7/2019	<0.0200	1.08	<0.250
	9/27/2019	<0.0200	2.58	<0.250
	12/4/2019	<0.0200	0.732	<0.250
	3/12/2020	<0.0200	3.25	<0.250
	6/16/2020	<0.0200	0.375	<0.250
MGMS1-1(110)	11/7/2017	0.822	0.73	<0.10
	7/1/2018	0.134	0.11	<0.10
	10/1/2018	0.595	0.898	<0.250
	6/7/2019	0.179	0.533	<0.250
	12/4/2019	0.225	0.587	<0.250
	6/16/2020	0.211	0.856	<0.250

*Please refer to notes at end of table*

**Table 4**  
**Groundwater Analytical Results - Ammonia, Nitrate, and Nitrite**  
**NuStar Vancouver Facility**  
**Vancouver, Washington**

Well Number	Sample Date	Ammonia (as Nitrogen)	Nitrate-Nitrogen	Nitrite-Nitrogen
		Concentrations in mg/L (ppm)		
MGMS2-4(40)	9/21/2010	130	560	<0.10
	6/7/2011	--	200	<0.10
	12/7/2011	--	8.0	<0.10
	11/9/2017	87.1	<0.10	<0.10
	3/22/2018	84.2	<0.10	<0.10
	7/1/2018	83.6	0.76	<0.10
	9/28/2018	85.2	9.38	<0.250
	12/10/2018	80.7	<0.250	<0.250
	3/25/2019	85.2	<0.250	<0.250
	6/4/2019	78.7	<0.250	<0.250
	9/27/2019	78.9	1.34	<0.250
	12/4/2019	76.1	<0.250	<0.250
	3/12/2020	74.9	<0.250	<0.250
6/16/2020	75.8	6.57	0.414	
MGMS2-3(60)	11/9/2017	1.03	0.12	<0.10
	3/22/2018	0.153	0.68	<0.10
	7/1/2018	<0.050	0.77	<0.10
	12/10/2018	1.39	<0.250	<0.250
	3/25/2019	0.407	<0.250	<0.250
	6/4/2019	<0.0200	0.852	<0.250
	9/27/2019	0.719	<0.250	<0.250
	12/4/2019	1.15	<0.250	<0.250
	3/12/2020	0.0280	0.678	<0.250
	6/16/2020	0.0200	0.519	<0.250
MGMS2-2(110)	11/9/2017	<0.050	0.37	<0.10
	7/1/2018	0.050	0.28	<0.10
	9/28/2018	<0.0200	0.412	<0.250
	6/4/2019	<0.0200	0.402	<0.250
	12/4/2019	<0.0200	0.400	<0.250
	6/16/2020	<0.0200	0.317	<0.250
MGMS2-1(132)	11/9/2017	<0.050	<0.10	<0.10
	7/1/2018	<0.050	<0.10	<0.10
	9/28/2018	0.0500	<0.250	<0.250
	6/4/2019	<0.0200	<0.250	<0.250
	12/4/2019	<0.0200	<0.250	<0.250
	6/16/2020	<0.0200	<0.250	<0.250

Please refer to notes at end of table

**Table 4**  
**Groundwater Analytical Results - Ammonia, Nitrate, and Nitrite**  
**NuStar Vancouver Facility**  
**Vancouver, Washington**

Well Number	Sample Date	Ammonia (as Nitrogen)	Nitrate-Nitrogen	Nitrite-Nitrogen
		Concentrations in mg/L (ppm)		
<b>MGMS3-4(40)</b>	9/22/2015	<b>1.1</b>	<b>&lt;.10</b>	--
	11/10/2017	<b>1.71</b>	<0.10	<0.10
	3/22/2018	<b>1.55</b>	<0.10	<0.10
	7/1/2018	<b>0.971</b>	<0.10	<0.10
	9/28/2018	<b>1.71</b>	<0.250	<0.250
	9/28/2018 DUP	<b>1.68</b>	<0.250	<0.250
	12/10/2018	<b>1.04</b>	<0.250	<0.250
	3/26/2019	<b>2.67</b>	<0.250	<0.250
	6/3/2019	<b>1.31</b>	<0.250	<0.250
	6/3/2019 DUP	<b>1.32</b>	<0.250	<0.250
	6/3/2019 DUP	<b>1.32</b>	<0.250	<0.250
	9/27/2019	<b>1.14</b>	<0.250	<0.250
	9/27/2019 DUP	<b>1.26</b>	<0.250	<0.250
	12/4/2019	<b>0.906</b>	<0.250	<0.250
	12/4/2019 DUP	<b>0.918</b>	<0.250	<0.250
	3/12/2020	<b>2.09</b>	<0.250	<0.250
6/16/2020	<b>0.784</b>	<0.250	<0.250	
6/16/2020 DUP	<b>0.789</b>	<0.250	<0.250	
<b>MGMS3-3(60)</b>	11/10/2017	<0.050	<0.10	<0.10
	3/22/2018	<b>0.272</b>	<b>0.39</b>	<0.10
	7/1/2018	<b>0.100</b>	<b>0.29</b>	<0.10
	9/28/2018	<0.0200	<b>0.393</b>	<0.250
	12/10/2018	<0.0200	<0.250	<0.250
	3/26/2019	<0.0200	<b>0.495</b>	<0.250
	6/3/2019	<0.0200	<b>0.371</b>	<0.250
	9/27/2019	<0.0200	<0.250	<0.250
	12/4/2019	<0.0200	<b>0.364</b>	<0.250
	3/12/2020	<0.0200	<b>0.257</b>	<0.250
6/16/2020	<0.0200	<b>0.262</b>	<0.250	
<b>MGMS3-2(110)</b>	11/10/2017	<0.050	<b>0.48</b>	<0.10
	7/1/2018	<0.050	<b>0.43</b>	<0.10
	9/28/2018	<0.0200	<b>0.506</b>	<0.250
	6/3/2019	<0.0200	<b>0.467</b>	<0.250
	12/4/2019	<0.0200	<b>0.451</b>	<0.250
	6/16/2020	<0.0200	<b>0.370</b>	<0.250

*Please refer to notes at end of table*

**Table 4**  
**Groundwater Analytical Results - Ammonia, Nitrate, and Nitrite**  
**NuStar Vancouver Facility**  
**Vancouver, Washington**

Well Number	Sample Date	Ammonia (as Nitrogen)	Nitrate-Nitrogen	Nitrite-Nitrogen
		Concentrations in mg/L (ppm)		
<b>MGMS3-1(132)</b>	11/10/2017	<0.050	<b>0.52</b>	<0.10
	7/1/2018	<0.050	<b>0.46</b>	<0.10
	9/28/2018	<0.0200	<b>0.468</b>	<0.250
	6/5/2019	<0.0200	<b>0.560</b>	<0.250
	12/4/2019	<0.0200	<b>0.629</b>	<0.250
	6/16/2020	<0.0200	<b>0.591</b>	<0.250
<b>MP-1</b>	2/6/2007	<b>42.4</b>	<b>247</b>	<b>0.18</b>
	3/23/2009	<b>35</b>	<b>210</b>	<b>1.2</b>
	3/16/2010	<b>37</b>	<b>990</b>	<b>0.76</b>
	6/7/2011	--	<b>160</b>	<0.10
	12/9/2011	--	<b>120</b>	<b>0.91</b>
	11/9/2017	<b>12.2</b>	<b>23.0</b>	<0.50
	3/21/2018	<b>7.13</b>	<b>37.8</b>	<0.10
	6/28/2018	<b>8.71</b>	<b>38.2</b>	<0.10
	9/26/2018	<b>10.9</b>	<b>113</b>	<0.250
	12/4/2018	<b>6.01</b>	<b>80.8</b>	<0.250
	3/20/2019	<b>7.05</b>	<b>77.6</b>	<0.250
	6/7/2019	<b>8.24</b>	<b>61.6</b>	<b>0.366</b>
	9/26/2019	<b>2.15</b>	<b>97.7</b>	<b>0.384</b>
	12/3/2019	<b>2.39</b>	<b>118</b>	<0.250
3/11/2020	<b>8.82</b>	<b>110</b>	<0.250	
6/17/2020	<b>5.81</b>	<b>161 H-01</b>	<0.250	
<b>MP-3</b>	6/28/2018	<b>18.8</b>	<b>138</b>	<b>0.42</b>

**Notes:**

1. mg/L (ppm) = Milligrams per liter (parts per million).
2. **Bold** 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).
5. Ammonia as nitrogen by Method 350.1.
6. Nitrate as nitrogen and nitrite as nitrogen by Method 300.0.
7. E = Estimated value.
8. H-01 = This sample was analyzed outside the recommended holding time.

**Table 5**  
**Interim Action: Groundwater Analytical Results**  
**NuStar Vancouver Facility**  
**Vancouver, Washington**

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

Please refer to notes at end of table.

**Table 5**  
**Interim Action: Groundwater Analytical Results**  
**NuStar Vancouver Facility**  
**Vancouver, Washington**

Well Number	Sample Date	Volatile Organic Compounds										Attenuation Chemistry	Field Parameters	
		Tetrachloro ethene	Trichloro ethene	cis-1,2-Dichloro ethene	trans-1,2-Dichloro ethene	Vinyl chloride	Ethene	1,1-Dichloro ethene	1,1-Dichloro ethane	1,2-Dichloro ethane	1,1,1-Trichloro ethane	Total Organic Carbon	Dissolved Oxygen	Oxidation Reduction Potential
		Concentrations in µg/L										(mg/L)	(mg/L)	(mV)
<b>MW-7 (continued)</b>	6/17/2016	<b>0.69</b>	<b>2.1</b>	<b>10.9</b>	<0.50	<b>5.4</b>	<10.0	<0.50	<b>0.60</b>	<0.50	<0.50	<b>18.9</b>	1.67	-120.1
	9/29/2016	<0.50	<b>6.0</b>	<b>10.9</b>	<0.50	<b>5.5</b>	N/A	<0.50	<b>1.1</b>	<0.50	<0.50	N/A	0.96	164.1
	12/14/2016	<b>0.78</b>	<0.50	<b>9.4</b>	<0.50	<b>1.0</b>	N/A	<0.50	<0.50	<0.50	<0.50	N/A	1.13	5.6
	3/28/2017	<b>1.2</b>	<b>0.73</b>	<0.50	<0.50	<0.50	N/A	<0.50	<0.50	<0.50	<0.50	N/A	0.89	-25.4
	6/14/2017	<0.50	<b>0.55</b>	<b>2.5</b>	<0.50	<b>2.5</b>	<10.0	<0.50	<0.50	<1.0	<0.50	<b>9.1</b>	1.08	-60.5
	9/27/2017	<b>2.6</b>	<b>1.60</b>	<b>1.7</b>	<0.50	<b>1.7</b>	<10.0	<0.50	<0.50	<1.0	<0.50	<b>7.8</b>	1.75	110.2
	11/7/2017	<b>6.3</b>	<b>7.8</b>	<b>2.6</b>	<0.50	<b>1.5</b>	<10.0	<0.50	<0.50	<0.50	<0.50	<b>3.1</b>	2.65	68.6
	3/21/2018	<b>0.228 J</b>	<b>2.86</b>	<b>17.6</b>	<0.500	<b>4.93</b>	<13.0	<0.500	<b>0.495 J</b>	<0.500	<0.500	<b>9.96</b>	6.03	10.5
	6/29/2018	<b>9.89</b>	<b>3.53</b>	<b>5.50</b>	<0.500	<b>1.47</b>	<10.0	<0.500	<b>0.461 J</b>	<0.500	<0.500	<b>5.0</b>	0.56	187.5
	9/27/2018	<b>6.50</b>	<b>10.8</b>	<b>8.48</b>	<0.400	<b>2.08</b>	N/A	<0.400	<b>1.23</b>	<0.400	<0.400	N/A	1.21	-9.0
	12/7/2018	<b>30.4</b>	<b>18.1</b>	<b>17.7</b>	<0.400	<b>1.62</b>	N/A	<b>0.472</b>	<b>3.97</b>	<0.400	<0.400	N/A	1.89	18.5
	3/20/2019	<b>22.8</b>	<b>10.8</b>	<b>22.2</b>	<0.400	<b>0.605</b>	<1.0	<0.400	<b>1.87</b>	<0.400	<0.400	<b>9.07</b>	3.20	93.4
	6/5/2019	<b>28.4</b>	<b>12.7</b>	<b>20.2</b>	<0.400	<b>1.15</b>	<1.0	<b>0.559</b>	<b>2.91</b>	<0.400	<0.400	<b>4.77</b>	6.02	92.2
	9/26/2019	<b>41.7</b>	<b>17.9</b>	<b>21.0</b>	<0.400	<b>0.420</b>	N/A	<b>0.672</b>	<b>2.98</b>	<0.400	<0.400	N/A	0.67	182.9
	12/3/2019	<b>66.1</b>	<b>31.8</b>	<b>29.7</b>	<0.400	<0.400	<1.0	<b>0.839</b>	<b>4.61</b>	<0.400	<0.400	<b>7.51</b>	6.61	194.0
	3/11/2020	<b>47.4</b>	<b>14.3</b>	<b>26.5</b>	<0.400	<b>0.476</b>	<1.0	<0.400	<b>0.936</b>	<0.400	<0.400	<b>5.98</b>	3.39	109.1
6/18/2020	<b>43.0</b>	<b>10.1</b>	<b>11.1</b>	<0.400	<0.400	<1.0	<0.400	<b>0.850</b>	<0.400	<0.400	<b>5.10</b>	1.03	230.9	
<b>MP-1</b>	2/6/2007	<b>1,610</b>	<b>421</b>	<b>347</b>	<b>8.5</b>	<b>23.6</b>	N/A	<5.0	<b>18.4</b>	<5.0	<b>11.2</b>	< 1.00	0.39	208.9
	12/16/2008	<b>1,600</b>	<b>230</b>	<b>70</b>	<5.0	<5.0	N/A	<5.0	<b>&lt;5.0</b>	<5.0	<b>10</b>	<b>1.80</b>	1.37	-78.5
	3/23/2009	<b>1,200</b>	<b>180</b>	<b>89</b>	<4.0	<4.0	N/A	<4.0	<b>6.0</b>	<4.0	<b>10</b>	<b>2.0</b>	1.05	127.3
	6/18/2009	<b>1,500</b>	<b>180</b>	<b>43</b>	<4.0	<4.0	N/A	<4.0	<b>4.3</b>	<4.0	<b>12</b>	N/A	3.65	-43.7
	9/18/2009	<b>1,100</b>	<b>310</b>	<b>240</b>	<b>8.9</b>	<b>7.3</b>	<1.0	<0.40	<b>14</b>	<4.0	<b>8.2</b>	<b>1.50</b>	0.48	99.7
	12/18/2009	<b>1,000</b>	<b>180</b>	<b>58</b>	<4.0	<4.0	<1.0	<4.0	<4.0	<4.0	<b>7.1</b>	<b>1.60</b>	0.78	155.3
	3/16/2010	<b>1,500</b>	<b>400</b>	<b>410</b>	<b>13</b>	<b>10</b>	<b>2.47</b>	<b>4.7</b>	<b>22</b>	<3.0	<b>8.6</b>	<b>2.4</b>	0.89	83.2
	6/17/2010	<b>800</b>	<b>140</b>	<b>120</b>	<3.0	<3.0	<1.0	<3.0	<b>3.2</b>	<3.0	<b>5.4</b>	<b>2.4</b>	3.22	228.3
	9/23/2010	<b>730</b>	<b>120</b>	<b>41</b>	<3.0	<3.0	<1.0	<3.0	<3.0	<3.0	<b>4.0</b>	<b>2.0</b>	0.53	-464.0
	12/10/2010	<b>1,000</b>	<b>150</b>	<b>27</b>	<3.0	<3.0	<1.0	<3.0	<3.0	<3.0	<b>4.5</b>	<b>1.0</b>	0.52	-4.6
	3/14/2011	<b>1,200</b>	<b>180</b>	<b>150</b>	<3.0	<b>5.9</b>	<0.0010	<3.0	<b>7.1</b>	<3.0	<b>6.4</b>	<b>0.96</b>	1.35	159.6
	6/7/2011	<b>640</b>	<b>130</b>	<b>75</b>	<2.5	<2.5	<1.0	<2.5	<b>4.9</b>	<2.5	<b>3.3</b>	<b>1.6</b>	0.52	48.9
	9/19/2011	<b>30</b>	<b>72</b>	<b>4.1</b>	<1.5	<b>1.6</b>	NA	<1.5	<b>2.4</b>	<1.5	<b>1.9</b>	<b>3.7</b>	0.69	913.5
	12/9/2011	<b>640</b>	<b>120</b>	<b>49</b>	<b>3.1</b>	<2.5	<b>3.28</b>	<2.5	<b>2.6</b>	<2.5	<b>3.1</b>	<b>8.3</b>	0.83	-51.7
	3/9/2012	<b>490</b>	<b>140</b>	<b>440</b>	<b>6.3</b>	<b>21</b>	<b>15.9</b>	<b>2.8</b>	<b>9.4</b>	<1.5	<b>3.5</b>	<b>16</b>	0.23	77.7
	6/22/2012	<b>690</b>	<b>120</b>	<b>530</b>	<b>2.9</b>	<b>48</b>	<b>66.6</b>	<b>2.8</b>	<b>5.6</b>	<2.5	<b>12</b>	<b>26</b>	0.83	-51.7
9/14/2012	<b>340</b>	<b>83</b>	<b>170</b>	<b>2.2</b>	<b>4.5</b>	<b>16</b>	<1.5	<b>4.0</b>	<1.5	<b>2.0</b>	<b>23</b>	0.43	98.2	
12/14/2012	<b>230</b>	<b>48</b>	<b>170</b>	<b>1.7</b>	<b>1.8</b>	<b>21.1</b>	<0.90	<b>2.0</b>	<0.90	<b>1.0</b>	<b>18</b>	0.28	-15.2	

Please refer to notes at end of table.

**Table 5**  
**Interim Action: Groundwater Analytical Results**  
**NuStar Vancouver Facility**  
**Vancouver, Washington**

Well Number	Sample Date	Volatile Organic Compounds										Attenuation Chemistry	Field Parameters	
		Tetrachloro ethene	Trichloro ethene	cis-1,2-Dichloro ethene	trans-1,2-Dichloro ethene	Vinyl chloride	Ethene	1,1-Dichloro ethene	1,1-Dichloro ethane	1,2-Dichloro ethane	1,1,1-Trichloro ethane	Total Organic Carbon	Dissolved Oxygen	Oxidation Reduction Potential
		Concentrations in µg/L										(mg/L)	(mg/L)	(mV)
MP-1 (continued)	3/15/2013	230	69	140	2.5	1.8	5.86	0.94	5.1	<0.90	1.0	35	0.44	60.4
	6/14/2013	330	70	190	1.6	1.8	2.96	1.4	4.5	<0.90	1.4	28	0.34	187.2
	9/20/2013	260	66	77	1.5	<0.90	3.17	<0.90	2.9	<0.90	0.95	35	0.44	1.2
	12/16/2013	290	70	67	0.92	<0.90	<1.0	1.1	1.7	<0.90	1.2	26	1.10	10.3
	3/24/2014	360	54	240	<1.5	<1.5	33	<1.5	2.2	<1.5	1.8	38	0.69	-18.7
	6/23/2014	1,200	130	290	1.7	5.0	19.6	2.3	4.9	<1.5	9.5	34	3.00	-14.0
	9/30/2014	360	63	110	<2.0	16	<1.0	<2.0	2.8	<2.0	<2.0	29	4.09	42.3
	12/15/2014	320	59	58	<1.5	<1.5	<1.0	<1.5	1.7	<1.5	<1.5	2.4	0.88	-28.6
	3/20/2015	570	96	190	1.5	25	<6.2	1.5	3.6	<1.0	1.0	7.8	1.04	29.8
	6/18/2015	376	80.8	91	0.87	<0.84	<10.0	1.5	2.9	<0.84	<0.84	6.0	1.75	-148.5
	9/22/2015	343	68.3	38.3	<1.2	<1.2	<1.0	1.4	1.8	<1.2	<1.2	2.2	1.66	105.5
	12/8/2015	308	62.6	50.9	<1.2	<1.2	<1.0	1.5	1.8	<1.2	<1.2	9.9	1.20	82.8
	3/8/2016	433	100	148	1.2	<0.84	<1.0	2.1	7.5	<0.84	<0.84	5.1	1.13	29.5
	6/17/2016	206	67.3	125	0.97	<0.50	<10.0	1.5	5.0	<0.50	<0.50	<1.0	3.71	-8.6
	9/28/2016	99.4	35.5	40.5	<0.50	3.3	<10.0	3.1	1.3	<0.50	<0.50	2620	1.32	135.2
	12/13/2016	2.9	1.0	209	0.55	4.3	<10.0	0.92	0.64	<0.50	<0.50	130	3.57	12.1
	3/30/2017	<0.50	0.79	177	6.0	186	328	<0.50	7.5	<0.50	<0.50	137	0.79	-137.7
	6/14/2017	16.2	8.5	143	1.9	29.4	83.2	<0.50	2.3	<1.0	<0.50	38.9	0.87	-53.2
	9/26/2017	307	65.9	83.0	0.83	2.3	<10.0	3.4	4.5	<1.0	<0.50	4.3	0.93	80.5
	11/9/2017	198	74.0	105	0.91	2.6	<10.0	4.3	3.3	<0.50	<0.50	3.7	0.66	-104.8
3/21/2018	245	64.5	151	1.02	1.63	<13.0	4.04	3.17	<0.500	<0.500	8.3	0.36	175.8	
6/28/2018	747	140	353	1.74	5.26	<10.0	9.34	10.2	<0.500	0.555	8.2	0.45	159.1	
9/26/2018	322	57	60.2	<8.00	<8.00	<1.0	<8.00	<8.00	<8.00	<8.00	3.12	0.99	126.4	
12/4/2018	355	76.7	130	0.836	1.24	<1.0	6.59	<0.400	2.79	<0.400	6.09	2.28	-22.7	
3/20/2019	146	36.6	69.0	<0.400	1.55	<1.0	3.08	1.43	<0.400	<0.400	3.34	5.86	72.6	
6/7/2019	769	111	205	<8.00	<8.00	<1.0	<8.00	<8.00	<8.00	<8.00	8.2	0.73	29.2	
9/29/2019	176	26.8	37.1	<0.800	<0.800	<1.0	1.14	1.36	<0.800	<0.800	1.94	0.70	-16.2	
12/3/2019	306	57.8	40.6	<0.800	<0.800	<1.0	1.80	1.57	<0.800	<0.800	2.27	5.01	181.8	
3/11/2020	1,370	190	177	1.14	<0.800	<1.0	5.63	3.94	<0.800	1.77	2.28	0.94	99.5	
6/17/2020	427	61.2	72.0	<4.00	<4.00	<1.0	<4.00	<4.00	<4.00	<4.00	5.91	0.96	237.3	

Please refer to notes at end of table.

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

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Well Number	Sample Date	Volatile Organic Compounds										Attenuation Chemistry	Field Parameters	
		Tetrachloro ethene	Trichloro ethene	cis-1,2-Dichloro ethene	trans-1,2-Dichloro ethene	Vinyl chloride	Ethene	1,1-Dichloro ethene	1,1-Dichloro ethane	1,2-Dichloro ethane	1,1,1-Trichloro ethane	Total Organic Carbon	Dissolved Oxygen	Oxidation Reduction Potential
		Concentrations in µg/L										(mg/L)	(mg/L)	(mV)
EX (continued)	3/8/2016	274	71.1	1,160	3.6	13.3	<1.0	2.9	4.0	<1.2	5.0	22	0.36	113.3
	6/17/2016	592	90.8	1,040	<5.0	<5.0	<10.0	<5.0	<5.0	<5.0	<5.0	1.2	2.72	4.8
	9/28/2016	39.4	549	2,230	3.8	128	N/A	3.5	4.6	<1.7	2.5	N/A	1.61	138.1
	12/12/2016	4.3	0.96	8.1	<0.50	51.9	N/A	<0.50	<0.50	<0.50	<0.50	N/A	2.00	-24
	3/28/2017	6.1	1.9	5.2	<0.50	<0.50	23.5	<0.50	<0.50	<0.50	<0.50	347	1.50	89.9
	6/14/2017	9.5	3.0	11.7	0.56	1.3	11.2	<0.50	10.7	<1.0	<0.50	14.0	3.48	-12.4
	9/26/2017	0.82	0.63	6.9	<0.50	10.1	17.5	<0.50	8.8	<1.0	<0.50	25.5	1.18	-140.5
	3/21/2018	1.48	2.72	22.6	<0.500	10.8	28.3	<0.500	1.34	<0.500	<0.500	15.4	0.19	74.4
	6/28/2018	1.91	0.758	722	8.72	424	99.2	1.11	4.55	<0.500	<0.500	43.6	0.39	-62.6
	9/24/2018	3.07	2.42	3.38	0.751	7.56	2.9	<0.400	1.42	<0.400	<0.400	13.2	1.55	150.7
12/4/2018	6.35	3.60	8.18	<0.400	1.88	<1.0	<0.400	0.876	<0.400	<0.400	11.0	5.80	-10.0	
MW-12	6/7/2011	53	25	59	1.0	<0.50	<1.0	<0.50	1.8	<0.50	0.70	0.94	3.16	110.4
	9/19/2011	860	690	4,700	55	63	NA	45	240	2.5	65	8.3	0.84	906.3
	12/7/2011	520	380	2,900	33	40	6.15	28	130	1.3	34	59	1.00	109.0
	3/12/2012	770	540	3,800	45	46	<1.0	44	210	<15.0	48	65	1	45.3
	6/22/2012	270	200	1,700	39	22	<1.0	16	100	<5.0	13	56	0.66	117.1
	9/14/2012	1,100	730	5,400	73	84	<1.0	58	270	<15.0	76	100	0.43	140.7
	12/13/2012	38	23	62	0.97	<0.50	<1.0	<0.50	1.0	<0.50	0.53	4.9	1.07	128.6
	3/15/2013	760	540	4,300	56	54	<1.0	40	200	1.8	53	95	0.62	117.3
	6/13/2013	610	500	4,800	53	59	<1.0	39	240	<15.0	46	62	0.39	205.2
	9/20/2013	510	400	3,400	49	50	<1.0	37	170	1.6	37	110	0.59	-10.7
	12/16/2014	150	110	800	10	9.8	<1.0	7.6	36	<2.5	5.8	23	1.22	40.4
	3/24/2014	180	170	1,900	25	47	<1.0	18	110	0.77	8.6	41	1.94	29.1
	6/24/2014	42	34	310	2.3	<1.5	<1.0	1.9	14	<1.5	1.6	13	3.68	1.5
	9/30/2014	680	480	3,500	45	42	<1.0	39	190	<15.0	36	93	6.09	47.1
	12/11/2014	25	15	34	0.64	<0.50	<1.0	<0.50	0.73	<0.50	<0.50	1.9	0.65	-110.0
	3/20/2015	580	340	2,110	29	37	<6.2	25	102	<5.0	18	4	0.89	75.7
6/19/2015	514	356	2,570	25	31.1	<10.0	28.2	151	<10.0	23.6	4.8	0.71	10.2	
9/22/2015	343	239	2,250	23.4	22.5	<1.0	16.9	120	<8.3	15.7	4.4	1.06	65.3	
12/8/2015	44.9	22	40.1	0.72	<0.50	<10.0	<0.50	0.84	<0.50	0.52	16.5	0.99	28.1	

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Well Number	Sample Date	Volatile Organic Compounds										Attenuation Chemistry	Field Parameters	
		Tetrachloro ethene	Trichloro ethene	cis-1,2-Dichloro ethene	trans-1,2-Dichloro ethene	Vinyl chloride	Ethene	1,1-Dichloro ethene	1,1-Dichloro ethane	1,2-Dichloro ethane	1,1,1-Trichloro ethane	Total Organic Carbon	Dissolved Oxygen	Oxidation Reduction Potential
		Concentrations in µg/L										(mg/L)	(mg/L)	(mV)
MW-12 (continued)	3/8/2016	325	209	1,380	16.2	21.3	<10.0	15.4	79.9	<3.6	7.7	5.5	0.71	62.2
	6/16/2016	314	288	3,310	31.6	52.3	<10.0	29.9	174	<8.4	12.8	3.7	2.68	59.7
	9/27/2016	387	163	867	11.4	14.8	<10.0	11.5	44	<10.0	3.9	5240	0.98	252.5
	12/14/2016	62.3	42.2	744	2.3	20.5	<10.0	4.7	16.5	<10.0	<10.0	1930	0.46	-91.3
	3/30/2017	55.9	29.6	1,120	6.1	28.3	75.2	3.8	11.4	<2.5	<2.5	490	2.92	-17.9
	6/12/2017	42.4	18.1	893 J	7.6	48.4	120	4.7	14.0	<3.1	<3.1	530	0.91	-34.2
	9/28/2017	<1.7	<1.7	457	5.4	47.7	16.0	<1.7	19.5	<1.7	<1.7	243	1.19	-87.4
	11/9/2017	<0.50	<0.50	22.2	1.6	49.1	<10.0	<0.50	4.5	<0.50	<0.50	326 J	1.61	-119.0
	3/20/2018	<0.500	0.271 J	5.64	1.33	2.77	<13.0	<0.500	0.522	<0.500	<0.500	89.1	8.95	-136.3
	7/1/2018	0.304 J	0.996	4.02	1.57	1.45	<10.0	<0.500	0.913	<0.500	<0.500	66.0	1.77	114.3
	9/25/2018	<0.400	<0.400	1.46	0.520	1.23	<1.0	<0.400	0.730	<0.400	<0.400	79.5	1.27	-174.0
	12/4/2018	1.29	1.29	4.30	0.415	1.69	<1.0	<0.400	0.470	<0.400	<0.400	36.4	5.51	-30.5
	3/20/2019	2.11	1.33	6.70	0.675	1.64	<1.0	<0.400	0.655	<0.400	<0.400	34.4	2.34	-38.6
	6/5/2019	3.64	3.45	9.36	0.756	2.74	<1.0	<0.400	0.719	<0.400	<0.400	16.6	1.72	69.9
	9/26/2019	<0.400	0.459	5.31	0.565	6.82	1.1	<0.400	6.26	<0.400	<0.400	46.1	0.29	-227.1
	12/5/2019	2.37	1.41	2.61	<0.400	0.413	<1.0	<0.400	<0.400	<0.400	<0.400	23.8	9.18	185.3
3/11/2020	7.01	4.25	8.47	0.561	0.423	<1.0	<0.400	0.806	<0.400	<0.400	12.0	5.10	91.3	
6/18/2020	2.59	2.68	14.1	<0.400	1.04	<1.0	<0.400	1.30	<0.400	<0.400	10.5	0.90	173.1	
MW-24i	6/7/2011	6.6	1.4	2.0	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	1.2	6.40	59.0
	9/16/2011	27	24	270	1.7	19	NA	2.5	13	<0.50	5.6	7.0	0.61	646.9
	12/7/2011	19	14	100	<0.50	7.5	2.29	0.84	5.0	<0.50	2.9	290	3.50	-147.5
	3/12/2012	30	11	79	<0.50	4.5	2.03	<0.50	5.9	<0.50	2.3	33	2.11	-1.2
	6/22/2012	0.85	<0.50	14	<0.50	2.6	1.52	<0.50	1.8	<0.50	<0.50	44	3.50	-147.5
	9/14/2012	31	20	58	<0.50	<0.50	<1.0	0.87	4.4	<0.50	0.79	15	0.40	-54.0
	12/14/2012	2.1	0.65	51	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	16	2.11	6.3
	3/15/2013	23	15	48	<0.50	<0.50	<1.0	<0.50	2.8	<0.50	0.57	9.5	0.79	13.1
	6/14/2013	6.2	3.6	28	<0.50	<0.80	<1.0	<0.50	2.7	<0.50	<0.50	11	0.39	130.2
	9/20/2013	15	5.9	15	<0.50	<0.80	<1.0	<0.50	1.0	<0.50	<0.50	11	1.92	-31.2
	12/16/2013	6.7	3.4	8.4	<0.50	<0.50	<1.0	<0.50	1.3	<0.50	<0.50	7.9	3.08	16.9
	3/24/2014	10	5.5	16	<0.50	<0.80	<1.0	<0.50	1.3	<0.50	<0.50	9.4	3.16	-55.4
	6/23/2014	1.3	5.2	13	<0.50	2.1	29.1	<0.50	1.2	<0.50	<0.50	8.4	4.70	-49.7
	9/30/2014	20	10	21	<0.50	<0.50	<1.0	<0.50	1.8	<0.50	<0.50	12.0	2.01	129.7
12/15/2014	2.4	1.1	12	<0.50	<0.50	<1.0	<0.50	0.60	<0.50	<0.50	<1.0	6.27	-13.9	

Please refer to notes at end of table.

**Table 5**  
**Interim Action: Groundwater Analytical Results**  
**NuStar Vancouver Facility**  
**Vancouver, Washington**

Well Number	Sample Date	Volatile Organic Compounds										Attenuation Chemistry	Field Parameters	
		Tetrachloro ethene	Trichloro ethene	cis-1,2-Dichloro ethene	trans-1,2-Dichloro ethene	Vinyl chloride	Ethene	1,1-Dichloro ethene	1,1-Dichloro ethane	1,2-Dichloro ethane	1,1,1-Trichloro ethane	Total Organic Carbon	Dissolved Oxygen	Oxidation Reduction Potential
		Concentrations in µg/L										(mg/L)	(mg/L)	(mV)
<b>MW-24i</b> <b>(continued)</b>	3/20/2015	6.1	3.1	5.9	<0.50	<0.50	<6.2	<0.50	0.58	<0.50	<0.50	<1.0	10.28	38.6
	6/18/2015	<0.50	<0.50	3.4	<0.50	<0.50	<10.0	<0.50	<0.50	<0.50	<0.50	1.6	1.08	-158.7
	9/22/2015	2.2	0.8	4.7	<0.50	<0.50	<1.0	<0.50	1.9	<0.50	<0.50	2.3	1.85	99.4
	12/8/2015	189	36.4	18	<0.50	<0.50	<1.0	<0.50	0.74	<0.50	<0.50	3.5	1.36	99.2
	3/8/2016	4.1	1.6	3.5	<0.50	<0.50	<10.0	<0.50	<0.50	<0.50	<0.50	1.0	1.75	47.8
	6/17/2016	11.5	6.3	7.8	<0.50	<0.50	<10.0	<0.50	0.99	<0.50	<0.50	<1.0	3.12	14.0
	9/28/2016	5.8	3.1	5.4	<0.50	<0.50	<10.0	<0.50	0.53	<0.50	<0.50	5.3	2.58	123.9
	12/12/2016	1.1	<0.50	<0.50	<0.50	<0.50	<10.0	<0.50	<0.50	<0.50	<0.50	1.5	5.64	2.6
	3/30/2017	1.0	<0.50	0.70	<0.50	<0.50	<10.0	<0.50	<0.50	<0.50	<0.50	3.4	5.24	14.3
	6/15/2017	6.6	2.8	3.2	<0.50	<0.50	<10.0	<0.50	<0.50	<1.0	<0.50	1.2	3.72	-13.4
	9/26/2017	30.1	16.6	24.5	<0.50	<0.50	<10.0	<0.50	2.1	<1.0	<0.50	1.2	1.21	-10.7
	11/9/2017	12.7	5.9	9.6	<0.50	<0.50	<10.0	<0.50	1.1	<0.50	<0.50	1.3	3.11	-100.1
	3/21/2018	19.1	10.2	13.5	<0.500	<0.500	<13.0	<0.500	1.42	<0.500	<0.500	0.734 B J	0.95	129.6
	6/28/2018	10.3	5.93	13.6	1.09	<0.500	<10.0	<0.500	1.44	<0.500	<0.500	<1.0	2.69	129.9
	9/27/2018	24.8	14.3	25.0	<0.400	<0.400	N/A	<0.400	2.18	<0.400	<0.400	N/A	1.67	106.3
	12/4/2018	10.2	3.76	5.13	<0.400	<0.400	N/A	<0.400	0.800	<0.400	<0.400	N/A	5.24	-6.9
	3/25/2019	11.7	5.91	8.46	<0.400	<0.400	<1.0	<0.400	0.888	<0.400	<0.400	<1.00	4.52	18.1
	6/7/2019	7.39	3.55	4.99	<0.400	<0.400	<1.0	<0.400	0.601	<0.400	<0.400	<1.00	4.39	5.8
	9/27/2019	<0.400	<0.400	<0.400	<0.400	<0.400	1.6	<0.400	<0.400	<0.400	<0.400	<1.00	5.30	-252.2
	12/3/2019	8.78	3.72	3.82	<0.400	<0.400	<1.0	<0.400	0.775	<0.400	<0.400	<1.00	3.09	1.3
3/12/2020	17.0	8.42	15.4	<0.400	<0.400	<1.0	<0.400	1.30	<0.400	<0.400	<1.00	7.57	66.9	
6/18/2020	6.24	2.84	2.91	<0.400	<0.400	<1.0	<0.400	0.610	<0.400	<0.400	<1.00	7.63	-43.8	
<b>MGMS2-40</b>	6/7/2011	4,400	1,400	1,600	17	48	<1.0	30	65	<15.0	57	2.2	0.86	49.5
	9/12/2011	790	380	7,400	20	58	NA	28	44	<15.0	48	110	2.63	338.9
	12/7/2011	61	39	5,300	<15.0	460	14.5	<15.0	35	<15.0	<15.0	300	6.28	-137.9
	3/8/2012	9.9	5.4	470	2.8	260	368	2.3	38	<2.0	5.2	290	1.22	-73.6
	6/19/2012	7.2	2.5	20	1.3	63	566	<0.50	53	<0.50	<0.50	500	6.28	-137.9
	9/12/2012	89	80	310	3.2	440	264	2.8	39	<1.5	5.0	140	1.16	-40.1
	12/11/2012	10	3.4	33	1.3	4.0	110	<0.50	4.8	<0.50	<0.50	280	0.55	-82.3
	3/15/2013	5.6	2.2	300	2.0	270	121	1.9	28	<0.50	2.5	81	0.33	-24.3
	6/11/2013	0.94	<0.50	7.9	<0.50	4.8	55.6	<0.50	8.3	<0.50	<0.50	110	0.42	-116.7
	9/17/2013	16	17	290	1.4	330	143	4.8	28	<0.50	1.6	98	0.27	-209.9
	12/16/2013	2.4	1.4	8.4	<0.50	3.4	33.3	<0.50	9.7	<0.50	<0.50	110	1.19	-41.9
	3/24/2014	2.6	1.8	84	<0.50	270	930	2.9	45	<0.50	<0.50	120	1.06	-126.1
	6/26/2014	21	22	88	0.84	90	207	10	31	<0.50	<0.50	120	2.22	-23.7
	9/23/2014	170	110	590	2.4	800	12.1	30	30	<0.50	3.2	94	1.31	-119.0
	12/12/2014	3.4	2.3	10	<0.50	18	34	<0.50	35	<0.50	<0.50	7.9	1.41	-162.1

Please refer to notes at end of table.

**Table 5**  
**Interim Action: Groundwater Analytical Results**  
**NuStar Vancouver Facility**  
**Vancouver, Washington**

Well Number	Sample Date	Volatile Organic Compounds										Attenuation Chemistry	Field Parameters	
		Tetrachloro ethene	Trichloro ethene	cis-1,2-Dichloro ethene	trans-1,2-Dichloro ethene	Vinyl chloride	Ethene	1,1-Dichloro ethene	1,1-Dichloro ethane	1,2-Dichloro ethane	1,1,1-Trichloro ethane	Total Organic Carbon	Dissolved Oxygen	Oxidation Reduction Potential
		Concentrations in µg/L										(mg/L)	(mg/L)	(mV)
<b>MGMS2-40 (continued)</b>	3/20/2015	31	22	47	<0.50	17	8.1	3.9	4.3	<0.50	<0.50	8	20.02	-83.7
	6/19/2015	18.4	12.8	53.8	<0.50	48.3	33.7	1.3	13.8	<0.50	<0.50	11	13.5	-117.5
	9/25/2015	67.4	45.9	105	0.61	57.8	<10.0	4.2	12.3	<0.50	0.92	10.9	9.67	-145.1
	12/8/2015	4.0	2.8	7.2	<0.50	3.3	22.8	<0.50	13.5	<0.50	<0.50	7.9	6.14	-96.9
	3/8/2016	6.5	6.2	36.0	<0.50	36	63.7	1.6	20.6	<0.50	<0.50	7.4	5.52	-161.7
	6/17/2016	223	146	744	2.8	227	31	26.4	24.9	<0.50	3.1	3.8	1.60	-72.2
	9/29/2016	33.3	24.8	115	<0.50	142	N/A	<0.50	12.1	<0.50	<0.50	N/A	5.16	194.5
	12/16/2016	2.6	1.9	5.2	<0.50	2.0	N/A	<0.50	10.3	<0.50	<0.50	N/A	0.80	-28.1
	3/31/2017	4.3	14.4	236	0.60	235	N/A	14.3	57.6	<0.50	<0.50	N/A	0.68	-92.2
	6/15/2017	5.1	4.9	46.2	<0.50	98.9	128	3.5	38.6	<0.50	<0.50	7.0	1.29	-109.6
	9/29/2017	41.5	31.3	195	0.74	428	47.4	6.8	21.7	<1.0	0.67	6.4	1.03	-43.7
	11/9/2017	13.2	9.2	61.6	0.52	170	95.7	0.86	21.3	<0.50	<0.50	6.2	1.24	-113.3
	3/22/2018	46.0	27.3	109	0.571	122	32.7	4.22	25.9	<0.500	0.259 J	9.58	6.89	-112.9
	7/1/2018	62.1	48.9	151	0.971	38.2	<10.0	5.93	12.7	<0.500	1.04	5.2	3.15	-50.8
	9/28/2018	66.9	43.3	140	<0.800	106	3.6	1.44	8.74	<0.800	<0.800	5.91	1.50	97.3
	12/10/2018	18.7	12.0	24.9	<0.400	123	78	0.563	20.9	<0.400	<0.400	5.08	2.05	-111.4
	3/25/2019	62.0	35.9	136	0.752	155	26	2.58	26.6	<0.400	<0.400	4.61	0.97	151.7
	6/4/2019	14.6	10.4	37.8	<0.400	145	19	0.960	28.2	<0.400	<0.400	4.83	0.64	104.5
	9/27/2019	17.0	13.1	73.8	<0.400	101	1.4	0.729	11.2	<0.400	<0.400	4.76	7.37	-133.9
	12/4/2019	32.3	17.9	40.5	<0.400	65.4	4.2	0.778	20.6	<0.400	<0.400	5.01	4.39	-82.2
3/12/2020	86.3	43.3	105	0.641	134	2.1	2.73	24.1	<0.400	0.453	5.13	8.14	-78.9	
6/16/2020	14.8	9.09	85.0	<0.400	138	6.1	1.25	27.3	<0.400	<0.400	4.13	0.93	177.2	
<b>MW-13</b>	9/28/2016	5,090	951	148	<2.5	<2.5	<10.0	<2.5	<2.5	<2.5	<2.5	33,600	2.71	158.7
	12/16/2016	1,020	394	509	<5.0	<5.0	<10.0	<5.0	<5.0	<5.0	<5.0	2220	0.66	-111.4
	3/30/2017	176	57.6	101	<5.0	<5.0	<10.0	<5.0	<5.0	<5.0	<5.0	341	4.36	-61.8
	6/15/2017	97.7	56.3	272	1.6	4.1	NA	1.2	<1.0	<1.0	<1.0	N/A	1.41	-105.7
	9/27/2017	3.3	1.3	3220	7.3	25.0	<10.0	5.0	<1.0	<1.0	<1.0	55.8	2.16	-103.9
	11/7/2017	<4.2	<4.2	1,360	5.4	25.0	11.6	<4.2	<4.2	<4.2	<4.2	85.5	2.19	-89.2
	3/20/2018	0.396 J	2.19	1,730	5.20	211	191	2.55	0.879	<0.500	<0.500	73.7	5.79	-114.8
	7/1/2018	<0.500	0.781	1680	26.9	2030	500	5.98	18.3	0.148 J	<0.500	52.9	1.13	-31.0
	9/25/2018	0.410	0.800	9.78	1.26	113	61	<0.400	1.91	<0.400	<0.400	20.8	1.22	-146.8
	12/5/2018	0.567	0.413	6.17	0.682	55.2	7.1	<0.400	<0.400	<0.400	<0.400	51.7	7.71	-130.6
	3/19/2019	<0.400	0.433	2.69	<0.400	2.02	<1.0	<0.400	<0.400	<0.400	<0.400	48.5	2.58	-79.2
	6/6/2019	<0.400	0.673	4.62	<0.400	2.89	<1.0	<0.400	<0.400	<0.400	<0.400	21.2	0.02	48.4
	9/26/2019	<0.400	<0.400	1.94	0.439	2.01	<1.0	<0.400	1.07	<0.400	<0.400	34.3	0.50	-261.4
	12/3/2019	<0.400	<0.400	1.06	0.488	1.42	<1.0	<0.400	1.50	<0.400	<0.400	29.1	2.41	-149.4
	3/10/2020	<0.400	7.59	72.5	2.04	134	18.0	1.97	9.19	<0.400	<0.400	20.1	5.76	-122.2
6/18/2020	<0.400	1.12	1.15	<0.400	5.28	<1.0	<0.400	0.610	<0.400	<0.400	21.9	0.90	182.1	

Please refer to notes at end of table.

**Table 5**  
**Interim Action: Groundwater Analytical Results**  
**NuStar Vancouver Facility**  
**Vancouver, Washington**

Well Number	Sample Date	Volatile Organic Compounds										Attenuation Chemistry	Field Parameters	
		Tetrachloro ethene	Trichloro ethene	cis-1,2-Dichloro ethene	trans-1,2-Dichloro ethene	Vinyl chloride	Ethene	1,1-Dichloro ethene	1,1-Dichloro ethane	1,2-Dichloro ethane	1,1,1-Trichloro ethane	Total Organic Carbon	Dissolved Oxygen	Oxidation Reduction Potential
		Concentrations in µg/L										(mg/L)	(mg/L)	(mV)
MW-14	9/27/2016	100	218	61.8	0.94	<0.50	<10.0	2.1	7.2	<0.50	1.7	8.8	8.1	221.2
	12/13/2016	0.56	0.97	1.3	<0.50	<0.50	<10.0	<0.50	<0.50	<0.50	<0.50	5.1	3.1	55.0
	3/27/2017	14.7	33.4	69.2	<0.50	0.62	<10.0	0.57	<0.50	<0.50	<0.50	5.1	3.1	55.0
	6/13/2017	58.3	204	432	2.7	2.5	NA	5.3	10	<1.0	2.1	N/A	0.94	61.3
	9/26/2017	62.4	265	279	2.8	<0.84	<10.0	2.6	6.2	<0.84	1.1	3.8	1.89	80.6
	11/8/2017	39.3	160	306	2.2	0.91	<10.0	2.1	4.5	<0.84	<0.84	8.5	1.85	106.9
	3/20/2018	36.0	150	500	2.56	1.35	<13.0	3.64	5.42	<0.500	0.579	8.76	0.58	21.7
	6/28/2018	34.9	247	255	2.52	0.687	<10.0	2.54	10.5	<0.500	1.57	6.6	6.59	203.6
	9/26/2018	84.3	484	361	4.50	<4.00	<1.0	4.40	12.1	<4.00	<4.00	4.56	1.55	100.1
	12/5/2018	83.4	260	333	<4.00	<4.00	<1.0	<4.00	5.43	<4.00	<4.00	13.4	4.40	55.3
	3/19/2019	31.4	178	223	2.06	<2.00	<1.0	<2.00	5.4	<2.00	<2.00	4.89	8.17	88.6
	6/6/2019	19.1	76.4	151	0.937	<0.400	<1.0	1.09	1.74	<0.400	<0.400	6.64	2.96	80.3
	9/25/2019	91.8	327	264	3.60	0.482	<1.0	4.58	12.5	<0.400	1.47	5.06	0.77	67.5
	12/4/2019	107	351	242	2.88	<0.400	<1.0	3.17	7.81	<0.400	0.704	50.0	4.41	110.9
	3/11/2020	85.9	294	186	2.45	<2.00	NA	2.72	6.80	<2.00	<2.00	N/A	3.30	108.2
6/17/2020	62.6	197	82.6	<2.00	<2.00	<1.0	<2.00	3.50	<2.00	<2.00	4.22	1.16	205.3	
MW-19	9/26/2016	1,520	592	235	<5.0	10.1	<10.0	11.0	10.4	<5.0	14.5	1.9	3.27	174.4
	12/12/2016	1,730	975	1,030	11.6	31.9	<10.0	14.2	78.7	<5.0	15.5	8.1	9.22	175.2
	3/28/2017	755	896	1,990	21.5	63.2	<10.0	26.7	214	<5.0	19.9	4.8	2.5	35.8
	6/14/2017	566	506	486	6.2	17.2	NA	15.8	41.8	<2.5	8.2	N/A	1.54	-22.7
	9/26/2017	3,710	1,480	1,160	5.4	111	44.3	28.9	11.1	<2.5	40.4	8.1	1.92	185.2
	11/9/2017	1,530	1,020	1,660	24.0	115	11.8	24.9	104	0.75 J	20.2	6.9	2.26	-75.2
	3/21/2018	1,250	1,340	2,430	11.2	413	32.3	31.4	59.0	0.225 J	17.0	29.9	1.43	135.6
	6/28/2018	177	191	4190	18.4	799	271	36.3	81.6	<0.500	11.7	58.2	2.18	-30.8
	9/25/2018	3,830	2,270	1,960	<0.400	116	9.8	<0.400	<0.400	<0.400	<0.400	16.8	1.30	57.4
	12/5/2018	3,090	1,490	1,750	18.4	79.0	2.1	39.3	91.8	0.453	21.8	10.5	5.11	-29.9
	3/20/2019	2,970	2,090	1,910	13.9	75.8	2.1	39.5	49.7	<8.00	23.7	19.1	4.26	108.6
	6/7/2019	894	793	1,910	20.4	80.8	2.9	52.6	108	<10.0	<10.0	9.34	0.72	61
	9/26/2019	4,340	1,620	1,160	12.1	39.1	3.1	40.2	41.9	<4.00	30.6	5.38	1.73	-172.4
	12/3/2019	1,670	1,200	1,250	<20.0	25.6	<1.0	28.6	57.4	<20.0	<20.0	6.88	6.52	205.1
	3/11/2020	4,730	2,010	1,450	14.8	154	7.5	60.4	35.4	<10.0	29.1	13.6	3.01	87.0
6/18/2020	1,080	697	956	5.60	96.3	5.0	27.5	32.5	<20.0	9.40	40.1	3.12	162.1	

Please refer to notes at end of table.

**Table 5**  
**Interim Action: Groundwater Analytical Results**  
**NuStar Vancouver Facility**  
**Vancouver, Washington**

Well Number	Sample Date	Volatile Organic Compounds										Attenuation Chemistry	Field Parameters	
		Tetrachloro ethene	Trichloro ethene	cis-1,2-Dichloro ethene	trans-1,2-Dichloro ethene	Vinyl chloride	Ethene	1,1-Dichloro ethene	1,1-Dichloro ethane	1,2-Dichloro ethane	1,1,1-Trichloro ethane	Total Organic Carbon	Dissolved Oxygen	Oxidation Reduction Potential
		Concentrations in µg/L										(mg/L)	(mg/L)	(mV)
MW-26	9/26/2016	160	288	61.1	1.6	<0.50	N/A	1.1	3.9	<0.50	2.4	N/A	1.64	236.7
	12/13/2016	167	410	85.9	2.0	<0.50	<10.0	2.4	8.9	<0.50	3.3	2.4	0.88	102.4
	3/29/2017	214	452	170	<0.50	<0.50	<10.0	<0.50	<0.50	<0.50	<0.50	1.3	1.34	165.2
	6/13/2017	160	311 E, J	113	2.0	0.65	NA	1.9	6.7	<1.0	2.1	N/A	3.80	74.6
	9/26/2017	68.4	192	192	2.1	0.98	<10.0	1.0	5.1	<1.0	0.83	7.1	5.56	77.3
	11/8/2017	88.1	170	204	2.3	1.8	<10.0	1.5	4.8	<0.50	1.0	5.9	1.75	99.8
	3/20/2018	108	190	157	1.85	1.75	<13.0	1.35	4.85	<0.500	1.20	5.84	7.28	156.4
	6/29/2018	138	221	114	1.88	1.02	<10.0	1.46	5.05	<0.500	1.94	3.9	0.88	224.6
	9/24/2018	117	233	141	2.14	1.18	<1.0	1.24	4.24	<0.400	1.19	5.13	4.17	152.8
	12/5/2018	139	210	147	1.89	0.85	<1.0	1.09	3.02	<0.400	0.846	<1.00	4.16	36.5
	3/22/2019	139	383	142	3.18	<0.800	<1.0	2.18	7.74	<0.800	2.09	3.48	1.12	100.2
	6/3/2019	148	336	92.2	2.35	<2.00	<1.0	<2.00	5.75	<2.00	2.10	2.76	5.68	69.1
	9/26/2019	133	272	104	2.6	<2.00	<1.0	<2.00	5.14	<2.00	<2.00	4.38	0.40	-6.1
	12/3/2019	137	216	95.0	<2.00	<2.00	<1.0	<2.00	2.63	<2.00	<2.00	5.56	3.12	49.2
	3/11/2020	79.1	205	59.7	<2.00	<2.00	<1.0	<2.00	3.65	<2.00	<2.00	3.72	10.81	72.3
6/17/2020	143	299	64.2	1.90	<0.800	--	1.38	5.16	<0.800	2.20	--	2.19	-17.1	
MGMS1-43	9/26/2016	230	366	1,980	24.2	52	<10.0	13.5	81.9	<8.3	<8.3	9.0	5.09	184.2
	12/16/2016	64.1	171	1,810	20.1	239	<10.0	9.5	92.6	<8.4	<8.4	6.2	6.06	-17.5
	3/31/2017	45.8	119	1,430	15.2	348	14.8	12.5	90.8	<8.4	<8.4	7.0	3.02	-40.7
	6/12/2017	24.4	116	2,620	18.7	681	NA	16.7	173	<8.3	<8.3	N/A	1.17	-109.8
	9/29/2017	70.7	126	901	12.9	117	<10.0	6.9	60.1	<2.5	<2.5	6.1	8.73	90.7
	11/7/2017	108	211	2,350 J	26.6	181	<10.0	13.7	153	<2.5	<2.5	5.6	2.04	74.5
	3/22/2018	80.1	278	2,450	34.9	236	<13.0	18.0	192	<0.500	0.780	13.8	10.71	-11.7
	7/1/2018	107	246	1,880	32.8	118	<10.0	13.8	116	<0.500	0.588	7.5	3.48	-1.6
	9/28/2018	252	528	3,150	47.4	134	<1.0	27.8	141	<8.00	<8.00	5.52	1.98	97.4
	12/4/2018	146	388	2,750	48.1	129	<1.0	22.5	148	<0.400	1.08	6.06	8.31	-2.0
	3/26/2019	145	372	3,210	42.2	105	<1.0	22.3	160	<8.00	<8.00	5.58	0.96	-10.1
	6/7/2019	115	315	3,090	40.8	145	<1.0	26.5	169	<8.00	<8.00	6.73	1.24	-12.5
	9/27/2019	212	434	3,240	53.9	113	<1.0	30.5	156	<8.00	<8.00	6.32	0.42	-295.7
	12/4/2019	162	398	2,860	40.9	11.8	<1.0	17.5	124	<8.00	<8.00	5.60	6.76	-32.5
	3/11/2020	228	495	3,230	60.4	157	1.4	29.7	157	<10.0	<10.0	4.82	8.24	-40.1
6/16/2020	116	264	2,520	31.5	152	3.4	21.8	114	<10.0	<10.0	6.56	1.3	166.4	

Please refer to notes at end of table.

**Table 5**  
**Interim Action: Groundwater Analytical Results**  
**NuStar Vancouver Facility**  
**Vancouver, Washington**

Well Number	Sample Date	Volatile Organic Compounds										Attenuation Chemistry	Field Parameters	
		Tetrachloro ethene	Trichloro ethene	cis-1,2-Dichloro ethene	trans-1,2-Dichloro ethene	Vinyl chloride	Ethene	1,1-Dichloro ethene	1,1-Dichloro ethane	1,2-Dichloro ethane	1,1,1-Trichloro ethane	Total Organic Carbon	Dissolved Oxygen	Oxidation Reduction Potential
		Concentrations in µg/L										(mg/L)	(mg/L)	(mV)
MGMS3-40	9/26/2016	1.7	1.4	226	2.0	52.1	<10.0	0.60	4.5	<0.50	<0.50	36.2	2.7	165.3
	12/16/2016	0.63	<0.50	1.3	0.97	0.88	55.2	<0.50	1.0	<0.50	<0.50	86.9	5.95	-9.20
	3/28/2017	1.4	0.60	1,050	6.0	323	68.1	3.3	22.5	0.68	<0.50	5.0	1.57	-125.8
	6/12/2017	0.97	<0.50	1.7	<0.50	<0.50	NA	<0.50	3.3	<0.50	<0.50	N/A	5.22	-94.1
	9/26/2017	0.79	<0.50	0.69	<0.50	<0.50	22.8	<0.50	1.1	<1.0	<0.50	3.8	10.02	-82.8
	11/10/2017	0.85	<0.50	8.0	<0.50	15.8	54.8	<0.50	4.3	<0.50	<0.50	6.5	0.93	-111.6
	3/22/2018	1.45	0.528	9.81	0.179 J	39.8	242	<0.500	8.57	<0.500	<0.500	8.74	6.95	-130.8
	7/1/2018	0.498 J	0.169 J	7.58	<0.500	8.98	27.4	<0.500	1.39	<0.500	<0.500	4.6	3.18	-28.6
	9/28/2018	0.970	<0.400	143	<0.400	129	33	0.560	9.08	<0.400	<0.400	4.38	6.62	-61.7
	12/10/2018	0.603	<0.400	1.77	<0.400	5.44	4.9	<0.400	1.54	<0.400	<0.400	3.42	1.05	-122.9
	3/26/2019	0.680	<0.400	117	<0.400	151	38	0.709	8.36	<0.400	<0.400	4.00	0.74	92.6
	6/3/2019	0.530	<0.400	74.7	<0.400	157	45	0.440	7.22	<0.400	<0.400	3.66	0.89	-24.3
	9/27/2019	0.578	<0.400	80.5	<0.400	106	8.4	0.413	5.09	<0.400	<0.400	2.86	0.35	-182.8
	12/4/2019	1.35	<0.400	2.66	<0.400	5.79	<1.0	<0.400	1.67	<0.400	<0.400	2.69	2.92	-91.1
	3/12/2020	0.529	0.439	418	0.638	330	40	2.43	12.8	<0.400	<0.400	4.00	3.98	-136.4
6/16/2020	0.660	<0.400	138	<0.400	134	12.0	<0.400	3.71	<0.400	<0.400	3.08	0.48	186.5	

**Notes:**

1. µg/L (ppb) = Micrograms per liter (parts per billion).
2. mg/L = milligrams per liter
3. mV = millivolts
4. N/A = Not analyzed.
5. -- = Not sampled
6. B = The analyte was found in the associated method blank.
7. J = Value is estimated.
8. Ethene is analyzed by EPA Method RSK-175M. All other VOCs were analyzed by EPA Method 8260.
9. **Bold value** represents detected concentration of listed analyte.
10. < = Not detected at or above the specified laboratory method reporting limit (MRL).
11. E = Analyte concentration exceeded the calibration range. Reported result is estimated.

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

**Table 7**  
**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 <sup>3</sup>								
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 7**  
**North SVE System – Analytical Results**  
**NuStar Vancouver Facility**  
**Vancouver, Washington**

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

**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. **Bold** value represents detected concentration of listed analyte
5. < = Not detected at or above the specified laboratory method reporting limit (MRL)

**Table 8**  
**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	--

Please refer to notes at end of table.

**Table 8**  
**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	
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
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	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. No sample collected.
4/24/2017	--	--	--	--	--	--	--	--	Could not get valve to operate properly. System pulling in ambient air.
7/31/2017	0.0	-18	31.8	31.0	31.2	18.0	27.2	8.0	Used Apex PID #3
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	Used Apex PID #3
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.

Please refer to notes at end of table.

**Table 8**  
**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	
1/22/2018	0.0	-20	13.6	30.0	10.2	18.0	7.2	7.0	Used Apex PID #3 PID was not within calibration and readings were not recorded. Used Apex PID #3 Used Apex PID #3
2/28/2018	--	-20	--	30.0	--	18.0	--	7.0	
3/29/2018	--	-20	19.0	31.0	28.0	19.0	19.0	8.0	
4/24/2018	2.2	-20	26.8	31.0	29.2	19.0	18.8	8.0	
5/16/2018	13.8	-20	26.6	30.0	40.2	18.0	26.8	8.0	
7/23/2018	30.0	-18	34.5	29.0	37.5	17.0	37.3	7.0	
11/7/2018	3.0	-18	22.9	30.0	20.7	17.0	19.3	6.0	
1/4/2019	0.5	-24	27.3	28.0	23.4	16.0	22.4	6.0	
3/8/2019	0.7	-24	19.2	28.0	12.1	16.0	12.4	6.0	
5/7/2019	4.0	-20	33.0	29.0	25.4	17.0	25.8	7.0	
7/8/2019	0.6	-21	33.6	29.0	26.1	17.0	27.1	7.0	
9/9/2019	1.0	-21	29.7	29.0	27.1	17.0	22.8	6.0	
11/4/2019	0.9	-21	31.6	29.0	18.1	12.0	16.2	6.0	
1/10/2020	0.1	-21	6.3	29.0	4.2	16.0	3.5	6.0	

**Notes:**

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

**Table 9**  
**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/m³										
Pre Carbon	INF 1006	10/6/2011	<330	<320	<b>470</b>	<320	<280	<b>40,000</b>	<300	<b>520</b>	<b>5,100</b>	<210	<350
Post Carbon	EFF 1006	10/6/2011	<16	<16	<b>390</b>	<16	<14	<27	<15	<b>140</b>	<b>50</b>	<10	<17
Pre Carbon	Post Blower 110211	11/2/2011	<290	<280	<b>430</b>	<280	<250	<b>26,000</b>	<270	<390	<b>2,100</b>	<180	<310
Pre Carbon	SOUTHSVE_PRECARBON_121411	12/14/2011	<580	<570	<b>620</b>	<570	<500	<b>54,000</b>	<540	<780	<b>2,800</b>	<360	<620
Post Carbon	SOUTHSVE_POSTCARBON_121411	12/14/2011	<16	<b>35</b>	<b>23</b>	<16	<b>17</b>	<b>1,600</b>	<15	<b>78</b>	<b>1,300</b>	<b>12</b>	<17
Post 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	<b>460</b>	<300	<260	<b>28,000</b>	<280	<410	<b>1,200</b>	<190	<330
Post Carbon	South_PostCarbon_021712	2/17/2102	<16	<16	<16	<16	<14	<27	<15	<22	<21	<17	<10
Pre Carbon	South Influent - 032212	3/22/2012	<190	<190	<b>310</b>	<95	<84	<b>30,000</b>	<91	<b>99</b>	<b>960</b>	<31	<100
Post Carbon	South Effluent - 032212	3/22/2012	<1.2	<3.2	<1.6	<1.6	<b>4</b>	<2.7	<1.5	<1.6	<2.1	<b>6.4</b>	<3.5
Pre Carbon	South_SVE_PRECARBON	4/26/2012	<210	<560	<280	<280	<240	<b>32,000 S</b>	<270	<290	<b>640 S</b>	<90	<610
Post Carbon	South-SVE_POSTCARBON	4/26/2012	<1.2	<3.2	<1.6	<1.6	<b>4</b>	<2.7	<1.5	<1.6	<2.1	<b>2.4</b>	<3.5
Pre Carbon	SOUTH_SVE_PRECARBON	5/23/2012	<100	<260	<b>200</b>	<130	<120	<b>19,000</b>	<130	<140	<b>780</b>	<43	<290
Post Carbon	South_SVE_PRECARBON	5/23/2012	<1.2	<3.2	<1.6	<1.6	<b>3</b>	<2.7	<1.5	<1.6	<2.1	<b>3.7</b>	<3.5
Pre Carbon	South_PreCarbon_062012	6/20/2012	<240	<630	<b>360</b>	<320	<280	<b>35,000</b>	<300	<330	<b>1,400</b>	<100	<1040
Post Carbon	South_PostCarbon_062012	6/20/2012	<0.30	<0.80	<0.40	<0.40	<b>1.0</b>	<0.40	<0.40	<0.30	<0.40	<b>1.2</b>	<1.2
Pre Carbon	South_PreCarbon_072412	7/24/2012	<150	<390	<b>240</b>	<200	<170	<b>33,000</b>	<190	<200	<b>1,100</b>	<63	<640
Post Carbon	South_PostCarbon_072412	7/24/2012	<1.2	<b>11</b>	<1.6	<1.6	<b>3.0</b>	<2.7	<b>2.2</b>	<1.6	<2.1	<b>3.9</b>	<5.2
Pre Carbon	South_PreCarbon_082212	8/22/2012	<250	<660	<b>760</b>	<330	<290	<b>47,000</b>	<310	<340	<b>2,000</b>	<110	<b>1,080</b>
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	<b>500</b>	<400	<310	<b>50,000</b>	<330	<360	<b>1,900</b>	<230	<770
Post Carbon	South_PostCarbon_092512	9/25/2012	<b>13</b>	<b>18</b>	<b>1,200</b>	<b>11</b>	<b>5.7</b>	<2.7	<1.5	<1.6	<2.1	<b>6.2</b>	<3.5
Pre Carbon	South_PreCarbon_102912	10/29/2012	<320	<850	<b>440</b>	<480	<370	<b>60,000</b>	<400	<440	<b>2,200</b>	<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	<b>10,000</b>	<120	<130	<b>530</b>	<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	<b>110</b>	<93	<82	<b>14,000</b>	<89	<96	<b>600</b>	<60	<300
Post Carbon	South_PostCarbon_122112	12/21/2012	<1.2	<3.2	<1.6	<1.6	<b>1.6</b>	<2.7	<1.5	<1.6	<2.1	<b>3.0</b>	<5.2
Pre Carbon	South_PreCarbon_012413	1/24/2013	<9.2	<24	<b>14</b>	<12	<11	<b>1,700</b>	<11	<12	<b>100</b>	<7.8	<39
Post Carbon	South_PostCarbon_012413	1/24/2013	<1.2	<3.2	<1.6	<1.6	<b>3.3</b>	<2.7	<1.5	<1.6	<2.1	<b>3.7</b>	<5.2
Pre Carbon	South_PreCarbon_022813	2/28/2013	<5.9	<15	<b>8.5</b>	<7.7	<6.7	<b>940</b>	<7.3	<7.9	<b>84</b>	<5.0	<25.4
Post Carbon	South_PostCarbon_022813	2/28/2013	<1.2	<3.2	<1.6	<1.6	<b>8.1</b>	<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	<b>3,700</b>	<36	<39	<b>160</b>	<24	<123
Post Carbon	South_PostCarbon_032513	3/25/2013	<1.2	<3.2	<1.6	<1.6	<b>2.0</b>	<2.7	<1.5	<1.6	<2.1	<b>2.0</b>	<5.2
Pre Carbon	SVE South Pre Carbon	4/29/2013	<6.3	<16	<b>10</b>	<8.2	<7.2	<b>950</b>	<7.8	<8.4	<b>48</b>	<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	<b>0.93</b>	<1.2
Pre Carbon	SVE South Pre Carbon	5/24/2013	<1,100	<1,100	<b>2,400</b>	<1,100	<2,400	<b>240,000</b>	<1,100	<1,500	<b>8,400</b>	<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 9**  
**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 <sup>3</sup>										
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 9**  
**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 <sup>3</sup>										
Pre Carbon	SVE South Pre Carbon	2/26/2015	<150	<390	<b>260</b>	<200	<170	<b>18,000</b>	<b>280</b>	<200	<b>660</b>	<130	<650
Post Carbon	SVE South Post Carbon	2/26/2015	<1.2	<3.2	<1.6	<1.6	<b>3.2</b>	<2.7	<1.5	<1.6	<2.1	<b>2.5</b>	<5.2
Pre Carbon	SVE South Pre Carbon	3/30/2015	<61	<160	<b>200</b>	<79	<b>160</b>	<b>17,000</b>	<b>180</b>	<82	<b>570</b>	<51	<257
Post Carbon	SVE South Post Carbon	3/30/2015	<1.2	<3.2	<1.6	<1.6	<b>2.8</b>	<2.7	<b>2.7</b>	<1.6	<b>51</b>	<b>2.5</b>	<5.2
Pre Carbon	SVE S Pre Carbon	4/24/2015	<37	<97	<b>170</b>	<49	<43	<b>5,400</b>	<46	<50	<b>410</b>	<31	<163
Post Carbon	SVE S Post Carbon	4/24/2015	<6.2	<16	<8.1	<8.1	<7.1	<b>660</b>	<7.7	<8.3	<b>19</b>	<5.2	<b>18</b>
Pre Carbon	SVE South Pre Carbon	5/28/2015	<60	<160	<b>140</b>	<79	<b>92</b>	<b>8,000</b>	<b>240</b>	<81	<b>460</b>	<51	<256
Post Carbon	SVE South Post Carbon	5/28/2015	<4.9	<13	<6.3	<6.3	<5.6	<b>650</b>	<6.0	<6.5	<b>16</b>	<4.1	<b>22.1</b>
Pre Carbon	SVE South Pre Carbon	7/29/2015	<65	<170	<b>190</b>	<85	<75	<b>12,000</b>	<81	<88	<b>790</b>	<55	<183
Post Carbon	SVE South Post Carbon	7/29/2015	<b>10</b>	<27	<b>960</b>	<b>16</b>	<12	<b>440</b>	<13	<14	<18	<8.7	<45
Pre Carbon	SVE South Pre Carbon	8/31/2015	<64	<170	<b>160</b>	<83	<73	<b>12,000</b>	<79	<86	<b>780</b>	<54	<171
Post Carbon	SVE South Post Carbon	8/31/2015	<21	<55	<b>530</b>	<27	<24	<b>3,400</b>	<26	<28	<b>94</b>	<18	<90
Pre Carbon	SVE South Pre Carbon	9/28/2015	<83	<220	<b>170</b>	<110	<94	<b>9,900</b>	<100	<110	<b>660</b>	<70	<360
Post Carbon	SVE South Post Carbon	9/28/2015	<b>3.4</b>	<6.0	<b>340</b>	<b>3.6</b>	<2.6	<b>300</b>	<2.8	<b>39</b>	<b>59</b>	<1.9	<9.8
Pre Carbon	SVE South Pre Carbon	10/29/2015	<130	<350	<b>230</b>	<170	<150	<b>18,000</b>	<170	<180	<b>790</b>	<110	<570
Post Carbon	SVE South Post Carbon	10/29/2015	<b>4.2</b>	<b>5.2</b>	<b>340</b>	<b>4.5</b>	<b>2.6</b>	<b>26</b>	<1.5	<b>67</b>	<b>310</b>	<b>1.7</b>	<5.2
Pre Carbon	SVE_South_Precarbon_113015	11/30/2015	<29	<77	<b>54</b>	<38	<38	<b>3,000</b>	<38	<29	<b>300</b>	<38	<77
Post Carbon	SVE_South_Postcarbon_113015	11/30/2015	<0.80	<0.80	<b>27</b>	<b>0.60</b>	<0.40	<0.40	<0.40	<b>6</b>	<b>11</b>	<0.40	<0.80
Pre Carbon	SVE_SOUTH_PRE CARBON_12/28/15	12/28/2015	<120	<320	<b>180</b>	<160	<140	<b>35,000</b>	<150	<170	<b>1,200</b>	<100	<530
Post Carbon	SVE_SOUTH_POST CARBON_12/28/15	12/28/2015	<1.2	<3.2	<b>28</b>	<1.6	<1.4	<2.7	<b>1.5</b>	<b>2</b>	<b>6.5</b>	<1.0	<4.2
Pre Carbon	SVE_SOUTH_PRE CARBON	2/1/2016	<8.6	<22	<b>20</b>	<11	<9.8	<b>2,900</b>	<11	<b>14</b>	<b>120</b>	<7.2	<37
Post Carbon	SVE_SOUTH_POST CARBON	2/1/2016	<b>2.2</b>	<3.2	<b>160</b>	<b>2.90</b>	<1.4	<2.7	<1.5	<b>92</b>	<b>260</b>	<1.0	<5.2
Pre Carbon	SVE_SOUTH_PRE CARBON	3/29/2016	<230	<610	<b>710</b>	<300	<270	<b>71,000</b>	<290	<b>520</b>	<b>2,800</b>	<200	<670
Post Carbon	SVE_SOUTH_POST CARBON	3/29/2016	<69	<180	<b>490</b>	<23	<79	<b>9,300</b>	<86	<b>1500</b>	<b>9,300</b>	<58	<200
Pre Carbon	SVE_SOUTH_PRE CARBON	4/27/2016	<6.4	<17	<b>12</b>	<8.4	<7.4	<b>910</b>	<8.0	<8.7	<b>23</b>	<5.4	<18
Post Carbon	SVE_SOUTH_POST CARBON	4/27/2016	<63	<160	<b>180</b>	<82	<72	<b>11,000</b>	<78	<b>110</b>	<b>2,200</b>	<53	<180
Pre Carbon	SVE_SOUTH_PRE CARBON	5/25/2016	<1.2	<3.2	<b>4</b>	<1.6	<1.4	<b>550</b>	<b>2.9</b>	<b>3</b>	<b>22</b>	<1.0	<b>3.9</b>
Post Carbon	SVE_SOUTH_POST CARBON	5/25/2016	<16	<41	<b>2300</b>	<b>30.00</b>	<18	<b>14,000</b>	<19	<b>130</b>	<b>3,300</b>	<13	<45
Pre Carbon	SVE_SOUTH_PRE CARBON	7/26/2016	<98	<260	<b>340</b>	<130	<110	<b>18,000</b>	<120	<130	<b>970</b>	<83	<420
Post Carbon	SVE_SOUTH_POST CARBON	7/26/2016	<78	<200	<b>760</b>	<120	<89	<b>15,000</b>	<97	<b>220</b>	<b>1,400</b>	<66	<330

Please refer to notes at end of table.

**Table 9**  
**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 <sup>3</sup>										
Pre Carbon	SVE_SOUTH_PRE CARBON	8/30/2016	<86	<230	<b>340</b>	<110	<99	<b>28,000</b>	<110	<120	<b>1,400</b>	<73	<370
Post Carbon	SVE_SOUTH_POST CARBON	8/30/2016	<81	<210	<b>370</b>	<110	<93	<b>19,000</b>	<100	<b>210</b>	<b>910</b>	<68	<350
Pre Carbon	SVE_SOUTH_PRE CARBON	9/29/2016	<73	<190	<b>340</b>	<95	<83	<b>25,000</b>	<90	<b>110</b>	<b>1,300</b>	<61	<310
Post Carbon	SVE_SOUTH_POST CARBON	9/29/2016	<46	<120	<b>410</b>	<60	<53	<b>14,000</b>	<57	<b>140</b>	<b>1,900</b>	<39	<196
Pre Carbon	SVE-SOUTH_PRE CARBON_102516	10/25/2016	<150	<390	<b>380</b>	<190	<170	<b>32,000</b>	<180	<200	<b>1,500</b>	<120	<630
Post Carbon	SVE-SOUTH_POST CARBON_102516	10/25/2016	<100	<260	<b>530</b>	<130	<120	<b>19,000</b>	<130	<b>180</b>	<b>2,700</b>	<85	<430
Pre Carbon	SVE_SOUTH_PRE CARBON_112816	11/28/2016	<260	<670	<b>420</b>	<340	<290	<b>52,000</b>	<320	<350	<b>2,100</b>	<220	<1110
Post Carbon	SVE_SOUTH_POST CARBON_112816	11/28/2016	<79	<210	<100	<100	<90	<b>18,000</b>	<98	<b>360</b>	<b>3,200</b>	<66	<340
Pre Carbon	SVE_SOUTH_PRE CARBON_013017	1/30/2017	<260	<690	<b>660</b>	<340	<300	<b>61,000</b>	<330	<b>400</b>	<b>2,400</b>	<220	<1130
Post Carbon	SVE_SOUTH_POST CARBON_013017	1/30/2017	<1.2	<3.2	<1.6	<1.6	<1.4	<b>24</b>	<b>1.8</b>	<1.6	<2.1	<1.0	<5.2
Pre Carbon	SVE_SOUTH_PRE CARBON_073117	7/31/2017	<100	<260	<b>400</b>	<130	<110	<b>17,000</b>	<b>340</b>	<130	<b>1,000</b>	<84	<430
Post Carbon	SVE_SOUTH_POST CARBON_073117	7/31/2017	<1.2	<3.2	<1.6	<1.6	<b>2.4</b>	<b>6.5</b>	<b>8.2</b>	<1.6	<b>3.9</b>	<b>2.4</b>	<5.2
Pre Carbon	SVE_SOUTH_PRE CARBON_082817	8/28/2017	<60	<160	<b>320</b>	<79	<69	<b>32,000</b>	<75	<b>90</b>	<b>1,100</b>	<51	<256
Post Carbon	SVE_SOUTH_POST CARBON_082817	8/28/2017	<1.2	<b>5.8</b>	<b>2</b>	<1.6	<b>2.4</b>	<b>160</b>	<b>2.3</b>	<1.6	<b>3.9</b>	<b>2.2</b>	<5.2
Pre Carbon	SVE_SOUTH_PRE CARBON_092517	9/25/2017	<21	<55	<b>200</b>	<27	<24	<b>23,000</b>	<26	<b>45</b>	<b>460</b>	<18	<90
Post Carbon	SVE_SOUTH_POST CARBON_092517	9/25/2017	<1.2	<b>8.0</b>	<b>16</b>	<1.6	<b>5.3</b>	<b>6.8</b>	<1.5	<1.6	<2.1	<b>2.2</b>	<5.2
Pre Carbon	SVE_SOUTH_PRE CARBON_102617	10/26/2017	<40	<100	<b>230</b>	<52	<45	<b>13,000</b>	<49	<b>64</b>	<b>700</b>	<33	<167
Post Carbon	SVE_SOUTH_POST CARBON_102617	10/26/2017	<b>2.0</b>	<b>15</b>	<b>98</b>	<b>2.1</b>	<b>1.6</b>	<b>9.7</b>	<1.5	<b>3.9</b>	<2.1	<b>1.5</b>	<5.2
Pre Carbon	SVE_SOUTH_PRE CARBON_112917	11/29/2017	<140	<370	<b>280</b>	<180	<160	<b>22,000</b>	<170	<190	<b>820</b>	<120	<600
Post Carbon	SVE_SOUTH_POST CARBON_112917	11/29/2017	<b>3.8</b>	<b>8.5</b>	<b>220</b>	<b>4.0</b>	<2.0	<4.0	<2.2	<b>12</b>	<3.2	<b>2.5</b>	<5.7
Pre Carbon	SVE_SOUTH_PRE CARBON_122117	12/21/2017	--	--	--	--	--	--	--	--	--	--	--
Post Carbon	SVE_SOUTH_POST CARBON_122117	12/21/2017	<b>4.6</b>	<b>4.9</b>	<b>300</b>	<b>5.2</b>	<b>1.7</b>	<2.7	<1.5	<b>20</b>	<b>7.2</b>	<b>1.8</b>	<5.2
Pre Carbon	SVE_SOUTH_PRE CARBON_012218	1/22/2018	<110	<290	<b>150</b>	<150	<130	<b>13,000</b>	<140	<150	<b>390</b>	<95	<480
Post Carbon	SVE_SOUTH_POST CARBON_012218	1/22/2018	<b>4.3</b>	<6.5	<b>380</b>	<3.2	<2.8	<b>8.1</b>	<3.1	<b>11</b>	<b>16</b>	<b>2.1</b>	<10.6
Pre Carbon	SVE_SOUTH_PRE CARBON_022818	2/28/2018	<19	<49	<b>200</b>	<25	<22	<b>13,000</b>	<23	<b>52</b>	<b>440</b>	<16	<81
Post Carbon	SVE_SOUTH_POST CARBON_022818	2/28/2018	<b>2.8</b>	<3.2	<b>300</b>	<b>4.0</b>	<1.4	<2.7	<1.5	<b>14</b>	<b>51</b>	<b>5.1</b>	<5.2
Pre Carbon	SVE_SOUTH_PRE CARBON_032918	3/29/2018	<23	<60	<b>180</b>	<30	<26	<b>13,000</b>	<28	<b>46</b>	<b>470</b>	<19	<98
Post Carbon	SVE_SOUTH_POST CARBON_032918	3/29/2018	<b>4.2</b>	<b>5.2</b>	<b>500</b>	<b>7.4</b>	<b>1.5</b>	<b>7.8</b>	<1.5	<b>15</b>	<b>110</b>	<b>1.7</b>	<5.2
Pre Carbon	SVE_SOUTH_PRE CARBON_042418	4/24/2018	<69	<180	<b>140</b>	<90	<79	<b>12,000</b>	<86	<58	<b>350</b>	<58	<299
Post Carbon	SVE_SOUTH_POST CARBON_042418	4/24/2018	<b>3.4</b>	<b>4.2</b>	<b>470</b>	<b>7.6</b>	<b>1.5</b>	<b>6.6</b>	<b>3.1</b>	<b>8.4</b>	<b>76</b>	<b>1.4</b>	<b>17.9</b>
Pre Carbon	SVE_SOUTH_PRE CARBON_051618	5/16/2018	<50	<130	<b>160</b>	<65	<57	<b>7,800</b>	<62	<68	<b>370</b>	<42	<212
Post Carbon	SVE_SOUTH_POST CARBON_051618	5/16/2018	<4.7	<12	<b>480</b>	<b>6.6</b>	<0.97	<1.3	<0.75	<b>7.1</b>	<b>33</b>	<4	<19.7
Pre Carbon	SVE_South_72318-Pre Carbon	7/23/2018	<63	<170	<b>170</b>	<83	<73	<b>18,000</b>	<79	<85	<b>770</b>	<53	<271
Post Carbon	SVE_South_Post Carbon-72318	7/23/2018	<25	<65	<b>230</b>	<33	<29	<b>8,300</b>	<31	<b>520</b>	<b>6,400</b>	<21	<108

Please refer to notes at end of table.

**Table 9**  
**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 <sup>3</sup>										
Pre Carbon	SVE_South_PreCarbon_110718	11/7/2018	<64	<170	<b>310</b>	<84	<74	<b>31,000</b>	<80	<b>91</b>	<b>1,300</b>	<54	<180
Post Carbon	SVE_South_PostCarbon_110718	11/7/2018	<1.2	<3.2	<1.6	<1.6	<1.4	<b>15</b>	<1.5	<1.6	<2.1	<b>1.6</b>	<3.5
Pre Carbon	SVE_South_PreCarbon_010419	1/4/2019	<64	<160	<b>280</b>	<82	<71	<b>32,000</b>	<77	<b>84</b>	<b>920</b>	<53	<180
Post Carbon	SVE_South_PostCarbon_010419	1/4/2019	<1.2	<3.2	<1.6	<1.6	<b>2.1</b>	<2.7	<b>2.3</b>	<1.6	<2.1	<b>1.5</b>	<b>7.3</b>
Pre Carbon	SVE_South_PreCarbon_030819	3/8/2019	<69	<180	<b>180</b>	<90	<79	<b>21,000</b>	<86	<93	<b>570</b>	<58	<200
Post Carbon	SVE_South_PostCarbon_030819	3/8/2019	<1.2	<3.2	<1.6	<1.6	<b>1.8</b>	<b>5.5</b>	<1.5	<1.6	<2.1	<b>1.3</b>	<3.5
Pre Carbon	SVE_South_PreCarbon_050719	5/7/2019	<69	<180	<b>140</b>	<90	<79	<b>17,000</b>	<85	<93	<b>450</b>	<58	<200
Post Carbon	SVE_South_PostCarbon_050719	5/7/2019	<1.2	<3.2	<b>9.9</b>	<1.6	<1.4	<b>1,300</b>	<b>13</b>	<b>3.0</b>	<b>31</b>	<1.0	<b>11.7</b>
Pre Carbon	SVE_South_PreCarbon_070819	7/8/2019	<64	<170	<b>100</b>	<83	<73	<b>16,000</b>	<79	<86	<b>530</b>	<54	<180
Post Carbon	SVE_South_PostCarbon_070819	7/8/2019	<1.2	<b>6.3</b>	<1.6	<1.6	<b>1.6</b>	<b>7.9</b>	<1.5	<1.6	<2.1	<1.0	<b>1.7</b>
Pre Carbon	SVE_South_PreCarbon_090919	9/9/2019	<28	<74	<b>120</b>	<37	<32	<b>15,000</b>	<35	<b>48</b>	<b>590</b>	<24	<81
Post Carbon	SVE_South_PostCarbon_090919	9/9/2019	<b>2.8</b>	<b>3.6</b>	<b>160</b>	<b>9.1</b>	<1.4	<2.7	<1.5	<1.6	<2.1	<1.0	<3.5
Pre Carbon	SVE_South_PreCarbon_110419	11/4/2019	<33	<87	<b>300</b>	<43	<38	<b>38,000</b>	<41	<b>87</b>	<b>990</b>	<28	<95
Post Carbon	SVE_South_PostCarbon_110419	11/4/2019	<b>2.2</b>	<5.2	<b>160</b>	<b>5.6</b>	<2.3	<4.4	<2.5	<2.7	<3.5	<b>3.2</b>	<5.7
Pre Carbon	SVE-South-PreCarbon-011020	1/10/2020	<12	<31	<b>110</b>	<16	<14	<b>9,200</b>	<15	<b>33</b>	<b>420</b>	<10	<17
Post Carbon	SVE-South-PostCarbon-011020	1/10/2020	<1.7	<4.5	<b>130</b>	<2.3	<2.0	<3.9	<2.2	<b>5.1</b>	<3.1	<1.5	<5.0

**Notes:**

1. µg/m<sup>3</sup> = 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. -- = Not sampled.

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

Sample Date	Post-Blower Pressure (in water)	Air Flow Rate <sup>(1)</sup> (cfm)	Total VOCs (mg/m <sup>3</sup> )	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	--*	--*	--*	--*

*Please refer to notes at end of table.*

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

Sample Date	Post-Blower Pressure (in H <sub>2</sub> O)	Air Flow Rate <sup>(1)</sup> (cfm)	Total VOCs (mg/m <sup>3</sup> )	VOC Removal (lb/day)
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

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

*Please refer to notes at end of table.*

**Table 10**  
**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)
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:**

1. Air flow rate read from system gauge.
2. cfm = cubic feet per minute
3. mg/m<sup>3</sup> = milligrams per cubic meter
4. lb/day = pounds per day
5. VOCs = volatile organic compounds
6. lbs = pounds
7. \* = Not measured/sampled; system intentionally shut down to evaluate system efficiency.
8. -- = Not measured/sampled.

**Table 11**  
**South SVE System – VOC Mass Removal**  
**NuStar Vancouver Facility**  
**Vancouver, Washington**

Sample Date	Activity	Post-Blower Pressure (in water)	Air Flow Rate <sup>(1)</sup> (cfm)	Total VOCs (mg/m <sup>3</sup> )	VOC Removal (lb/day)	Days of Operation	Approximate VOCs Removed (lbs)	Approximate Cumulative VOCs Removed (lbs)
10/6/2011	Startup	33.0	590	46	2.4	0.5	2	2
11/2/2011	Sample	27.0	590	29	1.5	27	41	43
12/14/2011	Sample	27.0	590	57	3.0	42	96	139
2/17/2012	Sample	29.0	-- <sup>6</sup>	30	1.6	65	151	290
3/22/2012	Sample	27.0	658	31	1.9	34	59	349
4/26/2012	Sample	27.0	--	0	0.0	35	33	382
5/23/2012	Sample	31.0	--	20	1.2	29	18	400
6/20/2012	Sample	33.0	--	37	2.2	28	47	447
7/24/2012	Sample	32.0	--	34	2.0	34	72	519
8/22/2012	Sample	29.0	--	51	3.0	29	74	593
9/25/2012	Sample	29.0	--	52	3.1	34	104	697
10/29/2012	Sample	47.0	--	63	3.7	34	116	813
11/26/2012	Sample	18.0	--	11	0.6	28	61	874
12/21/2012	Sample	17.0	--	15	0.9	25	19	893
1/24/2013	Sample	10.0	--	2	0.1	34	17	910
2/28/2013	Sample	18.0	--	1	0.1	35	3	913
3/25/2013	Sample	16.0	--	4	0.2	25	4	917
4/29/2013	Sample	15.0	--	1	0.1	35	6	923
5/24/2013	Sample	47.0	--	251	14.8	--	--	996
6/25/2013	Sample	51.0	--	41	2.5	32	277	1,273
7/25/2013	Sample	50.0	--	24	1.4	30	58	1,331
8/27/2013	Sample	52.0	--	30	1.8	33	53	1,384
9/30/2013	Sample	45.0	--	28	1.6	34	59	1,443
10/24/2013	Sample	50.0	--	29	1.7	24	41	1,484
11/25/2013	Sample	51.0	--	22	1.3	32	48	1,532
12/27/2013	Sample	55.0	--	21	1.3	32	41	1,573

*Please refer to notes at end of table.*



**Table 11**  
**South SVE System – VOC Mass Removal**  
**NuStar Vancouver Facility**  
**Vancouver, Washington**

Sample Date	Activity	Post-Blower Pressure (in water)	Air Flow Rate <sup>(1)</sup> (cfm)	Total VOCs (mg/m <sup>3</sup> )	VOC Removal (lb/day)	Days of Operation	Approximate VOCs Removed (lbs)	Approximate Cumulative VOCs Removed (lbs)
1/29/2014	Sample	50.0	--	21	1.2	33	41	1,614
2/24/2014	Sample	50.0	--	37	2.2	--	--	1,614
3/31/2014	Sample	46.0	--	21	1.2	35	60	1,674
4/29/2014	Sample	48.8	--	14	0.8	29	30	1,704
5/27/2014	Sample	49.0	--	13	0.7	28	22	1,726
7/3/2014	Sample	50.0	--	3	0.2	37	18	1,744
7/28/2014	Sample	50.0	--	16	0.9	25	15	1,759
8/25/2014	Sample	49.0	--	21	1.2	28	31	1,790
9/30/2014	Sample	40.0	--	18	1.1	36	42	1,832
11/3/2014	Sample	50.0	--	25	1.5	30	39	1,871
12/31/2014	Estimated	--	--	--	--	22	33	1,904
1/26/2015	Sample	20.0	--	23	1.3	26	37	1,941
2/26/2015	Sample	30.0	--	19	1.1	31	39	1,980
3/30/2015	Sample	29.0	--	18	1.1	32	36	2,016
4/24/2015	Sample	29.0	--	6	0.4	25	18	2,034
5/28/2015	Sample	28.0	--	9	0.5	34	15	2,049
7/29/2015	Sample	25.0	--	13	0.8	62	41	2,090
8/31/2015	Sample	26.0	--	13	0.8	33	26	2,116
9/28/2015	Sample	26.0	--	11	0.6	28	20	2,136
10/29/2015	Sample	27.0	--	19	1.1	31	28	2,164
11/30/2015	Sample	30.0	--	3	0.2	32	22	2,186
12/28/2015	Sample	29.0	--	36	2.2	28	33	2,219

*Please refer to notes at end of table.*

**Table 11**  
**South SVE System – VOC Mass Removal**  
**NuStar Vancouver Facility**  
**Vancouver, Washington**

Sample Date	Activity	Post-Blower Pressure (in water)	Air Flow Rate <sup>(1)</sup> (cfm)	Total VOCs (mg/m <sup>3</sup> )	VOC Removal (lb/day)	Days of Operation	Approximate VOCs Removed (lbs)	Approximate Cumulative VOCs Removed (lbs)
2/1/2016	Sample	19.0	--	3	0.2	35	41	2,260
2/29/2016	Sample	30.0	--	3	0.2	28	6	2,266
3/29/2016	Sample	28.0	--	75	4.4	29	67	2,333
4/27/2016	Sample	5.0	--	1	0.1	29	66	2,399
5/25/2016	Sample	3.0	--	1	0.03	28	2	2,401
6/28/2016	Sample	-- *	-- *	-- *	-- *	-- *	-- *	2,401
7/26/2016	Sample	30.0	--	19	1.1	62	36	2,437
9/29/2016	Sample	28.0	--	27	1.6	65	89	2,526
10/25/2016	Sample	30.0	--	34	2.0	26	47	2,573
11/28/2016	Sample	30.0	--	55	3.3	34	90	2,663
12/28/2016	No sample collected	2.0	--	--	--	--	--	2,663
1/30/2017	Sample	33.0	--	64	3.8	63	223	2,886
3/28/2017	**System Not Working Properly -- No Data or Samples**	--	--	--	--	--	--	2,886
9/25/2017	Sample	30.0	--	24	1.4	28	48	3,427
10/26/2017	Sample	30.0	--	14	0.8	31	35	3,462
11/29/2017	Sample	30.0	--	23	1.4	34	38	3,500
12/21/2017	Estimated (using November effluent data)	30.0	--	23	1.4	22	30	3,530
1/22/2018	Sample	30.0	--	14	0.8	32	36	3,566
2/28/2018	Sample	30.0	--	14	0.8	37	31	3,597
3/29/2018	Sample	31.0	--	14	0.8	29	24	3,621
4/24/2018	Sample	31.0	--	12	0.7	26	21	3,642
5/16/2018	Sample	30.0	--	8	0.5	22	14	3,656
7/23/2018	Sample	29.0	--	19	1.1	68	55	3,711
11/7/2018	Sample	30.0	--	33	1.9	107	164	3,875

Please refer to notes at end of table.

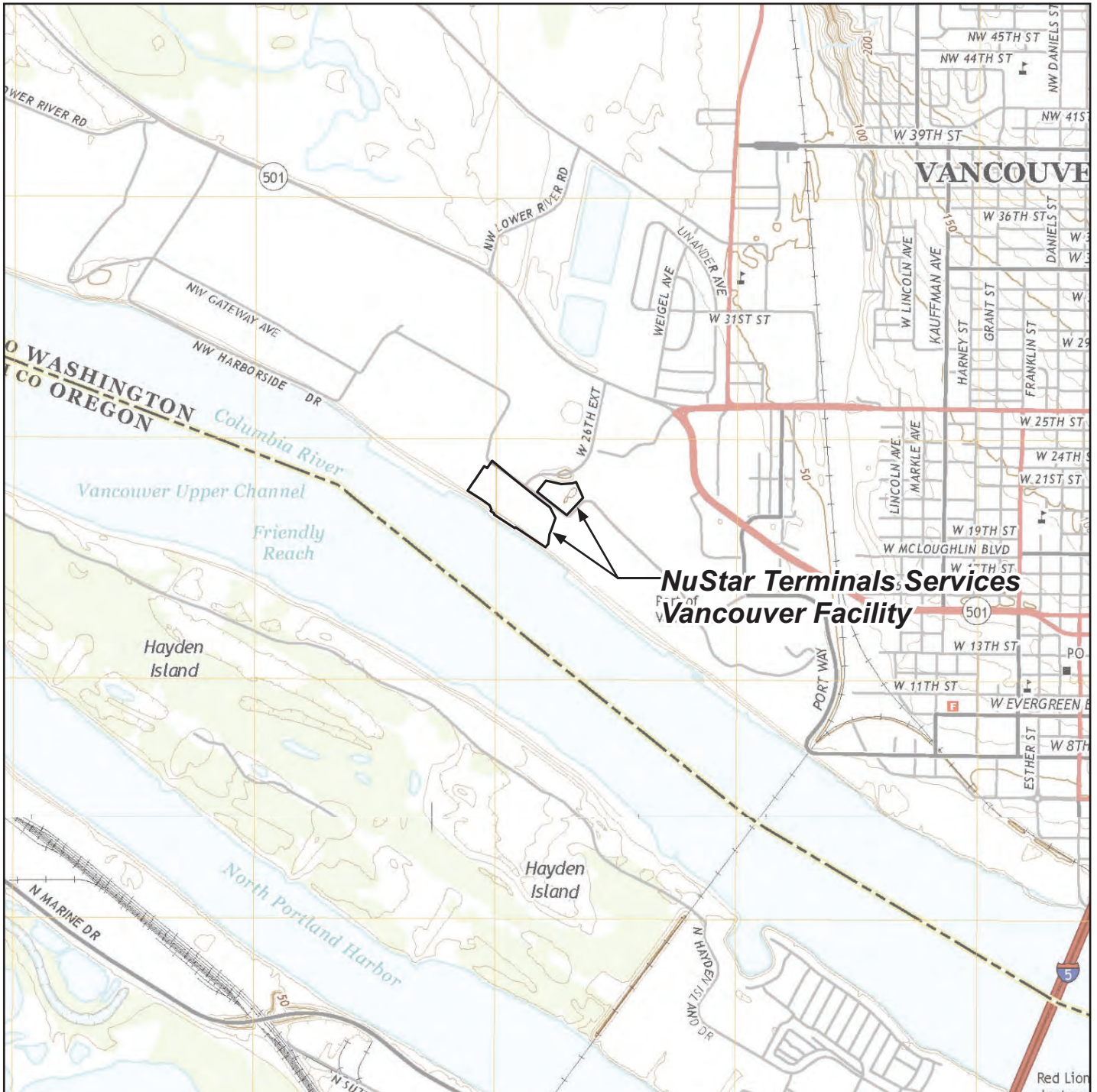
**Table 11**  
**South SVE System – VOC Mass Removal**  
**NuStar Vancouver Facility**  
**Vancouver, Washington**

Sample Date	Activity	Post-Blower Pressure (in water)	Air Flow Rate <sup>(1)</sup> (cfm)	Total VOCs (mg/m <sup>3</sup> )	VOC Removal (lb/day)	Days of Operation	Approximate VOCs Removed (lbs)	Approximate Cumulative VOCs Removed (lbs)
1/4/2019	Sample	28.0	--	33	2.0	58	114	3,989
3/8/2019	Sample	28.0	--	22	1.3	63	103	4,092
5/7/2019	Sample	29.0	--	18	1.0	60	70	4,162
7/8/2019	Sample	29.0	--	17	1.0	62	63	4,225
9/9/2019	Sample	29.0	--	16	0.9	63	61	4,286
11/4/2019	Sample	29.0	468	39	1.7	56	73	4,359
1/10/2020	Sample	29.0	468	10	0.4	67	70	4,429

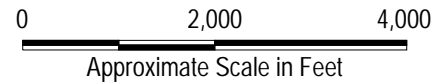
**Notes:**

1. Air flow rate read from system gauge.
2. cfm = cubic feet per minute
3. mg/m<sup>3</sup> = 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.
9. -- = Not measured/sampled.
10. VOCs = volatile organic compounds

## FIGURES



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



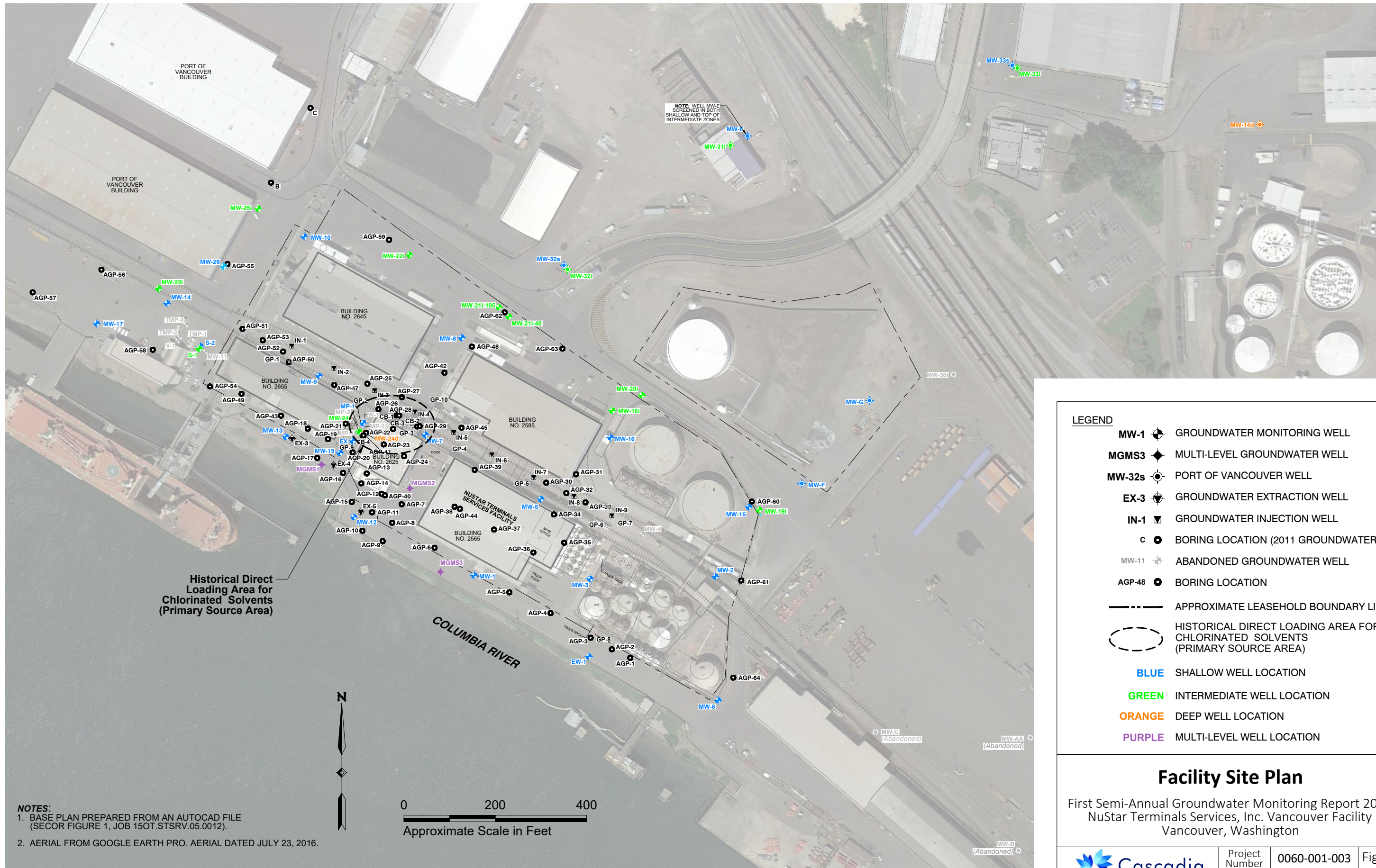
### Facility Location Map

First Semi-Annual Groundwater Monitoring Report 2020  
 NuStar Terminals Services, Inc. Vancouver Facility  
 Vancouver, Washington



Project Number	0060-002-008
August 2020	

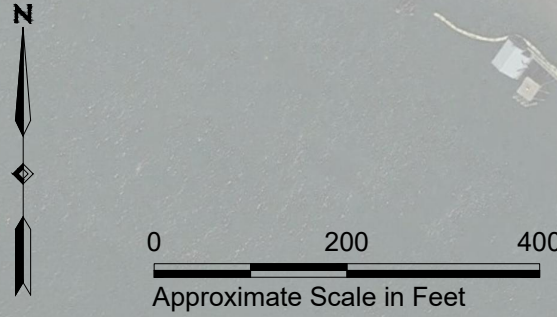
Figure  
**1**

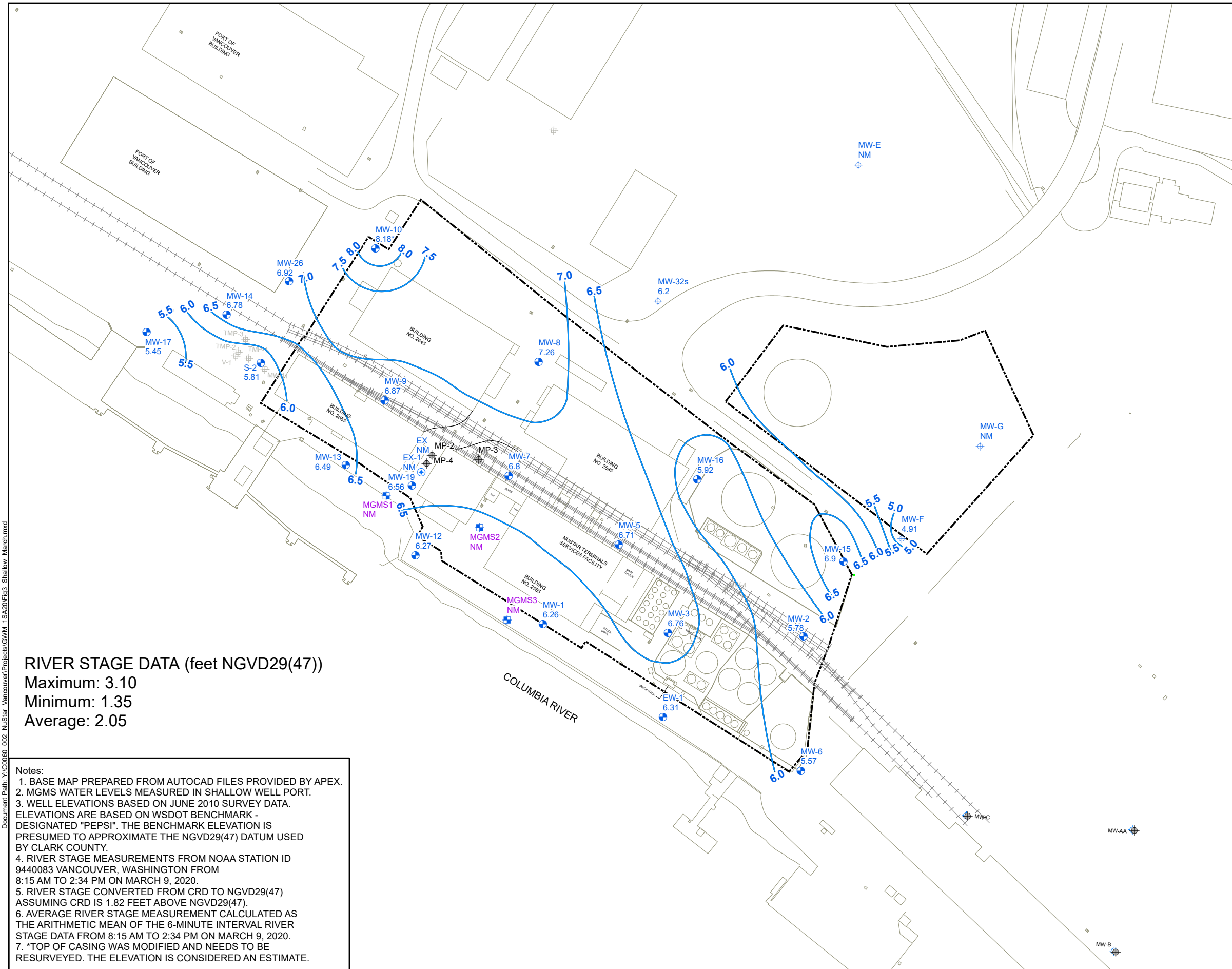


- LEGEND**
- MW-1** GROUNDWATER MONITORING WELL
  - MGMS3** MULTI-LEVEL GROUNDWATER WELL
  - MW-32s** PORT OF VANCOUVER WELL
  - EX-3** GROUNDWATER EXTRACTION WELL
  - IN-1** GROUNDWATER INJECTION WELL
  - c** BORING LOCATION (2011 GROUNDWATER INV.)
  - MW-11** ABANDONED GROUNDWATER WELL
  - AGP-48** 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**  
 First Semi-Annual Groundwater Monitoring Report 2020  
 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. AERIAL FROM GOOGLE EARTH PRO. AERIAL DATED JULY 23, 2016.

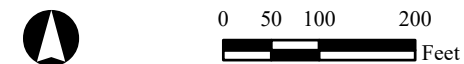




- Legend**
- Port of Vancouver Well
  - Multi-Level Groundwater Well
  - Monitoring Well
  - Historical Groundwater Extraction Well
  - Abandoned Groundwater Well
  - Groundwater Elevation Contour (Feet)
  - Approximate Property Line
  - 5.92 - Groundwater Elevation in Feet
  - NM** - Not Measured
  - BLUE** - Shallow Well Location
  - PURPLE** - Multi Level Well Location
  - Groundwater Flow Direction

**RIVER STAGE DATA (feet NGVD29(47))**  
 Maximum: 3.10  
 Minimum: 1.35  
 Average: 2.05

**Notes:**  
 1. BASE MAP PREPARED FROM AUTOCAD FILES PROVIDED BY APEX.  
 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 8:15 AM TO 2:34 PM ON MARCH 9, 2020.  
 5. RIVER STAGE CONVERTED FROM CRD TO NGVD29(47) ASSUMING CRD IS 1.82 FEET ABOVE NGVD29(47).  
 6. AVERAGE RIVER STAGE MEASUREMENT CALCULATED AS THE ARITHMETIC MEAN OF THE 6-MINUTE INTERVAL RIVER STAGE DATA FROM 8:15 AM TO 2:34 PM ON MARCH 9, 2020.  
 7. \*TOP OF CASING WAS MODIFIED AND NEEDS TO BE RESURVEYED. THE ELEVATION IS CONSIDERED AN ESTIMATE.

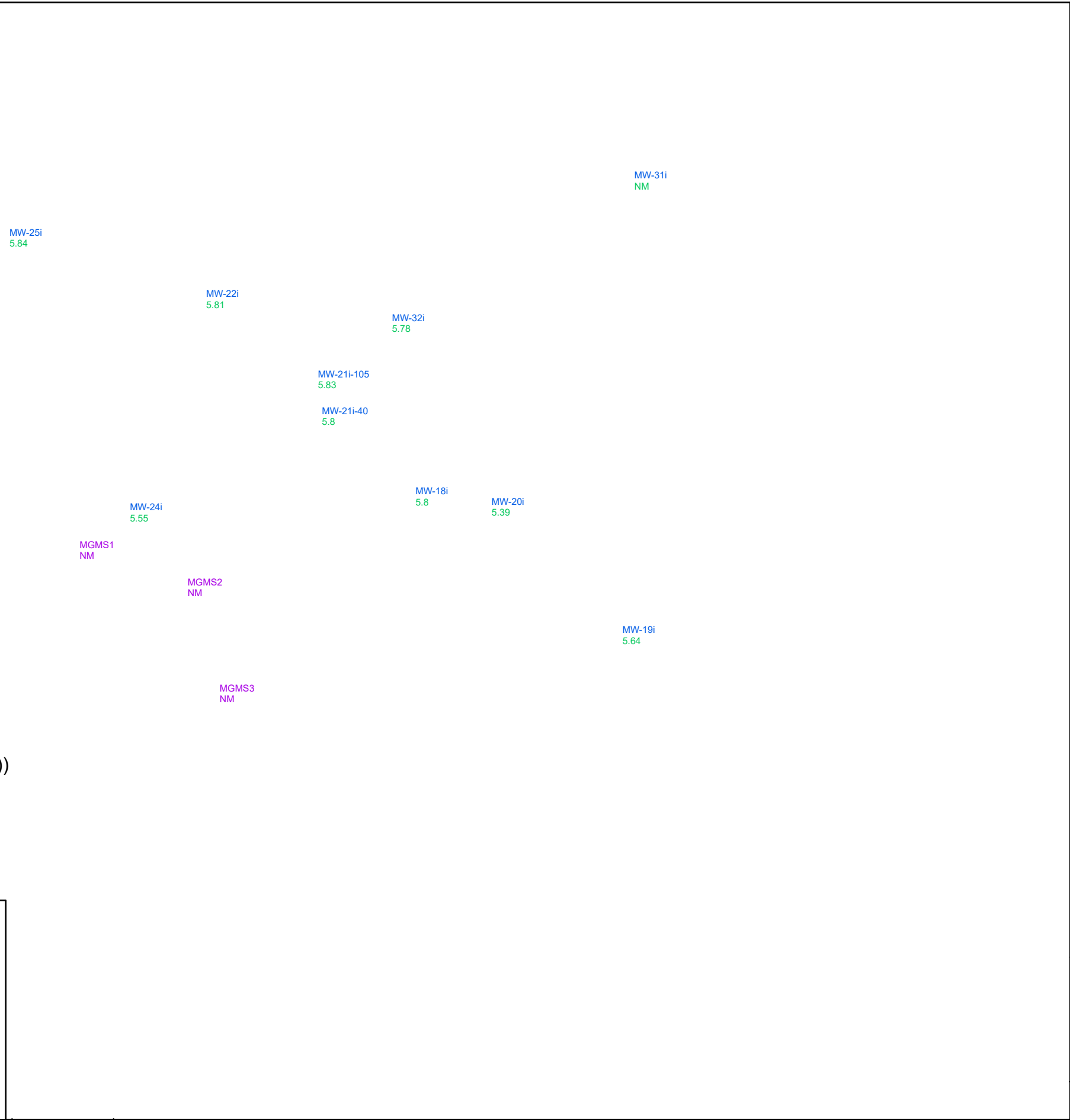


**First Quarter 2020 Groundwater Elevations-  
 Shallow Groundwater (March 9, 2020)**  
 First Semi-Annual Groundwater Monitoring Report 2020  
 NuStar Terminals Services, Inc. Vancouver Facility Vancouver,  
 Washington

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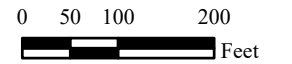
RIVER STAGE DATA (feet NGVD29(47))  
Maximum: 2.21  
Minimum: 1.66  
Average: 1.94

Notes:  
1. Base map prepared from AutoCAD files provided by Apex.  
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 10:42 am to 12:30 pm on March 9, 2020.  
5. RIVER STAGE CONVERTED FROM CRD TO NGVD29(47) ASSUMING CRD IS 1.82 FEET ABOVE NGVD29(47).  
6. AVERAGE RIVER STAGE MEASUREMENT CALCULATED AS THE ARITHMETIC MEAN OF THE 6-MINUTE INTERVAL RIVER STAGE DATA FROM 10:42 am to 12:30 pm on March 9, 2020.



**Legend**

- Port of Vancouver Well
- Multi-Level Groundwater Well
- Monitoring Well
- Historical Groundwater Extraction Well
- Abandoned Groundwater Well
- Groundwater Elevation Contour (Feet)
- Approximate Property Line
- 5.83 - Groundwater Elevation in Feet
- NM - Not Measured
- GREEN - Intermediate Well Location
- PURPLE - Multi Level Well Location



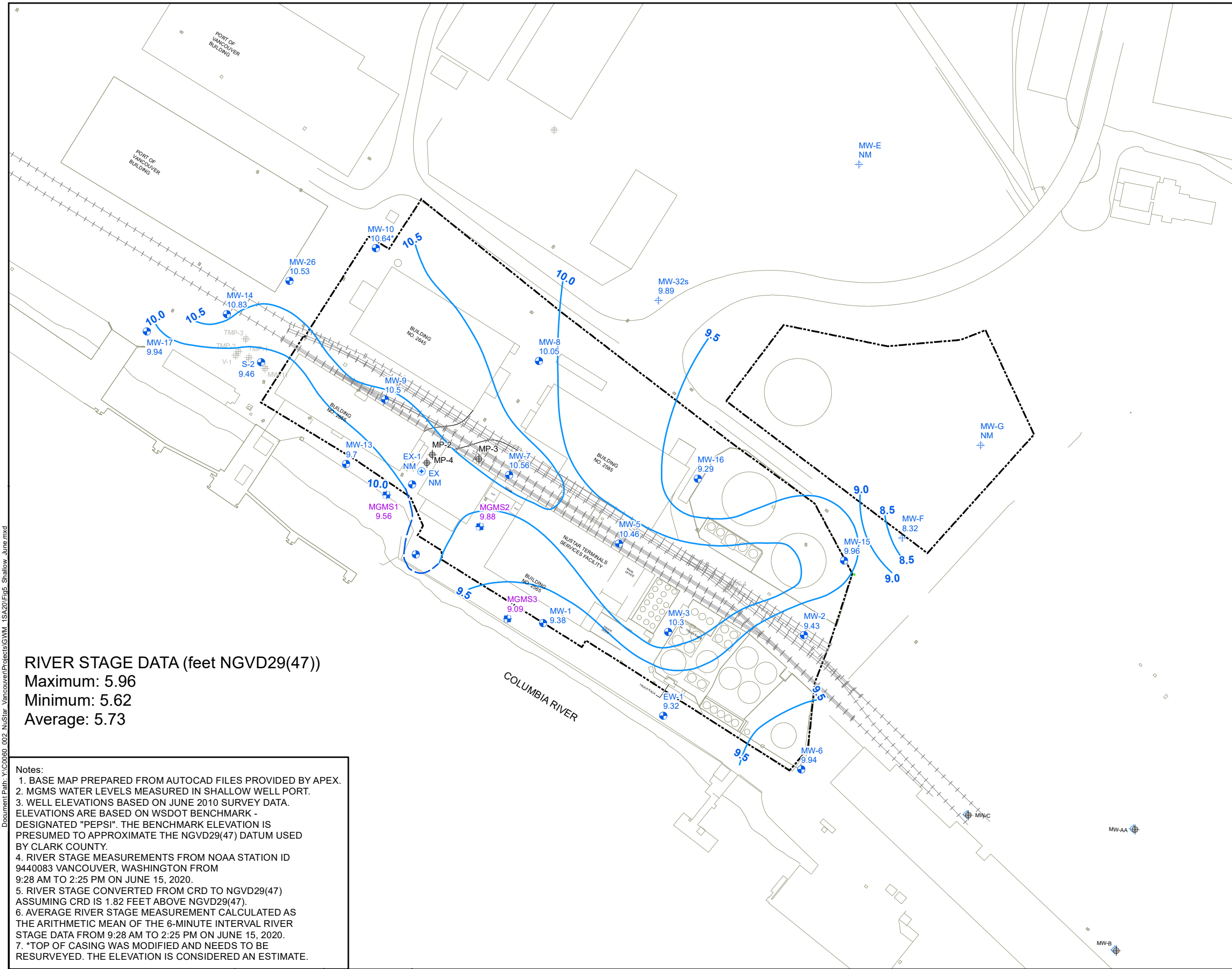
**First Quarter 2020 Groundwater Elevations- Intermediate Groundwater (March 9, 2020)**

First Semi-Annual Groundwater Monitoring Report 2020  
NuStar Terminals Services, Inc. Vancouver Facility  
Vancouver, Washington



**Figure 4**

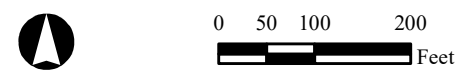




- Legend**
- Port of Vancouver Well
  - Multi-Level Groundwater Well
  - Monitoring Well
  - Historical Groundwater Extraction Well
  - Abandoned Groundwater Well
  - Groundwater Elevation Contour (Feet)-Dashed Where Inferred
  - Approximate Property Line
  - 10.53 - Groundwater Elevation in Feet
  - NM - Not Measured
  - BLUE - Shallow Well Location
  - PURPLE - Multi Level Well Location
  - Groundwater Flow Direction

**RIVER STAGE DATA (feet NGVD29(47))**  
 Maximum: 5.96  
 Minimum: 5.62  
 Average: 5.73

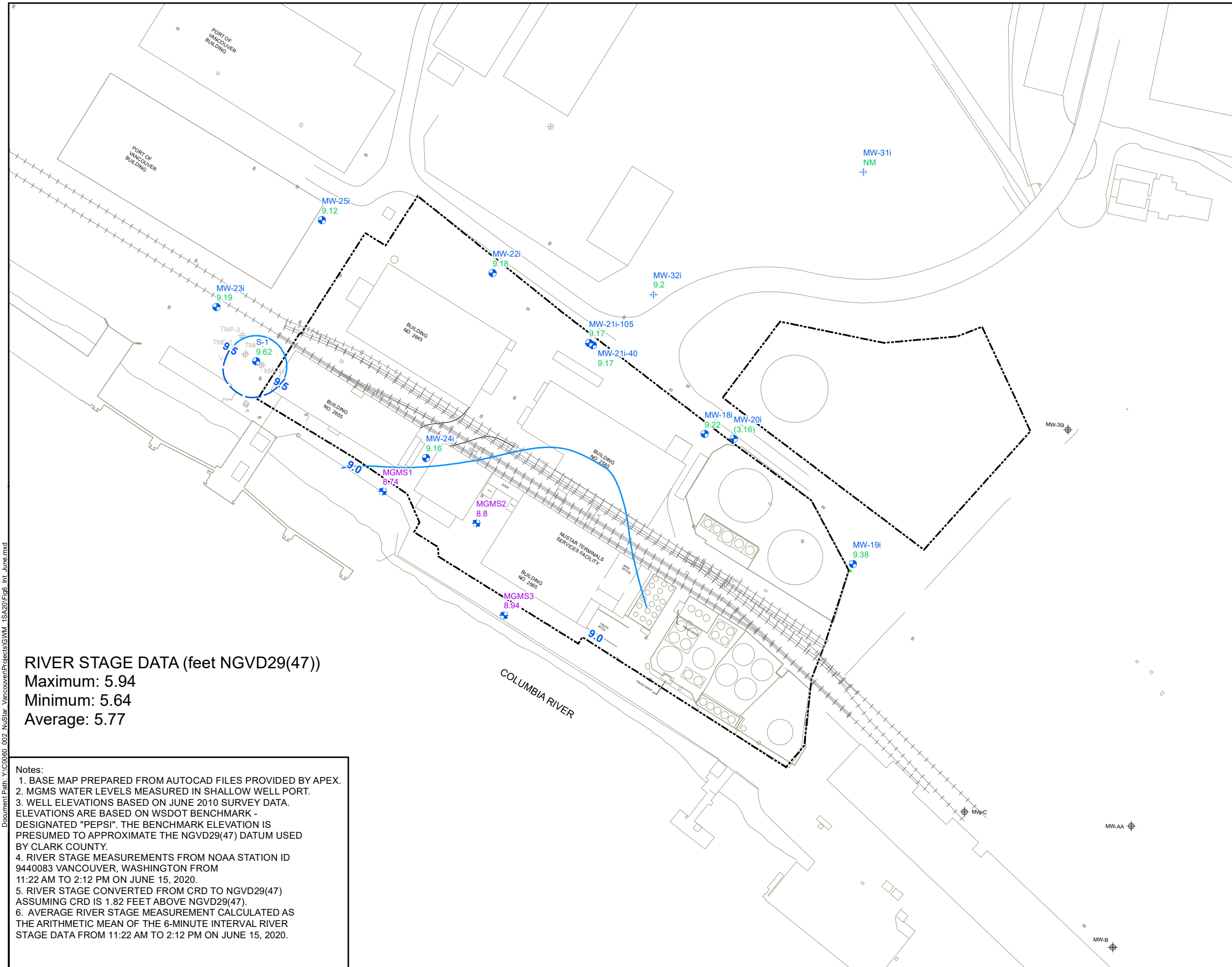
**Notes:**  
 1. BASE MAP PREPARED FROM AUTOCAD FILES PROVIDED BY APEX.  
 2. MGMS WATER LEVELS MEASURED IN SHALLOW WELL PORT.  
 3. WELL ELEVATIONS BASED ON JUNE 2010 SURVEY DATA. ELEVATIONS ARE BASED ON WSDOT BENCHMARK - DESIGNATED "PEPSI". THE BENCHMARK ELEVATION IS PRESUMED TO APPROXIMATE THE NGVD29(47) DATUM USED BY CLARK COUNTY.  
 4. RIVER STAGE MEASUREMENTS FROM NOAA STATION ID 9440083 VANCOUVER, WASHINGTON FROM 9:28 AM TO 2:25 PM ON JUNE 15, 2020.  
 5. RIVER STAGE CONVERTED FROM CRD TO NGVD29(47) ASSUMING CRD IS 1.82 FEET ABOVE NGVD29(47).  
 6. AVERAGE RIVER STAGE MEASUREMENT CALCULATED AS THE ARITHMETIC MEAN OF THE 6-MINUTE INTERVAL RIVER STAGE DATA FROM 9:28 AM TO 2:25 PM ON JUNE 15, 2020.  
 7. \*TOP OF CASING WAS MODIFIED AND NEEDS TO BE RESURVEYED. THE ELEVATION IS CONSIDERED AN ESTIMATE.



**Second Quarter 2020 Groundwater Elevations-  
 Shallow Groundwater (June 15, 2020)**  
 First Semi-Annual Groundwater Monitoring Report 2020  
 NuStar Terminals Services, Inc. Vancouver Facility  
 Vancouver, Washington



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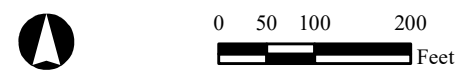


- Legend**
- Port of Vancouver Well
  - Multi-Level Groundwater Well
  - Monitoring Well
  - Historical Groundwater Extraction Well
  - Abandoned Groundwater Well
  - Groundwater Elevation Contour (Feet)-Dashed Where Inferred
  - Approximate Property Line
- 10.53 - Groundwater Elevation in Feet  
Values in Parentheses Not Used in Contouring
- NM - Not Measured
- GREEN - Intermediate Well Location
- PURPLE - Multi Level Well Location

**RIVER STAGE DATA (feet NGVD29(47))**  
 Maximum: 5.94  
 Minimum: 5.64  
 Average: 5.77

**Notes:**

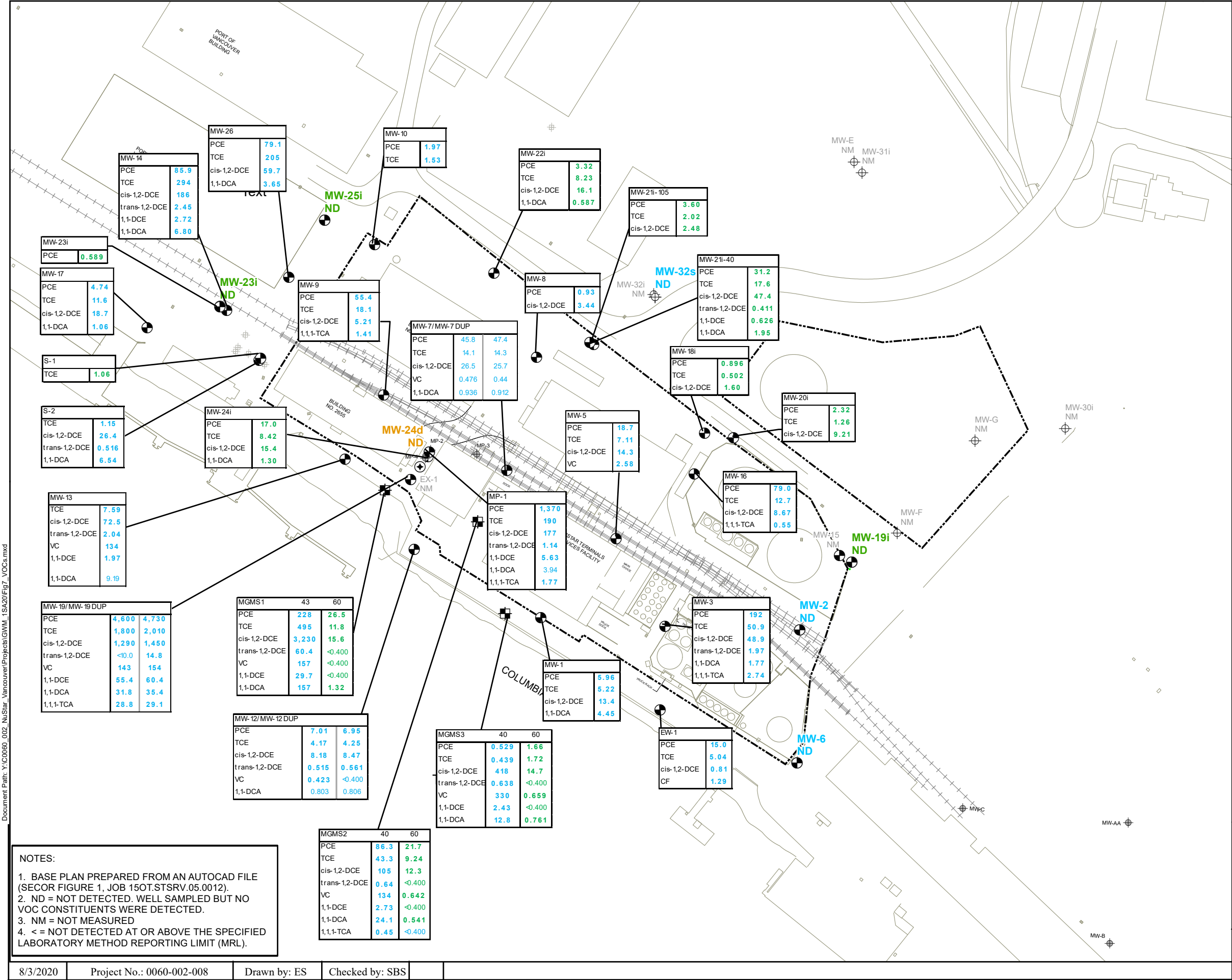
1. BASE MAP PREPARED FROM AUTOCAD FILES PROVIDED BY APEX.
2. MGMS WATER LEVELS MEASURED IN SHALLOW WELL PORT.
3. WELL ELEVATIONS BASED ON JUNE 2010 SURVEY DATA. ELEVATIONS ARE BASED ON WSDOT BENCHMARK - DESIGNATED "PEPSI". THE BENCHMARK ELEVATION IS PRESUMED TO APPROXIMATE THE NGVD29(47) DATUM USED BY CLARK COUNTY.
4. RIVER STAGE MEASUREMENTS FROM NOAA STATION ID 9440083 VANCOUVER, WASHINGTON FROM 11:22 AM TO 2:12 PM ON JUNE 15, 2020.
5. RIVER STAGE CONVERTED FROM CRD TO NGVD29(47) ASSUMING CRD IS 1.82 FEET ABOVE NGVD29(47).
6. AVERAGE RIVER STAGE MEASUREMENT CALCULATED AS THE ARITHMETIC MEAN OF THE 6-MINUTE INTERVAL RIVER STAGE DATA FROM 11:22 AM TO 2:12 PM ON JUNE 15, 2020.



**Second Quarter 2020 Groundwater Elevations- Intermediate Groundwater (June 15, 2020)**

First Semi-Annual Groundwater Monitoring Report 2020  
 NuStar Terminals Services, Inc. Vancouver Facility  
 Vancouver, Washington





WELL IDENTIFICATION		DEPTH OF PORT SAMPLED (IF NOT SPECIFIED - SINGLE PORT WELL)	
MGMS1	43	60	
PCE	212	33.2	
TCE	434	19.0	
cis-1,2-DCE	3,240	27.9	
trans-1,2-DCE	53.9	<0.400	
VC	113	7.89	
1,1-DCE	30.5	0.443	
1,1-DCA	156	4.58	

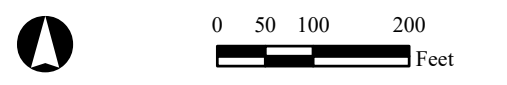
ANALYTE SAMPLED

**Legend**

- Port of Vancouver Well
- Multi-Level Groundwater Well
- Monitoring Well
- Historical Groundwater Extraction Well
- Abandoned Groundwater Well
- Approximate Property Line

**BLUE** - Shallow zone concentration data  
**GREEN** - Intermediate zone concentration data  
**ORANGE** - Deep zone concentration data

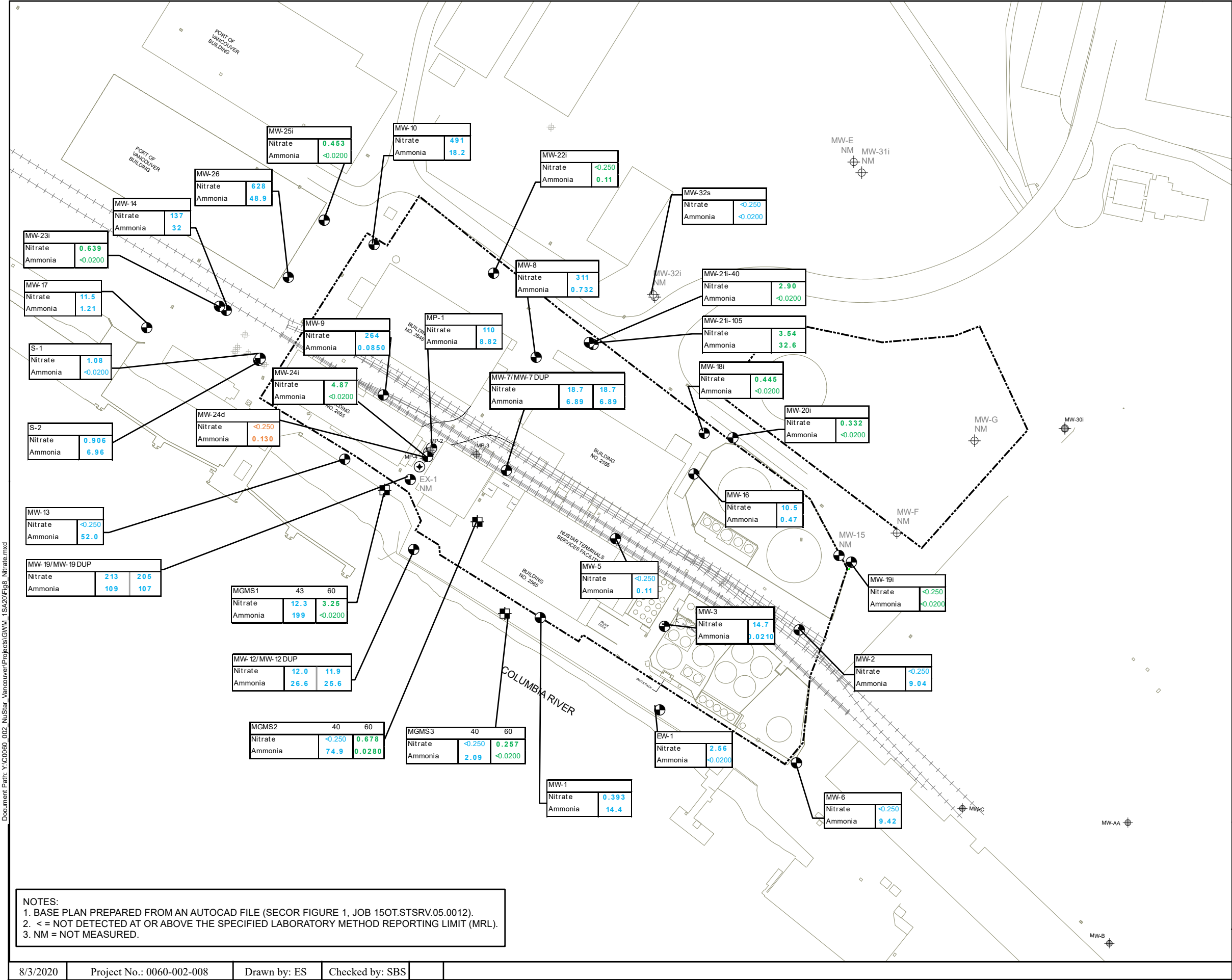
PCE	TETRACHLOROETHENE
TCE	TRICHLOROETHENE
cis-1,2-DCE	CIS-1,2-DICHLOROETHENE
trans-1,2-DCE	TRANS-1,2-DICHLOROETHENE
VC	VINYL CHLORIDE
1,1-DCE	1,1-DICHLOROETHENE
1,1-DCA	1,1-DICHLOROETHANE
CF	CHLOROFORM
1,1,1-TCA	1,1,1-TRICHLOROETHANE
CA	CHLOROETHANE



**VOC Concentrations in Groundwater (March 2020)**  
 First Semi-Annual Groundwater Monitoring Report 2020  
 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. ND = NOT DETECTED. WELL SAMPLED BUT NO VOC CONSTITUENTS WERE DETECTED.  
 3. NM = NOT MEASURED  
 4. < = NOT DETECTED AT OR ABOVE THE SPECIFIED LABORATORY METHOD REPORTING LIMIT (MRL).

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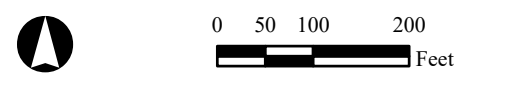


WELL IDENTIFICATION

MW-22i		
Nitrate	<0.250	NITRATE IN mg/L (AS NITROGEN METHOD 300.0)
Ammonia	0.339	AMMONIA IN mg/L (AS NITROGEN METHOD 350.1)

- Legend**
- ⊕ Port of Vancouver Well
  - ⊕ Multi-Level Groundwater Well
  - Monitoring Well
  - ⊕ Historical Groundwater Extraction Well
  - ⊕ Abandoned Groundwater Well
  - Approximate Property Line

**BLUE** - Shallow zone concentration data  
**GREEN** - Intermediate zone concentration  
**ORANGE** - Deep zone concentration data

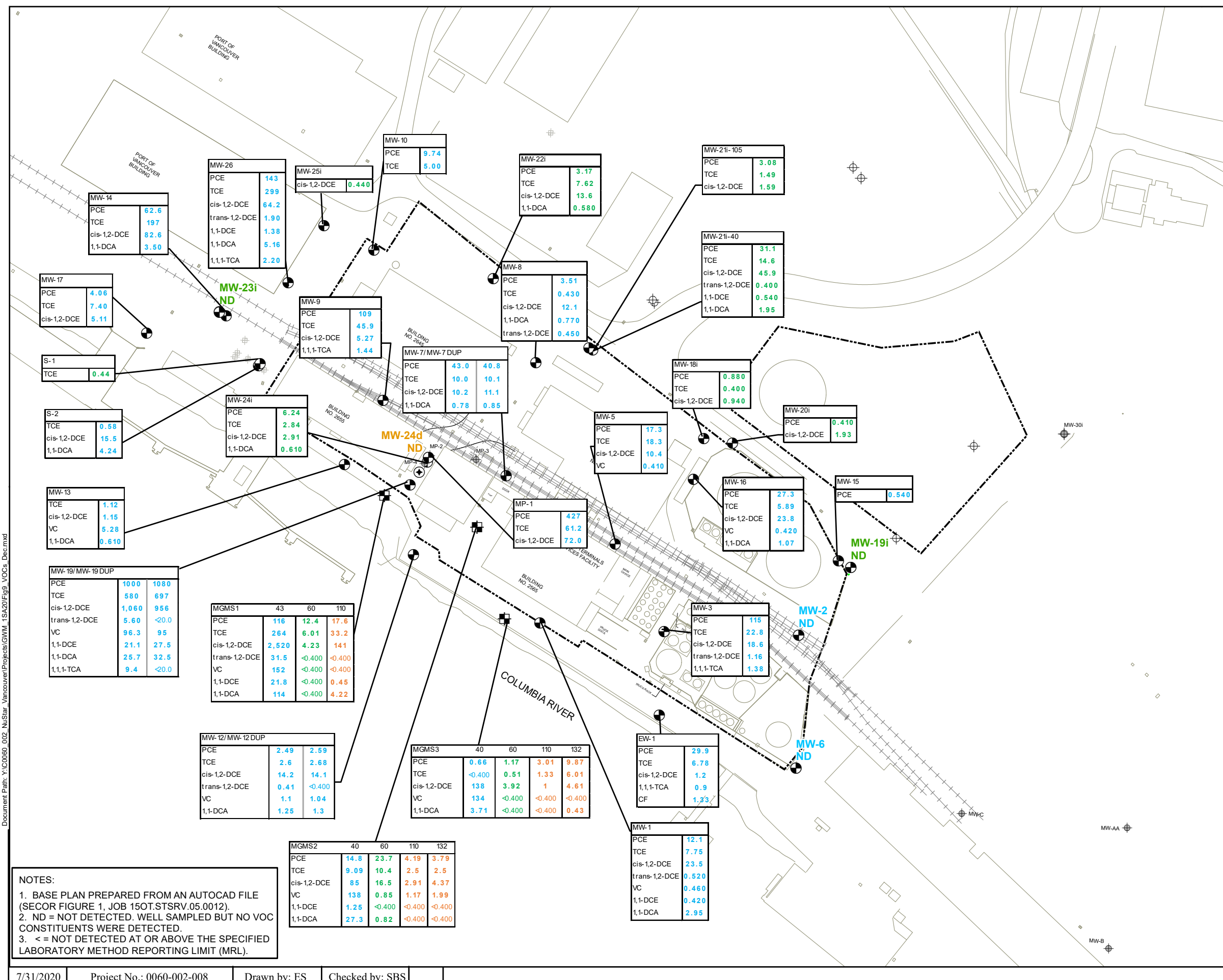


**Nitrate and Ammonia Concentrations in Groundwater (March 2020)**  
 First Semi-Annual Groundwater Monitoring Report 2020  
 NuStar Terminals Services, Inc. Vancouver Facility  
 Vancouver, Washington

**NOTES:**  
 1. BASE PLAN PREPARED FROM AN AUTOCAD FILE (SECOR FIGURE 1, JOB 150T.STSRV.05.0012).  
 2. <= NOT DETECTED AT OR ABOVE THE SPECIFIED LABORATORY METHOD REPORTING LIMIT (MRL).  
 3. NM = NOT MEASURED.

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WELL IDENTIFICATION		DEPTH OF PORT SAMPLED (IF NOT SPECIFIED - SINGLE PORT WELL)	
MGMS1		43	60
PCE	212	33.2	
TCE	434	19.0	
cis-1,2-DCE	3,240	27.9	
trans-1,2-DCE	53.9	<0.400	
VC	113	7.89	
1,1-DCE	30.5	0.443	
1,1-DCA	156	4.58	

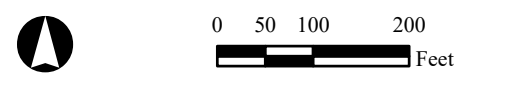
ANALYTE SAMPLED

**Legend**

- Port of Vancouver Well
- Multi-Level Groundwater Well
- Monitoring Well
- Historical Groundwater Extraction Well
- Abandoned Groundwater Well
- Approximate Property Line

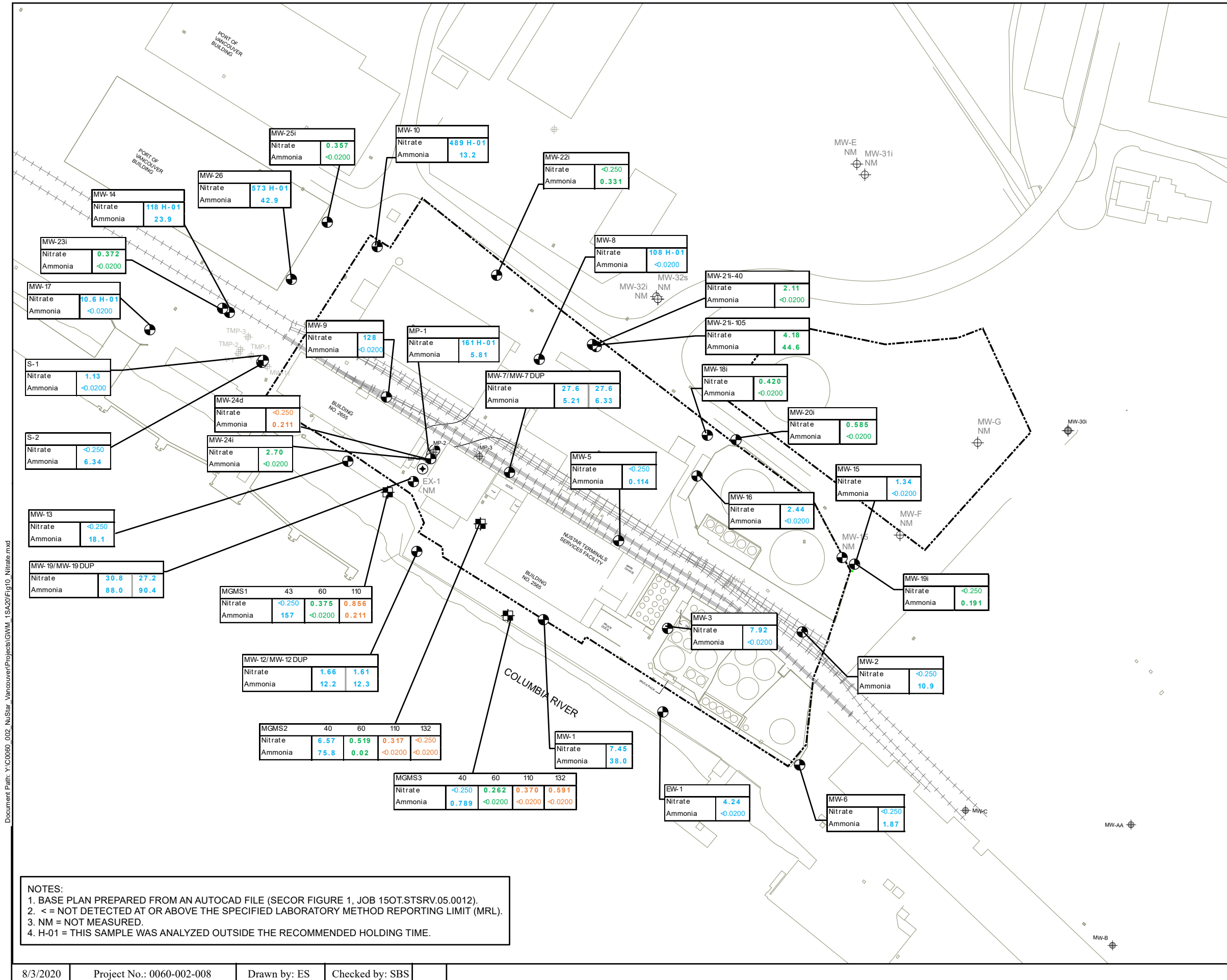
**BLUE** - Shallow zone concentration data  
**GREEN** - Intermediate zone concentration data  
**ORANGE** - Deep zone concentration data

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
CF	CHLOROFORM
1,1,1-TCA	1,1,1-TRICHLOROETHANE
CA	CHLOROETHANE



**VOC Concentrations in Groundwater (June 2020)**  
 First Semi-Annual Groundwater Monitoring Report 2020  
 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. ND = NOT DETECTED. WELL SAMPLED BUT NO VOC CONSTITUENTS WERE DETECTED.  
 3. < = NOT DETECTED AT OR ABOVE THE SPECIFIED LABORATORY METHOD REPORTING LIMIT (MRL).

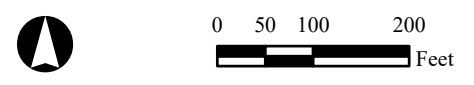


WELL IDENTIFICATION

MW-22i		
Nitrate	<0.250	NITRATE IN mg/L (AS NITROGEN METHOD 300.0)
Ammonia	0.339	AMMONIA IN mg/L (AS NITROGEN METHOD 350.1)

- Legend**
- ⊕ Port of Vancouver Well
  - ⊕ Multi-Level Groundwater Well
  - ⊕ Monitoring Well
  - ⊕ Historical Groundwater Extraction Well
  - ⊕ Abandoned Groundwater Well
  - Approximate Property Line

**BLUE** - Shallow zone concentration data  
**GREEN** - Intermediate zone concentration data  
**ORANGE** - Deep zone concentration data



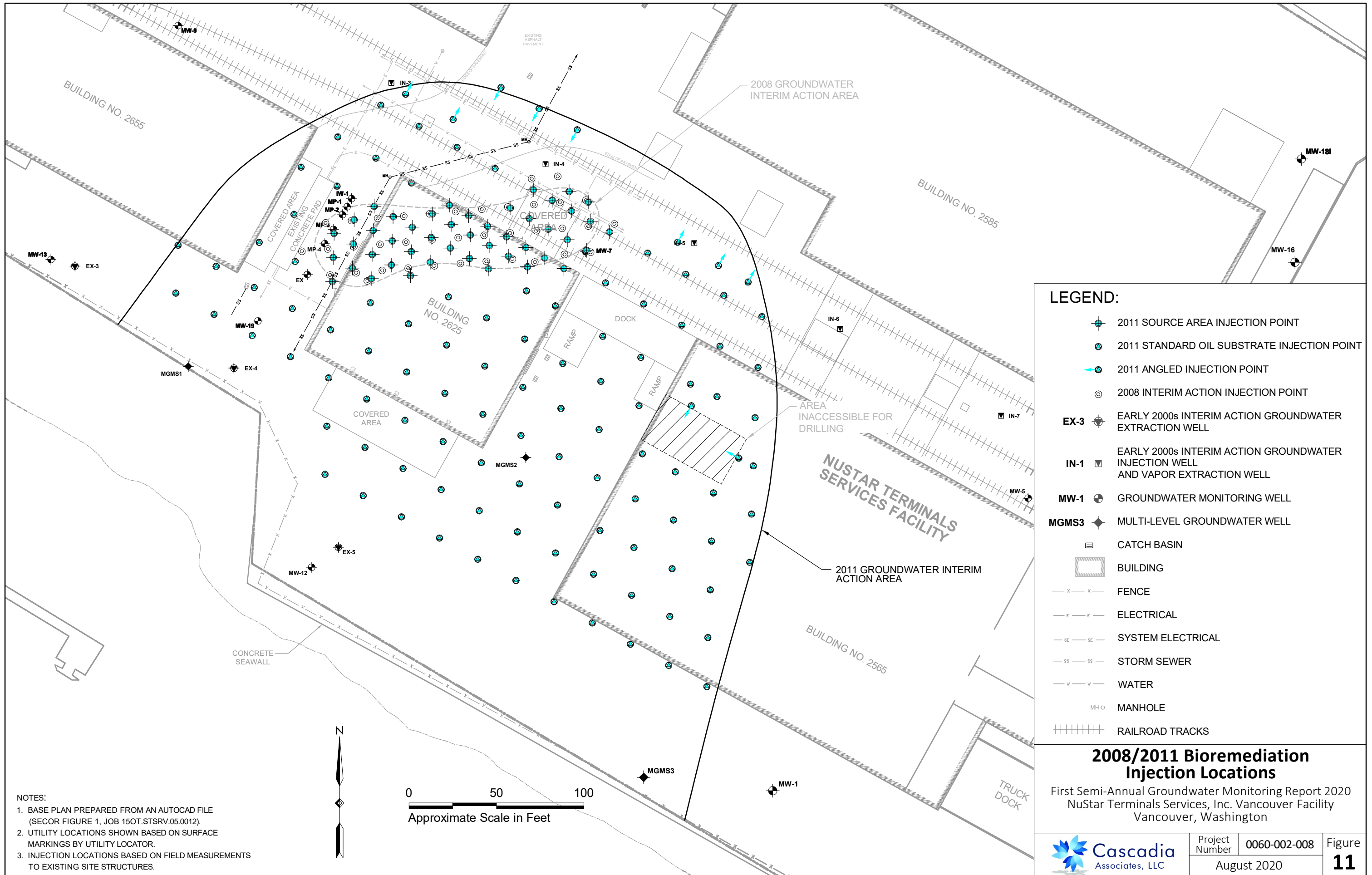
**Nitrate and Ammonia Concentrations in Groundwater (June 2020)**

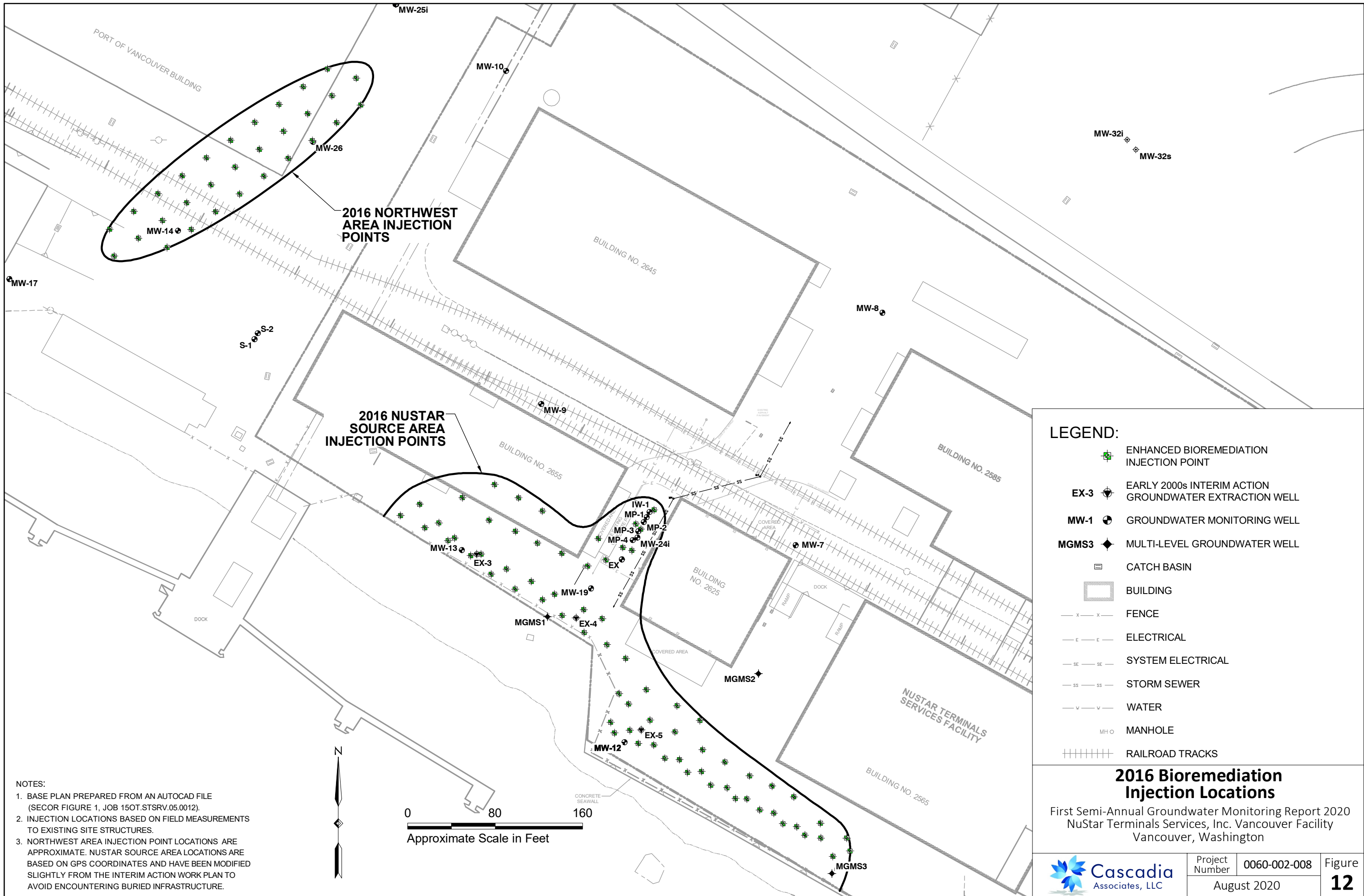
First Semi-Annual Groundwater Monitoring Report 2020  
 NuStar Terminals Services, Inc. Vancouver Facility  
 Vancouver, Washington

**NOTES:**  
 1. BASE PLAN PREPARED FROM AN AUTOCAD FILE (SECOR FIGURE 1, JOB 150T.STSRV.05.0012).  
 2. < = NOT DETECTED AT OR ABOVE THE SPECIFIED LABORATORY METHOD REPORTING LIMIT (MRL).  
 3. NM = NOT MEASURED.  
 4. H-01 = THIS SAMPLE WAS ANALYZED OUTSIDE THE RECOMMENDED HOLDING TIME.

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**LEGEND:**

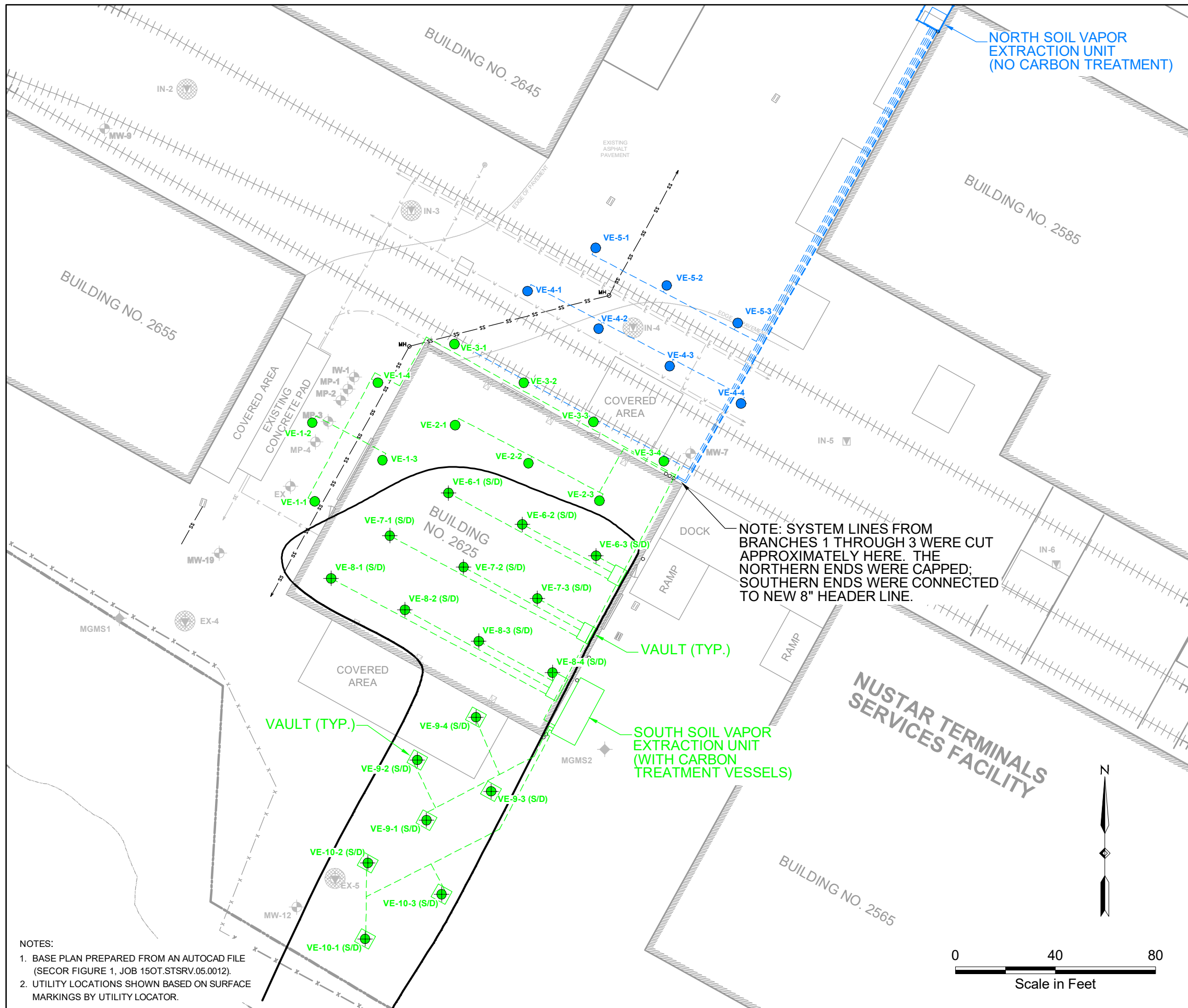
- ENHANCED BIOREMEDIATION INJECTION POINT
- EARLY 2000s INTERIM ACTION GROUNDWATER EXTRACTION WELL
- GROUNDWATER MONITORING WELL
- MULTI-LEVEL GROUNDWATER WELL
- CATCH BASIN
- BUILDING
- FENCE
- ELECTRICAL
- SYSTEM ELECTRICAL
- STORM SEWER
- WATER
- MANHOLE
- RAILROAD TRACKS

**2016 Bioremediation Injection Locations**  
 First Semi-Annual Groundwater Monitoring Report 2020  
 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.



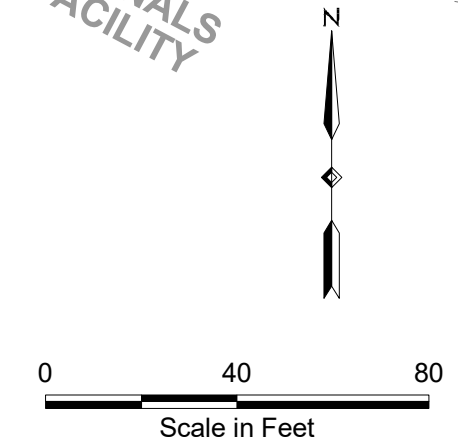


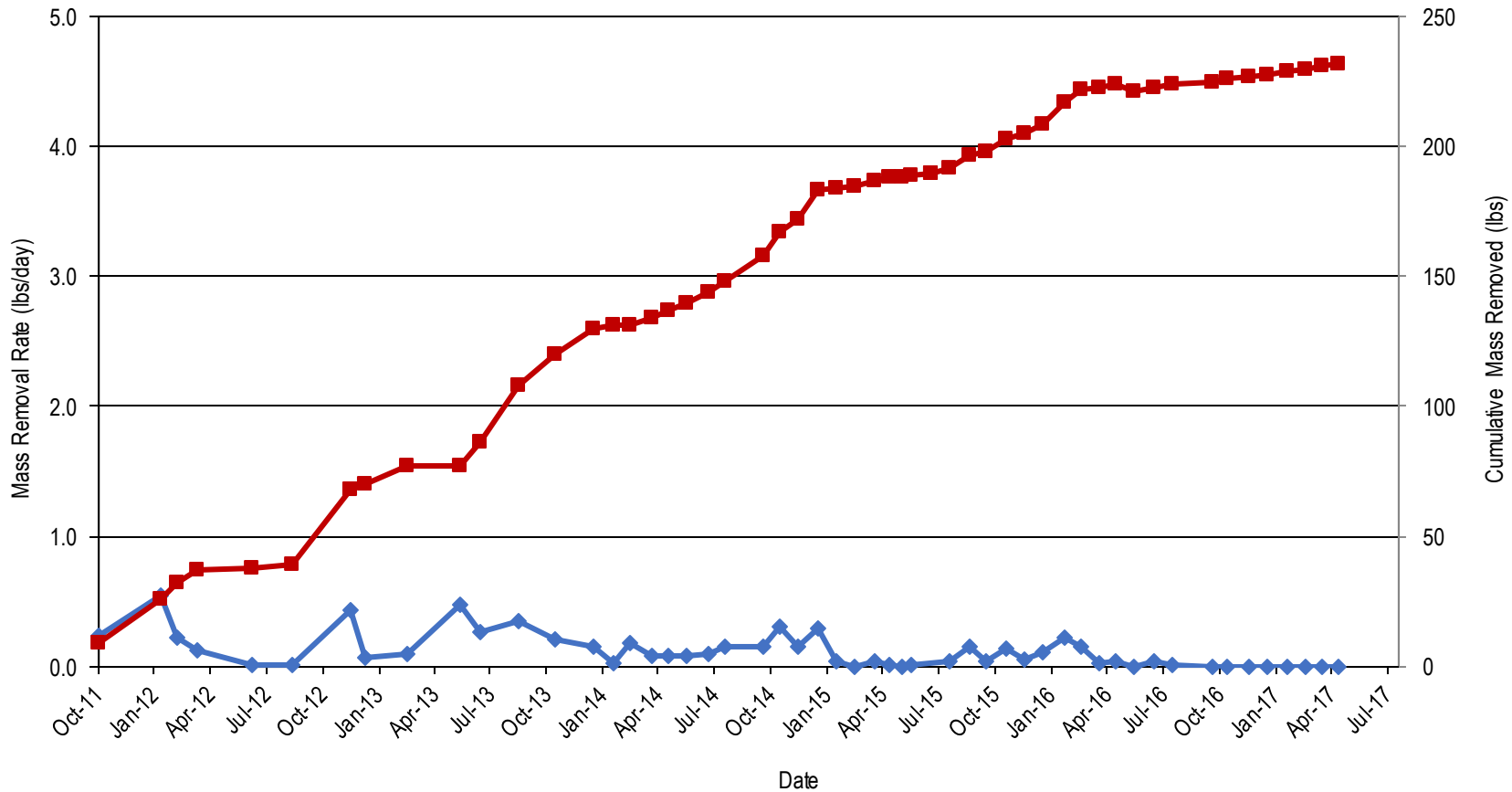
**LEGEND:**

- 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

**NOTES:**

1. BASE PLAN PREPARED FROM AN AUTOCAD FILE (SECOR FIGURE 1, JOB 150T.STSRV.05.0012).
2. UTILITY LOCATIONS SHOWN BASED ON SURFACE MARKINGS BY UTILITY LOCATOR.





**Legend:**

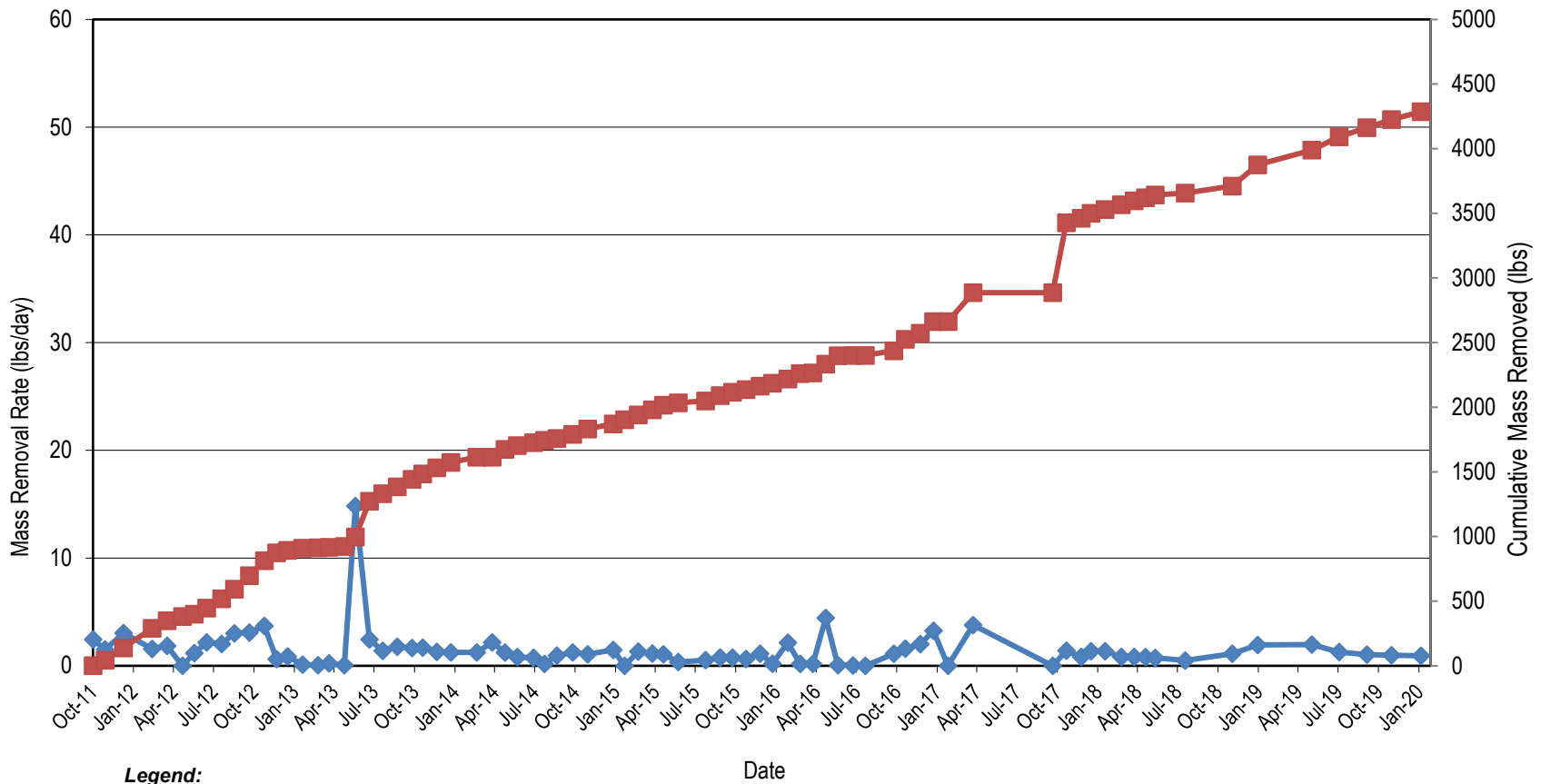
- ◆ Volatile Organic Compound (VOC) Removal Rate (lbs/day)
- Approximate Cumulative VOCs Removed (lbs)

**North SVE System – VOC Mass Removal**

First Semi-Annual Groundwater Monitoring Report 2020  
 NuStar Terminals, Inc. Vancouver Facility  
 Vancouver, Washington



Figure  
**14**



**Legend:**

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

**South SVE System – VOC Mass Removal**

First Semi-Annual Groundwater Monitoring Report 2020  
 NuStar Terminals, Inc. Vancouver Facility  
 Vancouver, Washington



Figure  
**15**

**APPENDIX A**  
**FIELD SAMPLING DATA SHEETS**

Project: *No Star Name*  
 Client:  
 Sampler: *FW*

Date: *3/9/20*  
 Permit: *5757*

	Well ID:	Time:	DTP:	DTW:	Product Thickness:	Notes:
<i>MW-6</i>	<del>MGMS2-40</del>	<i>1422</i>		<i>27.26</i>		
<i>EW-1</i>	<del>MGMS2-60</del>	<i>815</i>		<i>25.09</i>		
<i>MW-1</i>	<del>MGMS2-110</del>	<i>826</i>		<i>26.34</i>		
<i>MW-3</i>	<del>MGMS2-132</del>	<i>820</i>		<i>27.65</i>		
<i>MW-5</i>	<del>MGMSI-43</del>	<i>1018</i>		<i>27.15</i>		
<i>MP-1</i>	<del>MGMSI-60</del>	<i>1434</i>		<i>27.17</i>		
<i>MW-19</i>	<del>MGMSI-110</del>					
<i>MW-12</i>	<del>MW-24d</del>	<i>840</i>		<i>25.16</i>		
<i>MW-19</i>	<del>MW-24i</del>	<i>849</i>		<i>27.03</i>		
<i>MW-13</i>	<del>S-1</del>	<i>858</i>		<i>26.66</i>		
<i>S-2</i>	<del>MW-23i</del>	<i>907</i>		<i>27.34</i>		
<i>MW-14</i>	<del>MW-25i</del>	<i>928</i>		<i>27.03</i>		
<i>MW-17</i>	<del>MW-22i</del>	<i>920</i>		<i>27.20</i>		
<i>MW-7</i>	<del>MW-21i-105</del>	<i>1024</i>		<i>26.94</i>		
<i>MW-9</i>	<del>MW-21i-40</del>	<i>1031</i>		<i>26.99</i>		
<i>MW-26</i>	<del>MW-32i</del>	<i>939</i>		<i>26.81</i>		
<i>MW-10</i>	<del>MW-18i</del>	<i>946</i>		<i>26.65</i>		<i>No Bolts</i>
<i>MW-8</i>	<del>MW-20i</del>	<i>954</i>		<i>26.71</i>		
<i>MW-525</i>	<del>MW-19i</del>	<i>1007</i>		<i>28.14</i>		
<i>MW-16</i>		<i>1155</i>		<i>27.13</i>		
<i>MW-15</i>		<i>1441</i>		<i>32.23</i>		
<i>MW-2</i>		<i>1410</i>		<i>28.26</i>		
<i>MW-F</i>		<i>1503</i>		<i>28.57</i>		

Project: *Mustar Vanc*  
 Client:  
 Sampler: *GW*


Date: *3/9/20*  
 Permit:

*MGMS*

Well ID:	Time:	DTP:	DTW:	Product Thickness:	Notes:
MGMS2-40					<i>Tape Stopped</i> <i>24.04</i>
MGMS2-60					<i>0.85</i>
MGMS2-110					<i>0.77</i>
MGMS2-132					<i>24.95</i>
MGMS1-43					<i>22.05</i>
MGMS1-60					<i>11.70</i>
MGMS1-110					<i>2.65</i>
MW-24d	<i>1235</i>		<i>28.24</i>		
MW-24i	<i>1230</i>		<i>27.92</i>		
S-1	<i>1107</i>		<i>26.95</i>		
MW-23i	<i>1042</i>		<i>27.99</i>		
MW-25i	<i>1058</i>		<i>27.74</i>		
MW-22i	<i>1115</i>		<i>28.58</i>		
MW-21i-105	<i>1124</i>		<i>28.14</i>		
MW-21i-40	<i>1131</i>		<i>28.30</i>		
MW-32i	<del><i>1038</i></del>		<del><i>27.74</i></del>	<i>28.63</i>	
MW-18i	<i>1146</i>		<i>27.60</i>		
MW-20i	<i>1155</i>		<i>27.75</i>		
MW-19i	<i>1214</i>		<i>27.98</i>		
<i>MGMS3-10</i>			<del><i>27.24</i></del>		<i>25.81</i>
<i>MGMS-3</i>	<i>132</i>		<del><i>27.24</i></del>		<i>22.24</i>
"	<i>40</i>				<i>13.02</i>
"	<i>60</i>				<i>13.45</i>

*27.92*

**WELL MONITORING DATA SHEET**

 <b>Cascadia</b> Associates, LLC	Well ID: <u>MW-3</u>	Job Number: <u>          </u>
	Client: <u>No Star Valve</u>	Date: <u>10/3/10</u>
	Project: <u>GRM 1Q 20</u>	Sampler: <u>          </u>
	Weather: <u>Sun 35°</u>	Time In/Out: <u>9:30 - 10:15</u>

**WELL DATA**

Monument Type: <u>Flush-mount/Stick-up</u> Other: <u>          </u>	Well Diameter: <u>2"</u>	Depth to Free Product: <u>          </u>
Monument Condition: <u>good</u>	Well Depth: <u>          </u>	Free Product Thickness: <u>          </u>
Well Cap Lock Present: <u>Yes</u> <u>No</u>	Depth to Water: <u>28.34</u>	Water Column Length: <u>          </u>
Comments: <u>          </u>	Screened Interval: <u>          </u>	Purge Volume: <u>          </u>

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal):    1-inch well = 0.041    2-inch = 0.162    4-inch = 0.653    1 gal = 3.785 liters

**PURGING DATA**

Purge Method: <u>BP</u>			Pump Intake Depth: <u>MS</u>			Tubing Material & Type: <u>SB</u>		NEW <input checked="" type="checkbox"/> DEDICATED		
Sampling Method: <u>          </u>	Cumulative Volume Purged (liters)		DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Clarity/Color Other Remarks
	Volume Purged (liters)				+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
939			28.34	.2	6.94	7.39	309	12.66	26.4	clear
942			28.40		6.95	12.05	346	6.19	26.3	
945			28.46		6.92	12.43	347	4.63	36.1	
948			28.48		6.99	12.44	351	4.41	42.1	
951			28.49		6.84	12.35	355	4.39	44.8	

**PURGING DATA**


Sample ID: <u>MW-3</u>	Sampling Flow Rate: <u>2</u>	Analytical Laboratory: <u>Apex</u>
Sample Time: <u>951</u>	Final Depth to Water: <u>28.45</u>	Did Well Dewater: <u>No</u>
No. of Containers/Type	Preservative	Analysis/Method
<u>3x 40</u>	<u>HCl</u>	<u>          </u>
<u>1x 250</u>	<u>H2SO4</u>	<u>H</u>
<u>1x 250</u>	<u>          </u>	<u>          </u>

**NOTES/ADDITIONAL COMMENTS**

3 bolts  
1 clasp  
Mon, lid sk.  
Gasket - N

T=67

WELL MONITORING DATA SHEET

 <b>Cascadia Associates, LLC</b>	Well ID:	MW-1	Job Number:	
	Client:	Nor St Vance	Date:	3/15
	Project:	GWM 1A2	Sampler:	ALJ
	Weather:	Sun 45	Time In/Out:	1030

WELL DATA

Monument Type:	Other: <u>good</u>	Well Diameter:	2"	Depth to Free Product:	—
Monument		Well Depth:	—	Free Product Thickness:	—
Well Cap Lo	Present: <u>Yes</u>	Depth to Water:	26.32	Water Column Length:	—
Comments:		Screened Interval:	—	Large Volume:	—
Purge Volum	(Water Height) X (Multiplier) X (# Crans Volumes)				
Water height	(multiplier x ft)	2-inch = 0.162			

PURGING DATA

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	BH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Clarity/Color Other Remarks
						+/-0.5 °C				
1040			26.92	.2	6.80	12.02	653	47	1099	Clear
1043			26.32	.1	6.79	12.40	60	29	157	
1046			26.4		6.79	13.12	566	1.61	136	
1049			↓	↓	6.77	13.50		1.17	10	
1052			↓	↓	6.76	13.60	523	.9	98.0	
1055			↓	↓	6.76	13.65	510	.84	96.7	

PURGING DATA

Sample ID:	MW-1	Sampling Flow Rate:	.2		
Sample Time:	1055	Well Depth to Water:	26.32		
No. of Cont	Preservative	Field Filtered			
M 3x40	HCl				
1x250	H <sub>2</sub> O <sub>2</sub>				
1x25					

NOTES

Botts 3  
Gashe 9.6

7 (35)



WELL MONITORING DATA



Cascadia Associates, LLC

Well ID:	MW-15	Job Number:	
Client:	New Star Van	Date:	3/10
Project:	625M102 Sum 50°	Sampler:	113

Monument Type:	Flush-mount/Stick-up Other:	Well Diameter:	4"	Depth to Free Product:	
Monument Condition:	good	Depth to Water:	26.71	Water Column Length:	
Well Cap Lock Present:	No	Screened Interval:		Purge Volume:	

Comments:

Purge Volume = (Water H  
Water height multipl g 1-inch well = 0.041 2-inch = 0.162 1 gal = 3.785 liters

Purge Method:		Sampling Method:		Tubing Material & Type:							
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)			Cond (µS/cm)	DO (ppm)			Clarity/Color	Other Remarks
				+/-0.1	+/-0.5 °C			+/-0.5 ppm	+/-20 mV		
1137	-	-	26.71	.2	6.9	14.92	728	1.01	90.1		
1140			26.74		6.80	15.12	1127	8.32	3		
1143			26.79		6.89	15.1	1185	7.14	-109.2		
1146			26.81		6.99	15.35	1201	5.95	-119.1		
1149			8		7.02	15.35	1196	5.85	-120.5		
1152			26.80		7.06	15.38	119	5.76	122.2		

Sample ID:	MW-15	Sampling Flow Rate:	.2	Did Well Dewater:	Agree	
Sample Time:	115	Final Depth to Water:	26.82		No	
No. of Containers/Type		Analysis/Method		Field Filtered	Filter Size	Duplicate ID
3x 40		HCl				
2x 40		HCl				
1x 250		H2SO4				
1x 250						

NOTES/ADDITIONAL COM N

Botts: 3  
Gaskets: N, good other  
Time: 1.81





Cascadia  
Associates, LLC

Well ID:	5-2	Job Number:	
Client:	NuStar Vanc	Date:	3/10
Project:	GUM 1020	Sampler:	fw
Weather:	Sun 50°	Time In/Out:	13:5

Flush-mount/Stick-up	2		
Well Depth:	26.80	Water Column Length:	
Monument		Screened Interval:	
Well Cap Lock Present:	Yes	Purge Volume:	

Comments:	
Purge Volum	
Water height multipliers (gal):	1-inch well = 0.041    2-inch = 0.162    4-inch = 0.653

Purge Method:		Sampling Method:				MS		NEW / DEDICATED	
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1320			26.80	7.76	18.91	1	10.21		red / orange
1323				7.8	18.02	1248	9.07	43.2	
1326				7.17	1.9	1539	8.47	56.5	
1329				7.11	15.01	1630	8.04	56.5	
1332				7.09	14.99	6.4	7.90	55.9	
1335				7.80	14.84	1642	6.82	55.3	


Sample ID:	5-2	Sampling Flow Rate:	.2		
Sample Time:	1335	Final Depth to Water:	26.80	Did Well Dewater:	Apex No
No. of Containers/Type		Field Filtered		Filter Size	MS/MSD Duplicate ID
3x 4	ACE				
1x 250	H2SO4				
1x 250					

NOTES/ADDITIONAL CO

Bolt- 3x  
Gasket 1

T 314

WELL MONITORING DATA SHEET

	Well ID:	MW-17	Date:	3/10/10
	Client:	Max Store Valve	Sampler:	JL
	Project:	GLM 1020	Time In/Out:	1400-1445
	Weather:	sun		

WELL DATA

Monument Type:	Flush-mount/Stick-up	Well Diameter:	4"	Depth to Free Product:	—
	Other:	Well Depth:	—		—
Monument Condition:	ok	Depth to Water:	26.28	Water Column Length:	—
Well Cap Lock Present:	No	Screened Interval:	—		—

Comments:

Purge Volume = (Water Height) X (Mu)

Water height multipliers (gal): 2-inch = 0.162

Purge Method: *BL*

Sampling Method: *MS*

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	Temp (°C)	Temp (°C)	Temp (°C)	Temp (°C)	Temp (°C)
1407			26.28	.2	7.39	15.91	1.91	1	5 draw
1410			↓	↓	7.38	15.48	13.9	4.54	
1413			↓	↓	7.40	14.65	11.87	30	6-0
1416			↓	↓	7.42	14.42	1.94		69.7
1419			↓	↓	7.42	14.34	0.74	1.2	7.8
1422			28	↓	7.42	14.37	0.6	1.8	74.1


RGING

Sample ID:	MW-17	Sampling Flow Rate:	2	
Sample Time:	1422	Final Depth to Water:	26.29	<i>Apex</i>
No. of Containers/Type	Preservative			
3x40	HCl			
1x250	H2SO4			
1x250	—			

NOTES/ADDITIONAL CO

Botts: 3  
 Gasket: dmg.

WELL MONITORING DATA SHEET

	Well ID:	MW-12	Job Number:	
	Client:	Nu Star V	Date:	3/15
	Project:	GLSM 1220	Sampler:	du
	Weather:	Sun / low 40°	Inlet/Out:	730

WELL DATA

Monument Type:	Flush-mount / Stick-up	Well Diameter:	4"	Depth to Free Product:	
Monument Condition:	Other:	Well Depth:		Free Product Thickness:	
Well Cap Lock Present:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Depth to Water:	27.19	Water Column Length:	
Comments:		Screened Interval:		Purge Volume:	

Purge Volume = (Water Height) x (Multiplier) x (# Casing Volumes)

Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters
---------------------------------	---------------------	----------------	----------------	----------------------

PURGING DATA

Purge Method:		BP		Pump Intake Depth:		SS		NEW		DEDICATED	
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Clarity/Color	Other Remarks
752			77.9		6.77	3.6	961	1.76	6.2		clear
755					6.74	14.1	99	7.4	68.0		
758					6.6	0	10	5.0	7		
801					6	1.9	105	4.9	87.8		
804					6.6	15.2	99	5.1	90.7		
807					6.54	15.30	976	5.1	91.3		

PURGING DATA

Sample ID:	MW-12	Sampling Flow Rate:	2	Analytical Laboratory:	Apex	
Sample Time:		Final Depth to Water:	27.9	Old Well Dewater:	N	
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x 40	HCl	VOC				
2x 40	HCl	RSL				
1x 250	H2SO4	NO3/NO2				
1x 250		NH3				
3x 40	HCl	VOC				MW 12 Dup
2x 40	HCl					MW 12 Dup
3x 40	HCl					
1x 25	H2SO4					1 9 MW 1
Gashe	1x 25					MW 2 Dup

3  
4



Cascadia  
Associates, LLC

Well ID:	MW 14	Job Number:	
Client:	Nustar Van	Date:	3/11/20
Project:	GWM 1020	Sampler:	B40
Weather:	Cloudy 40°	Time In/Out:	

Monument Type:	Stick-up	Well Diameter:	4"	Depth to Free Product:	—
Other:		Well Depth:		Free Product Thickness:	—
Monument Condition:	good	Depth to Water:	7.04	Water Column Length:	—
Well Cap Lock Present:	Yes No	Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volum = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (well): 1-inch well = 0.041, 2-inch = 0.162, 4-inch = 0.653, gal = 3.785 liters

Purge Method:		BP		Pump Intake Depth:		MS		W		DEDICATED	
Sampling Method:		2b		Tubing Material & Type:		SB					
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Clarity/Color	Other Remarks
					+/-0.1	+/-0.5 °C					
849			27.04		6.47	9	9	68	00		clear
852			↓	↓	6.59	2.20	172	56	104		↓
855			↓	↓	6.7	11.29	1	570	7		↓
859			↓	↓	6.70	12.32	1687	384	10		↓
901			↓	↓	6.70	12.44		5	190		↓
904			↓	↓	6.71	12.41	113	330	08.2		↓

Sample ID:	MW 14	Sample Flow Rate:	2	Analysis Laboratory:	Apex
Sample Time:	904	Final Depth to Water:	27.08		
No. of Cont:		Field Filtered:			
3 40	HCO	VOC			
1 250	+2504	NO2/NO7			
1 250		NH3			

Bolt 3-ok  
Gaske 4

76



Cascadia  
Associates, LLC

Client:	MW 10 N Star Van C	Job Number:	
Project:	Quam 1Q 20	Date:	3/11
Weather:	lt rain	Sampler:	45
		Time In/Out:	930

Monument Type:	<input checked="" type="radio"/> Flush-mount/stick-up <input type="radio"/> Other:	Well Diameter:	4"	
Monument Condition:	good	Well Depth:	26.50	
Well Cap Lock Present:	<input checked="" type="radio"/> Yes <input type="radio"/> No	Screened Interval:	-	Purge Volume:

Purge Volum	
Water height multipliers (gal):	1-inch well = 0.041      4-inch = 0.653

Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	Purge Meth			Cond (µS/cm)	DO (ppm)	ORP (mV)
			SP	MS	MS			
947	26.58	.2			1929	5.23	111.1	
950	↓	↓			2258	4.60	111	
953	↓	↓			3130	3.45	121	
956	↓	↓			4099	2.67	118.8	
959	↓	↓			3983	2.49	116.5	
1002	↓	↓			3927	2.41	115.4	

Sample ID:	MW 10	Sampling Flow Rate:	.2	Analytical Laboratory:	Apex
Sample Tim	1002	Final Depth to Water:	26.61		No
No. of Containers/Type	Preservative	Field Filtered	Filter Size	MS/MSD	
3x 40	HCE				
1x 250	H2SO4	VOC			
1x 250		N02/N03			
		NH3			

Bolt None  
Gasket ok

T 22



**Cascadia**  
Associates, LLC

Well ID: MW 9  
 Client: New Star Vane  
 Project: GW M 1020  
 Weather: 1st rain  
 Date: 3/14  
 Sampler: dw  
 Time In/Out: 1025

Monument Type: Stick-up Well Diameter: 4"  
 Monument Condition: good Well Depth: —  
 Well Cap Lock Present: Yes Screened Interval: —  
 Comments: —  
 Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)  
 Water Height: —

Purge Meth: SP  
 Sampling M: lf  
 Tubing Material & Type: MS

Time	Volume Pumped	Cumulative Volume Purged	DTW (btc)	Purge Rate (l/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Clarity/Color/Other Remarks
						+/-0.5°C				
1029			2.00	.2	7.29	11.5	735	6.44	107	clear
1032			27.13	.1	5.90	11.29	216	6.82	109	
1035			27.15		5.91	11.20	2127	6.89	108	
1038					5.90	11.11	109	0	11	
1041					5.90	11.09	898	6.8	11	

Sample ID: MW 9  
 Sample Time: 1041 Final Depth to Water: 7.19  
 No. of Containers/Type: 3x 40 Preservative: HCl Field Filtered: —  
1x 250 H2SO4 NH3 No?  
1x 250 — NH3

Botts: 3  
 Casing: No - threaded 10 - 0.88 ft





Cascadia  
Associates, LLC

Client:	MW 7 Nw Steer Van	Sampler:	3/11 JW
P	GWSM 1020		
Weather:	pt cloud		111

Monument Type:	Flush-mount/Stick Other	Well Diameter:	4	Depth to Free Product:	-
Monument Condition:	ok	Well Depth:		Free Product Thickness:	-
Well Cap Lock Present:	ok	Depth to Water:	26.98	Water Column Length:	
Comments		Screened Interval:		Purge Volume:	✓

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)	
Water height	1-inch well = 0.041      2-inch = 0.162      1 gal = 3.785 liters

Time	Volume Purged (liters)	OTW (ft)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Clarity/Color/Other Items
1117		26.98	.2	6.13	10.6	1745	1.11	1	clear
1120				6.22	10.1	1601	0.88	118.1	
1123				6.39	11.14	1184	6.74	110.3	
1126				6.43	12.37	700	7	14.7	
1129				6.38	12.67	684	3.68	108.1	
1132				6.37	12.70	677	3.9	109.1	

Sample ID:	MW 7	Final Depth to Water:	26.98	Apex No	
Sample Time	113	Analysis/Method	Field Filtered		
No. of Containers/Type	3x 40	HCL	VOC		
	2x 40	HCL	RSL/HCL		
	1x 250	H SO 1	NO3/NO2		
	1x 250		NH4		
	3x				MW 7 Dup
	<del>3x 40</del>				MW 7 Dup

Botts. 2  
Gashe ok Sherwood Reg 1x 250 MW 7 Dup 688  
1x 250 MW 7 Dup



Cascadia Associates, LLC

Well ID:	MP-1	Job Number:	
Client:	Nuster ✓	Sampler:	3/15
Project:	Sum 1020		
Weather:	Sun		1210

Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	—
Monument	Other: <u>good</u>	Well Depth:	2714	Water Column Length:	—
Well Cap Lock Present:	Yes No	Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers: 2-inch = 0.162, 1 gal = 3.785 liters


Purge Method:	BP	Pump Intake Depth:	4.25
Sampling Method:	20	Tubing Material & Type:	4" NEW DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	Purge Rate (L/min)	Conductivity (µS/cm)	DO (ppm)	ORP (mV)	Notes		
				+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1219		2716	.2	6.9		665	7.63	108.8	clean
1222				6.55	12.71	846	4.02	101.2	
1225				6.71	13.18	916	2.54	109.0	
1228				7.08	13.64	1090	1.16	103.2	
1231				7.16	13.70	1101	.96	99.8	
1234				7.29	13.72	1118	.94	99.5	

Sample ID:	MP 1	Final Depth to Water:	27.21	Did Well Dewater:	Apex No
Sample Time:	1234	Analysis/Method		Duplicate ID	
No. of Containers/Type	Preservative	Field Filtered			
3x40	HCR	VOL			
2x40	HCR	R 4/TOC			
1x250	H 504	NO3/NO2			
1x250		N 3			

Botts: S  
Gasket: N

**WELL MONITORING DATA SHEET**

 <b>Cascadia</b> Associates, LLC	Well ID:	MW-19	Job Number:	
	Client:	New Star Vanc	Date:	3/11
	Project:	GWM 1020	Sampler:	fw
	Weather:	Sun 49°	Time In/Out:	1300

**WELL DATA**

Monument Type:	Flush-mount/Stick-up Other:	Well Diameter:	2"	Depth to Free Product:	-
Monument Condition:	good	Well Depth:	-	Free Product Thickness:	-
Well Cap Lock Present:	Yes No	Depth to Water:	26.92	Water Column Length:	-
Screened Interval:	-	Purge Volume:	-		

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal): 1-inch well = 0.041    2-inch = 0.162    4-inch = 0.653    1 gal = 3.785 liters

**PURGING DATA**

Purge Method:		6P		Pump Intake Depth:		MS		NEW		DEDICATED	
Sampling Method:		6P		Tubing Material & Type:		6P					
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Clarity/Color	Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV		
1308			26.92	.2	7.26	13.95	1198	3.31	86.7		clear
1311					7.34	13.92	1356	3.12	91.3		
1330					6.94	15.66	2940	4.08	92.4		
1336					6.94	15.66	2538	3.14	91.9		
1339					6.95	15.55	2664	3.07	89.2		
1342					6.94	15.58	2614	3.11	88.5		
1345					6.96	15.62	2662	3.01	87.0		

**PURGING DATA**

Sample ID:	MW-19	Sampling Flow Rate:	.2	Analytical Laboratory:	Apex	
Sample Time:	1345	Final Depth to Water:	26.95	Did Well Dewater:	No	
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x 40	HCL	VOC				
2x 40	HCL	RSC/TOC				
1x 250	H2SO4	NO2/NO3				
1x 250		NH3				
3x 40	HCL	NO2/NO3				MW-19 Dup
1x 250	H2SO4	NH3				MW-19 Dup
1x 250						MW-19 Dup

**NOTES/ADDITIONAL COMMENTS**

Botts: 3    1315 - Air line clamp failing. Intermittent pumping


Gasket: 4    1330 - purging; fails again after Cascadia sample

Well Seal: ✓    1430 - Antid sample

Other: (H2O, cracks)

~~11/10/19~~

WELL MONITORING DAT

	Well ID:	MW-16	Job Number:	
	Client:	Waste VAN	Date:	3/11/20
	Project:	1020	Sampler:	LN
	Weather:		Time In/Out:	

Monument	Flush-mount/Stick-up		44	Depth to Free Product:	-
Monument	g.o.d	Well Depth:	-	Depth to Water:	27.08
Well Cap Lock Present:	eg	Screened Interval:	-	Water Column Length:	-
Comments:				Purge Volume:	-

Purge Volume			
Water heig	1-inch well = 0.041	2-inch = 0.162	1 gal = 3.785 liters


PURGING DATA										
Purge Method:	BP									
Sampling Method:	LF				SB				DUPLICATED	
Time	Volume Purged (liters)							ORP (mV)	Clarity/Color Other Remarks	
				+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm			
1405		27.08	0.25	6.14	5	262	10.70	65.7	Le	
1408		27.01	↑	6.23	14.7	2	102	62.9	↓	
1411		↓	↑	6.23	14.7	271	9.30	59.5	↓	
1414		↓	↑	6.26	13.1	301	9.33	58.1	↓	
1417		↓	↑	6.29	13.51	323	9.35	7	↓	
1420		↓	↑	6.05	13.17	389	6	59.1	↓	
1423		↓	↑	5.59	13.09	469	5	69.8	↓	
1426		↓	↑	5.52	13.12	4	8.86	7	↓	
1429		↓	↑	5.50	13.14	45	1	72.3	↓	

GING DATA							
Sample ID:	MW-16	Sampling	0.25				
Sample Time:	1420	Final Depth to Water:	27.08				
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	Duplicate ID		
3x10	H21	AVOCs	←	←	←		
1x250		NO2/NO3	←	←	←		
1x250	H2004	NH3	←	←	←		

NOTES/ADDITIONAL COM

Botts.  
Gashe & ;

WELL MONITORING DATA SHEET

	Well ID:	EW-1	
	Client:	Muster VAN	3/1
	Project:	1020	✓
	Weather:	sun	

Monument Type:	Flush-mount/Stick-up	Well Diameter:	24	Free Product Thickness:	✓
	Other:		✓		✓
Monument Condition:	Good		250		✓
Well Cap Lock Present:	Yes No	Screened Interval:	✓	Purge Volume:	✓

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volume)

Water height multipliers (gal): 1-inch well = 0.041      0.162

GING DATA

Purge Method:		BP		Pump Intake Depth:		ms		EDCA ED		
Sampling Method:		LF		Tubing Material & Type:		SB				
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (bt)			Cond (µS/cm)		ORP (mV)	Clarity/Color Other Remarks	
				+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm			
1325			25.01	0.25	6.15	15.56	267	11.66	21.2	c ac
1328			25.03	↓	6.02	15.59	226	6.41	4	
1331			25.05	↓	5.96	15.70	215	6.27		
1334			25.08	↓	6.00	15.58	214	7	61.2	
1337			25.10	↓	6.03	15.37	213	8	74.3	
1340			25.13	↓	6.05	15.38	213	8.62	76.1	
1343			25.16		6.05	15.40	213	8	77.6	
1346			25.17		6.05	15.41	213	8.86	77.9	


PURGING DATA

Sample ID:	EW-1	Sampling Flow Rate:	0.25	Analytical Laboratory:	APGX
Sample Time:	1340	Final Depth to Water:	25.2		
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD Duplicate ID
3x40	H2O	VOL			
1x250		NO2(NDS)			
1x250	H2SO4	NH3			

NOTES/ADDITIONAL COMMENTS

Botts.  
Gashe +:

WELL MONITORING DATA SHEET

	Well ID:	MW-21-40	Date:	3/11/2020
	Project:	W-122 VAN	Time In/Out:	1:00 PM
	Weather:	100% SUN		

WELL DATA					
Monument Type:	Flush Amount/St	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	—
Monument Condition:	OK - bolt struck	Depth to Water:	27.68		
Well Cap Lock Present:	No	Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volume)

Water height multipliers (gal): 1-inch well = 0.041    2-inch = 0.162    4-inch = 0.653    1 gal = 3.785 liters


PURGING DATA											
Purge Method:		BP LC			Pump Intake Depth:			MS SB			NEW / <input checked="" type="checkbox"/> DATED
Sampling Method:					Tubing Material & Type:						
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (l/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)			
					+/-0.1	+/-0.5 °C		+/-0.5 ppm	+/-20 mV		
1241			27.68	0.2	6.18	14.10	232	4.32	33.4	c level	
1244			↓	↓	6.00	15.00	262	5.34	34.6		
1247			↓	↓	6.00	14.79	279	5.47	32.9		
1250			↓	↓	6.04	14.88	280	2.36	17.0		
1253			↓	↓	6.05	14.87	278	2.37	8.4		
1256			↓	↓	6.06	14.87	278	2.37	2.1		

PURGING DATA						
Sample ID:	MW-21-40	Sampling Flow Rate:	0.2	Analytical Laboratory:	APIX	
Sample Time:	1300	Final Depth to Water:	27.68	Did Well Dewater:		
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x40	Ac	VOL				
1x50	—	NOL/MS				
1x20	H2SO4	NHS				

NOTES/ADDITIONAL COMMENTS

Bolts.  
Gasket:

WELL MONITORING DATA SHEET

	Well ID:	MW-20i	Job Number:	
	Client:	Master VAN	Sampler:	3/11/2020 LW
	Project:	Q20	Weather:	Sun

WELL DATA

Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	-
Monument Condition:	good	Well Depth:	-	Water Column Length:	-
Well Cap Lock Present:	Yes No	Screened Interval:		Purge Volume:	-

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volume)

Water height multipliers (gal): 1-inch well = 0.041    2-inch = 0.162    1 gal = 3.785 liters

PURGING DATA

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	NEW / DEDICATED	
1142			26.97	0.2	6.26	12.35	479	38.01	33.3			
1145			↓	↓	6.10	13.18	317	13.29	25.2			
1148			↓	↓	6.02	13.71	215	3.95	11.8			
1151			↓	↓	6.05	13.74	213	3.55	10.4			
1154			↓	↓	6.08	13.75	212	2.80	12.4			
1157			↓	↓	6.03	13.64	212	2.56	18.6			
1200			↓	↓	6.02	13.65	212	25.3	9			


PURGING DATA

Sample ID:	MW-20i	Sampling Flow Rate:	0.2	Analytical Laboratory:	APIX
Sample Time:	1200	Final Depth to Water:	26.97	Did Well Dewater:	No
No. of Containers/Type	Preservative	Analysis/Method	tered	Filter Size	MS/MSD
3x40	H2O2	HPLC			
1x250		NOZIMUS			
1x250	H2SO4	NH3			

NOTES/ADDITIONAL COMMENTS

Bolts.  
Gasket:

WELL MONITORING DAT

 <b>Cascadia</b> Associates, LLC	Well ID: MW-18	Job Number:
	Client: N 1/2 VAN 102	Date: 3/1/1
	Sum WE	Sampler: W

Monument	Flush-mount/Stick-up	2u	Depth to Free Product:
	Other:	Well Depth:	
Monument Condition:	good	27.09	Water Column Length: -
Well Cap Lock Present:	Yes No	Screened Interval:	-
Comments:			
Purge Volume = (Water)			
Water height multipliers	1-inch well = 0.041	1 gal = 3.785 liters	

Purge Method:		BP				MS SB		NEW DEDICATED	
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	Purge Rate (L/min)	Conductivity (µS/cm)	DO (ppm)	ORP (mV)	Quality Category		
				+/-0	+/-0.5 °C	+/-5%	+/-20 mV		
1059		27.09	0.2	6.17	12.75	2436	9.89	5	CL
1102		27.09	↓	6.36	13.30	9	8	1	↓
1105		↓	↓	6.45	13.77	209	3		↓
1108		↓	↓	6.38	13.72	172	5.81		↓
1111		↓	↓	6.22	13.66		9	8.4	↓
1114		↓	↓	6.28	6	145	5.24	41.0	↓
1117		↓	↓	6.19	13.46	143	5.19	4	↓
1120		↓	↓	6.17	13.43	43	5.7	50.4	↓


RINGING			
Sample ID: MW-18	Sample Time: 1115	Sampling Flow Rate: 0.2	APL
No. of Containers/Type	Preservative	Field Filtered	
3640	HCl	NO	
14250		NO	
14250	H2SO4	NH3	

NOTES/ADDITIONAL CO

Botts.  
Gash



WELL MONITORING DAT

	Well ID:	MW-26	Job Number:	
	Client:	WATER AN	Date:	3/11/11
	Project:	1Q 20 Ra	Sampler:	EW
	Weather:		Time In/Out:	

Type:	Flush Count/Stick-up	20	
Monument Condition:	Other: good	Well Depth:	—
Well Cap Lock Present:	<input checked="" type="checkbox"/> No	Depth to Water:	26.50
		Water Column Length:	—
		Screened Interval:	—

Comments

Purge Volume (Water Height) X (Mu)

Water height multipliers (gal): 1-inch well = 0.041 4-inch = 0.653

Purge Method: BP LF

Sampling Method: M S/S

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)				DO (ppm)	ORP (mV)	
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV
1020			26.80	02	6.0	13.39	2219	16.68	77.0
1023			26.15		5.79	14.26		16.27	107.0
1026			26.25		5.89	14.31	4543	16.66	
1029			26.35		5.93	14.31	4518	10.72	86.9
1032			26.45		6.00	14.4	4488	10.87	75.1
1035			26.55		6.02	14.26	4501	10.81	72.3


URGING DATA

Sample ID:	MW-16			
Sample Time:	1035		26.05	greek
No. of Containers/Type	Preservative	Field Filtered		
2x40	HCl			
3x40	HCl			
1x200	H2SO4			
1x200				

NOTES/ADDITIONAL CO

Bolt Gasket:

**WELL MONITORING DATA SHEET**

 <b>Cascadia</b> Associates, LLC	Well ID: <u>MW-8</u>	Job Number: <u>3/11/2020</u>
	Client: <u>MUSTER VAN</u>	Date: <u>3/11/2020</u>
	Project: <u>1020</u>	Sampler: <u>LW</u>
	Weather: <u>Rain</u>	Time In/Out: <u></u>

**WELL DATA**

Monument Type:	Flush mount/Stick-up <input checked="" type="checkbox"/>	Well Diameter: <u>4"</u>	Depth to Free Product: <u>-</u>
	Other: <u></u>	Well Depth: <u>-</u>	Free Product Thickness: <u>-</u>
Monument Condition: <u>cracked</u>		Depth to Water: <u>26.61</u>	Water Column Length: <u>-</u>
Well Cap Lock Present: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Screened Interval: <u>-</u>	Purge Volume: <u>-</u>

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal): 1-inch well = 0.041    2-inch = 0.162    4-inch = 0.653    1 gal = 3.785 liters

**PURGING DATA**

Purge Method: <u>DP</u>		Pump Intake Depth: <u>MS</u>								
Sampling Method: <u>LC</u>		Tubing Material & Type: <u>SB</u>								
		NEW / <del>DISCATED</del>								
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5	+/-0.5 ppm	+/-20 mV	
935			26.61	0.2	5.77	12.21	2011	9.38	54.5	clear
938			26.61		5.88	13.07	2047	9.71	59.0	
941			↓		6.16	13.48	2064	9.97	53.2	
944			↓		6.24	13.76	2070	9.93	51.1	
947			↓		6.33	13.98	2083	10.14	52.4	↓
950			↓		6.39	14.14	2085	10.18	53.2	↓
953			↓		6.42	14.19	2081	10.23	53.5	↓


**PURGING DATA**

Sample ID: <u>MW-8</u>	Sampling Flow Rate: <u>0.2</u>	Analytical Laboratory: <u>Apex</u>
Sample Time: <u>950</u>	Final Depth to Water: <u>26.61</u>	Did Well Dewater: <u>NO</u>
No. of Containers/Type	Preservative	Analysis/Method
<u>3x40</u>	<u>H2O</u>	<u>VOL</u>
<u>1x250</u>	<u>-</u>	<u>NO2/NO3</u>
<u>1x250</u>	<u>H2O4</u>	<u>NH3</u>

**NOTES/ADDITIONAL COMMENTS**

Botts:  
Gash:

**WELL MONITORING DATA SHEET**

	Well ID:	MCMJ1-48	Job Number:	
	Client:	Mojave VAW	Date:	3/11/2020
	Project:	1 Q20	Sampler:	LW
	Weather:	Sun	Time In/Out:	

**WELL DATA**

Monument Type:	Flush-mount/Stick-up	Well Diameter:		Depth to Free Product:	
	Other: Vault	Well Depth:	-	product Thick	-
Monument Condition:		Depth to Water:	24.50	Water Column Length:	-
Well Cap Lock Present:	Yes No	Screened Interval:	-	Purge Volume:	-

Comments:   
 Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)   
 Water height multipliers (gal).    1-inch well = 0.041    2-inch = 0.162    4-inch = 0.653    1 gal = 3.785 liters

**PURGING DATA**

Purge Method:		PP LF		Pump Intake Depth:		MS		NEW / EDUCATED		
Sampling Method:				Tubing Material & Type:		CDPT				
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	T mp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
822			26.50	0.02	5.98	13.37	2058	14.37	-6.4	close
825			↓	↓	5.78	13.72	2093	16.12	3.6	↓
828			↓	↓	5.78	13.84	2121	16.14	-5.8	↓
831			↓	↓	5.82	13.87	2139	11.02	-22.2	↓
834			↓	↓	5.85	13.85	2151	9.03	-24.3	↓
837			↓	↓	5.83	13.86	2158	8.74	-24.1	↓
840			↓	↓	5.90	13.86	2163	8.33	-27.9	↓
843			↓	↓	5.92	13.83	2166	8.24	-40.1	↓


**PURGING DATA**

Sample ID:	MCMJ1-48	Sampling Flow Rate:	0.2	Analytical Laboratory:	Apex	
Sample Time:	840	Final Depth to Water:	24.50	Did Well Dewater:	NO	
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
2x40ml	HCl	RSK				
3x40 ml	HCl	VOCS				
1x250	-	NH3/				
1x250	H2SO4	NO2/NO3				

**NOTES/ADDITIONAL COMMENTS**

Botts:   
 Gasket:   
 . . .

**WELL MONITORING DATA SHEET**

	Well ID: <u>MGMS1-60</u>	Job Number: <u>3/12/2020</u>
	Client: <u>Nustar IAP</u>	Date: <u>3/12/2020</u>
	Project: <u>1Q20</u>	Sampler: <u>W</u>
	Weather: <u>Sun</u>	Time In/Out: <u>    </u>

WELL DATA			
Monument Type	Flush-mount/Stick up	Well Diameter:	=
	Other: <u>Vault</u>	Well Depth:	=
Monument Condition:		Depth to Water:	<u>26.61</u>
Well Cap Lock Present:	Yes No	Screened Interval:	=
		Purge Volume:	=

Comments:     

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal): 1-inch well = 0.041    2-inch = 0.162    4-inch = 0.653    1 gal = 3.785 liters

PURGING DATA										
Purge Method:		<u>BP/VP</u>			Pump Intake Depth:		<u>MS</u>			
Sampling Method:		<u>LF</u>			Tubing Material & Type:		<u>LDPE</u>		NEW / <u>DEDICATED</u>	
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (bt )	Purge Rate (L/min)	pH	Temp (°C)	nd (µS/cm)	DO (ppm)		Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
<u>1002</u>			<u>26.61</u>	<u>0.2</u>	<u>6.57</u>	<u>14.12</u>	<u>188</u>	<u>6.66</u>	<u>-109.1</u>	<u>clear</u>
<u>1005</u>			↓	↓	<u>6.49</u>	<u>13.72</u>	<u>186</u>	<u>3.28</u>	<u>-105.3</u>	↓
<u>1008</u>			↓	↓	<u>6.41</u>	<u>13.37</u>	<u>183</u>	<u>2.17</u>	<u>-91.6</u>	↓
<u>1011</u>			↓	↓	<u>6.36</u>	<u>13.38</u>	<u>182</u>	<u>1.99</u>	<u>-81.0</u>	↓
<u>1014</u>			↓	↓	<u>6.34</u>	<u>13.40</u>	<u>181</u>	<u>1.84</u>	<u>-76.4</u>	↓
<u>1017</u>			↓	↓	<u>6.32</u>	<u>13.42</u>	<u>180</u>	<u>1.86</u>	<u>-73.2</u>	↓


PURGING DATA							
Sample ID:	Sampling Flow Rate:	Analytical Laboratory:					
Sample Time:	Final Depth to Water:	Did Well Dewater:					
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID	
<u>3x 10</u>	<u>AC1</u>	<u>VOCs</u>					
<u>1x 250</u>	<u>    </u>	<u>NO2/NO3</u>					
<u>1x 250</u>	<u>AC5.4</u>	<u>NH3</u>					

NOTES/ADDITIONAL COMMENTS

Botts:

Gasket:

**WELL MONITORING DATA SHEET**

 <b>Cascadia</b> Associates, LLC	Well ID: <u>MAMS2-40</u>	Job Number:	
	Client: <u>Mustang VTA</u>	Date: <u>3/12/2020</u>	
	Project: <u>1Q20</u>	Sampler: <u>EW</u>	
	Weather: <u>Sun</u>	Time In/Out:	

WELL DATA			
Monument Type:	Flush-mount/Stick-up	Well Diameter:	-
	Other: <u>Now LT</u>	Well Depth:	-
Monument Condition:		Depth to Water:	<u>2650</u>
Well Cap Lock Present:	Yes No	Screened Interval:	-
		Purge Volume:	-

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal): 1-inch well = 0.041    2-inch = 0.162    4-inch = 0.653    1 gal = 3.785 liters

PURGING DATA											
Purge Method: <u>EP/AP</u>				Pump Intake Depth:			NEW / <u>DEDICATED</u>				
Sampling Method: <u>LF</u>				Tubing Material & Type: <u>MS CDPZ</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)	Clarity/Color Other Remarks	
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV		
<u>1037</u>			<u>26.50</u>	<u>0.75</u>	<u>6.24</u>	<u>14.29</u>	<u>1071</u>	<u>5.66</u>	<u>-19.7</u>	<u>clear</u>	
<u>1040</u>			↓	↓	<u>6.47</u>	<u>14.52</u>	<u>1317</u>	<u>5.56</u>	<u>-55.0</u>		
<u>1043</u>			↓	↓	<u>6.54</u>	<u>14.61</u>	<u>1389</u>	<u>5.94</u>	<u>-59.7</u>		
<u>1046</u>			↓	↓	<u>6.61</u>	<u>14.89</u>	<u>1423</u>	<u>6.68</u>	<u>-62.4</u>		
<u>1049</u>			↓	<u>0.02</u>	<u>6.71</u>	<u>14.84</u>	<u>1416</u>	<u>7.73</u>	<u>-70.0</u>	↓	
<u>1052</u>			↓	↓	<u>6.73</u>	<u>14.89</u>	<u>1409</u>	<u>7.91</u>	<u>-72.1</u>		
<u>1055</u>			↓	↓	<u>6.76</u>	<u>14.74</u>	<u>1404</u>	<u>8.21</u>	<u>-74.3</u>	↓	
<u>1058</u>			↓	↓	<u>6.82</u>	<u>14.76</u>	<u>1401</u>	<u>8.14</u>	<u>-78.9</u>	↓	


PURGING DATA						
Sample ID: <u>MAMS2-40</u>	Sampling Flow Rate: <u>0.25</u>	Analytical Laboratory: <u>AMY</u>				
Sample Time: <u>1050</u>	Final Depth to Water: <u>2650</u>	Did Well Dewater: <u>NO</u>				
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
<u>3x40</u>	<u>H2O</u>	<u>HVSLS</u>				
<u>1x250</u>	<u>H2SO4</u>	<u>NH3</u>				
<u>1x250</u>	<u>---</u>	<u>NO2/NO3</u>				

**NOTES/ADDITIONAL COMMENTS**

Botts:

Gashe &:

**WELL MONITORING DATA SHEET**

	Well ID:	MCMS 2-60	Job Number:	
	Client:	NASTER VAN	Date:	3/12/2020
	Project:	1Q20	Sampler:	W
	Weather:	Sun	Time In/Out:	

**WELL DATA**

Monument Type:	Flush-mount/Stick up	Well Diameter:	-	Depth to Free Product:	-
	Other: Van 1	Well Depth:	-	Free Product Thickness:	-
Monument Condition:		Depth to Water:	26.48	Water Column Length:	-
Well Cap Lock Present:	Yes No	Screened Interval:	-	Purge Volume:	-

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal): 1-inch well = 0.041    2-inch = 0.162    4-inch = 0.653    1 gal = 3.785 liter

**PURGING DATA**

Purge Method:		BPIP LF			Pump Intake Depth:		MS		NEW / DEDICATED	
Sampling Method:		LF			Tubing Material & Type:		LDPE		NEW / DEDICATED	
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+	
1107			26.48	0.2	6.80	15.12	830	4.64	-58.4	clear
1110					6.72	14.99	478	2.81	-52.0	
1113			↓	↓	6.46	14.93	270	1.56	-27.9	
1116			↓	↓	6.42	14.83	212	1.39	-17.0	
1119			↓	↓	6.36	14.77	196	1.42	-13.7	


**PURGING DATA**

Sample ID:	MCMS 2-60	Sampling Flow Rate:	0.2	Analytical Laboratory:	Apex
Sample Time:	1120	Final Depth to Water:	26.48	Did Well Dewater:	W
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD Duplicate ID
3x40	HCl	Hvols			
1x250	Asesol	NB2/NB3			
1x250	-	NH3			

**NOTES/ADDITIONAL COMMENTS**

Botts.  
Gashe +

**WELL MONITORING DATA SHEET**

	Well ID:	MW-25i	Date:	3/12/2020
	Client:	JUSTAR VAN		
	Project:	1025		LN
	Weather:	59-		

**WELL DATA**

Monument Type:	Flush Mount/Stick-up	Well Diameter:	24	Depth to Free Product:	---
	Other:	Well Depth:	---	Free Product Thickness:	---
Monument Condition:	Good	Depth to Water:	27.79	Water Column Length:	---
Well Cap Lock Present:	Yes <input checked="" type="checkbox"/> No	Screened Interval:	---	Purge Volume:	---

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volume)

Water height multipliers (gal):    1-inch well = 0.041    2-inch = 0.162    4-inch = 0.653

**PURGING DATA**

Purge Method:		BP		LF		Pump Intake Depth:		MS		DE	
Sampling Method:						Tubing Material & Typ		SB		DE	
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)				
					+ 1	+0.5 °C	+	+	+		
1213			27.79	0.25	6.79	16.94	203	5.51	-14.6	clear	
1220					6.27	15.78	224	3.29	15.1		
1221					6.24	15.26	223	2.82	11.3		
1227					6.24	15.11	222	2.53			
1230					6.22	15.16	222	2.04	9.1		
1233					6.22	15.21	224	1.91	0.4		

**PURGING DATA**

Sample ID:	MW-25i	Sampling Flow Rate:	0.25	Analytical Laboratory:	Apex	
Sample Time:	1230	Final Depth to Water:	27.79	Did Well Dewater:	NO	
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter	MS/MSD	Duplicate ID
3x48	HCl	VOCS				
1x150	9/2504	NH3				
1x150		NO2/NO3				

**NOTES/ADDITIONAL COMMENTS**

Botts.  
Gashe + :







**Cascadia**  
Associates, LLC

Well ID:	MGMS3 10	Job Number:	
Client:	Nuster N	Date:	3/13
Project:	1020	Sampler:	CUJ
Weather:	Sun		

WELL DATA

Monument Type:	Flush-mount/Stick-up	Well Diameter:	1	Depth to Free Product:	1
	Other: <i>Stick</i>	Well Depth:	1		1
Monument Condition:		Depth to Water:	26.0		1
Well Cap Lock Present:	Yes No	Screened Interval:	1	Purge Volume:	1

Comments:	
Purge Volume - (Wat	
Water height multipl	1-inch well = 0.041
	4-inch = 0.653


Purge Meth	BP/BP	Pump Intake Depth:	
Sampling Method:	LR	Tubing Material & Type:	LDPE
			NEW / <u>DEDICATED</u>

Time	Volume Purged	Purge Rate (L/min)	Cond (µS/cm)	DO (ppm)	
			+/-0.1	+/-0.5 °C	+/-5%
1349		26.01	7.02	4.4	5
1352				15	577
1355			6.33	1.38	564
1358			6.34	15.35	56
1401			6.3	15.29	568
					3.98
					-104.8
					-132.4
					-176.4

Sample ID:	MGMS3-4D	Analytical Laboratory:	APX
Sample Time:	1400	Did Well Dewater:	NO
No. of Cont /Typ		Field Filtered	Filter Size
3470	H2O		
14250			
14250	4		

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**WELL MONITORING DATA SHEET**

	Well ID:	Mgms 3-60		
	Client:	Justa Jans		3/12/20
	Project:	1020		LW
	Weather:	sun	Time In/Out:	

**WELL DATA**

Monument Type	Flush-mount/Stack-up	Well Diameter:	-	Depth to Free Product:	-
	Other: <i>Jan 14</i>	Well Depth:	-	Free Product Thickness:	-
Monument Condition:		Depth to Water:	26.45	Water Column Length:	-
Well Cap Lock Present:	Yes No	Screened Interval:	-	Purge Volume:	-

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal):  
 1-inch well = 0.041    2-inch = 0.162    4-inch = 0.653    1 gal = 3.7

**PURGING DATA**

Purge Method:		<i>BR (PP) LW</i>			Pump Intake Depth:		<i>MS</i>			
Sampling Method:					Tubing Material & Type:		<i>LDFE</i>		NEW / <u>DEDICATED</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)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5°C	+/-5%	+/-0.5 ppm	+/-20 mV	
1429			26.45	0.2	6.41	16.54	519	11.88	-109.0	clear
1432			↓	↓	6.23	17.01	250	6.64	-77.2	
1435			↓	↓	6.07	17.89	166	3.46	-61.6	
1438			↓	↓	6.01	14.80	154	2.87	-53.9	
1441			↓	↓	5.95	14.69	147	2.76	-45.5	
1444			↓	↓	5.90	14.81	144	2.02	-36.0	
1447			↓	↓	5.89	14.82	144	1.94	-31.1	


**PURGING DATA**

Sample ID:	Mgms 3-60	Sampling Flow Rate:	0.2	Analytical Laboratory:	Apex	
Sample Time:	1430	Final Depth to Water:	26.45	Did Well Dewater:	NO	
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3040	HCl	VOL				
1x250		NO2/NO3				
1x250	H2SO4	NH3				

**NOTES/ADDITIONAL COMMENTS**

Botts.  
 Gashead:

**WELL MONITORING DATA SHEET**

	Well ID: <u>MW-22j</u>	Job Number: <u>          </u>
	Client: <u>Nu Star Vanu</u>	Date: <u>3/12/10</u>
	Project: <u>GWM 1020</u>	Sampler: <u>          </u>
	Weather: <u>Sun 35°</u>	Time In/Out: <u>0750 - 840</u>

**WELL DATA**

Monument Type: <u>Flush-mount/stick-up</u>	Well Diameter: <u>2"</u>	Depth to Free Product: <u>          </u>
Other: <u>          </u>	Well Depth: <u>          </u>	Free Product Thickness: <u>          </u>
Monument Condition: <u>St. Crack</u>	Depth to Water: <u>28.03</u>	Water Column Length: <u>          </u>
Well Cap Lock Present: <u>Yes</u> No	Screened Interval: <u>          </u>	Purge Volume: <u>          </u>

Comments:           

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters
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**PURGING DATA**

Purge Method: <u>SP</u>			Pump Intake Depth: <u>MS</u>							
Sampling Method: <u>SB</u>			Tubing Material & Type: <u>NEW DEDICATED</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)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
809			28.03	2	8.13	5.39	349	24.91	12.6	clear
812					7.79	7.20	334	13.36	24.5	
815					7.14	10.75	302	13.07	26.6	
818					6.98	12.05	316	12.50	14.0	
821					6.94	12.17	321	12.42	9.6	
824					6.88	12.27	332	12.29	4.9	

**PURGING DATA**

Sample ID: <u>MW-22j</u>	Sampling Flow Rate: <u>2</u>	Analytical Laboratory: <u>Arcor</u>
Sample Time: <u>824</u>	Final Depth to Water: <u>28.05</u>	Did Well Dewater: <u>NO</u>
No. of Containers/Type	Analysis/Method	Field Filtered   Filter Size   MS/MSD   Duplicate ID
<u>3x 40</u>	<u>HCL</u>	<u>          </u>
<u>1x 250</u>	<u>H2SO4</u>	<u>          </u>
<u>1x 250</u>	<u>VOC</u>	<u>          </u>
	<u>NO2/NO3</u>	<u>          </u>
	<u>NH3</u>	<u>          </u>

**NOTES/ADDITIONAL COMMENTS**

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**WELL MONITORING DATA SHEET**

	Well ID:	MW-19;	Job Number:							
	Client:	Nustar Valve	Date:	3/12						
	Project:	QUM 1020	Sampler:							
	Weather:	Sunny	Time In/Out:	1145 - 1235						
<b>WELL DATA</b>										
Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:						
	Other:	Well Depth:		Free Product Thickness:						
Monument Condition:	Good	Depth to Water:	26.16	Water Column Length:						
Well Cap Lock Present:	Yes No	Screened Interval:		Purge Volume:						
Comments:										
Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)										
Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters						
<b>PURGING DATA</b>										
Purge Method:	BP		Pump Intake Depth:	MS						
Sampling Method:			Tubing Material & Type:	SB MS						
				NEW / DEDICATED						
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1154			26.16	.2	6.98	14.73	461	5.67	-56.5	clear
1157			26.16		6.96	14.92	455	4.14	-52.7	
1200					7.02	14.97	442	3.39	-51.5	
1203					7.02	15.02	440	2.72	-50.0	
1206					7.04	15.08	436	2.40	-42.7	
1209					7.04	15.10	435	2.49	-40.1	
<b>PURGING DATA</b>										
Sample ID:	MW-19;	Sampling Flow Rate:	2	Analytical Laboratory:	Apex					
Sample Time:	1209	Final Depth to Water:	26.16	Did Well Dewater:						
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID				
3x40	HCL									
1x250	H2SO4									
1x250										
<b>NOTES/ADDITIONAL COMMENTS</b>										
3x 9 ✓										






**WELL MONITORING DATA SHEET**

	Well ID:	MW-23i	Job Number:	3/17						
	Client:	Nussli Van C	Date:	1415						
	Project:	GWM 1220	Sampler:							
	Weather:	Sunny	Time In/Out:	1335 - 1415						
<b>WELL DATA</b>										
Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	—					
	Other:	Well Depth:	—	Free Product Thickness:	—					
Monument Condition:	Open	Depth to Water:	28.9	Water Column Length:	—					
Well Cap Lock Present:	Yes No	Screened Interval:	—	Purge Volume:	—					
Comments:										
Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)										
Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters						
<b>PURGING DATA</b>										
Purge Method:	SP		Pump Intake Depth:	MS						
Sampling Method:	SP		Tubing Material & Type:	NEW / DEDICATED						
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1348			28.31	0.8	6.41	17.51	137	5.26	49.8	clear
1351			28.31		6.59	16.40	149	4.73	45.7	
1354					6.84	15.94	146	7.74	42.0	
1357					6.89	16.00	150	7.76	47.1	
1400					6.82	15.98	158	7.54	48.3	
1403					6.90	15.78	167	7.60	39.9	↓
					<del>6.8</del>	<del>15.73</del>				
<b>PURGING DATA</b>										
Sample ID:	MW-23i	Sampling Flow Rate:	2	Analytical Laboratory:	Apex					
Sample Time:	1403	Final Depth to Water:	28.31	Did Well Dewater:	N					
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID				
3x40	HCl	VOC	—	—	—	—				
1x250	H2SO4	NH2/NH3	—	—	—	—				
1x250	—	NH3	—	—	—	—				
<b>NOTES/ADDITIONAL COMMENTS</b>										
Damaged										



**WELL MONITORING DATA SHEET**

 <b>Cascadia</b> Associates, LLC	Client: <u>MW-325</u> <u>Nustar VAN</u>	Date: <u>3/13/2020</u>
	Project: <u>1Q20</u>	Sampler: <u>LN</u>
	Weather: <u>SUN</u>	Time In/Out:

WELL DATA					
Monument Type:	Flush-mount/Stick-up	Well Diam	<u>2 1/2"</u>	Depth to Free Product:	<u>-</u>
	Other: <u>0</u>	Well Depth:	<u>-</u>		<u>-</u>
Monument Condition:	<u>Good</u>	Depth to Water:	<u>28.45</u>		<u>-</u>
Well Cap Lock Present:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Screened Interval:	<u>-</u>	Purge Volume:	<u>-</u>

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height-multipliers (gal):      1-inch well = 0.041      2-inch = 0.162      1 gal = 3.785 liters

PURGING DATA										
Purge Method:		<u>BP/PP (Red)</u>			Pump Intake Depth:		<u>MS</u>			
Sampling Method:		<u>LF</u>			Tubing Material & Ty		<u>LDPZ</u>		<u>DICATED</u>	
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Tem (°C)	Cond (µS/cm)	DO (ppm)		Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
745			28.43	0.3	6.77	13.92	494	26.26	-58.9	clear
748			28.54	0.2	6.52	14.37	505	15.64	-44.3	
751			28.62		6.19	14.37	511	8.52	-22.2	
754			28.68		6.16	14.28	510	7.73	-16.1	
757			28.74		6.06	14.18	508	6.16	-9.6	
800			28.80		6.04	14.19	508	5.25	3.0	
803			28.85		6.05	14.25	511	4.64	3.9	
806			28.91		6.06	14.20	512	4.30	4.5	
809			28.99		6.07	14.18	512	4.13	3.1	
812			29.14		6.07	14.22	513	4.01	2.8	

PURGING DATA						
Sample ID:	<u>MW-325</u>	Sampling Flow Rate:	<u>0.2</u>	Analytical Laboratory:	<u>Apex</u>	
Sample Time:	<u>800</u>	Final Depth to Water:	<u>29.40</u>	Did Well Dewater:		
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
<u>3x40</u>	<u>H2O</u>	<u>HVOLS</u>				
<u>1x250</u>	<u>H2SO4</u>	<u>NHS</u>				
<u>1x250</u>	<u>-</u>	<u>NO2/NIS</u>				

**NOTES/ADDITIONAL COMMENTS**

Botts.

Gaslett:

Project: Vene GWSM  
 Client:  
 Sampler: GW

Date: 6/15/20  
 Permit: 12485

Well ID	Time	DTB	DTW	Product Thickness	Notes
MW-1	1336		23.22		
MW-2	1425		24.61		
MW-3	1331		24.11		
MW-5	1023		23.40		
MW-6	1326		22.89		
MW-7	1031		23.18		
MW-8	957		23.92		
MW-9	1003		23.36		
MW-10	949		24.19		
MW-11	1342		21.76		
MW-13	1048		23.45		
MW-14	928		22.98		
MW-15	1320		29.17		
MW-16	1210		23.76		
MW-17	950		22.71		
MW-18i	1159		24.18		
MW-19	1053		23.43		
MW-19i	1123		24.24		
MW-20i	1206		29.98		
21i-40	1150		24.93		
21i-105	1148		24.82		
MW-22i	1142		25.21		
MW-23i	1122		24.61		
MW-24i	1245		24.31		
MW-24d	1237		<del>24.31</del>	24.79	
EW-1	1102		22.08		





WELL MONITORING DATA SHEET



Cascadia Associates, LLC

Well ID:	MW-1	Job Number:	
Client:	Nu Star Vane	Date:	6/17
Project:	GWM 2020	Sampler:	4/5
Weather:	PT Sun	Time In/Out:	730

WELL DATA

Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	-
	Other:	Well Depth:	-	Free Product Thickness:	-
Monument Condition:	Good	Depth to Water:	23.20	Water Column Length:	-
Well Cap Lock Present:	Yes No	Screened Interval:	-	Purge Volume:	-

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal): 1-inch well = 0.041    2-inch = 0.162    4-inch = 0.653    1 gal = 3.785 liters

PURGING DATA

Purge Method:		Peri low flow		Pump Intake Depth:		MS		NEW		DEDICATED	
Sampling Method:				Tubing Material & Type:		LDPE					
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Clarity/Color Other Remarks	
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV		
746			23.20	.2	5.62	15.06	392	11.45	249.9	clear	
749					6.36	14.76	690	6.94	176.1		
752					6.39	14.74	691	3.91	174.2		
755					6.39	14.72	691	2.72	172.0		
758					6.37	14.70	690	2.01	172.0		
804					6.38	14.71	691	1.92	172.0		
804					6.37	14.70	690	1.87	171.9		

PURGING DATA

Sample ID:	MW-1	Sampling Flow Rate:	.2	Analytical Laboratory:	Apex
Sample Time:	804	Final Depth to Water:	23.20	Did Well Dewater:	No
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD Duplicate ID
3 x 40	HCl				
1 x 250	H2SO4				
1 x 250					

NOTES/ADDITIONAL COMMENTS

**WELL MONITORING DATA SHEET**



**Cascadia**  
Associates, LLC

Well ID:	MW-3	Job Number:	
Client:	NuStar Vance	Date:	6/17
Project:	GLSM 2020	Sampler:	AW
Weather:	Sun!	Time In/Out:	820-900

**WELL DATA**

Monument Type:	Flush-mount/Stick-up Other:	Well Diameter:	2"	Depth to Free Product:	-
Monument Condition:	ok	Well Depth:	-	Free Product Thickness:	-
Well Cap Lock Present:	Yes No	Depth to Water:	24.40	Water Column Length:	-
Comments:		Screened Interval:	-	Purge Volume:	-

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal): 1-inch well = 0.041    2-inch = 0.162    4-inch = 0.653    1 gal = 3.785 liters

**PURGING DATA**

Purge Method:		periflow			Pump Intake Depth:		MS		NEW		DEDICATED
Sampling Method:					Tubing Material & Type:		LDPE				
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Clarity/Color Other Remarks	
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV		
827			24.40	.2	6.17	14.34	678	5.13	178.9	clear	
830			↓	↓	6.41	14.16	569	2.82	164.9	↓	
833			↓	↓	6.38	13.79	474	3.07	167.9	↓	
836			↓	↓	6.34	13.77	465	3.11	168.5	↓	
839			↓	↓	6.32	13.70	460	3.17	170.7	↓	

**PURGING DATA**

Sample ID:	MW-3	Sampling Flow Rate:	.2	Analytical Laboratory:	Apert
Sample Time:	839	Final Depth to Water:	24.40	Did Well Dewater:	No
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD Duplicate ID
3 x 40	HCl				
1 x 250	H2SO4				
1 x 250					

**NOTES/ADDITIONAL COMMENTS**




WELL MONITORING DATA SHEET



Cascadia Associates, LLC

Well ID:	MW-6	Job Number:	
Client:	Nu Star Valve	Date:	6/17
Project:	GWSM 2Q20	Sampler:	AW
Weather:	Sun	Time In/Out:	900

WELL DATA

Monument Type:	Flush-mount/Stick-up Other: <u>good</u>	Well Diameter:	2"	Depth to Free Product:	—
Monument Condition:	<u>good</u>	Well Depth:	—	Free Product Thickness:	—
Well Cap Lock Present:	Yes No	Depth to Water:	22.76	Water Column Length:	—
Comments:		Screened Interval:	—	Purge Volume:	—

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters
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PURGING DATA

Purge Method:	Peri <u>downflow</u>				Pump Intake Depth:	MS <u>LDPE</u>				
Sampling Method:					Tubing Material & Type:	NEW DEDICATED				
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
907			22.76	.2	6.21	14.87	317	19.24	180.5	clear
910					6.31	15.02	318	9.43	170.4	
913					6.36	15.00	316	4.75	162.0	
914					6.37	15.03	312	2.24	157.6	
919					6.37	14.85	309	2.01	156.3	
922					6.37	14.95	308	1.95	156.0	

PURGING DATA

Sample ID:	MW-6	Sampling Flow Rate:	2	Analytical Laboratory:	Apex
Sample Time:	922	Final Depth to Water:	22.76	Did Well Dewater:	NS
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD Duplicate ID
3x40	HCl		—	—	—
1x250	H2SO4		—	—	—
1x250	—		—	—	—

NOTES/ADDITIONAL COMMENTS

WELL MONITORING DATA SHEET



Cascadia Associates, LLC

Well ID:	MW-14	Job Number:	
Client:	Nustar Vancouver	Date:	6/17/20
Project:	GWM 2020	Sampler:	
Weather:	Sun	Time In/Out:	11:35

WELL DATA

Monument Type:	Flush-mount Stick-up Other:	Well Diameter:	4"	Depth to Free Product:	-
Monument Condition:	good	Well Depth:	-	Free Product Thickness:	-
Well Cap Lock Present:	Yes No	Depth to Water:	23.53	Water Column Length:	-
Comments:		Screened Interval:	-	Purge Volume:	-

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal): 1-inch well = 0.041    2-inch = 0.162    4-inch = 0.653    1 gal = 3.785 liters

PURGING DATA


Purge Method:	BT				Pump Intake Depth:	MS					
Sampling Method:	long flow				Tubing Material & Type:	SB		NEW			DEDICATED
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Clarity/Color Other Remarks	
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV		
1145			23.53	.2	6.24	23.19	572	6.69	179.6	clear	
1148			↓	↓	6.50	21.30	207	3.39	160.5	↓	
1151			↓	↓	6.71	17.80	2042	2.03	162.4	↓	
1154			↓	↓	6.19	16.77	1761	1.50	199.7	↓	
1157			↓	↓	6.10	16.85	1712	1.24	203.1	↓	
1200			↓	↓	6.09	16.79	1700	1.16	205.3	↓	

PURGING DATA

Sample ID:	MW-14	Sampling Flow Rate:	.2	Analytical Laboratory:	Apex
Sample Time:	1200	Final Depth to Water:	23.53	Did Well Dewater:	No
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD Duplicate ID
3x 40	HCC				
2x 40	HCC				
1x 250	H2SO4				
1x 250	-				

NOTES/ADDITIONAL COMMENTS


**WELL MONITORING DATA SHEET**

 <p><b>Cascadia</b> Associates, LLC</p>	Well ID: <u>S2</u>	Client: <u>Nu Star Valve</u>	Job Number:	Date: <u>6/17</u>						
	Project: <u>GSUM 2020</u>	Weather: <u>Sun</u>	Sampler:	<u>JS</u>						
	Time In/Out: <u>1225</u>									
	<b>WELL DATA</b>									
Monument Type:	<u>Flush-mount/Stick-up</u> Other:	Well Diameter: <u>2"</u>	Depth to Free Product:	<u>—</u>						
Monument Condition:	<u>good</u>	Well Depth:	Free Product Thickness:	<u>—</u>						
Well Cap Lock Present:	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth to Water: <u>23.70</u>	Water Column Length:	<u>—</u>						
Screened Interval:	<u>—</u>	Purge Volume:	<u>—</u>							
Comments:										
Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)										
Water height multipliers (gal):		1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters					
<b>PURGING DATA</b>										
Purge Method:	<u>BP lowflow</u>			Pump Intake Depth:	<u>MS</u>					
Sampling Method:				Tubing Material & Type:	<u>SB</u> NEW / <u>DEDICATED</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)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
<u>1227</u>			<u>23.70</u>	<u>.25</u>	<u>6.24</u>	<u>22.43</u>	<u>1857</u>	<u>1.37</u>	<u>190.1</u>	<u>cloudy</u>
<u>1230</u>			<u>23.70</u>	<u> </u>	<u>6.45</u>	<u>22.01</u>	<u>1817</u>	<u>1.16</u>	<u>185.7</u>	<u> </u>
<u>1238</u>			<u> </u>	<u> </u>	<u>6.53</u>	<u>21.5</u>	<u>1790</u>	<u>2.49</u>	<u>182.4</u>	<u>clear</u>
<u>1236</u>			<u> </u>	<u> </u>	<u>6.33</u>	<u>17.84</u>	<u>1726</u>	<u>3.04</u>	<u>188.7</u>	<u> </u>
<u>1239</u>			<u> </u>	<u> </u>	<u>6.07</u>	<u>17.65</u>	<u>1694</u>	<u>3.12</u>	<u>202.1</u>	
<u>1242</u>			<u> </u>	<u> </u>	<u>6.00</u>	<u>17.40</u>	<u>1639</u>	<u>3.09</u>	<u>204.9</u>	
<b>PURGING DATA</b>										
Sample ID:	<u>S2</u>	Sampling Flow Rate:	<u>.25</u>	Analytical Laboratory:	<u>Apex No</u>					
Sample Time:	<u>1242</u>	Final Depth to Water:	<u>23.70</u>	Did Well Dewater:						
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID				
<u>3 x 40</u>	<u>HCL</u>									
<u>1 x 250</u>	<u>H2SO4</u>									
<u>1 x 250</u>	<u>—</u>									
<b>NOTES/ADDITIONAL COMMENTS</b>										

**WELL MONITORING DATA SHEET**



**Cascadia**  
Associates, LLC

Well ID:	S-1	Job Number:	
Client:	Nu Star Vanc	Date:	6/17
Project:	GW M 2020	Sampler:	45
Weather:	Sun	Time In/Out:	1300

**WELL DATA**

Monument Type:	Flush-mount Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	—
Monument Condition:	Bad damaged	Depth to Water:	23.81	Water Column Length:	—
Well Cap Lock Present:	Yes No	Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal): 1-inch well = 0.041    2-inch = 0.162    4-inch = 0.653    1 gal = 3.785 liters

**PURGING DATA**

Purge Method:		BP		Pump Intake Depth:		MS		NEW / DEDICATED		
Sampling Method:		Low flow		Tubing Material & Type:		SIS				
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1306			23.81	.25	6.16	21.17	1425	1.90	191.8	clear
1309			24.56	↓	6.45	24.56	978	3.02	179.7	↓
1312			↓	↓	6.47	23.72	809	4.07	177.1	↓
1315			↓	↓	6.49	21.46	426	5.31	177.4	↓
1318			↓	↓	6.89	18.79	308	5.09	188.6	↓
1321			↓	↓	6.01	18.47	300	4.95	205.1	↓
1324			↓	↓	6.08	18.31	294	4.76	208.1	↓

**PURGING DATA**

Sample ID:	S-1	Sampling Flow Rate:	1.25	Analytical Laboratory:	Apex	
Sample Time:	1324	Final Depth to Water:	23.8	Did Well Dewater:	NS	
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x 40	HCl					
1x 250	H2SO4					
1x 250						

**NOTES/ADDITIONAL COMMENTS**

**WELL MONITORING DATA SHEET**



**Cascadia**  
Associates, LLC

Well ID:	MW-22i	Job Number:	
Client:	Nie Star Vanc	Date:	6/18
Project:	GWM 2Q20	Sampler:	fw
Weather:	sun 50°	Time In/Out:	740-840

**WELL DATA**

Monument Type:	Flush-mount/Stick-up Other: <u>repaired</u>	Well Diameter:	2"	Depth to Free Product:	—
Monument Condition:		Well Depth:	—	Free Product Thickness:	—
Well Cap Lock Present:	Yes No	Depth to Water:	24.92	Water Column Length:	—
		Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal): 1-inch well = 0.041    2-inch = 0.162    4-inch = 0.653    1 gal = 3.785 liters

**PURGING DATA**

Purge Method:		BP constant		Pump Intake Depth:		MS		NEW / DEDICATED		Clarity/Color Other Remarks
Sampling Method:				Tubing Material & Type:		SB				
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
801			24.92	.25	5.82	17.45	221	21.73	249.1	clear
804					6.71	17.36	393	12.19	178.5	
807					6.69	17.14	376	10.41	167.3	
810					6.39	16.74	357	4.89	165.7	
813					6.30	16.65	351	2.71	166.7	
816					6.27	16.52	352	2.66	166.8	
819					6.21	16.38	356	2.51	167.4	

**PURGING DATA**

Sample ID:	MW-22i	Sampling Flow Rate:	.25	Analytical Laboratory:	Apex
Sample Time:	819	Final Depth to Water:	24.92	Did Well Dewater:	No
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD Duplicate ID
3x40	HCl		—		—
1x250	H2SO4		—		—
1x25	—		—		—

**NOTES/ADDITIONAL COMMENTS**




**WELL MONITORING DATA SHEET**



**Cascadia**  
Associates, LLC

Well ID:	MW-13	Job Number:	
Client:	Nu Star Vanc	Date:	6/18
Project:	GHM 2020	Sampler:	DL
Weather:	Sun	Time In/Out:	945 1024

**WELL DATA**

Monument Type:	Flush-mount/Stick-up	Well Diameter:	4"	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	—
Monument Condition:	good	Depth to Water:	22.27	Water Column Length:	—
Well Cap Lock Present:	Yes No	Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal): 1-inch well = 0.041    2-inch = 0.162    4-inch = 0.653    1 gal = 3.785 liters

**PURGING DATA**

Purge Method:		BP		Pump Intake Depth:		MS		NEW / DEDICATED		
Sampling Method:		long flow		Tubing Material & Type:		SB				
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
950			22.27	.25	6.26	20.71	812	2.15	180.7	cloudy
953			22.50		6.41	21.87	849	2.72	158.9	
954			22.79		6.34	21.90	842	3.11	160.6	clear
959			23.00		6.34	17.81	800	2.99	154.2	
1002			23.31		5.63	16.50	765	1.13	184.0	
1005			23.55		5.58	16.49	764	1.08	185.1	
1008			23.96		5.54	16.41	758	.90	182.1	

**PURGING DATA**

Sample ID:	MW-13	Sampling Flow Rate:	.25	Analytical Laboratory:	Apex	
Sample Time:	1008	Final Depth to Water:	24.25	Did Well Dewater:	Yes	
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x40	HCl	VOC	—	—	—	—
2x40	HCl	Rsh	—	—	—	—
1x250	H2SO4	NH3	—	—	—	—
1x250	—	NO2/3	—	—	—	—

**NOTES/ADDITIONAL COMMENTS**

**WELL MONITORING DATA SHEET**



**Cascadia**  
Associates, LLC

Well ID:	MW-19	Job Number:	
Client:	New Star Vanc	Date:	6/18
Project:	GSJM 2020	Sampler:	4w
Weather:	Sun - Warm	Time In/Out:	1030 1130

**WELL DATA**

Monument Type:	Flush-mount/Stick-up Other:	Well Diameter:	2"	Depth to Free Product:	—
Monument Condition:	good	Well Depth:	—	Free Product Thickness:	—
Well Cap Lock Present:	Yes No	Depth to Water:	23.80	Water Column Length:	—
Comments:		Screened Interval:	—	Purge Volume:	—

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters
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**PURGING DATA**

Purge Method:	SD Conflow			Pump Intake Depth:	MS					
Sampling Method:				Tubing Material & Type:	SB		NEW DEDICATED			
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1037			23.80	.25	6.16	18.84	820	1.06	144.5	clear
1040					6.34	18.75	1132	.86	130.7	
1043					6.61	17.70	1594	1.82	119.5	
1046					6.75	17.46	1720	2.25	119.6	
1049					6.50	17.07	1716	2.89	150.0	
1052					6.44	17.18	1696	3.01	161.7	
1055					6.48	17.21	1697	3.12	162.1	

**PURGING DATA**

Sample ID:	MW-19	Sampling Flow Rate:	.25	Analytical Laboratory:	Apex
Sample Time:	1055	Final Depth to Water:	23.80	Did Well Dewater:	No
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD Duplicate ID
3x 40	HCl				
2x 40	HCl	RStk			
1x 250	H2SO4				
1x 250	—				
3x 40	HCl				MW-19 Dup
1x 250	H2SO4				MW-19 Dup

**NOTES/ADDITIONAL COMMENTS**


1x 250	—				MW-19 Dup
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WELL MONITORING DATA SHEET

 <b>Cascadia</b> Associates, LLC	Well ID:	MW-21i-105	Job Number:	
	Client:	Nu Star Valve	Date:	6/18
	Project:	GRM 2QCO	Sampler:	AD
	Weather:	Sun	Time In/Out:	1315-1405

WELL DATA

Monument Type:	Flush-mount/stick-up	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	—
Monument Condition:	OK	Depth to Water:	24.94	Water Column Length:	—
Well Cap Lock Present:	Yes No	Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal): 1-inch well = 0.041    2-inch = 0.162    4-inch = 0.653    1 gal = 3.785 liters

PURGING DATA

Purge Method:		BP		Pump Intake Depth:		MS		NEW / DEDICATED		
Sampling Method:		low flow		Tubing Material & Type:		SPB				
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1329			24.94	.25	4.82	26.15	820	9.20	226.1	clear
1332					4.86	28.35	598	6.30	230.2	
1335					6.59	24.80	603	7.02	226.0	
1338					6.68	18.11	607	6.79	177.6	
1341					6.73	17.90	610	6.89	175.1	
1344					6.71	17.83	611	6.86	174.5	

PURGING DATA

Sample ID:	MW-21i-105	Sampling Flow Rate:	.25	Analytical Laboratory:	Agri	
Sample Time:	1344	Final Depth to Water:	24.94	Did Well Dewater:	No	
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x40	HCl	VOC				
1x250	H2SO4	NH3				
1x250		NO2/3				

NOTES/ADDITIONAL COMMENTS

**WELL MONITORING DATA SHEET**



**Cascadia**  
Associates, LLC

Well ID:	MW-15	Job Number:	
Client:	Nustar VAN	Date:	6/18/2020
Project:	2020	Sampler:	LW
Weather:	Sun	Time In/Out:	1220/

**WELL DATA**

Monument Type:	Flush-mount/Stick-up	Well Diameter:		Depth to Free Product:	—
	Other:	Well Depth:		Free Product Thickness:	—
Monument Condition:	good	Depth to Water:	29.5'	Water Column Length:	—
Well Cap Lock Present:	Yes No	Screened Interval:		Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal): 1-inch well = 0.041    2-inch = 0.162    4-inch = 0.653    1 gal = 3.785 liters

**PURGING DATA**

Purge Method:	BP	Pump Intake Depth:	M/S
Sampling Method:	LF	Tubing Material & Type:	S/S
			NEW / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1230			29.5'	0.2	6.66	25.07	391	6.04	179.7	clear
1233			29.5'		6.36	21.71	327	5.23	25.0	
1236			↓	↓	6.38	22.24	733	2.58	-0.7	↓
1239			↓	↓	6.79	21.50	721	2.78	-2.1	↓
1242			↓	↓	6.25	21.13	719	3.00	-9.5	↓
1245			↓	↓	6.25	20.42	711	2.70	-10.8	↓
1248			↓	↓	6.27	19.60	694	1.56	-22.6	↓
1251			↓	↓	6.29	19.85	695	1.44	-26.9	↓
1254			↓	↓	6.29	19.89	697	1.39	-28.0	↓

**PURGING DATA**

Sample ID:	MW-15	Sampling Flow Rate:	29.5'	Analytical Laboratory:	Apex	
Sample Time:	1250	Final Depth to Water:	0.2'	Did Well Dewater:	NO	
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x40	HCl	HVOLS	✓			
1x250	—	NH2/NH3				
1x250	#2504	NH3				

**NOTES/ADDITIONAL COMMENTS**

**WELL MONITORING DATA SHEET**



**Cascadia Associates, LLC**

Well ID:	MW - 24 i	Job Number:	
Client:	Mustar VAN	Date:	6/18/2020
Project:	2020	Sampler:	LOW
Weather:	Sunny	Time In/Out:	740 / 820

**WELL DATA**

Monument Type:	<input checked="" type="radio"/> Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	-	
	Other:	Well Depth:	-	Free Product Thickness:	-	
Monument Condition:	OK - bolt stripped		Depth to Water:	24.01	Water Column Length:	-
Well Cap Lock Present:	<input checked="" type="radio"/> Yes <input type="radio"/> No	Missing tabs	Screened Interval:	-	Purge Volume:	-

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)	
Water height multipliers (gal):	1-inch well = 0.041    2-inch = 0.162    4-inch = 0.653    1 gal = 3.785 liters

**PURGING DATA**

Purge Method:	BP	Pump Intake Depth:	MS
Sampling Method:	LF	Tubing Material & Type:	SB


Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks
748			24.01	0.2	7.49	14.82	247	11.81	7.0	clear
751			24.01		6.21	13.73	164	11.64	32.5	
754					5.48	13.31	152	9.02	36.1	
757					5.88	13.21	154	8.76	10.8	
800					6.26	13.10	161	8.46	-20.2	
803					6.39	13.07	162	7.96	-35.9	
806					6.52	13.13	163	7.72	-42.1	
809					6.54	13.14	163	7.62	-44.1	
812					6.53	13.14	162	7.63	-43.8	

**PURGING DATA**

Sample ID:	MW-24i	Sampling Flow Rate:	0.2	Analytical Laboratory:	Apex	
Sample Time:	800	Final Depth to Water:	24.01	Did Well Dewater:	NO	
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x40	H2O	VOLs				
1x250	-	NO2 / NO3				
1x250	H2SO4	NH3				
2x40	H2O	RSE / TOL				

**NOTES/ADDITIONAL COMMENTS**

**WELL MONITORING DATA SHEET**

	Well ID: <u>MW-24d</u>	Job Number:
	Client: <u>Nustar JAN</u>	Date: <u>6/18/2020</u>
	Project: <u>2020</u>	Sampler: <u>LM</u>
	Weather: <u>Sun</u>	Time In/Out: <u>820 / 855</u>

**WELL DATA**

Monument Type:	<u>Flush-mount/Stick-up</u> Other:	Well Diameter:	<u>2"</u>	Depth to Free Product:	<u>-</u>
Monument Condition:	<u>good</u>	Well Depth:	<u>-</u>	Free Product Thickness:	<u>-</u>
Well Cap Lock Present:	<u>Yes</u> No	Depth to Water:	<u>24.74</u>	Water Column Length:	<u>-</u>
Screened Interval:		Purge Volume:			<u>-</u>

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal):    1-inch well = 0.041    2-inch = 0.162    4-inch = 0.653    1 gal = 3.785 liters

**PURGING DATA**


Purge Method:				<u>BP</u>				Pump Intake Depth:		
Sampling Method:				<u>LF</u>				Tubing Material & Type:		<u>SB MS</u>
								NEW / <u>DEDICATED</u>		
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
<u>827</u>			<u>24.74</u>	<u>0.2</u>	<u>8.32</u>	<u>14.08</u>	<u>258</u>	<u>20.19</u>	<u>-17.1</u>	<u>clear</u>
<u>830</u>			↓	↓	<u>7.75</u>	<u>13.72</u>	<u>331</u>	<u>7.18</u>	<u>-116.8</u>	↓
<u>833</u>			↓	↓	<u>7.70</u>	<u>13.68</u>	<u>335</u>	<u>6.90</u>	<u>-114.3</u>	↓
<u>836</u>			↓	↓	<u>7.69</u>	<u>13.67</u>	<u>336</u>	<u>6.81</u>	<u>-115.9</u>	↓
<u>839</u>			↓	↓	<u>7.69</u>	<u>13.60</u>	<u>337</u>	<u>6.63</u>	<u>-115.9</u>	↓
<u>842</u>			↓	↓	<u>7.69</u>	<u>13.58</u>	<u>337</u>	<u>6.57</u>	<u>-114.7</u>	↓

**PURGING DATA**

Sample ID: <u>MW-24d</u>	Sampling Flow Rate: <u>0.2</u>	Analytical Laboratory: <u>Arex</u>				
Sample Time: <u>845</u>	Final Depth to Water: <u>24.74</u>	Did Well Dewater: <u>NO</u>				
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
<u>3x40</u>	<u>H2O</u>	<u>HTVOCs</u>				
<u>1x250</u>	<u>HT2504</u>	<u>NH3</u>				
<u>1x250</u>	<u>-</u>	<u>NO2/NO3</u>				

**NOTES/ADDITIONAL COMMENTS**

**WELL MONITORING DATA SHEET**

	Well ID:	MW-25i	Job Number:	
	Client:	MUSTER VAN	Date:	6/18/2020
	Project:	2A20	Sampler:	LW
	Weather:	Sunny	Time In/Out:	900/945

**WELL DATA**

Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	—
Monument Condition:	good	Depth to Water:	24.29	Water Column Length:	—
Well Cap Lock Present:	Yes No	Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal):    1-inch well = 0.041    2-inch = 0.162    4-inch = 0.653    1 gal = 3.785 liters

**PURGING DATA**

Purge Method:		BP LF			Pump Intake Depth:		MS			
Sampling Method:					Tubing Material & Type:		SB		NEW / DEDICATED	
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
913			24.29	0.2	7.25	15.50	260	4.51	-84.6	clear
916			24.30		7.01	15.45	229	6.09	-74.6	
919			24.31	↓	6.91	14.18	220	5.80	-73.6	
922			24.32	↓	6.74	13.97	217	5.94	-72.0	
925			24.33	↓	6.78	13.83	215	5.72	-73.1	
928			24.34	↓	6.77	13.73	211	5.36	-72.5	
931			24.35	↓	6.76	13.64	209	5.41	-68.2	

**PURGING DATA**

Sample ID:	MW-25i	Sampling Flow Rate:	0.2	Analytical Laboratory:	Apex
Sample Time:	930	Final Depth to Water:	24.37	Did Well Dewater:	No
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD Duplicate ID
3x20	H2O	VOCS			
1x250	—	NO2/NO3			
1x250	H2SO4	NH3			

**NOTES/ADDITIONAL COMMENTS**

**WELL MONITORING DATA SHEET**



**Cascadia**  
Associates, LLC

Well ID:	MW-16	Job Number:	
Client:	NASTAR VAN	Date:	6/18/2020
Project:	2020	Sampler:	W
Weather:	SKYNY	Time In/Out:	950 / 1030

**WELL DATA**

Monument Type:	Flush-mount/Stick-up	Well Diameter:	40	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	—
Monument Condition:	Good ↓	Depth to Water:	23.54	Water Column Length:	—
Well Cap Lock Present:	Yes No	Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal): 1-inch well = 0.041    2-inch = 0.162    4-inch = 0.653    1 gal = 3.785 liters

**PURGING DATA**

Purge Method:		BP LF			Pump Intake Depth:		MS SB		NEW / DEDICATED	
Sampling Method:					Tubing Material & Type:					
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
953			23.54	0.2	6.86	16.40	421	9.08	-65.1	clear
956			23.79	0.2	6.44	15.73	558	9.60	-68.7	
959			↓	0.18	6.42	16.00	580	9.19	-74.3	
1002			↓	↓	6.43	16.51	587	9.01	-75.1	
1005			↓	↓	6.44	16.93	598	8.69	-76.3	
1008			↓	↓	6.44	16.99	605	8.54	-75.5	


**PURGING DATA**

Sample ID:	MW-16	Sampling Flow Rate:	0.18	Analytical Laboratory:	APLX
Sample Time:	1005	Final Depth to Water:	23.79	Did Well Dewater:	NO
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD
5x40	HCl	HVOCs			
1x250	—	NO2/NO3			
1x250	42504	NH3			

**NOTES/ADDITIONAL COMMENTS**




**WELL MONITORING DATA SHEET**

	Well ID:	MW-5	Job Number:	
	Client:	Master Van	Date:	6/18/2020
	Project:	2020	Sampler:	kw
	Weather:	sunny	Time In/Out:	10:40

**WELL DATA**

Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	-
	Other:	Well Depth:	-	Free Product Thickness:	-
Monument Condition:	Good	Depth to Water:	23.74	Water Column Length:	-
Well Cap Lock Present:	Yes No	Screened Interval:	✓	Purge Volume:	-

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal):    1-inch well = 0.041    2-inch = 0.162    4-inch = 0.653    1 gal = 3.785 liters

**PURGING DATA**


Purge Method:		BP		Pump Intake Depth:		MS		NEW / <u>DEDICATED</u>		
Sampling Method:		LF		Tubing Material & Type:		FS				
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1044			23.74	0.2	6.39	19.55	442	3.95	-65.4	clear
1047			↓	↑	6.22	19.87	262	2.76	-78.1	↓
1050			↓	↑	6.16	20.12	223	2.79	-70.4	↓
1053			↓	↑	6.15	20.17	217	2.49	-69.2	↓
1056			↓	↑	6.15	20.18	218	2.39	-61.1	↓
1059			↓	↑						↓

**PURGING DATA**

Sample ID:	MW-5	Sampling Flow Rate:	0.2	Analytical Laboratory:	APEX	
Sample Time:	1100	Final Depth to Water:	23.74	Did Well Dewater:	no	
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x40	15% HCl	HVOCs				
1x250	H2SO4	NH3				
1x250	-	NO2/NO3				

**NOTES/ADDITIONAL COMMENTS**

**WELL MONITORING DATA SHEET**

	Well ID:	MW-19i	Job Number:	
	Client:	Nixtarc JAN	Date:	6/18/2020
	Project:	2020	Sampler:	lw
	Weather:	Sunny	Time In/Out:	

**WELL DATA**

Monument Type:	<input checked="" type="checkbox"/> Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	<input type="checkbox"/> Other:	Well Depth:		Free Product Thickness:	—
Monument Condition:	<input checked="" type="checkbox"/> Good	Depth to Water:	24.49	Water Column Length:	—
Well Cap Lock Present:	<input checked="" type="checkbox"/> No	Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal):      1-inch well = 0.041      2-inch = 0.162      4-inch = 0.653      1 gal = 3.785 liters

**PURGING DATA**

Purge Method:		SR		LF		Pump Intake Depth:		MS		NEW / DEDICATED	
Sampling Method:		SR		LF		Tubing Material & Type:		SR		NEW / DEDICATED	
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks	
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV		
1153			24.49	0.2	6.96	19.42	912	4.78	-40.6	clear	
1156			24.49		6.89	16.17	364	9.94	-32.6	↓	
1159					6.74	15.24	258	9.72	-39.6		
1202					6.69	14.98	245	9.26	-44.6		
1205					6.67	14.89	233	9.17	-47.0		
1208					6.68	14.86	229	8.89	-50.4		
1211					6.69	14.88	229	8.79	-51.3		

**PURGING DATA**

Sample ID:	MW-19i	Sampling Flow Rate:	0.2	Analytical Laboratory:	Apex	
Sample Time:	1210	Final Depth to Water:	24.49	Did Well Dewater:	No	
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x40	H2O	VOLs				
1x250	—	NO3/NO2				
1x250	H2SO4	NH3				

**NOTES/ADDITIONAL COMMENTS**





**WELL MONITORING DATA SHEET**



**Cascadia**  
Associates, LLC

Well ID:	MW-181	Job Number:	
Client:	Nustar VAN	Date:	6/17/2020
Project:	2020 CWM	Sampler:	LW
Weather:	sun	Time In/Out:	812 / 840

**WELL DATA**

Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	-
	Other:	Well Depth:	-	Free Product Thickness:	-
Monument Condition:	good	Depth to Water:	24.52	Water Column Length:	-
Well Cap Lock Present:	Yes No	Screened Interval:	-	Purge Volume:	-

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal): 1-inch well = 0.041    2-inch = 0.162    4-inch = 0.653    1 gal = 3.785 liters

**PURGING DATA**

Purge Method:		Per. pump LF			Pump Intake Depth:		MS			
Sampling Method:					Tubing Material & Type:		LDPE		NEW / DEDICATED	
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
817			24.52	0.2	6.48	14.70	203	16.01	-56.7	clear
820			24.09	↓	6.77	14.93	177	6.18	-62.9	↓
823			24.09	↓	6.84	14.77	167	5.81	-58.2	↓
826			24.09	↓	6.89	14.67	165	5.70	-60.7	↓
829			24.09	↓	6.91	14.81	164	5.71	-60.7	↓
832			24.09	↓	6.91	14.77	164	5.69	-60.1	↓


**PURGING DATA**

Sample ID:	MW-181	Sampling Flow Rate:	0.2	Analytical Laboratory:	Apex	
Sample Time:	830	Final Depth to Water:	24.09	Did Well Dewater:	✓	
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x40	HCl	HVOCs				
1x250	-	NH3				
1x250	H2SO4	NO2 / NO3				

**NOTES/ADDITIONAL COMMENTS**




**WELL MONITORING DATA SHEET**

 <b>Cascadia</b> Associates, LLC	Well ID:	mw-21i-40	Job Number:	
	Client:	Mt Hood Vancouver	Date:	6/17/2020
	Project:	2020 GWM	Sampler:	LW
	Weather:	Sunny	Time In/Out:	9:10/9:40

**WELL DATA**

Monument Type:	<input checked="" type="checkbox"/> Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	-
	<input type="checkbox"/> Other:	Well Depth:	-	Free Product Thickness:	-
Monument Condition:	Good - Bolt Stuck	Depth to Water:	2474	Water Column Length:	-
Well Cap Lock Present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Screened Interval:	-	Purge Volume:	-

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal):      1-inch well = 0.041      2-inch = 0.162      4-inch = 0.653      1 gal = 3.785 liters

**PURGING DATA**


Purge Method:		Peri pump low flow			Pump Intake Depth:		MS			
Sampling Method:					Tubing Material & Type:		LDPE		<input checked="" type="checkbox"/> NEW / <input type="checkbox"/> DEDICATED	
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
917			24.74	0.25	6.71	15.16	184	11.35	-48.2	clear
920			24.85	0.2	6.50	14.90	276	2.86	-78.6	↓
923			↓	↓	6.55	14.71	296	1.52	-89.2	↓
926			↓	↓	6.56	14.69	302	1.17	-87.1	↓
929			↓	↓	6.56	14.66	315	0.86	-86.8	↓
932			↓	↓	6.56	14.59	315	0.79	-87.3	↓

**PURGING DATA**

Sample ID:	mw-21i-40	Sampling Flow Rate:	0.2	Analytical Laboratory:	Apex	
Sample Time:	9:30	Final Depth to Water:	24.85	Did Well Dewater:	NO	
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x40	H2O	VOLs				
1x250	-	NO2/NH3				
1x250	H2SO4	NH3				

**NOTES/ADDITIONAL COMMENTS**

**WELL MONITORING DATA SHEET**

 <b>Cascadia</b> Associates, LLC	Well ID:	MW-2	Job Number:	
	Client:	Nustar VAN	Date:	6/17/2020
	Project:	2020	Sampler:	LW
	Weather:	sun	Time In/Out:	958 / 1025

**WELL DATA**

Monument Type:	Flush mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	-
	Other:	Well Depth:	-	Free Product Thickness:	-
Monument Condition:	good	Depth to Water:	25.16	Water Column Length:	-
Well Cap Lock Present:	Yes No	Screened Interval:	-	Purge Volume:	-

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal): 1-inch well = 0.041    2-inch = 0.162    4-inch = 0.653    1 gal = 3.785 liters

**PURGING DATA**

Purge Method:	Peri pump	Pump Intake Depth:	Mid Screen
Sampling Method:	Low flow	Tubing Material & Type:	LDPPE NEW / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
957			25.16	0.24	6.37	14.12	669	2.48	-68.5	clear
1000			25.65	0.2	6.40	14.06	707	1.57	-88.3	
1003			25.72	↓	6.46	13.86	723	1.20	-100.1	
1006			25.79	↓	6.99	13.96	743	0.81	-89.1	
1009			25.79	↓	6.29	13.82	754	0.69	-85.6	
1002			25.79	↓	6.30	13.76	764	0.60	-101.4	

**PURGING DATA**


Sample ID:	MW-2	Sampling Flow Rate:	0.2	Analytical Laboratory:	Apex
Sample Time:	1010	Final Depth to Water:	25.79	Did Well Dewater:	NO
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD Duplicate ID
3x40	H2O	VOL1			
1x250	H2SO4	NH3			
1x250	-	NO2/NO3			

**NOTES/ADDITIONAL COMMENTS**

Antea sampling 1016-1020



**WELL MONITORING DATA SHEET**

 <b>Cascadia</b> Associates, LLC	Well ID:	Mw-23i	Job Number:	
	Client:	Nustar VAN	Date:	6/17/2020
	Project:	2Q23 GWM	Sampler:	LW
	Weather:	Sunny	Time In/Out:	1320 /

**WELL DATA**

Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	-
	Other:	Well Depth:	-	Free Product Thickness:	-
Monument Condition:	Good - Missing 1 tab	Depth to Water:	24.80	Water Column Length:	-
Well Cap Lock Present:	Yes No	Screened Interval:	-	Purge Volume:	-

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal):      1-inch well = 0.041      2-inch = 0.162      4-inch = 0.653      1 gal = 3.785 liters

**PURGING DATA**


Purge Method:		Bladder Pump		Pump Intake Depth:		MS		NEW / <u>DEDICATED</u>		
Sampling Method:		CL		Tubing Material & Type:		SB				
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1328			24.80	0.2	6.13	22.05	4331	0.44	-27.7	clear
1329			24.80	↓	6.58	15.97	569	7.67	18.2	↓
1330			↓	↓	6.74	16.05	204	7.14	16.3	↓
1333			↓	↓	6.98	15.92	169	6.96	16.9	↓
1336			↓	↓	6.79	15.82	162	6.89	16.7	↓
1339			↓	↓	6.79	15.73	157	6.79	16.5	↓

**PURGING DATA**

Sample ID:	Mw-23i	Sampling Flow Rate:	0.2	Analytical Laboratory:	Apex
Sample Time:	1340	Final Depth to Water:	24.80	Did Well Dewater:	No
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD      Duplicate ID
3x40	H21	HVLS			
1x250	H2504	NO2 / NO3			
1x250	-	NH3 ↓			

**NOTES/ADDITIONAL COMMENTS**

**WELL MONITORING DATA SHEET**

	Well ID:	MW-26	Job Number:	
	Client:	NUSTAR VANCOUVER	Date:	6/17/2020
	Project:	2 Q20 GWM	Sampler:	LW
	Weather:	Sunny	Time In/Out:	1220 / 1310

**WELL DATA**

Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	-
	Other:	Well Depth:	-	Free Product Thickness:	-
Monument Condition:	good	Depth to Water:	23.41	Water Column Length:	-
Well Cap Lock Present:	Yes No	Screened Interval:	-	Purge Volume:	-

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal):    1-inch well = 0.041    2-inch = 0.162    4-inch = 0.653    1 gal = 3.785 liters

**PURGING DATA**


Purge Method:		Bladder Pump		Pump Intake Depth:		Mid Screen				
Sampling Method:		Low Flow		Tubing Material & Type:		SEK Bore		NEW DEDICATED		
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1230			23.41	0.7	6.22	22.77	2271	4.83	127.5	clear
1233			23.41	↓	6.25	22.85	2365	4.73	60.5	↓
1236			23.41	↓	6.22	23.20	2388	4.88	21.9	↓
1239			↓	↓	6.20	23.80	2431	5.04	15.8	↓
1242			↓	0.2	5.91	21.79	4196	6.60	9.3	↓
1245			↓	↓	5.77	15.88	4714	2.72	4.2	↓
1248			↓	↓	5.83	15.37	4644	2.23	-9.2	↓
1251			↓	↓	5.84	15.40	4637	2.12	-10.8	↓
1254			↓	↓	5.88	15.48	4641	2.19	-17.1	↓

**PURGING DATA**

Sample ID:	MW-26	Sampling Flow Rate:	0.2	Analytical Laboratory:	Apex No
Sample Time:	1245	Final Depth to Water:	23.41	Did Well Dewater:	
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD    Duplicate ID
3x40	HCl	VOCS			
1x250	-	NO3/NO2			
1x250	H2SO4	NH3			

**NOTES/ADDITIONAL COMMENTS**

**WELL MONITORING DATA SHEET**

 <b>Cascadia</b> Associates, LLC	Well ID: <u>MW-17</u>	Job Number:	
	Client: <u>Master VAN</u>	Date: <u>6/17/2020</u>	
	Project: <u>2020 GWM</u>	Sampler: <u>LW</u>	
	Weather: <u>Sunny</u>	Time In/Out: <u>1100 /</u>	

WELL DATA					
Monument Type:	<input checked="" type="radio"/> Flush-mount/Stick-up	Well Diameter:	<u>4"</u>	Depth to Free Product:	<u>---</u>
	<input type="radio"/> Other:	Well Depth:	<u>---</u>	Free Product Thickness:	<u>---</u>
Monument Condition:	<u>Cross</u>	Depth to Water:	<u>22.86</u>	Water Column Length:	<u>---</u>
Well Cap Lock Present:	<input checked="" type="radio"/> Yes <input type="radio"/> No	Screened Interval:	<u>---</u>	Purge Volume:	<u>---</u>

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal):      1-inch well = 0.041      2-inch = 0.162      4-inch = 0.653      1 gal = 3.785 liters

PURGING DATA									
Purge Method:		<u>Peri pump</u>			Pump Intake Depth:		<u>Mid screen</u>		
Sampling Method:		<u>Low flow</u>			Tubing Material & Type:		<u>LDPE</u>		
							<input checked="" type="radio"/> NEW / <input type="radio"/> DEDICATED		


Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
<u>1108</u>			<u>22.89</u>	<u>8.2</u>	<u>4.94</u>	<u>15.56</u>	<u>750</u>	<u>6.77</u>	<u>130.2</u>	<u>clear</u>
<u>1111</u>			<u>22.89</u>	↓	<u>5.18</u>	<u>14.41</u>	<u>245</u>	<u>5.90</u>	<u>106.7</u>	↓
<u>1114</u>			↓	↓	<u>5.63</u>	<u>14.20</u>	<u>192</u>	<u>5.67</u>	<u>96.8</u>	↓
<u>1117</u>			↓	↓	<u>5.81</u>	<u>14.11</u>	<u>203</u>	<u>6.29</u>	<u>91.8</u>	↓
<u>1120</u>			↓	↓	<u>6.10</u>	<u>14.09</u>	<u>292</u>	<u>5.64</u>	<u>75.3</u>	↓
<u>1123</u>			↓	↓	<u>6.24</u>	<u>14.22</u>	<u>373</u>	<u>4.72</u>	<u>46.6</u>	↓
<u>1126</u>			↓	↓	<u>6.27</u>	<u>14.26</u>	<u>398</u>	<u>4.37</u>	<u>30.8</u>	↓
<u>1129</u>			↓	↓	<u>6.26</u>	<u>14.19</u>	<u>402</u>	<u>4.31</u>	<u>28.8</u>	↓

PURGING DATA							
Sample ID:	<u>MW-17</u>	Sampling Flow Rate:	<u>0.2</u>	Analytical Laboratory:		<u>Apex</u>	
Sample Time:	<u>1120 / <del>1130</del></u>	Final Depth to Water:	<u>22.89</u>	Did Well Dewater:		<u>No</u>	
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID	
<u>3x40</u>	<u>HCl</u>	<u>VOCs</u>	<u>---</u>	<u>---</u>	<u>---</u>	<u>---</u>	
<u>1x250</u>	<u>H2SO4</u>	<u>NO2/NO3</u>	<u>---</u>	<u>---</u>	<u>---</u>	<u>---</u>	
<u>1x250</u>	<u>-</u>	<u>NH3</u>	<u>---</u>	<u>---</u>	<u>---</u>	<u>---</u>	

**NOTES/ADDITIONAL COMMENTS**

After Sampling 1131-1135

**WELL MONITORING DATA SHEET**

 <b>Cascadia</b> Associates, LLC	Well ID:	MW-10	Job Number:	
	Client:	Nustar VAN	Date:	6/17/2020
	Project:	2020	Sampler:	LW
	Weather:	Sunny	Time In/Out:	1025 / 1055

**WELL DATA**

Monument Type:	Flush mount/Stick-up	Well Diameter:	4"	Depth to Free Product:	-
	Other:	Well Depth:	-	Free Product Thickness:	-
Monument Condition:	Good - Missing bolts	Depth to Water:	24.18	Water Column Length:	-
Well Cap Lock Present:	Yes No (Need rethread)	Screened Interval:	-	Purge Volume:	-

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal):    1-inch well = 0.041    2-inch = 0.162    4-inch = 0.653    1 gal = 3.785 liters

**PURGING DATA**

Purge Method:	Per Pump	Pump Intake Depth:	Mid screen	
Sampling Method:	Low Flow	Tubing Material & Type:	LDPE	NEW / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks
1031			24.18	0.24	5.65	15.92	3214	9.11	33.1	Clear
1034			24.41	0.2	4.50	15.44	3596	1.94	42.6	↓
1037			24.45	↓	4.44	15.06	3619	1.16	20.6	
1040			24.49	↓	4.43	15.01	3611	0.92	7.9	
1043			24.49	↓	4.42	15.01	3614	0.78	2.7	

**PURGING DATA**

Sample ID:	MW-10	Sampling Flow Rate:	0.2	Analytical Laboratory:	Apex
Sample Time:	1040	Final Depth to Water:	24.49	Did Well Dewater:	No
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD Duplicate ID
3x40	H2O	NO3			
1x250	-	NH3			
1x250	H2SO4	NO2/NO3			

**NOTES/ADDITIONAL COMMENTS**

Anten sampling    1046 - 1050

**WELL MONITORING DATA SHEET**



**Cascadia**  
Associates, LLC

Well ID:	MGMS1-48	Job Number:	
Client:	Muster Vanc	Date:	6/16
Project:	Gym 2Q 20	Sampler:	ZW
Weather:	Rain	Time In/Out:	8:15

**WELL DATA**

Monument Type:	Flush-mount/Stick-up	Well Diameter:	—	Depth to Free Product:	—
	Other: Vault	Well Depth:	—	Free Product Thickness:	—
Monument Condition:		Depth to Water:	23.42	Water Column Length:	—
Well Cap Lock Present:	Yes No	Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal): 1-inch well = 0.041    2-inch = 0.162    4-inch = 0.653    1 gal = 3.785 liters

**PURGING DATA**


Purge Method:		Peri lowflow			Pump Intake Depth:		Mid Screen			
Sampling Method:					Tubing Material & Type:		2PPE		NEW / DEDICATED	
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Clarity/Color Other Remarks
					±0.1	±0.5 °C	±5%	±0.5 ppm	±20 mV	
832			23.42	.2	5.24	14.96	1029	23.14	251.9	clear
835			↓	↓	5.64	14.02	1973	6.67	217.6	↓
838			↓	↓	5.99	14.72	2030	3.64	194.6	↓
841			↓	↓	6.31	14.89	2102	1.75	174.1	↓
844			↓	↓	6.39	14.90	2116	1.40	171.0	↓
847			↓	↓	6.42	14.87	2106	1.33	168.0	↓
850			↓	↓	6.42	14.89	2120	1.30	166.2	↓

**PURGING DATA**

Sample ID:	MGMS1-48	Sampling Flow Rate:	.2	Analytical Laboratory:	Apex	
Sample Time:	850	Final Depth to Water:	23.38	Did Well Dewater:	No	
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
4 x 250	H2SO4					
1 x 250	—					
3 x 40	HCl	VOC				
2 x 40	HCl	RSU				

**NOTES/ADDITIONAL COMMENTS**


**WELL MONITORING DATA SHEET**

	Well ID: <u>MGMSI-60</u>	Job Number: _____
	Client: <u>Nuotenvanc</u>	Date: <u>6/16</u>
	Project: <u>GSJM 2Q20</u>	Sampler: <u>905</u>
	Weather: <u>Rain</u>	Time In/Out: <u>9:00</u>

**WELL DATA**

Monument Type:	Flush-mount/Stick-up	Well Diameter:	—	Depth to Free Product:	—
	Other: <u>Vault</u>	Well Depth:		Free Product Thickness:	
Monument Condition:		Depth to Water:	<u>23.65</u>	Water Column Length:	—
Well Cap Lock Present:	Yes No	Screened Interval:	—	Purge Volume:	

Comments: \_\_\_\_\_

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal):    1-inch well = 0.041    2-inch = 0.162    4-inch = 0.653    1 gal = 3.785 liters

**PURGING DATA**

Purge Method: _____			Pump Intake Depth: _____			NEW / <u>DEDICATED</u>				
Sampling Method: <u>Peri low flow</u>			Tubing Material & Type: <u>MS LDPE</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)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5°C	+/-5%	+/-0.5 ppm	+/-20 mV	
<u>902</u>			<u>23.65</u>	<u>2</u>	<u>7.25</u>	<u>14.94</u>	<u>1511</u>	<u>4.43</u>	<u>136.7</u>	<u>clear</u>
<u>905</u>			↓	↓	<u>7.72</u>	<u>14.78</u>	<u>990</u>	<u>2.41</u>	<u>120.6</u>	↓
<u>908</u>			↓	↓	<u>7.79</u>	<u>14.59</u>	<u>648</u>	<u>2.27</u>	<u>119.5</u>	↓
<u>911</u>			↓	↓	<u>7.85</u>	<u>14.30</u>	<u>216</u>	<u>2.76</u>	<u>89.1</u>	↓
<u>914</u>			↓	↓	<u>7.86</u>	<u>14.28</u>	<u>210</u>	<u>2.78</u>	<u>89.9</u>	↓
<u>917</u>			↓	↓	<u>7.84</u>	<u>14.27</u>	<u>207</u>	<u>2.82</u>	<u>88.5</u>	↓

**PURGING DATA**

Sample ID: <u>MGMSI-60</u>	Sampling Flow Rate: <u>2</u>	Analytical Laboratory: <u>Apex</u>				
Sample Time: <u>917</u>	Final Depth to Water: <u>23.64</u>	Did Well Dewater: <u>No</u>				
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
<u>3x 40</u>	<u>HCl</u>		—			
<u>1x 250</u>	<u>H2SO4</u>		—			
<u>1x 250</u>	—		—			

**NOTES/ADDITIONAL COMMENTS**

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**WELL MONITORING DATA SHEET**



Well ID:	MGM51-110	Job Number:	
Client:	New Steer Vanc	Date:	6/10
Project:	GLM 2020	Sampler:	
Weather:	Rain	Time In/Out:	925-10

**WELL DATA**

Monument Type:	Flush-mount/Stick-up	Well Diameter:	—	Depth to Free Product:	—
	Other: Vault	Well Depth:	—	Free Product Thickness:	—
Monument Condition:		Depth to Water:	23.8	Water Column Length:	—
Well Cap Lock Present:	Yes No	Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal): 1-inch well = 0.041    2-inch = 0.162    4-inch = 0.653    1 gal = 3.785 liters

**PURGING DATA**

Purge Method:	Peri	Pump Intake Depth:	Mid screen
Sampling Method:	downflow	Tubing Material & Type:	LDPE NEW DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
927			23.81	.2	6.04	14.44	150	11.45	217.0	down
930			↓	↓	7.10	14.52	162	4.54	114.5	↓
933			↓	↓	7.26	14.41	167	2.92	107.7	↓
936			↓	↓	7.30	14.30	174	2.79	101.0	↓
939			↓	↓	7.32	14.27	176	2.74	99.1	↓

**PURGING DATA**

Sample ID:	MGM51-110	Sampling Flow Rate:	2	Analytical Laboratory:	Apex
Sample Time:	939	Final Depth to Water:	23.77	Did Well Dewater:	NO
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD Duplicate ID
1x250	H2SO4		—	—	—
1x250	—		—	—	—
3x40	HCl		—	—	—

**NOTES/ADDITIONAL COMMENTS**


**WELL MONITORING DATA SHEET**



Well ID:	MGMS2-40	Job Number:	
Client:	Nustar Vene	Date:	6/16
Project:	GMM 2020	Sampler:	gws
Weather:	Rain	Time In/Out:	10-

**WELL DATA**

Monument Type:	Flush-mount/Stick-up	Well Diameter:	—	Depth to Free Product:	—
	Other: Vault	Well Depth:	—	Free Product Thickness:	—
Monument Condition:		Depth to Water:	23.45	Water Column Length:	—
Well Cap Lock Present:	Yes No	Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal): 1-inch well = 0.041    2-inch = 0.162    4-inch = 0.653    1 gal = 3.785 liters

**PURGING DATA**

Purge Method:	Sevi	Pump Intake Depth:	MS
Sampling Method:	Lowflow	Tubing Material & Type:	LDPE

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1014			23-48	.2	6.23	15.93	707	3.04	225.5	clear
1017			↓	↓	6.54	15.99	1054	2.01	215.9	↓
1020			↓	↓	6.96	16.20	1224	1.04	188.8	↓
1023			↓	↓	6.99	16.22	1234	.96	180.4	↓
1026			↓	↓	7.01	16.20	1240	.93	177.2	↓


**PURGING DATA**

Sample ID:	MGMS2-40	Sampling Flow Rate:	.2	Analytical Laboratory:	Apex	
Sample Time:	1026	Final Depth to Water:	23.55	Did Well Dewater:	No	
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x 40	HCl		—	—	—	—
2x 20	HCl		—	—	—	—
1x 250	H2SO4		—	—	—	—
1x 250	—		—	—	—	—

**NOTES/ADDITIONAL COMMENTS**




**WELL MONITORING DATA SHEET**

 <b>Cascadia Associates, LLC</b>	Well ID:	MG MS2-60	Job Number:	6/56
	Client:	Nustar Vane	Date:	6/56
	Project:	GUM 2020	Sampler:	905
	Weather:	Pt Sun	Time In/Out:	1030

**WELL DATA**

Monument Type:	Flush-mount/Stick-up	Well Diameter:	-	Depth to Free Product:	-
	Other: Vault	Well Depth:	~	Free Product Thickness:	~
Monument Condition:		Depth to Water:	23.7	Water Column Length:	~
Well Cap Lock Present:	Yes No	Screened Interval:	~	Purge Volume:	~

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal):      1-inch well = 0.041      2-inch = 0.162      4-inch = 0.653      1 gal = 3.785 liters

**PURGING DATA**

Purge Method:		Peri Leak flow			Pump Intake Depth:		MS LDPE				NEW	DEDICATED
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Clarity/Color Other Remarks		
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV			
1037			23.7	.2	7.41	17.12	1078	4.11	151.9	Clear		
1040			↓	↓	7.60	16.90	920	2.19	140.4	↓		
1043			↓	↓	7.70	16.81	801	1.80	136.5	↓		
1046			↓	↓	7.85	16.43	680	1.52	132.1	↓		
1049			↓	↓	8.09	16.12	402	1.40	129.6	↓		
1052			↓	↓	8.05	15.96	395	1.37	131.8	↓		
1055			↓	↓	8.60	15.95	391	1.41	132.5	↓		

**PURGING DATA**

Sample ID:	MG MS2-60	Sampling Flow Rate:	1.2	Analytical Laboratory:	Apex	
Sample Time:	1055	Final Depth to Water:	23.7	Did Well Dewater:	NO	
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3 x 40	HCl					
1 x 250	H2SO4					
1 x 250						

**NOTES/ADDITIONAL COMMENTS**

**WELL MONITORING DATA SHEET**



**Cascadia**  
Associates, LLC

Well ID:	MGM52-110	Job Number:	
Client:	Nu Star Valve	Date:	6/16
Project:	GWM 2Q 20	Sampler:	7/5
Weather:	PT Sun	Time In/Out:	11-1130

**WELL DATA**

Monument Type:	Flush-mount/Stick-up	Well Diameter:	~	Depth to Free Product:	~
	Other: <i>Saw</i>	Well Depth:	~	Free Product Thickness:	~
Monument Condition:		Depth to Water:	23.90	Water Column Length:	~
Well Cap Lock Present:	Yes No	Screened Interval:	~	Purge Volume:	~

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal): 1-inch well = 0.041    2-inch = 0.162    4-inch = 0.653    1 gal = 3.785 liters

**PURGING DATA**

Purge Method:	<i>Peri Longflow</i>				Pump Intake Depth:	<i>MS</i>				
Sampling Method:					Tubing Material & Type:	<i>LDPE</i>			NEW <i>(DEDICATED)</i>	
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1107			23.90	.2	7.58	18.33	184	8.92	150.4	<i>Clear</i>
1110			↓	↓	8.00	17.15	177	4.80	135.4	
1113			↓	↓	8.14	16.51	171	3.14	131.8	
1116			↓	↓	7.81	16.04	167	2.06	157.6	
1119			↓	↓	7.77	15.43	160	2.10	149.9	
1122			↓	↓	7.75	15.91	160	2.07	149.3	

**PURGING DATA**

Sample ID:	MGM52-110	Sampling Flow Rate:	.2	Analytical Laboratory:	<i>Apex</i>	
Sample Time:	1125	Final Depth to Water:	23.90	Did Well Dewater:	<i>NO</i>	
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
1x250	—		—	—	—	—
1x250	H2SO4		—	—	—	—
3x40	HCl		—	—	—	—

**NOTES/ADDITIONAL COMMENTS**

**WELL MONITORING DATA SHEET**



**Cascadia**  
Associates, LLC

Well ID:	MGM52-132	Job Number:	
Client:	Ny Star Nunc	Date:	6/10
Project:	GWSM 2020	Sampler:	AW
Weather:	Pt Sun	Time In/Out:	1130-12

**WELL DATA**

Monument Type:	Flush-mount/Stick-up	Well Diameter:	-	Depth to Free Product:	-
	Other: <i>Vault</i>	Well Depth:	-	Free Product Thickness:	-
Monument Condition:		Depth to Water:	23.94	Water Column Length:	-
Well Cap Lock Present:	Yes No	Screened Interval:	-	Purge Volume:	-

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal): 1-inch well = 0.041    2-inch = 0.162    4-inch = 0.653    1 gal = 3.785 liters

**PURGING DATA**

Purge Method:	<i>Peri lowflow</i>			Pump Intake Depth:	<i>MIS</i>						
Sampling Method:				Tubing Material & Type:	<i>LDPE</i>						
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Clarity/Color	Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV		
1140			23.96	.2	6.47	16.97	165	15.45	188.3	clear	
1143					6.66	17.28	175	6.00	189.4		
1146					6.84	17.36	197	3.58	177.3		
1149					7.25	16.70	202	2.41	159.3		
1152					7.30	16.77	206	2.34	149.0		
1155					7.29	16.81	207	2.30	151.4		

**PURGING DATA**

Sample ID:	MGM52-132	Sampling Flow Rate:	.2	Analytical Laboratory:	<i>Apex</i>	
Sample Time:	1155	Final Depth to Water:	23.92	Did Well Dewater:	<i>No</i>	
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
1x 250	H2SO4					
1x 250	-					
3x 40	HCl					

**NOTES/ADDITIONAL COMMENTS**

**WELL MONITORING DATA SHEET**



**Cascadia**  
Associates, LLC

Well ID: <b>MGM53-40</b>	Job Number: <b>---</b>
Client: <b>Nu Star Vanc</b>	Date: <b>6/16</b>
Project: <b>GLWM 2020</b>	Sampler: <b>fw</b>
Weather: <b>Part Sun</b>	Time In/Out: <b>1230</b>

**WELL DATA**

Monument Type:	Flush-mount/Stick-up	Well Diameter:	<b>---</b>	Depth to Free Product:	<b>---</b>
	Other: <b>Vault</b>	Well Depth:	<b>---</b>	Free Product Thickness:	<b>---</b>
Monument Condition:		Depth to Water:	<b>22.52</b>	Water Column Length:	<b>---</b>
Well Cap Lock Present:	Yes No	Screened Interval:		Purge Volume:	<b>---</b>

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal): 1-inch well = 0.041    2-inch = 0.162    4-inch = 0.653    1 gal = 3.785 liters

**PURGING DATA**

Purge Method:	<b>Peri lowflow</b>			Pump Intake Depth:	<b>MS LDPE</b>					
Sampling Method:				Tubing Material & Type:	<b>NEW / DEDICATED</b>					
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1244			22.52	.2	6.60	17.08	322	7.67	183.6	clear
1247			↓	↓	6.97	15.33	363	1.95	174.7	↓
1250			↓	↓	6.28	15.05	365	.99	210.2	↓
1253			↓	↓	6.46	14.75	364	.70	201.9	↓
1256			↓	↓	6.48	14.74	367	.50	190.4	↓
1259			↓	↓	6.49	14.75	367	.48	186.5	↓

**PURGING DATA**

Sample ID: <b>MGM53-40</b>	Sampling Flow Rate: <b>.2</b>	Analytical Laboratory: <b>Apex</b>				
Sample Time: <b>1259</b>	Final Depth to Water: <b>22.52</b>	Did Well Dewater: <b>No</b>				
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x40	HCl					
1x250	H2SO4					
1x250						
2x40	HCl					
3x40	HCl					MGM53-40 Dup
1x250	H2SO4					MGM53-40 Dup

**NOTES/ADDITIONAL COMMENTS**

1x250						MGM53-40 Dup
2x40	HCl					MGM53-40 Dup

WELL MONITORING DATA SHEET



Cascadia Associates, LLC

Well ID:	MGMS3-60	Job Number:	
Client:	NuStar Vault	Date:	6/16
Project:	6W2020	Sampler:	AW
Weather:	PT Sun	Time In/Out:	1320

WELL DATA

Monument Type:	Flush-mount/Stick-up Other: Vault	Well Diameter:	—	Depth to Free Product:	—
Monument Condition:		Well Depth:	—	Free Product Thickness:	—
Well Cap Lock Present:	Yes No	Depth to Water:	22.64	Water Column Length:	—
		Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal): 1-inch well = 0.041 2-inch = 0.162 4-inch = 0.653 1 gal = 3.785 liters

PURGING DATA

Purge Method:	Peri-confluent			Pump Intake Depth:	Mid Screen					
Sampling Method:				Tubing Material & Type:	LDPE		NEW / DEDICATED			
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1326			22.64	.2	6.80	16.91	383	2.69	157.6	clear
1329					7.20	16.56	302	1.14	140.6	
1332					7.15	16.46	208	1.61	151.6	
1335					7.21	16.34	146	1.80	150.9	
1338					7.23	16.20	140	1.85	152.3	
1341					7.27	16.16	137	1.91	155.5	

PURGING DATA

Sample ID:	MGMS3-60	Sampling Flow Rate:	2	Analytical Laboratory:	Apex		
Sample Time:	1341	Final Depth to Water:	22.64	Did Well Dewater:	No		
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID	
3x40	HCE		—	—	—	—	
1x250	H2SO4		—	—	—	—	
1x250	—		—	—	—	—	

NOTES/ADDITIONAL COMMENTS


**WELL MONITORING DATA SHEET**



**Cascadia**  
Associates, LLC

Well ID:	MGM53-110	Job Number:	
Client:	NuStar Vanc	Date:	6/10
Project:	GW 2020	Sampler:	JW
Weather:	PT Sun	Time In/Out:	1335

**WELL DATA**

Monument Type:	Flush-mount/stick-up Other: <i>Vault</i>	Well Diameter:	—	Depth to Free Product:	—
Monument Condition:		Well Depth:	—	Free Product Thickness:	—
Well Cap Lock Present:	Yes No	Depth to Water:	22.61	Water Column Length:	—
		Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal): 1-inch well = 0.041    2-inch = 0.162    4-inch = 0.653    1 gal = 3.785 liters

**PURGING DATA**

Purge Method:	<i>Peri low flow</i>			Pump Intake Depth:	<i>MS</i>					
Sampling Method:				Tubing Material & Type:	<i>LDPE</i>			<i>NEW / DEDICATED</i>		
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1359			22.61	.2	6.43	17.90	130	23.06	186.0	clear
1402			↓	↓	6.72	16.41	154	8.23	181.7	↓
1405			↓	↓	6.73	15.61	167	3.61	184.0	↓
1408			↓	↓	6.70	15.22	168	2.54	212.7	↓
1411			↓	↓	6.69	15.17	170	2.50	215.5	↓
1414			↓	↓	6.71	15.20	168	2.45	218.1	↓

**PURGING DATA**

Sample ID:	MGM53-110	Sampling Flow Rate:	.2	Analytical Laboratory:	<i>Apex No</i>	
Sample Time:	1414	Final Depth to Water:	22.61	Did Well Dewater:		
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x40	HCl		—	—	—	—
1x250	12804		—	—	—	—
1x250	—		—	—	—	—

**NOTES/ADDITIONAL COMMENTS**

**WELL MONITORING DATA SHEET**



**Cascadia**  
Associates, LLC

Well ID:	MGM53-132	Job Number:	
Client:	Nu Star Vault	Date:	6/16
Project:	GWM 2020	Sampler:	AW
Weather:	PT Sun	Time In/Out:	1425-1500

**WELL DATA**

Monument Type:	Flush-mount/Stick-up Other: Vault	Well Diameter:	—	Depth to Free Product:	—
Monument Condition:		Well Depth:	—	Free Product Thickness:	—
Well Cap Lock Present:	Yes No	Depth to Water:	22.70	Water Column Length:	—
		Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal): 1-inch well = 0.041    2-inch = 0.162    4-inch = 0.653    1 gal = 3.785 liters

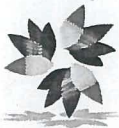
**PURGING DATA**

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Clarity/Color Other Remarks
1428			22.70	.2	8.11	16.59	183	4.45	184.3	clear
1431					8.46	16.04	190	2.92	114.6	
1434					8.41	15.70	194	2.16	115.2	
1437					8.01	15.49	195	1.98	126.9	
1440					7.92	15.20	196	1.90	136.4	
1443					7.93	15.13	196	1.88	140.7	

**PURGING DATA**

Sample ID:	MGM53-132	Sampling Flow Rate:	.2	Analytical Laboratory:	Apex	
Sample Time:	1443	Final Depth to Water:	22.70	Did Well Dewater:	No	
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3 x 40	HCL		—			
1 x 250	H2SO4		—			
1 x 250	—		—			

**NOTES/ADDITIONAL COMMENTS**



**DAILY FIELD REPORT**

Job No.			
Report By: <i>Lindsay Willis</i>			
Date of Work: <i>1/10/2020</i>			
Project Name and Address <i>Nistar Vancouver</i>		Client/Owner: <i>Nistar</i>	Page of <i>1 2</i>
		Project Manager: <i>Stephanie Schaberg</i>	Weather <i>Rain</i>
Description of Work: <i>SVE O&amp;M</i>			
Field Staff: <i>LW</i>			
Report: <i>0645 - LW onsite, signed in</i> <i>0700 - Safety meeting. Issued work permit.</i>			
<i>0740 - Measurements:</i>			
	<u>PID</u>	<u>Pressure</u>	
<i>Pre blower</i>	<i>0.1</i>	<i>21</i>	
<i>post blower</i>	<i>6.3</i>	<i>29</i>	
<i>post carbon 1</i>	<i>4.2</i>	<i>16</i>	
<i>post carbon 2</i>	<i>3.5</i>	<i>6</i>	
<i>661541</i>			
<i>SVE - South - Post Carbon - 011020 #27420, #N2500</i>			
<i>Pi = -27 Pf = -5 Ti = 905 Tf = 910</i>			
<i>660908</i>			
<i>SVE - South - Pre Carbon - 011020 27420 N1785</i>			
<i>Pi = -30 Pf = -5 Ti = 915 Tf = 920</i>			
Site Status:			
Drum Inventory:			
Time of Arrival On-Site:		Total Mileage	
Time of Departure from Site:		Truck	Car
Attachments:			





**DAILY FIELD REPORT**

Job No.			
Report By: <i>LW</i>			
Date of Work: <i>1/10/20</i>			
Project Name and Address <i>Nustar Vancouver</i>		Client/Owner: <i>Nustar</i>	Page of <i>2 2</i>
		Project Manager: <i>Stephanie Salisbury</i>	Weather <i>Rain</i>
Description of Work:			
Field Staff:			
Report: <i>0930 - Emptied ~70 gal blue water from KO drum. Leak in KO drum outlet (appears corroded though). Blue water flows through hole when system is off. Took blue water sample for waste profiling.</i>			
<i>Blue Water 1/10/20 930 (cont.)</i>			
<i>Sending to Apex Labs for copper, nitrate, ammonia, VOLS</i>			
<i>Site status PRIOR to 1/10/20 sampling: System on. All lines open, EXCEPT Butle. Bldg lines closed (only those accessible and not corroded/leaking).</i>			
<i>site status Post 1/10/20: System off.</i>			
<i>950 - Blue water → Drum in waste area (already partially full).</i>			
<i>1 x (full) 30 gal drum</i>			
<i>1000 - Turned in work permit, signed out, offsite</i>			
Site Status:			
Drum Inventory: <i>1 x 30 gal</i>			
Time of Arrival On-Site: <i>0645</i>		Total Mileage	
Time of Departure from Site: <i>1000</i>		Truck	Car <i>RT</i>
Attachments: <i>Ø</i>			

## **APPENDIX B**

### **HISTORICAL GROUNDWATER ANALYTICAL DATA**

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

Well Number	Sample Date	Concentrations in µg/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	11/17/1993	--	500	--	--	<250	<250	--	14,000	--	--	750	<250	--	1,400	<500
	9/1/1995	<250	<500	<250	<250	<250	<250	<250	13,000	<250	<250	620	<250	--	890	610
	9/24/1996	<5	<20	<2	<2	54	<2	8.4	11,000	83	17	2,600	68	--	1,800	420
	12/2/1996	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
	11/12/1997	<125	<250	<125	<125	<125	<125	<125	11,600	<125	<125	6,330	<125	--	2,880	<250
	8/11/1999	<50	<250	<25	<250	43.1	<25	<25	8,590	86	<25	2,520	52.5	--	1,210	408
	11/16/1999	<50	<125	<25	<50	38	<25	<25	6,250	47.5	<25	2,400	28	--	829	148
	2/29/2000	<100	<500	<50	<50	<50	<50	<50	6,720	60.9	<50	1,370	<100	--	590	438
	6/27/2000	<100	<500	<50	<50	<50	<50	<50	6,480	65.1	<50	1,780	<100	--	795	284
	8/31/2000	<100	<500	<50	<50	<50	<50	<50	5,160	<50	<50	1,960	<100	--	720	<50
	11/30/2000	<20	<100	<10	<10	15	<10	<10	1,550	12.7	<10	660	<20	--	234	<10
	2/27/2001	<100	<100	<50	<50	<50	<50	<50	4,990	<50	<50	1,140	<100	--	440	190
	5/29/2001	<50	<250	<25	<25	<25	<25	<25	4,050	<25	<25	1,040	<50	--	407	91
	9/25/2001	<50	<50	<50	<50	<50	<50	<50	5,000	<50	<50	890	<50	--	440	240
	12/17/2001	<2	<10	<1	<1	<1	<1	<1	109	1.26	<1	164	<2	--	42.9	<1
	3/19/2002	<50	<25	<25	<50	35	<25	<25	4,120	35	<25	710	<25	--	349	170
	5/30/2002	<10	<5	<5	<10	10.8	<5	<5	1,140	6.6	<5	307	<5	--	101	22.3
	11/8/2002	<20	<10	<10	<20	22.8	<10	<10	1,980	20.2	<10	367	<10	--	174	14.4
	5/30/2003	<20	<10	<10	<20	21.2	<10	<10	2,180	<10	<10	1,200	14.2	--	340	22.6
	11/2/2004	<20	<10	<10	<20	22.4	<10	<10	2,130	23.6	<10	335	<10	--	169	22.8
	11/16/2004	<12	<12	<12	<12	15	<12	<12	1,300	<12	<12	310	<12	--	130	<12
	5/18/2005	<5	<2.5	<2.5	<5	12	<2.5	<2.5	773	14.1	<2.5	193	<2.5	--	87.6	3.8
	5/23/2007	<10	<10	<10	<10	15.5	<10	<10	1,110	<10	<10	58.5	<10	--	45.4	11.7
	9/11/2007	<50	<25	<25	<50	<25	<25	<25	916	<25	<25	34	<25	--	34	62.5
	12/13/2007	<10	<5	<5	<10	9.7	<5	<5	526	5	<5	81.9	<5	--	45.4	8.8
	3/5/2008	<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
	9/19/2008	<20	<10	<10	<20	20.4	<10	<10	633	<10	<10	108	<10	<10	74.8	<10
	12/10/2008	<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
	3/27/2009	<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
	6/17/2009	<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
	9/18/2009	<0.80	<0.80	<0.80	<0.80	19	<0.80	<0.80	590	4.2	1.9	29	<0.80		27	8.1
	12/17/2009	<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 µg/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	3/19/2010	<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
(continued)	6/15/2010	<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
	9/23/2010	<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
	12/9/2010	<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
	3/10/2011	<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
	6/9/2011	<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
	9/19/2011	<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
	12/9/2011	<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
	3/9/2012	<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
	6/22/2012	<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
	9/13/2012	<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
	12/13/2012	<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
	3/15/2013	<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
	6/13/2013	<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
	9/19/2013	<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
	12/16/2013	<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	22.6
	11/9/2017	<2.0	<2.0	<0.50	<0.50	5.00	<0.50	<0.50	22.80	<0.50	<0.50	9.50	<0.50	<0.50	6.50	1.1

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 µg/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)	3/20/2018	<0.500	<2.50	<0.500	<0.500	4.84	<0.500	<0.500	6.13	<0.500	0.322 J	2.49	<0.500	<0.500	2.06	<0.500
	7/1/2018	<0.500	<2.50	<0.500	<0.500	6.70	<0.500	0.204 J	16.1	0.303 J	0.427 J	0.530	<0.500	<0.500	1.63	10.5
	9/25/2018	<1.00	<5.00	<1.00	<1.00	7.33	<0.400	0.740	44.9	0.610	0.510	4.24	<0.400	<0.500	8.09	3.19
	12/4/2018	<1.00	<5.00	<1.00	<1.00	4.73	<0.400	<0.400	22.7	<0.400	<0.500	15.700	<0.400	<0.500	9.04	2.57
	3/21/2019	<1.00	<5.00	<1.00	<1.00	4.37	<0.400	0.780	28.5	0.530	<0.500	2.78	<0.400	<0.500	6.65	0.400
	6/5/2019	<1.00	<5.00	<1.00	<1.00	2.54	<0.400	<0.400	27.6	0.481	<0.500	12.9	<0.400	<0.500	8.43	<0.400
	9/27/2019	<1.00	<5.00	<1.00	<1.00	8.66	<0.400	0.57	106	1.78	0.703	19.1	0.45	<0.500	18.4	2.97
	12/4/2019	<1.00	<5.00	<1.00	<1.00	3.22	<0.400	<0.400	26.6	0.494	<0.500	10.6	<0.400	<0.500	7.39	0.67
	3/10/2020	<1.00	<5.00	<1.00	<1.00	4.45	<0.400	<0.400	13.4	<0.400	<0.500	5.96	<0.400	<0.500	5.22	<0.400
6/17/2020	<1.00	<5.00	<1.00	<1.00	2.95	<0.400	0.42	23.5	0.520	<0.500	12.1	<0.400	<0.500	7.75	0.46	
MW-2	11/17/1993	--	51	--	--	12	<0.50	--	10	--	--	<0.50	<0.50	--	<0.50	<0.10
	9/1/1995	<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
	9/24/1996	<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
	12/2/1996	<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
	11/13/1997	<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
	8/11/1999	<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
	2/29/2000	<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
	6/27/2000	<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
	5/30/2001	<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
	5/30/2002	<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
	11/8/2002	<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
	5/30/2003	<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
	9/12/2007	<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
	3/7/2008	<1	7.86	<0.500	<1	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	0.5	<0.500	<0.500	<0.500	<0.500
	9/18/2008	<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
	3/24/2009	<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
	9/16/2009	<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
	3/19/2010	<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
	9/23/2010	<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
	3/9/2011	<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
9/16/2011	<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	
3/9/2012	<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	
9/13/2012	<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	
3/14/2013	<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	
9/19/2013	<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	

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

Well Number	Sample Date	Concentrations in µg/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 (continued)	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	<0.50	<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
	7/2/2018	<0.500	3.0	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
	9/25/2018	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	3/21/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	6/5/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	9/27/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	12/5/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	3/12/2020	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	6/17/2020	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
MW-3	11/17/1993	--	210	--	--	27	4	--	240	--	--	190	20	--	97	130
	9/1/1995	<50	<100	<50	<50	<50	<50	<50	2,700	<50	<50	1,300	<50	--	140	730
	9/24/1996	<5	<20	7.9	<2	12	<2	<2	1,100	9.5	4	1,800	21	--	330	82
	12/2/1996	<50	<50	<50	<20	<30	<50	<20	650	<100	<20	2,100	<100	--	470	<50
	11/12/1997	<25	<50	<25	<25	<25	<25	<25	464	<25	<25	2,000	<25	--	241	<50
	8/11/1999	<20	<100	<10	<10	<10	<10	<10	500	<10	<10	1,760	25.4	--	247	<10
	11/16/1999	<20	<50	<10	<20	14	<10	<10	628	15.2	<10	700	<10	--	132	<10
	2/29/2000	<20	<100	<10	<10	<10	<10	<10	473	<10	<10	1,890	25.4	--	356	<10
	6/27/2000	<20	<100	<10	<10	<10	<10	<10	410	<10	10.2	1,460	<20	--	241	<10
	8/31/2000	<20	<100	<10	<10	52.2	<10	<10	2,580	25.5	<10	399	<20	--	100	171
	11/30/2000	<5	<25	<2.5	<2.5	13.3	<2.5	<2.5	374	3.73	<2.5	366	<5	--	80.3	3.1
	2/27/2001	<5	<25	3.64	<2.5	5.78	<2.5	<2.5	153	<2.5	2.5	358	<5	--	76.1	<2.5
	5/29/2001	<5	<25	2.8	<2.5	<2.5	<2.5	<2.5	112	<2.5	<2.5	647	5.12	--	93.3	<2.5
	9/25/2001	<1.3	3.1	2.4	<1.3	10	2	<1.3	210	3	1.7	550	7.2	--	90	4.9
	12/17/2001	<10	<50	<5	<5	<5	<5	<5	164	<5	<5	826	16.9	--	155	<5
3/19/2002	<5	<2.5	2.75	<5	<2.5	<2.5	<2.5	138	4.1	<2.5	758	9.6	--	107	<2.5	
5/30/2002	<10	7.8	<5	<10	27.8	<5	<5	1,380	42.6	6	302	11.5	--	55.1	96.7	
11/8/2002	<5	15	<2.5	<5	29.4	3.55	<2.5	399	9.05	5.7	359	5.8	--	67.1	19.4	
5/30/2003	<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	

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 µg/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	11/16/2004	<10	<5	<5	<10	15	<5	<5	440	5.9	<5	270	<5	--	72	<5
(continued)	3/23/2005	<2	2.26	4.16 B	<2	8.92	<1	<1	246	8.4	2.86	329	5.04	--	71.9	3.84
	5/18/2005	<2	<1	3.86	<2	5.74	<1	<1	188	4.72	3.02	304	5.06	--	88.5	<1
	5/23/2007	<2	<2	<2	<2	<2	<2	<2	110	6.3	<2	349	4.54	--	70.6	<2
	9/11/2007	<5	9.95	14.4	<5	43	6.1	<2.50	950	28.2	12	601	31	--	223	6.1
	12/12/2007	<10	<5	<5	<10	<5	<5	<5	95.7	<5	<5	254	<5	--	63.2	<5
	3/6/2008	<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
	9/19/2008	<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
	12/10/2008	<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
	3/26/2009	<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
	6/17/2009	<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
	9/18/2009	<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
	12/17/2009	<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
	3/19/2010	<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
	6/16/2010	<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
	9/23/2010	<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
	12/9/2010	<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
	3/10/2011	<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
	6/10/2011	<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
	9/16/2011	<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
	12/9/2011	<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
	3/12/2012	<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
	6/21/2012	<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
	9/13/2012	<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
	12/13/2012	<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
	3/14/2013	<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
	6/14/2013	<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
	9/19/2013	<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
	12/16/2013	<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

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 µg/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)	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
	3/20/2018	<0.500	<2.50	0.380 J	<0.500	2.0	0.144 J	<0.500	77.8	2.2	1.99	194	3.4	<0.500	48.6	<0.500
	7/2/2018	<0.500	<2.50	0.439 J	<0.500	<0.500	3.2	<0.500	64.5	1.6	1.07	180	2.6	<0.500	43.1	<0.500
	9/26/2018	<1.00	<5.00	<1.00	<1.00	6.41	<0.400	<0.400	75.6	0.73	1.18	145	1.18	<0.500	36.3	<0.400
	12/7/2018	<2.00	<10.0	<2.00	<2.00	3.1	<0.800	<0.800	44.2	1.0	<1.00	96	1.0	<1.00	27.8	<0.800
	3/20/2019	<1.00	<5.00	<1.00	<1.00	0.930	<0.400	<0.400	37.5	1.16	1.03	112	1.55	<0.500	33.2	<0.400
6/7/2019	<1.00	<5.00	1.02	<1.00	1.22	<0.400	<0.400	41.6	1.99	0.708	195	2.62	<0.500	39.8	<0.400	
9/27/2019	<1.00	<5.00	<1.00	<1.00	7.00	0.47	<0.400	72.3	1.25	1.32	130	1.7	<0.500	32.9	<0.400	
12/4/2019	<1.00	<5.00	<1.00	<1.00	1.54	<0.400	<0.400	36.5	1.07	0.634	136	1.33	<0.500	36.4	<0.400	
3/10/2020	<1.00	<5.00	<1.00	<1.00	1.77	<0.400	<0.400	48.9	1.97	1.03	192	2.74	<0.500	50.9	<0.400	
6/17/2020	<2.00	<10.0	<2.00	<2.00	<0.800	<0.400	<0.400	18.6	1.16	<1.00	115	1.38	<1.00	22.8	<0.800	
MW-4	11/17/1993	--	850	--	--	12	<50	--	20	--	--	40	<50	--	5.4	<10
	9/1/1995	<5	340	<5	<5	5.2	<50	<5	14	<5	<5	<50	<50	--	<50	30
	9/24/1996	<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
	12/2/1996	<0.50	310	<0.50	0.3	3.8	1	<0.20	19	<1	0.3	<0.50	<1	--	<0.30	39
	11/13/1997	<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 µg/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)	8/11/1999	<2	144	<1	<1	1.21	<1	<1	<1	<1	<1	3.6	<2	--	<1	<1
	11/16/1999	<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
	2/29/2000	<2	119	<1	<1	2.84	<1	<1	4.1	<1	<1	<1	<2	--	<1	5.72
	6/28/2000	<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
	7/5/2000	Well Abandoned														
MW-5	11/17/1993	--	1,900	--	--	<25	<25	--	100	--	--	1,200	<25	--	52	<50
	9/1/1995	<1	<2	<1	<2	<1	<1	<1	1,300	<1	<1	60,000	<1	--	<1	<2
	9/24/1996	<5	140	<2	<2	35	<2	7.5	2,600	80	5.3	16,000	64	--	670	370
	12/2/1996	71	<50	<50	27	<30	<50	<20	5,600	<100	<20	27,000	110	--	1,700	340
	11/12/1997	<500	<1	<500	<500	<500	<500	<500	<500	<500	<500	28,000	<500	--	1,250	<1
	8/11/1999	<200	<1	<100	<100	<100	<100	<100	1,750	<100	<100	25,100	<200	--	862	238
	2/29/2000	<100	<500	<50	<50	<50	<50	<50	126	<50	<50	5,250	<100	--	135	<50
	8/31/2000	<50	<250	<25	<25	41.4	<25	<25	1,860	<25	<25	5,660	<50	--	347	280
	11/30/2000	<50	<250	<25	<25	27.3	<25	<25	3,850	26.8	<25	6,150	<50	--	511	189
	2/27/2001	<50	<250	<25	<25	<25	<25	<25	1,370	<25	<25	7,350	<50	--	445	127
	5/30/2001	<50	<250	<25	<25	<25	<25	<25	2,410	<25	<25	5,560	<50	--	439	129
	9/25/2001	<25	200	<25	<25	34	<25	<25	1,800	<25	<25	2,200	<25	--	180	180
	12/17/2001	<100	<500	<50	<50	<50	<50	<50	1,480	<50	<50	10,100	<100	--	646	<50
	3/19/2002	<50	<25	<25	<50	<25	<25	<25	360	<25	<25	4,640	<25	--	221	114
	5/29/2002	<50	46	<25	<50	<25	<25	<25	916	<25	<25	4,330	<25	--	238	39.5
	8/29/2002	<50	<25	<25	<50	<25	<25	<25	1,160	<25	<25	4,090	<25	--	288	310
	11/8/2002	<5	178	<2.5	<5	8.3	<2.5	<2.5	385	3.25	<2.5	603	<2.5	--	63.4	66
	1/23/2003	<50	<25	<25	<50	<25	<25	<25	582	<25	<25	4,090	<25	--	349	<25
	5/30/2003	<10	14.1	<5	<10	<5	<5	<5	382	<5	<5	1,450	7.9	--	140	67
	11/10/2003	<1	84.2	<1	<1	1.06	<1	<1	90.7	<1	<1	161	<1	--	30.8	9.42
1/26/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/4/2004	<20	<20	<20	<20	<20	<20	<20	432	<20	<20	2,440	<20	--	178	188	
8/17/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/2/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/16/2004	<50	<50	<50	<50	<50	<50	<50	6,300	<50	<50	1,800	<50	--	370	990	
3/23/2005	<20	<10	<10	<20	26.2	<10	<10	2,350	27.6	<10	511	<10	--	147	604	
5/18/2005	<5	<2.5	<2.5	<5	9.25	<2.5	6.45	817	10.2	<2.5	611	<2.5	--	156	329	

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

Well Number	Sample Date	Concentrations in µg/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	8/18/2005	<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)	11/15/2005	<20	<10	<10	<20	36.2	<10	<10	2,790	14	<10	408	<10	--	177	615
	2/21/2006	<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
	6/5/2006	<20	<20	<20	<20	<20	<20	<20	2,800	<20	<20	157	<20	--	75	199
	9/6/2006	<2	10.6	<1	<2	8.3	<1	<1	377	3.66	<1	104	<1	--	45	29.9
	12/6/2006	<2	<1	<1	<2	1.32	<1	1.34	113	1.28	1.52	240	1.6	--	58	43.3
	2/7/2007	<10	<5	<5	<10	<5	<5	<5	1,220	18	<5	124	<5	--	26.9	600
	5/22/2007	<5	<5	<5	<5	<5	<5	<5	634	8.45	<5	102	<5	--	40.8	59.4
	9/12/2007	<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
	12/13/2007	<1	<0.50	<0.50	<1	7.1	<0.50	4.67	2,420	9.22	1.14	180	<0.50	--	179	416
	3/7/2008	<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
	9/18/2008	<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
	12/10/2008	<2	<2	<2	<2	3.7	<2	<2	360	2.3	<2	49	<2	<2	53	150
	3/27/2009	<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
	6/17/2009	<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
	9/18/2009	<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
	12/17/2009	<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
	3/19/2010	<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
	6/16/2010	<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
	9/23/2010	<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
	12/9/2010	<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
	3/11/2011	<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
	6/10/2011	<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
	9/19/2011	<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
	12/9/2011	<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
	3/12/2012	<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
	6/22/2012	<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
	9/14/2012	<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
	12/13/2012	<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
	3/15/2013	<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 µg/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)	6/13/2013	<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
	9/19/2013	<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
	12/16/2013	<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
	3/21/2018	<0.500	<2.50	<0.500	<0.500	<0.500	<0.500	<0.500	1.9	<0.500	<0.500	10.6	0.199 J	<0.500	2.4	0.260 J
	6/29/2018	<0.500	<2.50	<0.500	<0.500	0.56	<0.500	<0.500	45.5	0.174 J	<0.500	21.3	<0.500	<0.500	11.8	1.17
	9/27/2018	<1.00	26.9	<1.00	<1.00	<0.400	<0.400	<0.400	0.562	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
12/7/2018	<1.00	<5.00	<1.00	<1.00	1.03	<0.400	<0.400	129.0	<0.400	<0.500	4.7	<0.400	<0.500	11.7	4.80	
3/26/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	2.01	<0.400	<0.500	0.947	<0.400	<0.500	0.977	<0.400	
6/7/2019	<1.00	<5.00	<1.00	<1.00	0.404	<0.400	<0.400	11.1	<0.400	<0.500	20.4	<0.400	<0.500	8.63	<0.400	
9/26/2019	<1.00	<5.00	<1.00	<1.00	<0.4	<0.400	<0.400	10.7	<0.400	<0.500	0.972	<0.400	<0.500	1.35	1.10	
12/4/2019	<1.00	<5.00	<1.00	<1.00	0.817	<0.400	1.60	632	1.11	<0.500	0.925	<0.400	<0.500	9.85	10.70	
3/12/2020	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	14.3	<0.400	<0.500	18.7	<0.400	<0.500	7.11	2.58	
6/18/2020	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	10.4	<0.400	<0.500	17.3	<0.400	<0.500	18.3	0.41	

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 µg/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	11/17/1993	--	<1	--	--	<0.50	<0.50	--	1.2	--	--	2.1	<0.50	--	0.54	<1
	9/1/1995	<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
	9/24/1996	<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
	12/2/1996	<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
	11/12/1997	<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
	8/11/1999	<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
	11/16/1999	<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
	2/29/2000	<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
	6/27/2000	<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
	5/29/2001	<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
	5/30/2002	<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
	8/28/2002	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/8/2002	<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
	1/23/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	5/30/2003	<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
	11/17/2004	<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
	5/17/2005	<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
	9/12/2007	<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
	3/6/2008	<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
	9/19/2008	<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
	3/24/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	9/16/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	3/19/2010	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	9/23/2010	<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
	3/9/2011	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	9/15/2011	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	3/5/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	9/13/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	3/14/2013	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	9/19/2013	<0.50	<0.50	<0.50	<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

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 µg/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)	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	<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
	7/1/2018	<0.500	<2.50	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
	9/25/2018	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	3/22/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	6/5/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	9/27/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	12/5/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	3/12/2020	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	6/17/2020	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
MW-7	12/2/1996	81	<50	<50	39	<30	<50	110	110	<100	<20	73,000	1,900	--	7,600	<50
	11/12/1997	<500	<1	<500	<500	<500	<500	<500	<500	<500	<500	36,400	<500	--	7,670	<1
	8/11/1999	<1	<5	<500	<500	<500	<500	<500	<500	<500	<500	49,000	1,210	--	4,650	<500
	11/16/1999	<100	<250	<50	<100	<50	<50	92	353	<50	<50	54,800	914	--	5,320	<50
	2/28/2000	<1	<5	<500	<500	<500	<500	<500	<500	<500	<500	52,400	<1	--	4,060	<500
	6/28/2000	<1	<5	<500	<500	<500	<500	<500	<500	<500	<500	54,300	<1	--	3,390	<500
	8/31/2000	<500	<2	<250	<250	<250	<250	<250	<250	<250	<250	50,900	824	--	3,960	<250
	11/30/2000	<500	<2	<250	<250	<250	<250	<250	<250	<250	<250	33,500	520	--	3,560	<250
	2/27/2001	<500	<2	<250	<250	<250	<250	<250	<250	<250	<250	26,700	<500	--	3,290	<250
	5/30/2001	<200	<1,000	<100	<100	<100	<100	<100	374	<100	<100	20,400	214	--	2,820	<100
	9/25/2001	<25	<25	<25	<25	28	<25	35	350	<25	<25	19,000	260	--	2,500	<25
	12/17/2001	<100	<50	<50	<50	84.6	<50	<50	506	<50	<50	10,100	200	--	1,960	<50
	3/18/2002	<50	<25	<25	<50	<25	<25	<25	206	<25	<25	7,250	71	--	1,020	<25
	5/31/2002	<50	<25	<25	<50	<25	<25	<25	42.5	<25	<25	5,500	<25	--	311	<25
	8/29/2002	<50	<25	<25	<50	<25	<25	50.5	93	<25	<25	4,940	44.5	--	634	<25
11/7/2002	<50	<25	<25	<50	<25	<25	<25	123	<25	<25	5,810	43	--	758	<25	
1/23/2003	<20	<10	<10	<20	<10	<10	<10	59.8	<10	<10	2,010	14	--	282	<10	
5/28/2003	<10	<5	<5	<5	6.3	<5	<5	<5	<5	<5	1,080	10.9	--	67.9	<5	
11/11/2003	<20	<20	<20	<20	40.2	<20	<20	246	<20	<20	2,460	62	--	599	<20	

Please refer to notes at end of table.

Appendix B  
Historical Groundwater Analytical Results  
NuStar Vancouver Facility  
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Well Number	Sample Date	Concentrations in µg/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	1/27/2004	<20	<10	<10	<20	17	<10	<10	105	<10	<10	3,510	33	--	380	<10
(continued)	5/4/2004	<20	<20	<20	<20	<20	<20	<20	72.4	<20	<20	3,940	22	--	323	<20
	11/16/2004	<50	<50	<50	<50	<50	<50	<50	99	<50	<50	8,000	<50	--	520	<50
	3/24/2005	<50	<25	<25	<50	<25	<25	<25	98.5	<25	<25	3,930	26	--	404	<25
	5/18/2005	<10	<5	<5	<10	<5	<5	<5	72.7	<5	<5	1,310	12.4	--	180	<5
	05/18/2005 DUP	<10	<5	<5	<10	<5	<5	<5	69.4	<5	<5	1,250	12.4	--	179	<5
	8/18/2005	<20	<10	<10	<20	<10	<10	<10	54.8	<10	<10	1,800	<10	--	237	<10
	11/15/2005	<20	<10	<10	<20	15.2	<10	<10	107	<10	<10	1,960	29.6	--	333	<10
	2/21/2006	<20	<10	<10	<20	<10	<10	<10	<10	<10	<10	2,640	<10	--	139	<10
	6/5/2006	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	26,100	<200	--	568	<200
	9/6/2006	<100	<50	<50	<100	<50	<50	<50	56	<50	<50	12,800	<50	--	422	<50
	12/6/2006	<200	<100	<100	<200	<100	<100	<100	<100	<100	<100	24,600	<100	--	408	<100
	2/7/2007	<200	<100	<100	<200	<100	<100	<100	<100	<100	<100	31,500	<100	--	352	<100
	5/22/2007	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	29,100	<200	--	450	<200
	9/12/2007	<200	<100	<100	<200	<100	<100	<100	<100	<100	<100	21,300	<100	--	366	<100
	12/13/2007	<500	<250	<250	<500	<250	<250	<250	345	<250	<250	18,700	<250	--	1,040	280
	03/06/2008 <sup>7</sup>	<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
	6/10/2008	<500	<500	<500	<500	<500	<500	<500	<500	<500	<500	27,000	<500	<500	575	<500
	9/18/2008	<500	<500	<500	<500	<500	<500	<500	<500	<500	<500	23,200	<500	<500	530	<500
	12/11/2008	<50	<50	<50	<50	<50	<50	<50	130	<50	<50	15,000	<50	<50	450	<50
	12/11/2008 DUP	<50	<50	<50	<50	<50	<50	<50	120	<50	<50	14,000	<50	<50	430	<50
	3/23/2009	<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
	6/18/2009	<3	<3	<3	<3	3.7	<3	<3	520	<3	<3	890	5.2	<3	350	<3
	06/18/2009 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
	9/18/2009	<3	<3	<3	<3	9.8	<3	5.5	930	<3	<3	2,600	10	<3	250	<3
	09/18/2009 DUP	<3	<3	<3	<3	8.7	<3	4.8	850	<3	<3	2,600	9.3	<3	240	<3
	12/18/2009	<5	<5	<5	<5	6.7	<5	<5	330	<5	<5	1,600	6.7	<5	160	<5
	12/18/2009 DUP	<5	<5	<5	<5	6.6	<5	<5	320	<5	<5	1,500	6.6	<5	160	<5
	3/16/2010	<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
	03/16/2010 DUP	<2	<2	<2	<2	<2	<2	<2	180	<2	<2	560	<2	<2	55	<2
	6/17/2010	<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
	06/17/2010 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

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Appendix B  
Historical Groundwater Analytical Results  
NuStar Vancouver Facility  
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Well Number	Sample Date	Concentrations in µg/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	9/23/2010	<3	<3	<3	<3	3.3	<3	<3	690	<3	<3	750	3.5	<3	110	4.8
(continued)	09/23/2010 DUP	<3	<3	<3	<3	3.1	<3	<3	700	<3	<3	740	3.8	<3	100	4.1
	12/10/2010	<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
	12/10/2010 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
	3/11/2011	<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
	03/11/2011 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
	6/7/2011	<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
	06/07/2011 DUP	<6	<6	<6	<6	<6	<6	<6	1,400	<6	<6	400	<6	<6	110	7.8
	9/19/2011	<5	<5	<5	<5	<5	<5	<5	1,300	<5	<5	410	<5	<5	84	78
	09/19/2011 DUP	<7	<7	<7	<7	<7	<7	<7	1,300	<7	<7	420	<7	<7	87	81
	12/7/2011	<5	<5	<5	<5	8	<5	6.9	3,400	6.8	<5	200	<5	<5	32	110
	12/07/2011 DUP	<6	<6	<6	<6	7.6	<6	7.8	3,400	6.8	<6	210	<6	<6	32	110
	3/12/2012	<5	<5	<5	<5	9.2	<5	<5	1,600	<5	<5	41	<5	<5	8.6	600
	03/12/2012 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
	06/22/2012 DUP	<2	8.1	<2	<2	9	<2	<2	500	<2	<2	25	<2	<2	5.2	290
	9/14/2012	<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
	09/14/2012 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
	12/14/2012	<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
	12/14/2012 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
	3/15/2013	<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
	03/15/2013 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
	6/14/2013	<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
	06/14/2013 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
	9/20/2013	<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
	09/20/2013 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
	12/16/2013	<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
	12/16/2013 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

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Appendix B  
Historical Groundwater Analytical Results  
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Well Number	Sample Date	Concentrations in µg/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	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
(continued)	6/25/2014 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
	3/20/2015 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
	6/17/2016 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
	3/21/2018	<0.500	<2.50	<0.500	<0.500	0.495 J	<0.500	<0.500	17.6	<0.500	<0.500	0.228 J	<0.500	<0.500	2.86	4.9
	3/21/2018 DUP	<0.500	<2.50	<0.500	<0.500	0.55	<0.500	<0.500	17.2	<0.500	<0.500	0.284 J	<0.500	<0.500	2.99	4.9
	6/29/2018	<0.500	<2.50	<0.500	<0.500	0.461 J	<0.500	<0.500	5.5	<0.500	<0.500	9.89	<0.500	<0.500	3.53	1.5
	6/29/2018 DUP	<0.500	<2.50	<0.500	<0.500	0.437 J	<0.500	<0.500	5.4	<0.500	<0.500	8.94	<0.500	<0.500	3.48	1.6

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Well Number	Sample Date	Concentrations in µg/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)	9/27/2018	<1.00	<5.00	<1.00	<1.00	1.23	<0.400	<0.400	8.48	<0.400	<0.500	6.50	<0.400	<0.500	10.8	2.08
	12/7/2018	<1.00	<5.00	<1.00	<1.00	3.97	<0.400	0.43	15.4	<0.400	<0.500	30.40	<0.400	<0.500	18.10	1.6
	12/7/2018 DUP	<1.00	<5.00	<1.00	<1.00	3.84	<0.400	0.47	17.7	<0.400	<0.500	26.60	<0.400	<0.500	16.40	1.1
	3/20/2019	<1.00	<5.00	<1.00	<1.00	1.87	<0.400	<0.400	22.2	<0.400	<0.500	22.3	<0.400	<0.500	10.8	0.605
	3/20/2019 DUP	<1.00	<5.00	<1.00	<1.00	1.84	<0.400	<0.400	22.8	<0.400	<0.500	22.8	<0.400	<0.500	10.7	0.553
	6/5/2019	<1.00	<5.00	<1.00	<1.00	2.91	<0.400	0.559	20.2	<0.400	<0.500	28.1	<0.400	<0.500	12.7	1.11
	6/5/2019 DUP	<1.00	<5.00	<1.00	<1.00	2.87	<0.400	0.494	20.2	<0.400	<0.500	28.4	<0.400	<0.500	12.7	1.15
	9/26/2019	<1.00	<5.00	<1.00	<1.00	2.98	<0.400	0.65	20.1	<0.400	<0.500	41.7	<0.400	<0.500	17.9	0.42
	9/26/2019 DUP	<1.00	<5.00	<1.00	<1.00	2.95	<0.400	0.672	21	<0.400	<0.500	39.6	<0.400	<0.500	17.8	<0.400
	12/3/2019	<1.00	<5.00	<1.00	<1.00	4.61	<0.400	0.837	29.4	<0.400	<0.500	65.8	<0.400	<0.500	31	<0.400
	12/3/2019 DUP	<1.00	<5.00	<1.00	<1.00	4.58	<0.400	0.839	29.7	<0.400	<0.500	66.1	<0.400	<0.500	31.8	<0.400
	3/11/2020	<1.00	<5.00	<1.00	<1.00	0.936	<0.400	<0.400	26.5	<0.400	<0.500	45.8	<0.400	<0.500	14.1	0.476
	3/11/2020 DUP	<1.00	<5.00	<1.00	<1.00	0.912	<0.400	<0.400	25.7	<0.400	<0.500	47.4	<0.400	<0.500	14.3	0.44
	6/18/2020	<1.00	<5.00	<1.00	<1.00	0.78	<0.400	<0.400	10.2	<0.400	<0.500	43	<0.400	<0.500	10	<0.400
	6/18/2020 DUP	<1.00	<5.00	<1.00	<1.00	0.85	<0.400	<0.400	11.1	<0.400	<0.500	40.8	<0.400	<0.500	10.1	<0.400
MW-8	12/2/1996	<0.50	<0.50	<0.50	<0.20	1	<0.50	0.2	6.5	<1	<0.20	2.3	<1	--	12	<0.50
	11/13/1997	<1	<2	<1	<1	1.72	<1	2.44	9.32	<1	<1	52.4	4	--	38.6	<2
	8/11/1999	<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
	11/16/1999	<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
	2/28/2000	<1	<5	<0.50	<0.50	0.929	<0.50	0.721	2.38	<0.50	<0.50	41.8	3.7	--	20.5	<0.50
	6/27/2000	<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
	5/30/2001	<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
	5/30/2002	<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
	5/28/2003	<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
	11/2/2004	<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
	11/16/2004	<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
	3/23/2005	<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
	5/17/2005	<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
	05/17/2005 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
	11/16/2005	<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
	6/5/2006	<1	<1	<1	<1	1.26	<1	<1	19.8	<1	<1	20.7	<1	--	11.4	<1
	12/6/2006	<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
	5/23/2007	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	22.8	<1	--	2.32	<1
	9/12/2007	<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
	12/12/2007	<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
	3/6/2008	<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
	6/10/2008 <sup>7</sup>	<1	<1	<1	<1	1.07	<1	<1	10.5	<1	<1	10.8	<1	<1	3.87	<1
9/18/2008	<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	
12/9/2008	<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	
12/09/2008 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	

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 µg/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)	3/26/2009	<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
	6/17/2009	<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
	9/16/2009	<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
	12/16/2009	<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
	3/18/2010	<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
	6/14/2010	<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
	9/22/2010	<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
	12/8/2010	<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
	3/11/2011	<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
	6/8/2011	<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
	9/15/2011	<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
	12/8/2011	<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
	3/6/2012	<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
	6/20/2012	<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
	9/12/2012	<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
	12/12/2012	<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
	3/13/2013	<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
	6/13/2013	<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
	9/19/2013	<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
	12/12/2013	<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

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 µg/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)	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
	3/19/2018	<0.500	<2.50	<0.500	<0.500	<0.500	<0.500	<0.500	0.6	<0.500	<0.500	4.2	<0.500	<0.500	<0.500	<0.500
	6/29/2018	<0.500	<2.50	<0.500	<0.500	0.139 J	<0.500	<0.500	2.6	<0.500	<0.500	5.4	<0.500	<0.500	0.368 J	<0.500
	9/25/2018	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	3.76	<0.400	<0.500	<0.400	<0.400
	12/7/2018	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	3.0	<0.400	<0.500	<0.400	<0.400
	3/22/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	3.83	<0.400	<0.500	<0.400	<0.400
	6/3/2019	<1.00	<5.00	<1.00	<1.00	0.430	<0.400	<0.400	6.57	<0.400	<0.500	2.05	<0.400	<0.500	<0.400	<0.400
	9/26/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	4.2	<0.400	<0.500	<0.400	<0.400
	12/3/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	4.06	<0.400	<0.500	<0.400	<0.400
	3/11/2020	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	3.44	<0.400	<0.500	0.929	<0.400	<0.500	<0.400	<0.400
6/17/2020	<1.00	<5.00	<1.00	<1.00	0.770	<0.400	<0.400	12.1	0.45	<0.500	3.51	<0.400	<0.500	0.43	<0.400	
MW-9	12/2/1996	<50	<50	<50	<20	<30	<50	<20	<20	<100	<20	5,000	200	--	1,600	<50
	11/13/1997	<50	<100	<50	<50	<50	<50	<50	487	<50	<50	2,890	<50	--	1,840	<100
	8/11/1999	<20	<100	<10	<10	<10	<10	<10	54	<10	<10	1,490	43.2	--	517	<10
	11/16/1999	<20	<50	<10	<20	<10	<10	<10	103	<10	<10	1,730	32	--	305	<10
	2/28/2000	<20	<100	<10	<10	<10	<10	<10	<10	<10	<10	2,040	36.4	--	315	<10
	6/27/2000	<50	<250	<25	<25	<25	<25	<25	<25	<25	<25	1,300	<50	--	298	<25
	8/31/2000	<10	<50	<5	<5	<5	<5	<5	<5	<5	<5	1,560	31.3	--	229	<5
	11/30/2000	<10	<50	<5	<5	21.7	<5	10.5	1,330	11.7	<5	823	26.6	--	528	8.15
	9/25/2001	<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
	12/17/2001	<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
	3/18/2002	<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
	5/31/2002	<2	<1	<1	<2	<1	<1	<1	1.22	<1	<1	296	1.44	--	44	<1
	8/29/2002	<2	<1	<1	<2	<1	<1	<1	1.88	<1	<1	294	2.12	--	67.4	<1
	11/7/2002	<5	<2.5	<2.5	<5	<2.5	<2.5	<2.5	17.2	<2.5	<2.5	453	4	--	145	<2.5
	1/23/2003	<2	<1	<1	<2	<1	<1	<1	1.66	<1	<1	205	2.74	--	59.5	<1
5/28/2003	<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	
11/11/2003	<5	<5	<5	<5	<5	<5	<5	23.7	<5	<5	401	6.25	--	91.4	<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 µg/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	1/27/2004	<2	<1	<1	<2	<1	<1	<1	2.58	<1	<1	179	2.54	--	58.1	<1
(continued)	5/4/2004	<1	<1	<1	<1	<1	<1	<1	1.09	<1	<1	178	2.56	--	51.9	<1
	11/15/2004	<25	<25	<25	<25	28	<25	<25	1,200	27	<25	1,800	<25	--	1,000	<25
	3/24/2005	<5	<2.5	<2.5	<5	3.3	<2.5	<2.5	54.2	<2.5	<2.5	675	8	--	239	<2.5
	5/18/2005	<2	<1	<1	<2	<1	<1	<1	2.68	<1	<1	2.41	2.08	--	62.4	<1
	8/18/2005	<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
	11/15/2005	<10	<5	<5	<10	27.1	<5	6.8	1,020	18.6	<5	1,040	14.1	--	633	21.2
	2/21/2006	<10	<5	<5	<10	<5	<5	<5	16.7	<5	<5	534	<5	--	165	<5
	6/5/2006	<1	<1	<1	<1	<1	<1	<1	1.47	<1	<1	151	2.6	--	57.3	<1
	9/5/2006	<5	<2.50	<2.50	<5	5.5	<2.50	<2.50	117	3.15	<2.50	698	6.8	--	314	<2.50
	12/6/2006	<5	<2.50	<2.50	<5	2.95	<2.50	<2.50	59	<2.50	<2.50	578	5.55	--	237	<2.50
	2/7/2007	<5	<2.50	<2.50	<5	3.15	<2.50	<2.50	72.6	<2.50	<2.50	591	6.1	--	239	2.65
	5/23/2007	<2	<2	<2	<2	<2	<2	<2	6.32	<2	<2	210	3	--	90.4	<2
	9/12/2007	<2	<1	<1	<2	2.34	<1	<1	47.1	1.44	<1	282	5.12	--	184	<1
	12/13/2007	<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
	3/6/2008	<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
	6/10/2008	<1	<1	<1	<1	<1	<1	<1	2.73	<1	<1	297	5.16	<1	87.7	<1
	9/18/2008	<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
	12/9/2008	<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
	3/26/2009	<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
	6/17/2009	<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
	9/17/2009	<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
	12/17/2009	<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
	3/19/2010	<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
	6/16/2010	<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
	9/21/2010	<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
	12/10/2010	<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
	3/11/2011	<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
	03/11/2011 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 µg/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	6/10/2011	<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
(continued)	9/19/2011	<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
	12/9/2011	<0.90	<0.90	<0.90	<0.90	53	<0.90	11	1,800	40	<0.90	600	10	<0.90	590	26
	3/12/2012	<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
	6/22/2012	<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
	9/14/2012	<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
	12/13/2012	<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
	3/15/2013	<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
	6/13/2013	<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
	9/20/2013	<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
	12/16/2013	<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
	3/21/2018	<0.500	<2.50	<0.500	<0.500	<0.500	<0.500	<0.500	1.2	<0.500	<0.500	39	1.1	<0.500	14.9	<0.500
	6/29/2018	<0.500	<2.50	<0.500	<0.500	6.86	<0.500	1.63	169.0	8.28	<0.500	332	3.5	<0.500	182.0	2.42 J
	9/27/2018	<1.00	<5.00	<1.00	<1.00	5.69	<0.400	1.59	219	7.54	<0.500	243	3.96	<0.500	168	3.90
	12/7/2018	<1.00	<5.00	<1.00	<1.00	0.75	<0.400	<0.400	20.0	0.80	<0.500	178	3.4	<0.500	66.5	0.55

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 µg/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)	3/20/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	2.47	<0.400	<0.500	58.9	1.47	<0.500	20.0	<0.400
	6/7/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	1.99	<0.400	<0.500	108	1.34	<0.500	49.4	<0.400
	9/26/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	3.34	<0.400	<0.500	81.3	2.34	<0.501	25.4	<0.401
	12/3/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	2.34	<0.400	<0.500	67.5	1.46	<0.502	24.3	<0.402
	3/11/2020	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	5.21	<0.400	<0.500	55.4	1.41	<0.500	18.1	<0.400
	6/18/2020	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	5.27	<0.400	<0.500	109	1.44	<0.500	45.9	<0.400
MW-10	12/2/1996	<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
	11/13/1997	<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
	8/11/1999	<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
	11/16/1999	<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
	2/28/2000	<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
	6/27/2000	<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
	5/30/2001	<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
	5/30/2002	<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
	5/28/2003	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	2.21	<0.50	--	1.28	<0.50
	11/2/2004	<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
	11/16/2004	<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
	3/23/2005	<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
	5/17/2005	<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
	9/12/2007	<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
	3/5/2008	<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
	9/18/2008	<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
	3/25/2009	<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
	9/16/2009	<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
	3/18/2010	<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
	9/22/2010	<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
	3/9/2011	<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
	9/14/2011	<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
	3/6/2012	<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
9/12/2012	<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	
3/13/2013	<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	
9/18/2013	<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	<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	

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 µg/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 (continued)	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
	6/29/2018	<0.500	<2.50	<0.500	<0.500	0.161 J	<0.500	<0.500	0.8	<0.500	<0.500	5.7	0.145 J	<0.500	5.8	<0.500
	9/25/2018	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	1.74	<0.400	<0.500	1.45	<0.400
	9/25/2018 DUP	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	1.76	<0.400	<0.500	1.54	<0.400
	3/21/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	3.24	<0.400	<0.500	2.00	<0.400
	6/6/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	7.51	<0.400	<0.500	4.19	<0.400
	9/25/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	2.03	<0.400	<0.500	1.35	<0.400
	12/4/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	1.65	<0.400	<0.500	1.15	<0.400
	3/11/2020	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	1.97	<0.400	<0.500	1.53	<0.400
	6/17/2020	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	9.74	<0.400	<0.500	5	<0.400
	MW-11	12/2/1996	<50	<50	<50	<20	<30	<50	52	140	<100	<20	2,200	550	--	5,900
11/13/1997		<50	<100	<50	<50	<50	<50	<50	<50	<50	<50	686	90.3	--	2,720	<100
8/10/1999		<5	<25	<2.5	<2.5	13.7	<2.5	22.8	14.4	<2.5	<2.5	259	112	--	1,300	<2.5
11/16/1999		<20	<50	<10	<20	12	<10	16.8	18.8	<10	<10	478	94.8	--	1,500	<10
2/28/2000		<5	<25	<2.5	<2.5	2.71	<2.5	7.9	5.05	<2.5	<2.5	247	30.2	--	473	<2.5
6/27/2000		<10	<50	<5	<5	12.1	<5	28.9	14.8	<5	<5	337	108	--	1,390	<5
8/31/2000		<20	<100	<10	<10	15.4	<10	28	24.8	<10	<10	646	159	--	1,690	<10
11/30/2000		<20	<100	<10	<10	12.2	<10	26.4	19.3	<10	<10	342	125	--	1,550	<10
2/27/2001		<5	<25	<2.5	<2.5	3.65	<2.5	7.82	7.1	<2.5	<2.5	198	35.1	--	468	<2.5
5/30/2001		<10	<50	<5	<5	5.2	<5	13.6	9.09	<5	<5	256	48.8	--	858	<5
9/25/2001		<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	260	57	--	820	<13
12/17/2001		<10	<50	<5	<5	<5	<5	15.4	25.9	<5	<5	983	40.9	--	1,390	<5
3/18/2002		<10	<5	<5	<10	11.9	<5	19.4	17.1	<5	<5	433	79.8	--	1,370	<5
5/30/2002		<10	<5	<5	<10	5.9	<5	10.9	15.6	<5	<5	571	45.6	--	965	<5
11/7/2002		<10	<5	<5	<10	15	<5	19.3	18.9	<5	<5	347	112	--	1,640	<5
1/23/2003		<5	<2.5	<2.5	<5	3.35	<2.5	4.3	5.35	<2.5	<2.5	265	24.1	--	534	<2.5
5/28/2003		<10	<5	<5	<10	13.3	<5	17.9	17.6	<5	<5	305	105	--	1,580	<5
11/11/2003	<5	<5	<5	<5	5	<5	5.15	9.15	<5	<5	191	38.8	--	504	<5	
1/26/2004	<10	<5	<5	<10	9.6	<5	11.5	13.5	<5	<5	369	73.3	--	1,070	<5	
3/22/2004	Well Abandoned															

Please refer to notes at end of table.

Appendix B  
Historical Groundwater Analytical Results  
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Vancouver, Washington

Well Number	Sample Date	Concentrations in µg/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	12/2/1996	<50	<50	<50	<20	<30	<50	<20	29	<100	<20	2,500	<100	--	950	<50
	11/12/1997	<250	<500	<250	<250	<250	<250	<250	2,710	<250	<250	12,900	645	--	5,400	<500
	8/11/1999	<200	<1	<100	<100	120	<100	<100	2,680	<100	<100	11,300	758	--	3,520	<100
	11/16/1999	<200	<500	<100	<200	<100	<100	<100	160	<100	<100	18,200	922	--	4,630	<100
	2/28/2000	<200	<1	<100	<100	<100	<100	<100	908	<100	<100	3,780	<200	--	1,210	<100
	6/27/2000	<100	<500	<50	<50	161	<50	<50	2,880	<50	<50	12,000	712	--	3,180	<50
	5/30/2001	<50	<250	<25	<25	64.8	<25	54	1,650	<25	<25	4,990	298	--	1,810	<25
	5/30/2002	<5	<2.5	<2.5	<5	4.25	<2.5	<2.5	101	<2.5	<2.5	344	6.6	--	81.6	<2.5
	5/29/2003	<5	<2.5	<2.5	<5	28.4	<2.5	8	601	5.7	<2.5	362	18.2	--	199	<2.5
	11/16/2004	<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
	3/23/2005	<20	<10	<10	<20	247	<10	53	3,640	40.2	<10	1,080	49.8	--	639	14.2
	5/18/2005	<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
	5/22/2007	<5	<5	<5	<5	35.6	<5	7.45	785	11.1	<5	233	7.8	--	139	<5
	9/11/2007	<100	<50	<50	<100	316	<50	57	6,700	53	<50	431	<50	--	516	<50
	12/12/2007	<2	<1	<1	<2	1.1	<1	<1	43.8	<1	<1	106	3.16	--	39.6	<1
	3/5/2008	<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
	9/19/2008	<50	<25	<25	<50	394	<25	66	7,650	69	<25	968	45	<25	924	58
	12/10/2008	<4	<4	<4	<4	33	<4	6.6	670	8.7	<4	99	5	<4	80	<4
	3/27/2009	<4	4.8	<4	<4	230	<4	39	4,800	46	<4	540	28	<4	440	31
	03/27/2009 DUP	<4	5	<4	<4	250	<4	44	4,700	51	<4	600	32	<4	490	35
	6/18/2009	<15	<15	<15	<15	170	<15	32	3,500	36	<15	270	<15	<15	230	26
	06/18/2009 DUP	<15	<15	<15	<15	170	<15	32	3,600	37	<15	310	<15	<15	250	25
	9/18/2009	<15	<15	<15	<15	240	<15	46	4,200	50	<15	540	26	<15	440	51
	09/18/2009 DUP	<15	<15	<15	<15	260	<15	49	4,600	52	<15	590	28	<15	470	56
	12/18/2009	<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
	12/18/2009 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
	3/19/2010	<0.50	4.1	<0.50	<0.50	220	2.6	48	4,400	53	<0.50	480	28	0.7	380	37
	03/19/2010 DUP	<15	<15	<15	<15	270	<15	44	4,900	54	<15	600	29	<15	460	39
	6/16/2010	<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
	06/16/2010 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
	9/23/2010	<15	<15	<15	<15	260	<15	47	4,800	56	<15	780	38	<15	560	68
	9/23/2010 DUP	<15	<15	<15	<15	260	<15	49	4,800	57	<15	800	41	<15	580	65

Please refer to notes at end of table.



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Well Number	Sample Date	Concentrations in µg/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	12/9/2010	<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
(continued)	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
	3/10/2011	<0.50	0.67	<0.50	<0.50	94	0.96	17	1,900	19	0.55	340	12	<0.50	220	11
	03/10/2011 DUP	<0.50	0.87	<0.50	<0.50	93	1	17	1,600	19	0.55	260	13	<0.50	180	11
	6/7/2011	<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
	06/07/2011 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
	9/19/2011	<0.50	3	<0.50	<0.50	240	2.5	45	4,700	55	<0.50	860	65	0.94	690	63
	09/19/2011 DUP	<20	<20	<20	<20	240	<20	53	4,700	60	<20	860	60	<20	680	68
	12/7/2011	<0.50	<0.50	<0.50	<0.50	130	1.3	28	2,900	33	<0.50	520	34	0.54	380	40
	12/07/2011 DUP	<0.50	<15	<0.50	<0.50	140	1.3	29	2,900	33	<0.50	580	34	0.55	400	41
	3/12/2012	<15	<15	<15	<15	210	<15	44	3,800	45	<15	770	48	<15	540	46
	03/12/2012 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
	06/22/2012 DUP	<5	<5	<5	<5	100	<5	16	1,700	39	<5	270	13	<5	190	22
	9/14/2012	<5	<5	<5	<5	220	<5	45	4,700	56	<5	890	61	<5	590	58
	09/14/2012 DUP	<15	<15	<15	<15	270	<15	58	5,400	73	<15	1,100	76	<15	730	84
	12/13/2012	<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
	12/13/2012 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
	3/15/2013	<0.50	1	<0.50	<0.50	200	1.7	40	4,300	55	<0.50	760	53	0.71	540	53
	03/15/2013 DUP	<0.50	1	<0.50	<0.50	200	1.8	40	4,200	56	<0.50	750	52	0.66	520	54
	6/13/2013	<15	<15	<15	<15	230	<15	38	4,700	53	<15	590	44	<15	480	55
	06/13/2013 DUP	<15	<15	<15	<15	240	<15	39	4,800	53	<15	610	46	<15	500	59
	9/20/2013	<0.50	<0.50	<0.50	<0.50	170	1.6	37	3,400	49	<0.50	510	37	0.66	400	50
	09/20/2013 DUP	<0.50	<0.50	<0.50	<0.50	180	1.7	36	3,400	48	<0.50	520	37	0.63	400	49
	12/16/2013	<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
	12/16/2013 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
	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

Please refer to notes at end of table.

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Well Number	Sample Date	Concentrations in µg/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	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
(continued)	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
	3/20/2015 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
	3/8/2016 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
	6/16/2016 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	17.4	<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	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	1.6	<0.50	<0.50	<0.50	<0.50	<0.50	36.4
	3/20/2018	<0.500	7.50	<0.500	<0.500	0.5	<0.500	<0.500	6	1.3	<0.500	<0.500	<0.500	<0.500	0.271 J	2.8
	3/20/2018 DUP	<0.500	8.18	<0.500	<0.500	0.550 J	<0.500	<0.500	6	1.29 J	<0.500	0.203 J	<0.500	<0.500	0.261 J	2.6
	7/1/2018	<0.500	9.73	<0.500	<0.500	0.9	<0.500	<0.500	4	1.6	<0.500	0.304 J	<0.500	<0.500	1.0	1.5
	7/1/2018 DUP	<0.500	8.34	<0.500	<0.500	0.8	<0.500	<0.500	4	1.6	<0.500	0.289 J	<0.500	<0.500	1.0	1.3
	9/25/2018	<1.00	24.5	<1.00	<1.00	0.730	<0.400	<0.400	1.46	0.520	<0.500	<0.400	<0.400	<0.500	<0.400	1.23
	9/25/2018 DUP	<1.00	23.7	<1.00	<1.00	0.670	<0.400	<0.400	1.31	0.500	<0.500	<0.400	<0.400	<0.500	<0.400	1.21
	12/4/2018	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	4	0.4	<0.500	1.3	<0.400	<0.500	1.3	1.7
	12/4/2018 DUP	<1.00	6.03	<1.00	<1.00	0.5	<0.400	<0.400	4	0.4	<0.500	1.0	<0.400	<0.500	1.0	1.6

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 µg/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)	3/20/2019	<2.00	<5.00	<1.00	<1.00	0.655	<0.400	<0.400	6.70	0.675	<0.500	2.11	<0.400	<0.500	1.33	1.64
	3/20/2019 DUP	<2.00	<5.00	<1.00	<1.00	0.615	<0.400	<0.400	6.31	0.621	<0.500	2.05	<0.400	<0.500	1.15	1.56
	6/5/2019	<2.00	<5.00	<1.00	<1.00	0.716	<0.400	<0.400	9.17	0.756	<0.500	3.30	<0.400	<0.500	3.45	2.64
	6/5/2019 DUP	<2.00	<5.00	<1.00	<1.00	0.719	<0.400	<0.400	9.36	0.725	<0.500	3.64	<0.400	<0.500	3.41	2.74
	9/26/2019	<1.00	18.1	<1.00	<1.00	6.26	<0.400	<0.400	5.31	0.565	<0.500	<0.400	<0.400	<0.500	0.442	6.82
	9/26/2019 DUP	<1.00	16	<1.00	<1.00	6.12	<0.400	<0.400	5.06	0.55	<0.500	<0.400	<0.400	<0.500	0.459	6.45
	12/5/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	2.61	<0.400	<0.500	2.37	<0.400	<0.500	1.41	0.413
	12/5/2019 DUP	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	2.51	<0.400	<0.500	2.18	<0.400	<0.500	1.23	<0.400
	3/11/2020	<1.00	<5.00	<1.00	<1.00	0.803	<0.400	<0.400	8.18	0.515	<0.500	7.01	<0.400	<0.500	4.17	0.423
	3/11/2020 DUP	<1.00	<5.00	<1.00	<1.00	0.806	<0.400	<0.400	8.47	0.561	<0.500	6.95	<0.400	<0.500	4.25	<0.400
	6/18/2020	<1.00	<5.00	<1.00	<1.00	1.25	<0.400	<0.400	14.2	0.41	<0.500	2.49	<0.400	<0.500	2.6	1.1
6/18/2020 DUP	<1.00	<5.00	<1.00	<1.00	1.3	<0.400	<0.400	14.1	<0.400	<0.500	2.59	<0.400	<0.500	2.68	1.04	
MW-13	12/2/1996	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
	11/12/1997	<250	<500	<250	<250	291	<250	<250	5,050	<250	<250	18,100	<250	--	9,050	<500
	8/11/1999	<200	<1	<100	<100	<100	<100	<100	2,280	<100	<100	9,590	<200	--	3,920	<100
	11/16/1999	<50	<125	<25	<50	108	<25	51	2,620	<25	<25	7,210	67.5	--	3,050	--
	2/28/2000	<200	<1	<100	<100	<100	<100	<100	562	<100	<100	1,340	<200	--	602	<100
	6/28/2000	<100	<500	<50	<50	132	<50	142	4,210	<50	<50	14,700	155	--	6,360	<50
	5/30/2001	<200	<1,000	<100	<100	<100	<100	<100	2,460	<100	<100	10,300	<200	--	4,620	<100
	5/30/2002	<2	<1	<1	<2	1.44	<1	1.28	60.4	<1	<1	241	1.68	--	86.4	<1
	5/28/2003	<1	<0.50	<0.50	<1	1.71	<0.50	1.75	79.6	1.26	<0.50	121	1.58	--	130	<0.50
	11/16/2004	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	1,200	<12	--	230	<12
	5/18/2005	<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
	9/12/2007	<50	<25	<25	<50	55	<25	28	1,290	<25	<25	2,730	29.5	--	2,020	<25
	12/12/2007	<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
	3/5/2008	<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
	6/25/2008	<5	<5	<5	<5	15.2	<5	<5	320	10.4	<5	132	<5	--	160	<5
	9/19/2008	<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
	12/10/2008	<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
	3/27/2009	<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
	03/27/2009 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
	6/18/2009	<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
9/17/2009	<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	
12/18/2009	<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	
3/19/2010	<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	
6/16/2010	<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	
9/23/2010	<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	
12/21/2010	<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	

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

Well Number	Sample Date	Concentrations in µg/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)	3/11/2011	<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
	6/9/2011	<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
	9/19/2011	<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
	12/9/2011	<9	<9	<9	<9	23	<9	11	530	18	<9	2,800	12	<9	1,400	<9
	3/12/2012	<9	<9	<9	<9	24	<9	14	600	14	<9	1,800	11	<9	1,200	<9
	6/22/2012	<4	<4	<4	<4	40	<4	13	940	30	<4	1,300	8.6	<4	1,000	4.5
	9/14/2012	<4	<4	<4	<4	38	<4	21	900	22	<4	3,100	16	<4	1,800	<4
	12/13/2012	<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
	3/15/2013	<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
	6/14/2013	<4	<4	<4	<4	19	<4	9.4	520	15	<4	1,100	6	<4	920	<4
	9/20/2013	<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
	12/13/2013	<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
	9/30/2014	<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
	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	
9/28/2016 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	

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 µg/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)	3/20/2018	<0.500	3.29	<0.500	<0.500	0.879	<0.500	2.55	1,730	5.20	<0.500	0.396 J	<0.500	<0.500	2.19	211
	7/1/2018	<0.500	<2.50	<0.500	<0.500	18.3	0.148 J	5.98	1680	26.9	<0.500	<0.500	<0.500	<0.500	0.781	2030
	9/25/2018	<1.00	10.9	<1.00	<1.00	1.91	<0.400	<0.400	9.78	1.26	<0.500	0.410	<0.400	<0.500	0.800	113
	12/5/2018	<1.00	6.7	<1.00	<1.00	<0.400	<0.400	<0.400	6.17	0.682	<0.500	0.567	<0.400	<0.500	0.413	55.2
	3/19/2019	<1.00	5.64	<1.00	<1.00	<0.400	<0.400	<0.400	2.69	<0.400	<0.500	<0.400	<0.400	<0.500	0.433	2.02
	6/6/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	4.62	<0.400	<0.500	<0.400	<0.400	<0.500	0.673	2.89
	9/26/2019	<1.00	<5.00	<1.00	<1.00	1.07	<0.400	<0.400	1.94	0.439	<0.500	<0.400	<0.400	<0.500	<0.400	2.01
	12/3/2019	<1.00	<5.00	<1.00	<1.00	1.50	<0.400	<0.400	1.06	0.488	<0.500	<0.400	<0.400	<0.500	<0.400	1.42
	3/10/2020	<1.00	<5.00	<1.00	<1.00	9.19	<0.400	1.97	72.5	2.040	<0.500	<0.400	<0.400	<0.500	7.59	134
	6/18/2020	<1.00	<5.00	<1.00	<1.00	0.61	<0.400	<0.400	1.15	<0.400	<0.500	<0.400	<0.400	<0.500	1.12	5.28
MW-14	11/12/1997	<5	<10	<5	<5	5.01	<5	<5	<5	<5	<5	42.6	<5	--	394	<10
	8/10/1999	<20	<100	<10	<10	<10	<10	<10	15.1	<10	<10	121	35.6	--	853	<10
	11/16/1999	<2	<5	<1	<2	2.48	<1	2.48	4.2	<1	<1	186	10.8	--	313	<1
	2/28/2000	<100	<500	<50	<50	<50	<50	83.2	85.1	<50	<50	711	190	--	5,300	<50
	6/27/2000	<10	<50	<5	<5	10.1	<5	18.9	219	<5	<5	207	46.2	--	1,150	<5
	11/30/2000	<2	<10	<1	<1	1.08	<1	1.88	2.27	<1	<1	21.3	5.54	--	157	<1
	5/30/2001	<1	<50	<5	<5	6.16	<5	13.8	30.4	<5	<5	268	28.2	--	1,280	<5
	5/30/2002	<10	<5	<5	<10	<5	<5	<5	8.4	<5	<5	78.3	11.9	--	303	<5
	5/28/2003	<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
	11/15/2004	<25	<25	<25	<25	<25	<25	<25	96	<25	<25	480	<25	--	1,200	<25
	5/17/2005	<2	<1	<1	<2	4.64	<1	2.3	41.1	<1	<1	127	9.28	--	367	<1
	9/12/2007	<20	<10	<10	<20	21.6	<10	<10	162	<10	<10	180	22.2	--	963	<10
	3/5/2008	<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
	6/25/2008	<5	<5	<5	<5	15.2	<5	10.2	113	<5	<5	360	18.2	--	1,290	<5
	9/19/2008	<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
	12/10/2008	<5	<5	<5	<5	17	<5	9.6	160	<5	<5	330	17	<5	1,200	<5
	3/27/2009	<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
	6/17/2009	<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
	9/18/2009	<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
	12/15/2009	<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
3/17/2010	<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	
7/2/2010	<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	
9/22/2010	<3	<3	<3	<3	16	<3	6.5	140	<3	<3	230	10	<3	800	<3	
12/8/2010	<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	

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Appendix B  
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Vancouver, Washington

Well Number	Sample Date	Concentrations in µg/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)	3/9/2011	<3	<3	<3	<3	6.8	<3	3.8	55	<3	<3	200	5	<3	540	<3
	6/8/2011	<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
	9/14/2011	<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
	12/6/2011	<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
	3/7/2012	<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
	6/19/2012	<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
	9/11/2012	<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
	12/12/2012	<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
	3/12/2013	<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
	6/12/2013	<3	<3	<3	<3	11	<3	5	84	<3	<3	260	6.6	<3	770	<3
	9/18/2013	<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
	12/11/2013	<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

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 µg/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)	3/20/2018	<0.500	1.67 J	<0.500	<0.500	5	<0.500	3.6	500	2.6	<0.500	36.0	0.6	<0.500	150	1.35 J
	6/28/2018	<0.500	<2.50	<0.500	<0.500	11	<0.500	2.5	255	2.5	<0.500	34.9	1.6	<0.500	247	0.7
	9/26/2018	<10.0	<50.0	<10.0	<10.0	12.1	<4.00	4.40	361	4.50	<5.00	84.3	<4.00	<5.00	484	<4.00
	12/5/2018	<10.0	<50.0	<10.0	<10.0	5	<4.00	<4.00	333	<4.00	<5.00	83.4	<4.00	<5.00	260	<4.00
	3/19/2019	<5.00	<25.0	<5.00	<5.00	5.40	<4.00	<4.00	223	2.06	<2.50	31.4	<2.00	<2.50	178	<2.00
	6/6/2019	<1.00	<5.00	<1.00	<1.00	1.74	<0.400	1.09	151	0.937	<0.500	19.1	<0.400	<0.500	76.4	<0.400
	9/25/2019	<1.00	<5.00	<1.00	<1.00	12.5	<0.400	4.58	264	3.6	<0.500	91.8	1.47	<0.500	327	0.482
	12/4/2019	<1.00	<5.00	<1.00	<1.00	7.81	<0.400	3.17	242	2.88	<0.500	107	0.704	<0.500	351	<0.400
	3/11/2020	<1.00	<5.00	<1.00	<1.00	6.8	<2.00	2.72	186	2.45	<2.50	85.9	<2.00	<2.50	294	<2.00
	6/17/2020	<5.00	<25.0	<5.00	<5.00	3.5	<2.00	<2.00	82.6	<2.00	<2.50	62.6	<2.00	<2.50	197	<2.00
MW-15	11/13/1997	<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
	11/16/1999	<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
	2/28/2000	<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
	6/27/2000	<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
	5/30/2001	<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
	5/31/2002	<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
	5/29/2003	<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
	11/2/2004	<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
	11/16/2004	<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
	3/24/2005	<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
	5/17/2005	<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
	9/13/2007	<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
	3/7/2008	<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
	9/18/2008	<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
	3/25/2009	<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
	9/17/2009	<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
	3/18/2010	<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
	9/23/2010	<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
	3/9/2011	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	9/16/2011	<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
3/9/2012	<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	
9/10/2012	<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	

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 µg/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)	3/14/2013	<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
	9/19/2013	<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	<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	0.6	<0.50	<0.50	<0.50	<0.50
	7/2/2018	<0.500	<2.50	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	0.60	<0.500	<0.500	<0.500	<0.500
	6/6/2019	<1.00	<5.00	<1.00	<1.00	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	0.531	<0.500	<0.500	<0.500	<0.500
	6/18/2020	<1.00	<5.00	<1.00	<1.00	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	0.540	<0.400	<0.500	<0.400	<0.400
MW-16	11/12/1997	<5	<10	<5	<5	19.8	<5	27.8	23.6	<5	<5	328	57.5	--	142	<10
	8/11/1999	<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
	2/28/2000	<2	<10	<1	<1	10.4	<1	12	7.4	<1	<1	523	54.5	--	112	<1
	6/27/2000	<10	<50	<5	<5	12.4	<5	13.9	8.39	<5	<5	236	45	--	93.8	<5
	5/30/2001	<10	<50	<5	<5	9.28	<5	12	8.95	<5	<5	302	30.1	--	110	<5
	5/30/2002	<5	<2.5	<2.5	<5	13.5	<2.5	10.6	8.65	<2.5	<2.5	467	24	--	119	<2.5
	5/29/2003	<5	<2.5	<2.5	<5	3.6	<2.5	3.35	2.85	<2.5	<2.5	412	13.4	--	76	<2.5
	11/2/2004	<2	<10	<1	<1	<1	<1	<1	1.66	<1	<1	260	6.9	--	25.4	<1
	11/16/2004	<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
	3/24/2005	<2	<1	<1	<2	1.8	<1	1.34	1.96	<1	<1	373	11.8	--	49.4	<1
	5/17/2005	<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
	11/15/2005	<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
	2/21/2006	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	6/6/2006	<2	<2	<2	<2	12.2	<2	3.38	210	<2	<2	84.6	2.56	--	25.2	5.64
	12/6/2006	<2	<1	<1	<2	4.2	<1	2.12	16.7	<1	<1	176	5.88	--	45.6	<1
5/23/2007	<1	<1	<1	<1	2.57	<1	<1	14	<1	<1	98.8	3.35	--	23.8	<1	
9/13/2007	<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	
12/12/2007	<2	<1	<1	<1	2.32	<1	1.44	5.9	<1	<1	110	5.92	--	28.2	<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 µg/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	3/7/2008	<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
(continued)	9/18/2008	<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
	12/9/2008	<1	<1	<1	<1	2.6	<1	1.8	5.5	<1	<1	300	5.7	<1	67	<1
	3/26/2009	<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
	6/17/2009	<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
	9/17/2009	<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
	12/17/2009	<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
	3/19/2010	<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
	6/16/2010	<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
	9/23/2010	<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
	12/10/2010	<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
	3/10/2011	<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
	6/9/2011	<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
	9/19/2011	<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
	12/8/2011	<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
	6/20/2012	<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
	9/13/2012	<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
	12/13/2012	<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
	3/14/2013	<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
	6/14/2013	<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
	9/19/2013	<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
	12/13/2013	<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
	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.														

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 µg/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)	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
	3/19/2018	<0.500	<2.50	<0.500	<0.500	0.232 J	<0.500	0.190 J	3.8	<0.500	<0.500	99.7	0.82	<0.500	12.6	<0.500
	7/2/2018	<0.500	<2.50	<0.500	<0.500	0.500 J	<0.500	0.209 J	9.6	<0.500	<0.500	72.5	0.86	<0.500	7.4	<0.500
	9/25/2018	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	15.8	<0.400	<0.500	171	0.580	<0.500	33.9	<0.400
	12/6/2018	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	4.5	<0.400	<0.500	130.0	0.76	<0.500	20.8	<0.400
	3/22/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	7.90	<0.400	<0.500	136	0.771	<0.500	24.3	<0.400
	6/4/2019	<1.00	<5.00	<1.00	<1.00	0.810	<0.400	<0.400	14.3	<0.400	<0.500	30.1	<0.400	<0.500	5.34	<0.400
	9/25/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	14.4	<0.400	<0.500	136	0.658	<0.500	23.9	<0.400
	12/3/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	8.75	<0.400	<0.500	102	0.598	<0.500	19.9	<0.400
	3/11/2020	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	8.67	<0.400	<0.500	79	0.552	<0.500	12.7	<0.400
	6/18/2020	<1.00	<5.00	<1.00	<1.00	1.070	<0.400	<0.400	23.8	<0.400	<0.500	27.3	<0.400	<0.500	5.89	0.42
MW-17	11/13/1997	<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
	11/16/1999	<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
	2/28/2000	<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
	6/27/2000	<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
	5/30/2001	<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
	5/30/2002	<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
	5/28/2003	<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
	11/15/2004	<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
	5/17/2005	<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
	5/23/2007	<1	<1	<1	<1	<1	<1	<1	8.82	<1	<1	37.8	<1	--	28.2	<1
	9/11/2007	<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
	3/5/2008	<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
	9/19/2008	<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
	3/25/2009	<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
	9/16/2009	<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
	3/23/2010	<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
9/20/2010	<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	
3/9/2011	<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	
9/13/2011	<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	

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 µg/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)	3/7/2012	<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
	9/11/2012	<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
	3/12/2013	<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
	9/17/2013	<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
	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
	6/28/2018	<0.500	<2.50	<0.500	<0.500	0.516	<0.500	<0.500	2.7	<0.500	<0.500	3.7	<0.500	<0.500	9.0	<0.500
	9/26/2018	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	1.6	<0.400	<0.500	2.2	<0.400	<0.500	4.6	<0.400
	3/19/2019	<1.00	<5.00	<1.00	<1.00	0.623	<0.400	<0.400	10.5	<0.400	<0.500	6.91	<0.400	<0.500	15.2	<0.400
	6/6/2019	<1.00	<5.00	<1.00	<1.00	0.413	<0.400	<0.400	4.34	<0.400	<0.500	4.34	<0.400	<0.500	10.0	<0.400
	9/26/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	3.87	<0.400	<0.500	2.41	<0.400	<0.500	4.6	<0.400
	12/3/2019	<1.00	<5.00	<1.00	<1.00	0.829	<0.400	<0.400	26.8	<0.400	<0.500	5.54	<0.400	<0.500	15.1	<0.400
	3/10/2020	<1.00	<5.00	<1.00	<1.00	1.06	<0.400	<0.400	18.7	<0.400	<0.500	4.74	<0.400	<0.500	11.6	<0.400
6/17/2020	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	5.11	<0.400	<0.500	4.06	<0.400	<0.500	7.4	<0.400	
MW-18i	9/29/2000	ND	ND	0.694	ND	0.843	ND	ND	16.5	ND	ND	11.7	ND	--	8.32	ND
	11/30/2000	<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
	2/27/2001	<5	<25	<2.5	<2.5	<2.5	<2.5	<2.5	10.2	<2.5	<2.5	15.2	<5	--	10	<2.5
	5/30/2001	<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
	9/25/2001	<1	<1	<1	<1	1.8	<1	<1	23	<1	<1	62	2.3	--	39	<1
	3/29/2002	<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
	5/30/2002	<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
	8/29/2002	<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
	11/7/2002	<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
	1/23/2003	<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
	5/29/2003	<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
	11/11/2003	<1	<1	<1	<1	<1	<1	<1	16.1	<1	<1	31.5	<1	--	16.3	<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 µg/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)	1/27/2004	<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
	5/4/2004	<1	<1	<1	<1	<1	<1	<1	15.6	<1	<1	112	<1	--	12.1	<1
	8/17/2004	<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
	11/2/2004	<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
	11/16/2004	<0.50	<0.50	<0.50	<0.50	1	<0.50	<0.50	24	<0.50	<0.50	42	0.69	--	21	<0.50
	2/1/2005	<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
	5/18/2005	<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
	8/18/2005	<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
	08/18/2005 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
	11/15/2005	<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
	2/21/2006	<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
	6/6/2006	<1	<1	<1	<1	<1	<1	<1	5.88	<1	<1	8.46	<1	--	4.47	<1
	9/6/2006	<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
	12/6/2006	<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
	2/7/2007	<1	<0.50	<0.50	<1	0.68	<0.50	<0.50	12	<0.50	<0.50	15	<0.50	--	9.32	<0.50
	5/23/2007	<1	<1	<1	<1	<1	<1	<1	14.6	<1	<1	17.2	<1	--	11.3	<1
	9/11/2007	<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
	12/13/2007	<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
	3/6/2008	<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
	6/10/2008	<1	1	1	<1	<1	<1	<1	4.17	<1	<1	4.31	<1	--	2.18	<1
	9/17/2008	<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
	12/9/2008	<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
	3/26/2009	<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
6/16/2009	<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	
9/16/2009	<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	
12/15/2009	<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	
3/18/2010	<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	
6/15/2010	<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	
9/22/2010	<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	
12/9/2010	<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	

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 µg/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	3/10/2011	<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
(continued)	6/9/2011	<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
	9/15/2011	<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
	12/8/2011	<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
	3/7/2012	<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
	6/21/2012	<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
	9/13/2012	<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
	12/13/2012	<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
	3/13/2013	<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
	6/13/2013	<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
	9/19/2013	<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
	12/13/2013	<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
	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
	3/21/2018	<0.500	<2.50	<0.500	<0.500	<0.500	<0.500	<0.500	1.43	<0.500	<0.500	1.5	<0.500	<0.500	0.82	<0.500
	7/2/2018	<0.500	<2.50	<0.500	<0.500	<0.500	<0.500	<0.500	0.63	<0.500	<0.500	0.6	0.320 J	<0.500	<0.500	<0.500
	9/27/2018	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	0.7	<0.400	<0.500	<0.400	<0.400
	12/6/2018	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	0.96	<0.400	<0.500	1.3	<0.400	<0.500	0.70	<0.400

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 µg/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)	3/21/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	2.53	<0.400	<0.500	1.38	<0.400	<0.500	1.03	<0.400
	6/3/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	1.31	<0.400	<0.500	0.970	<0.400	<0.500	0.560	<0.400
	9/25/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	0.63	<0.400	<0.500	0.920	<0.400	<0.500	0.647	<0.400
	12/3/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	1.300	<0.400	<0.500	0.589	<0.400
	3/11/2020	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	1.6	<0.400	<0.500	0.896	<0.400	<0.500	0.502	<0.400
	6/17/2020	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	0.94	<0.400	<0.500	0.880	<0.400	<0.500	0.400	<0.400
MW-19	11/7/2002	<20	<10	<10	<20	252	<10	66.2	2,450	23	<10	3,100	139	--	1,810	79.2
	5/30/2003	<50	<25	<25	<50	109	<25	36	1,300	<25	<25	7,160	104	--	2,070	35.5
	11/16/2004	<50	<50	<50	<50	<50	65	<50	490	<50	<50	7,300	130	--	1,400	<50
	5/18/2005	<10	<5	<5	<10	19.3	<5	<5	161	<5	<5	1,500	33.8	--	205	24.6
	11/15/2005	<20	<10	<10	<20	27	<10	18.8	230	<10	<10	3,080	67.2	--	785	14.6
	11/15/2005 DUP	<20	<10	<10	<20	25	<10	20.2	221	<10	<10	2,860	64.4	--	762	15.2
	6/5/2006	<10	<10	<10	<10	<10	<10	<10	80.9	<10	<10	1,280	13.1	--	237	<10
	12/6/2006	<20	<10	<10	<20	<10	<10	<10	76.2	<10	<10	2,060	17.2	--	304	<10
	5/22/2007	<20	<20	<20	<20	<20	<20	<20	114	<20	<20	2,720	51.4	--	504	<20
	9/11/2007	<50	<25	<25	<50	<25	<25	<25	85.5	<25	<25	3,370	62.5	--	608	<25
	12/12/2007	<50	<25	<25	<50	<25	<25	<25	80	<25	<25	2,070	38.5	--	326	<25
	03/05/2008 <sup>7</sup>	<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
	6/25/2008	<20	<20	<20	<20	45.8	<20	29.6	435	<20	<20	2,790	46.6	--	1,410	<20
	9/19/2008	<50	<25	<25	<50	62	<25	37.5	715	<25	<25	4,990	56.5	<25	2,870	39.5
	12/10/2008	<25	<25	<25	<25	51	<25	<25	500	<25	<25	6,600	110	<25	1,100	<25
	3/27/2009	<15	<15	<15	<15	53	<15	39	650	<15	<15	4,500	120	<15	1,900	25
	03/27/2009 DUP	<15	<15	<15	<15	56	<15	39	670	<15	<15	4,800	130	<15	1,900	25
	6/18/2009	<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
	06/18/2009 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
	9/18/2009	<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
	09/18/2009 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
	12/18/2009	<10	<10	<10	<10	87	<10	29	780	13	<10	3,200	57	<10	1,200	35
12/18/2009 DUP	<10	<10	<10	<10	84	<10	27	740	12	<10	3,100	53	<10	1,200	32	
3/19/2010	<5	<5	<5	<5	<5	<5	<5	8.3	45	<5	1,900	19	<5	380	<5	
03/19/2010 DUP	<7	<7	<7	<7	<7	<7	<7	8.3	44	<7	1,800	18	<7	360	<7	
6/17/2010	<0.50	<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
06/17/2010 DUP	<0.50	<0.50	<0.50	<0.50	0.53	<0.50	<0.50	<0.50	6.9	<0.50	<0.50	65	0.52	<0.50	24	<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 µg/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	9/23/2010	<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
(continued)	09/23/2010 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
	12/9/2010	<15	<15	<15	<15	59	<15	38	590	<15	<15	6,200	68	<15	1,500	48
	12/09/2010 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
	3/8/2011	<5	<5	<5	<5	23	<5	12	280	<5	<5	1,500	18	<5	590	13
	6/10/2011	<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
	06/10/2011 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
	9/19/2011	<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
	09/19/2011 DUP	<2	<2	<2	<2	<2	<2	<2	53	<2	<2	410	3.2	<2	80	<2
	12/9/2011	<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
	3/9/2012	<2.5	<2.5	<2.5	<2.5	46	<2.5	26	820	1	<2.5	2,400	50	<2.5	1,200	67
	03/09/2012 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
	06/22/2012 DUP	<5	<5	<5	<5	74	<5	18	1,000	13	<5	1,300	22	<5	1,000	57
	9/14/2012	<5	<5	<5	<5	<5	<5	5.7	300	<5	<5	2,200	31	<5	340	8
	09/14/2012 DUP	<5	<5	<5	<5	<5	<5	5.9	300	<5	<5	2,300	31	<5	340	<5
	12/14/2012	<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
	12/14/2012 DUP	<1	9.3	<1	<1	21	<1	1.7	340	3.7	<1	300	3.1	<1	140	3
	3/15/2013	<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
	03/15/2013 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
	6/14/2013	<9	<9	<9	<9	25	<9	13	730	<9	<9	2,500	29	<9	1,000	<9
	06/14/2013 DUP	<9	<9	<9	<9	25	<9	11	720	<9	<9	2,400	26	<9	1,000	<9
	9/20/2013	<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
	09/20/2013 DUP	<1	1.1	<1	<1	12	<1	21	490	3.8	<1	3,200	52	<1	1,200	9
	12/16/2013	<15	<15	<15	<15	37	<15	22	680	<15	<15	3,000	36	<15	1,100	<15
	12/16/2013 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 µg/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	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
(continued)	6/26/2014 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	985	<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
	12/8/2015 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
	3/8/2016 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
	3/21/2018	<0.500	3.90	<0.500	<0.500	59.0	0.225 J	31.4	2,430	11.2	<0.500	1,250	17.0	0.339 J	1,340	413.0
	3/21/2018 DUP	<0.500	4.26	<0.500	<0.500	58.2	0.242 J	30.7	2,470	10.8	<0.500	996	17.0	0.277 J	1,180	412.0

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 µg/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	6/28/2018	<0.500	<2.50	<0.500	<0.500	81.6	<0.500	35.6	3,890	16.4	<0.500	163	10.9	0.210 J	148	773.0
	6/28/2018 DUP	<0.500	<2.50	<0.500	<0.500	80.2	<0.500	36.3	4,190	18.4	<0.500	177	11.7	0.244 J	191	799.0
	9/25/2018	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	1,900	<0.400	<0.500	3,720	<0.400	<0.500	2,190	115.0
	9/25/2018 DUP	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	1,960	<0.400	<0.500	3,830	<0.400	<0.500	2,270	116.0
	12/5/2018	<1.00	<500	<1.00	<1.00	91.8	0.453	39.3	1,750	18.2	<0.500	3,090	21.8	0.67	1,490	79.0
	12/5/2018 DUP	<1.00	<500	<1.00	<1.00	90.1	<0.400	39.2	1,610	18.4	<0.500	2,460	21.3	0.67	1,290	77.1
	3/20/2019	<40.0	<100	<20.0	<20.0	49.7	<8.00	39.5	1,910	13.9	<10.0	2,970	22.7	<10.0	2,090	75.8
	3/20/2019 DUP	<40.0	<100	<20.0	<20.0	46.9	<8.00	37.6	1,820	13.5	<10.0	2,960	23.7	<10.0	2,040	70.2
	6/7/2019	<80.0	<100	<20.0	<20.0	108	<10.0	52.6	1,910	20.4	<12.5	894	<10.0	<12.5	793	70.1
	6/7/2019 DUP	<80.0	<100	<20.0	<20.0	89.6	<8.0	41.6	1,810	16.8	<10.0	772	8.60	<10.0	698	80.8
	9/26/2019	<10.0	<50.0	<10.0	<10.0	33.3	<4	35.1	958	9.59	<5	4340	26.90	<5	1430	35.4
	9/26/2019 DUP	<10.0	<50.0	<10.0	<10.0	41.9	<4	40.2	1,160	12.1	<5	4010	30.60	<5	1620	39.1
	12/3/2019	<50.0	<250	<50.0	<50.0	57.4	<20.0	28.6	1,250	<20.0	<25.0	1670	<20.0	<25.0	1190	25.6
	12/3/2019 DUP	<50.0	<250	<50.0	<50.0	53.4	<20.0	27.2	1,190	<20.0	<25.0	1650	<20.0	<25.0	1200	23.2
	3/11/2020	<25.0	<125	<25.0	<25.0	31.8	<10.0	55.4	1,290	<10.0	<12.5	4600	28.80	<12.5	1800	143
	3/11/2020 DUP	<25.0	<125	<25.0	<25.0	35.4	<10.0	60.4	1,450	14.8	<12.5	4730	29.10	<12.5	2010	154
	6/18/2020	<10.0	<50.0	<10.0	<10.0	25.7	<4.00	21.1	1,060	5.6	<5.00	1000	9.40	<5.00	580	96.3
	6/18/2020 DUP	<50.0	<250	<50.0	<50.0	32.5	<20.0	27.5	956	<20.0	<25.0	1080	<20.0	<25.0	697	95
MW-19i	6/10/2008	<1	<1	<1	<1	<1	<1	<1	8.46	<1	<1	<1	<1	<1	1.28	<1
	9/17/2008	<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
	12/10/2008	<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
	3/26/2009	<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
	6/17/2009	<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
	9/16/2009	<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
	12/15/2009	<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
	3/18/2010	<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
	6/15/2010	<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
	9/22/2010	<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
	12/9/2010	<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
	3/9/2011	<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
	6/9/2011	<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
	9/15/2011	<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
	12/9/2011	<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
	3/12/2012	<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
	6/21/2012	<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
	9/13/2012	<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
12/12/2012	<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	

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 µg/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)	3/14/2013	<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
	6/12/2013	<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
	9/19/2013	<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
	12/13/2013	<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
	3/20/2018	<0.500	<2.50	<0.500	<0.500	<0.500	<0.500	<0.500	0.228 J	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
	7/2/2018	<0.500	<2.50	<0.500	<0.500	<0.500	<0.500	<0.500	0.212 J	<0.500	<0.500	0.223 J	<0.500	<0.500	<0.500	<0.500
	9/27/2018	<1.00	<5.00	<1.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400
	12/6/2018	<1.00	<5.00	<1.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400
	3/25/2019	<1.00	<5.00	<1.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400
	6/3/2019	<1.00	<5.00	<1.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400
	9/26/2019	<1.00	<5.00	<1.00	<1.00	<1.00	<0.400	<0.400	<0.400	0.43	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400
	12/4/2019	<1.00	<5.00	<1.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400
3/12/2020	<1.00	<5.00	<1.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	
6/18/2020	<1.00	<5.00	<1.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	

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 µg/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	6/10/2008	<1	<1	<1	<1	<1	<1	<1	18	<1	<1	5.77	<1	<1	3.2	<1
	9/17/2008	<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
	12/11/2008	<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
	3/25/2009	<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
	6/16/2009	<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
	9/17/2009	<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
	12/16/2009	<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
	3/18/2010	<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
	6/15/2010	<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
	9/22/2010	<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
	12/9/2010	<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
	3/11/2011	<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
	6/8/2011	<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
	9/15/2011	<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
	12/8/2011	<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
	3/7/2012	<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
	6/21/2012	<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
	9/13/2012	<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
	12/13/2012	<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
	3/14/2013	<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
	6/13/2013	<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
	9/19/2013	<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
	12/13/2013	<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 µg/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
	3/21/2018	<0.500	<2.50	<0.500	<0.500	0.303 J	<0.500	<0.500	5.7	<0.500	<0.500	1.4	<0.500	<0.500	0.90	<0.500
	7/2/2018	<0.500	<2.50	<0.500	<0.500	0.436 J	<0.500	<0.500	9.7	<0.500	<0.500	2.3	<0.500	<0.500	1.60	<0.500
	9/25/2018	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	7.7	<0.400	<0.500	2.1	<0.400	<0.500	1.39	<0.400
	12/6/2018	<1.00	<5.00	<1.00	<1.00	0.43	<0.400	<0.400	10.7	<0.400	<0.500	2.2	<0.400	<0.500	1.55	<0.400
	3/22/2019	<1.00	<5.00	<1.00	<1.00	0.492	<0.400	<0.400	10.5	<0.400	<0.500	2.04	<0.400	<0.500	1.65	<0.400
	6/3/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	4.58	<0.400	<0.500	0.950	<0.400	<0.500	0.590	<0.400
	9/25/2019	<1.00	<5.00	<1.00	<1.00	0.461	<0.400	<0.400	9.43	<0.400	<0.500	2.340	<0.400	<0.500	1.440	<0.400
	12/3/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	8.68	<0.400	<0.500	1.370	<0.400	<0.500	0.897	<0.400
	3/11/2020	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	9.21	<0.400	<0.500	2.320	<0.400	<0.500	1.260	<0.400
	6/17/2020	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	1.93	<0.400	<0.500	0.410	<0.400	<0.500	<0.400	<0.400
MW-21i-105	6/10/2008	<2	<2	<2	<2	2	<2	<2	15.8	<2	<2	53.2	<2	<0.50	25.1	<2
	9/18/2008	<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
	12/11/2008	<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
	3/26/2009	<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
	6/17/2009	<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
	9/17/2009	<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
	12/16/2009	<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
	3/18/2010	<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
	6/15/2010	<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
	9/22/2010	<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
	12/8/2010	<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
	3/9/2011	<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
	6/9/2011	<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
	9/15/2011	<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
	12/8/2011	<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

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 µg/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)	3/7/2012	<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
	6/20/2012	<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
	9/12/2012	<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
	12/12/2012	<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
	3/13/2013	<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
	6/13/2013	<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
	9/18/2013	<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
	12/12/2013	<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
	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
	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
	9/26/2016	<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
	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
	3/22/2018	<0.500	<2.50	<0.500	<0.500	<0.500	<0.500	<0.500	0.7	<0.500	<0.500	0.5	<0.500	<0.500	0.477 J	<0.500
	6/29/2018	<0.500	<2.50	<0.500	<0.500	<0.500	<0.500	<0.500	1.9	<0.500	<0.500	1.8	<0.500	<0.500	1.3	<0.500
9/26/2018	<1.00	<5.00	<1.00	<1.00	0.82	<0.400	<0.400	36.4	<0.400	<0.500	8.6	<0.400	<0.500	11.0	<0.400	
12/6/2018	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	8.6	<0.400	<0.500	9.5	<0.400	<0.500	5.9	<0.400	
3/21/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	1.04	<0.400	<0.500	1.08	<0.400	<0.500	0.760	<0.400	
6/6/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	4.11	<0.400	<0.500	3.90	<0.400	<0.500	2.38	<0.400	
9/25/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	4.08	<0.400	<0.500	4.93	<0.400	<0.500	2.62	<0.400	
12/4/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	3.09	<0.400	<0.500	5.61	<0.400	<0.500	2.79	<0.400	
3/12/2020	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	2.48	<0.400	<0.500	3.60	<0.400	<0.500	2.02	<0.400	
6/18/2020	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	1.59	<0.400	<0.500	3.08	<0.400	<0.500	1.49	<0.400	

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 µg/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	9/18/2008	<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
	12/11/2008	<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
	3/26/2009	<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
	6/17/2009	<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
	9/18/2009	<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
	12/16/2009	<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
	3/18/2010	<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
	6/15/2010	<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
	9/22/2010	<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
	12/8/2010	<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
	3/10/2011	<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
	6/9/2011	<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
	9/15/2011	<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
	12/8/2011	<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
	3/7/2012	<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
	6/20/2012	<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
	9/12/2012	<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
	12/12/2012	<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
	3/13/2013	<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
	6/13/2013	<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
	9/18/2013	<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
	12/12/2013	<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

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 µg/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)	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
	3/22/2018	<0.500	<2.50	<0.500	<0.500	2.1	<0.500	0.64	55.1	0.391 J	<0.500	22.5	<0.500	<0.500	16.5	<0.500
	6/28/2018	<0.500	<2.50	<0.500	<0.500	2.6	<0.500	0.75	63.2	0.53	<0.500	26.0	0.145 J	<0.500	17.0	<0.500
	9/27/2018	<1.00	<5.00	<1.00	<1.00	2.5	<0.400	0.70	62.1	0.69	<0.500	24.5	<0.400	<0.500	17.1	<0.400
	12/6/2018	<1.00	<5.00	<1.00	<1.00	2.4	<0.400	0.67	59.1	0.48	<0.500	32.7	<0.400	<0.500	19.3	<0.400
	3/21/2019	<1.00	<5.00	<1.00	<1.00	2.48	<0.400	0.700	48.8	0.500	<0.500	24.6	<0.400	<0.500	16.2	<0.400
	6/3/2019	<1.00	<5.00	<1.00	<1.00	2.23	<0.400	0.730	60.9	0.470	<0.500	24.1	<0.400	<0.500	16.9	<0.400
	9/25/2019	<1.00	<5.00	<1.00	<1.00	2.48	<0.400	0.768	55.5	0.657	<0.500	22.5	<0.400	<0.500	14.9	<0.400
	12/3/2019	<1.00	<5.00	<1.00	<1.00	2.5	<0.400	0.614	56.3	0.521	<0.500	32.1	<0.400	<0.500	19.1	<0.400
	3/11/2020	<1.00	<5.00	<1.00	<1.00	1.95	<0.400	0.626	47.4	0.411	<0.500	31.2	<0.400	<0.500	17.6	<0.400
	6/17/2020	<1.00	<5.00	<1.00	<1.00	1.95	<0.400	0.540	45.9	0.400	<0.500	31.1	<0.400	<0.500	14.6	<0.400
MW-22i	6/10/2008	<1	<1	<1	<1	1.02	<1	<1	30	<1	<1	10.3	<1	<1	30	<1
	9/17/2008	<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
	12/11/2008	<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
	3/25/2009	<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
	6/16/2009	<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
	9/17/2009	<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
	12/15/2009	<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
	3/18/2010	<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
	6/14/2010	<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
	9/22/2010	<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
	12/8/2010	<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
	3/11/2011	<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
	6/8/2011	<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 µg/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)	9/14/2011	<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	
	12/8/2011	<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	
	3/6/2012	<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	
	6/20/2012	<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	
	9/12/2012	<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	
	12/13/2012	<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	
	3/13/2013	<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	
	6/12/2013	<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	
	9/18/2013	<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	
	12/12/2013	<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	<0.50	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	<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	<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	<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	<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	<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	<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	<1.0	<0.50	<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	<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	
3/22/2018	<0.500	<2.50	<0.500	<0.500	0.330 J	<0.500	<0.500	<0.500	9.6	<0.500	<0.500	1.76	<0.500	<0.500	7.8	<0.500	
6/29/2018	<0.500	<2.50	<0.500	<0.500	0.52	<0.500	<0.500	<0.500	12.4	<0.500	<0.500	2.77	<0.500	<0.500	8.1	<0.500	
9/26/2018	<1.00	<5.00	<1.00	<1.00	0.42	<0.400	<0.400	<0.400	12.5	<0.400	<0.500	2.42	<0.400	<0.500	6.8	<0.400	
12/5/2018	<1.00	<5.00	<1.00	<1.00	0.47	<0.400	<0.400	<0.400	11.7	<0.400	<0.500	3.34	<0.400	<0.500	8.2	<0.400	

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 µg/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)	3/21/2019	<1.00	<5.00	<1.00	<1.00	0.510	<0.400	<0.400	12.2	<0.400	<0.500	1.24	<0.400	<0.500	4.92	<0.400
	6/6/2019	<1.00	<5.00	<1.00	<1.00	0.584	<0.400	<0.400	15.5	<0.400	<0.500	2.22	<0.400	<0.500	7.22	<0.400
	9/25/2019	<1.00	<5.00	<1.00	<1.00	0.577	<0.400	<0.400	15.5	<0.400	<0.500	3.12	<0.400	<0.500	6.88	<0.400
	12/4/2019	<1.00	<5.00	<1.00	<1.00	0.461	<0.400	<0.400	15.2	<0.400	<0.500	1.94	<0.400	<0.500	7.35	<0.400
	3/12/2020	<1.00	<5.00	<1.00	<1.00	0.587	<0.400	<0.400	16.1	<0.400	<0.500	3.32	<0.400	<0.500	8.23	<0.400
	6/18/2020	<1.00	<5.00	<1.00	<1.00	0.58	<0.400	<0.400	13.6	<0.400	<0.500	3.17	<0.400	<0.500	7.62	<0.400
MW-23i	6/10/2008	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	06/10/2008 DUP	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	9/17/2008	<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
	12/9/2008	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	3/25/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	6/16/2009	<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
	9/16/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	12/15/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	3/17/2010	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	7/2/2010	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	9/22/2010	<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
	12/8/2010	<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
	3/9/2011	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	6/8/2011	<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
	9/13/2011	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	12/6/2011	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	3/7/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	6/19/2012	<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
	9/11/2012	<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
	12/12/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
3/12/2013	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
6/12/2013	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
9/18/2013	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
12/11/2013	<0.50	<0.50	<0.50	<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	

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 µg/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)	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	<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
	3/21/2018	<0.500	<2.50	<0.500	<0.500	<0.500	<0.500	<0.500	0.207 J	<0.500	<0.500	0.402 J	<0.500	<0.500	0.215 J	<0.500
	6/28/2018	<0.500	<2.50	<0.500	<0.500	<0.500	<0.500	<0.500	0.202 J	<0.500	<0.500	0.247 J	<0.500	<0.500	0.212 J	<0.500
	9/27/2018	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	12/6/2018	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	3/22/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	6/3/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	9/26/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	0.59	<0.400	<0.500	<0.400	<0.400
	12/5/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
3/12/2020	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400	
6/17/2020	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400	
MW-24i	10/1/2010	<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
	12/10/2010	<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
	3/14/2011	<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
	6/7/2011	<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
	9/16/2011	<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
	12/7/2011	<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
	3/12/2012	<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
	6/22/2012	<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
	9/14/2012	<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
	12/14/2012	<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

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 µg/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 (continued)	3/15/2013	<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	
	6/14/2013	<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	
	9/20/2013	<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	
	12/16/2013	<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	
	3/21/2018	<0.500	<2.50	<0.500	<0.500	1.42	<0.500	<0.500	13.5	<0.500	<0.500	19.1	<0.500	<0.500	10.2	<0.500	
	6/28/2018	<0.500	<2.50	<0.500	<0.500	1.44	<0.500	<0.500	13.6	1.09	<0.500	10.3	<0.500	<0.500	5.9	<0.500	
	9/27/2018	<1.00	<5.00	<1.00	<1.00	2.18	<0.400	<0.400	25.0	<0.400	<0.500	24.8	<0.400	<0.500	14.3	<0.400	
12/4/2018	<1.00	<5.00	<1.00	<1.00	0.80	<0.400	<0.400	5.1	<0.400	<0.500	10.2	<0.400	<0.500	3.8	<0.400		
3/25/2019	<1.00	<5.00	<1.00	<1.00	0.888	<0.400	<0.400	8.46	<0.400	<0.500	11.7	<0.400	<0.500	5.91	<0.400		
6/7/2019	<1.00	<5.00	<1.00	<1.00	0.601	<0.400	<0.400	4.99	<0.400	<0.500	7.39	<0.400	<0.500	3.55	<0.400		
9/27/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400		
12/3/2019	<1.00	<5.00	<1.00	<1.00	0.775	<0.400	<0.400	3.82	<0.400	<0.500	8.78	<0.400	<0.500	3.72	<0.400		
3/12/2020	<1.00	<5.00	<1.00	<1.00	1.3	<0.400	<0.400	15.4	<0.400	<0.500	17	<0.400	<0.500	8.42	<0.400		
6/18/2020	<1.00	<5.00	<1.00	<1.00	0.61	<0.400	<0.400	2.91	<0.400	<0.500	6.24	<0.400	<0.500	2.84	<0.400		
MW-24d	9/14/2011	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
	12/9/2011	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
	3/8/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
	6/21/2012	<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 µg/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	9/14/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
(continued)	12/14/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	3/15/2013	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	6/14/2013	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	9/20/2013	<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
	12/16/2013	<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	<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
	3/20/2018	<0.500	<2.50	<0.500	<0.500	<0.500	<0.500	<0.500	0.259 J	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	0.199 J
	6/27/2018	<0.500	<2.50	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	0.275 J
	9/28/2018	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	12/10/2018	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	3/25/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	6/4/2019	<4.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	9/27/2019	<1.00	<5.00	<1.00	<1.00	0.42	<0.400	<0.400	1.00	<0.400	<0.500	1.62	<0.400	<0.500	0.85	<0.400
	12/3/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	3/12/2020	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	6/18/2020	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400

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 µg/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	9/16/2011	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	12/8/2011	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	3/6/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	6/20/2012	<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
	9/11/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	12/12/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	3/13/2013	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	6/13/2013	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	9/18/2013	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	12/11/2013	<0.50	<0.50	<0.50	<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
	3/17/2015	<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	0.75	<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
	3/9/2016	<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
	3/21/2018	<0.500	<2.50	<0.500	<0.500	<0.500	<0.500	<0.500	0.245 J	<0.500	<0.500	0.248 J	<0.500	<0.500	<0.500	<0.500
	6/29/2018	<0.500	<2.50	<0.500	<0.500	<0.500	<0.500	<0.500	0.274 B J	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
	9/27/2018	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	12/6/2018	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400

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 µg/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)	3/22/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	6/4/2019	<4.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	9/25/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	12/3/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	0.54	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	3/12/2020	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	6/18/2020	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	0.44	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
MW-26	9/16/2011	<2	<2	<2	<2	7	<2	2.2	120	2.6	<2	250	5.7	<2	490	<2
	12/8/2011	<2	<2	<2	<2	7.1	<2	2.5	110	2.2	<2	300	5.8	<2	500	<2
	3/6/2012	<2	<2	<2	<2	8.2	<2	2.2	99	<2	<2	210	4.6	<2	450	<2
	6/19/2012	<2	<2	<2	<2	14	<2	3	90	<2	<2	160	5.2	<2	460	<2
	9/11/2012	<2	<2	<2	<2	6.3	<2	2.3	110	3	<2	280	4.3	<2	460	<2
	12/12/2012	<2	<2	<2	<2	5.6	<2	<2	120	3.7	<2	300	3.8	<2	470	<2
	3/13/2013	<2	<2	<2	<2	4.9	<2	<2	83	<2	<2	210	2.9	<2	390	<2
	6/12/2013	<2	<2	<2	<2	8.2	<2	<2	80	<2	<2	170	4.5	<2	360	<2
	9/18/2013	<2	<2	<2	<2	5.7	<2	<2	96	2.4	<2	210	3.2	<2	410	<2
	12/11/2013	<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
	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	

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 µg/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)	3/20/2018	<0.500	0.633 J	0.149 J	<0.500	4.9	<0.500	1.4	157	1.9	<0.500	108	1.2	<0.500	190	1.75
	6/29/2018	<0.500	<2.50	<0.500	<0.500	5.1	<0.500	1.5	114	1.9	<0.500	138	1.9	<0.500	221	1.02
	9/24/2018	<1.00	<5.00	<1.00	<1.00	4.2	<0.400	1.2	141	2.1	<0.500	117	1.2	<0.500	233	1.18
	12/5/2018	<2.00	<10.0	<2.00	<2.00	3.0	<0.800	1.1	147	1.9	<1.00	139	0.8	<1.00	210	0.85
	3/22/2019	<2.00	<10.0	<2.00	<2.00	7.74	<0.800	2.18	142	3.18	<1.00	139	2.09	<1.00	383	<0.800
	6/3/2019	<20.0	<25.0	<5.00	<5.00	5.75	<2.00	<2.00	92.2	2.35	<2.50	148	2.10	<2.50	336	<2.00
	9/26/2019	<5.00	<25.0	<5.00	<5.00	5.14	<2.00	<2.00	104	2.6	<2.50	133	<2.00	<2.50	272	<2.00
	12/3/2019					2.63	<2.00	<2.00	95	<2.00	<2.50	137	<2.00	<2.50	216	<2.00
	3/11/2020	<5.00	<25.0	<5.00	<5.00	3.65	<2.00	<2.00	59.7	<2.00	<2.50	79.1	<2.00	<2.50	205	<2.00
	6/17/2020	<2.00	<10.0	<2.00	<2.00	5.16	<0.800	1.38	64.2	1.9	<1.00	143	2.20	<1.00	299	<0.800
MW-32s	3/24/2005	<1	<0.50	<0.50	<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	5.79	<0.50	--	<0.50	<0.50
	8/18/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/14/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	3/6/1908	<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
	9/17/2008	<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
	12/9/2008	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	6/16/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	12/15/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	7/2/2010	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	9/22/2010	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	12/7/2010	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	6/9/2011	<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
	9/15/2011	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	12/8/2011	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	6/21/2012	<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
	9/13/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	12/11/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
3/14/2013	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
6/11/2013	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
9/20/2013	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
12/16/2013	<0.50	<0.50	<0.50	<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 µg/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)	3/24/2014	<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
	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
	3/22/2018	<0.500	<2.50	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
	10/1/2018	<2.0	<2.0	<0.50	<0.50	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	12/10/2018	<0.500	<2.50	<0.500	<0.500	0.860	<0.400	<0.400	16.5	<0.400	<0.500	14.7	<0.400	<0.500	5.99	<0.400
	3/25/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
9/26/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400	
3/13/2020	<2.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400	
MW-32i	11/10/2017	<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	<0.50
MW-F	6/14/1995	--	<10	<5	<5	<5	5	<5	15	<5	--	<5	<5	--	<5	<10
	2/27/2001	<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
	5/29/2001	<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
	9/24/2001	<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
	12/18/2001	<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
	3/18/2002	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	5/31/2002	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	8/28/2002	<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
	11/8/2002	<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
	1/23/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	5/29/2003	<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
11/10/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

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 µg/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-F (continued)	1/26/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	5/4/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	8/17/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/2/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/15/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	3/24/2005	<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
	5/17/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	8/18/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/14/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12/13/2007	<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
9/18/2008	<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	
EW-1	4/25/1991	--	<2	--	--	35	20	--	750	--	--	9,100	280	--	440	9.3
	11/17/1993	--	<200	---	--	<100	<100	--	1,700	--	--	8,600	<100	--	480	<200
	9/1/1995	<25	<50	<25	<25	<25	<25	<25	140	<25	<25	2,400	74	--	340	<50
	9/24/1996	<1	<4	3	<0.4	8.5	2.1	<0.40	260	6.2	<0.40	49	34	--	29	89
	12/2/1996	0.7	<0.50	1.9	<0.20	5.7	5	1	530	3.3	<0.20	310	86	--	98	10
	11/12/1997	<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
	8/11/1999	<10	<50	<5	<5	<5	<5	<5	14.5	<5	<5	369	<10	--	39.9	<5
	11/16/1999	<5	<12.5	<2.5	<5	<2.5	3.15	<2.5	41.7	3	<2.5	314	6.9	--	35.5	5.1
	2/29/2000	<2	<10	<1	<1	<1	6.42	<1	13.7	<1	<1	97.3	3.48	--	20.8	<1
	6/27/2000	<2	<10	2.12	<1	<1	6.42	<1	17.5	<1	<1	293	5.37	--	35.1	<1
	8/31/2000	<5	<25	<2.5	<2.5	<2.5	<2.5	<2.5	31.9	<2.5	<2.5	325	<5	--	38.4	<2.5
	1/30/2000	<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
	2/27/2001	<2	<10	1.42	<1	2.51	2.83	<1	35	<1	<1	240	7.98	--	47.5	2.43
	5/29/2001	<10	<50	<5	<5	<5	<5	<5	22.4	<5	<5	338	<10	--	61.1	<5
	9/25/2001	<5	<5	<5	<5	<5	<5	<5	14	<5	<5	320	9.5	--	61	<5
	12/17/2001	<2	<10	<1	<1	1.19	<1	<1	25.8	<1	<1	217	12.8	--	47.1	<1
	3/19/2002	<2	<1	<1	<2	1.04	<1	<1	17.5	<1	<1	323	5.66	--	46.1	<1
5/30/2002	<2	<1	1.38	<2	1	1.68	<1	23.5	<1	<1	319	6.46	--	39.9	<1	
8/29/2002	<2	<1	1.36	<2	2.44	1.24	<1	20.4	<1	<1	307	3.38	--	37.8	<1	
11/8/2002	<2	<1	1.46	<2	3.02	3.96	<1	28.4	<1	<1	274	5.54	--	50.2	<1	

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Historical Groundwater Analytical Results  
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Well Number	Sample Date	Concentrations in µg/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)	1/23/2003	<2	<1	1.36	<2	2.34	<1	<1	17	<1	<1	252	5.06	--	51.9	<1
	5/30/2003	<2	<1	5.22	<2	<1	<1	<1	6.12	<1	<1	255	5.06	--	41.1	<1
	11/10/2003	<5	<5	<5	<5	<5	<5	<5	9	<5	<5	85.8	<5	--	16.2	<5
	1/27/2004	<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
	5/4/2004	<1	<1	4.73	<1	<1	1.25	<1	4.36	<1	<1	168	3.09	--	30.8	<1
	8/17/2004	<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
	11/17/2004	<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
	5/18/2005	<2	<1	<1	<2	<1	<1	<1	8.28	<1	<1	207	<1	--	23.2	2.3
	11/14/2005	<2	<1	1.06	<2	1.36	2.7	<1	11.1	<1	<1	187	<1	--	26.1	<1
	6/5/2006	<1	<1	2.4	<1	<1	<1	<1	6.18	<1	<1	102	3.55	--	19.1	<1
	12/6/2006	<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
	9/12/2007	<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
	3/6/2008	<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
	9/19/2008	<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
	3/26/2009	<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
	9/17/2009	<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
	3/19/2010	<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
	9/23/2010	<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
	3/10/2011	<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
	9/16/2011	<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
	3/12/2012	<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
	9/13/2012	<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
	3/15/2012	<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
	9/19/2013	<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	

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 µg/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)	7/1/2018	<0.500	<2.50	1.94	<0.500	0.134 J	<0.500	<0.500	1.15 B	<0.500	<0.500	30.7	0.56	<0.500	7.6	<0.500
	9/27/2018	<1.00	<5.00	1.15	<1.00	0.41	1.03	<0.400	3.18	<0.400	<0.500	29.7	0.41	<0.500	8.4	<0.400
	3/25/2019	<1.00	<5.00	1.85	<1.00	<0.400	<0.400	<0.400	1.70	<0.400	<0.500	30.7	0.676	<0.500	11.2	<0.400
	6/4/2019	<1.00	<5.00	1.45	<1.00	<0.400	0.590	<0.400	2.56	<0.400	<0.500	27.4	0.690	<0.500	9.53	<0.400
	9/26/2019	<1.00	<5.00	1.54	<1.00	<0.400	<0.4	<0.400	2.39	<0.400	<0.500	24.4	0.482	<0.500	7.4	<0.400
	12/4/2019					<0.400	0.552	<0.400	3.34	<0.400	<0.500	28.3	0.488	<0.500	9.99	<0.400
	3/11/2020	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	0.811	<0.400	<0.500	15	<0.400	<0.500	5.04	<0.400
	6/17/2020	<1.00	<5.00	1.33	<1.00	<0.400	<0.400	<0.400	1.2	<0.400	<0.500	29.9	0.900	<0.500	6.78	<0.400
S-1	8/10/1999	<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
	2/29/2000	<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
	6/28/2000	<5	<25	<2.5	<2.5	<2.5	<2.5	2.7	58.2	<2.5	<2.5	749	14.5	--	232	<2.5
	8/31/2000	<5	<25	<2.5	<2.5	<2.5	<2.5	<2.5	4.98	<2.5	<2.5	313	5.14	--	60.4	<2.5
	11/30/2000	<1	<5	<0.50	<0.50	<0.50	<0.50	<0.50	1.61	<0.50	<0.50	9.78	1.95	--	29.8	<0.50
	2/27/2001	<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
	5/30/2001	<1	<5	<0.50	<0.50	<0.50	<0.50	<0.50	0.974	<0.50	<0.50	7.38	<1	--	12.6	<0.50
	9/25/2001	<2.5	<2.5	<2.5	<2.5	2.6	<2.5	4	2.7	<2.5	<2.5	39	18	--	210	<2.5
	3/19/2002	<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
	5/30/2002	<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
	11/7/2002	<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
	1/23/2003	<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
	5/28/2003	<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
	11/11/2003	<1	<1	<1	<1	<1	<1	<1	1.85	<1	<1	4.22	<1	--	13.2	<1
	1/26/2004	<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
	5/4/2004	<1	<1	<1	<1	<1	<1	<1	1.17	<1	<1	4.07	<1	--	10.6	<1
	11/15/2004	<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
	2/1/2005	<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
	5/18/2005	<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
	5/23/2007	<1	<1	<1	<1	<1	<1	<1	3.63	<1	<1	4.02	<1	--	6.85	<1
12/13/2007	<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	
3/5/2008	<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	
6/25/2008	<1	<1	<1	<1	<1	<1	<1	1.67	<1	<1	<1	1.37	<1	<1	<1	
9/17/2008	<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	
12/9/2008	<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	

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 µg/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)	3/25/2009	<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	
	6/16/2009	<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	
	9/16/2009	<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	
	12/16/2009	<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	
	3/17/2010	<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	
	7/2/2010	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
	9/22/2010	<0.5	<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
	12/8/2010	<0.5	<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
	3/9/2011	<0.50	<0.50	<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
	6/8/2011	<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	0.66	<0.5
	9/14/2011	<0.50	<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
	12/6/2011	<0.50	<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
	3/12/2012	<0.50	<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
	6/21/2012	<0.5	<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
	9/14/2012	<0.50	<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
	12/12/2012	<0.50	<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
	3/13/2013	<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	<0.50	1.5	<0.50
	6/12/2013	<0.50	<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
	9/20/2013	<0.50	<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
	12/12/2013	<0.50	<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	<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	<0.50	0.82	<0.50	<0.50	2.1	<0.50	
9/27/2014	<0.50	<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	<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	<0.50	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	<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	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	<0.50	0.6	<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 µg/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)	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
	3/20/2018	<0.500	<2.50	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
	6/28/2018	<0.500	<2.50	<0.500	<0.500	1.01	<0.500	0.336 J	3.62	<0.500	<0.500	3.16	0.90	<0.500	24.20	<0.500
	9/26/2018	<1.00	<5.00	<1.00	<1.00	0.51	<0.400	<0.400	2.58	<4.00	<0.500	2.11	0.41	<0.500	10.40	<0.400
	12/5/2018	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	1.10	<4.00	<0.500	1.94	<0.400	<0.500	7.39	<0.400
	3/19/2019	<1.00	<5.00	<1.00	<1.00	0.764	<0.400	<0.400	6.27	<0.400	<0.500	0.921	<0.400	<0.500	3.60	<0.400
	6/5/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	1.11	<0.400	<0.500	0.783	<0.400	<0.500	2.17	<0.400
	9/25/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	1.86	<0.400	<0.500	1.1	<0.400	<0.500	2.71	<0.400
	12/4/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	0.988	<0.400	<0.500	0.971	<0.400	<0.500	2.86	<0.400
	3/10/2020	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	1.06	<0.400
	6/17/2020	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	<0.400	<0.400	<0.500	0.44	<0.400
S-2	8/11/1999	<1	<5	<0.50	<0.50	2.37	<0.50	<0.50	<0.50	<0.50	<0.50	1.7	<1	--	0.843	<0.50
	11/15/2004	<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
	12/12/2012	<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
	3/13/2013	<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
	6/12/2013	<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
	9/20/2013	<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
	12/12/2013	<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	

Please refer to notes at end of table.

Appendix B  
Historical Groundwater Analytical Results  
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Well Number	Sample Date	Concentrations in µg/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-2 (continued)	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
	3/20/2018	<0.500	<2.50	<0.500	<0.500	3.7	<0.500	<0.500	5.9	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
	6/28/2018	<0.500	<2.50	<0.500	<0.500	4.1	<0.500	<0.500	23.2	0.56	<0.500	<0.500	1.00	<0.500	2.34	<0.500
	9/26/2018	<1.00	<5.00	<1.00	<1.00	10.0	<0.400	<0.400	50.9	0.70	<0.500	<4.00	1.74	<0.500	4.00	0.42
	12/5/2018	<1.00	<5.00	<1.00	<1.00	7.0	<0.400	<0.400	28.5	<4.00	<0.500	<0.400	<0.400	<0.500	2.18	<0.400
	3/19/2019	<1.00	<5.00	<1.00	<1.00	2.65	<0.400	<0.400	8.23	<4.00	<0.500	<0.400	<0.400	<0.500	<0.400	<0.400
	6/5/2019	<1.00	<5.00	<1.00	<1.00	5.38	<0.400	<0.400	19.8	<0.400	<0.500	<0.400	<0.400	<0.500	0.925	<0.400
	9/25/2019	<1.00	<5.00	<1.00	<1.00	8.88	<0.400	<0.400	49.6	0.64	<0.500	<0.400	0.94	<0.500	2.85	<0.400
	12/4/2019	<1.00	<5.00	<1.00	<1.00	7.12	<0.400	<0.400	30.5	<0.400	<0.500	<0.400	<0.400	<0.500	1.75	<0.400
	3/10/2020	<1.00	<5.00	<1.00	<1.00	6.54	<0.400	<0.400	26.4	0.52	<0.500	<0.400	<0.400	<0.500	1.15	<0.400
	6/17/2020	<1.00	<5.00	<1.00	<1.00	4.24	<0.400	<0.400	15.5	<0.400	<0.500	<0.400	<0.400	<0.500	0.58	<0.400
MGMS1-3(43)	6/28/2000	<50	<250	<25	<25	278	<25	55.9	4,270	<25	<25	734	<50	--	1,840	<25
	8/30/2000	<200	<1	<100	<100	420	<100	116	8,850	<100	<100	5,940	<200	--	3,040	<100
	11/29/2000	<100	<500	<50	<50	249	<50	76.2	4,560	<50	<50	1,210	<100	--	1,140	<50
	2/27/2001	<100	<500	<50	<50	697	<50	164	14,000	<50	<50	148	<100	--	1,390	133
	5/31/2001	<100	<500	<50	<50	<50	<50	<50	5,870	<50	<50	130	<100	--	599	<50
	9/24/2001	<13	<13	<13	<13	150	<13	32	4,700	<13	<13	310	<13	--	450	25
	12/18/2001	<50	<250	<25	<25	153	<25	33.3	3,600	<25	<25	276	<50	--	568	<25
	3/19/2002	<100	<50	<50	<100	310	<50	103	6,700	<50	<50	2,090	<50	--	1,720	86
	5/29/2002	<50	<25	<25	<50	188	<25	39	4,700	<25	<25	470	<25	--	624	37.5
	8/29/2002	<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
	11/11/2002	<100	<50	<50	<100	183	<50	<50	4,810	<50	<50	757	<50	--	831	51
	1/23/2003	<100	<50	<50	<100	378	<50	76	10,500	<50	<50	782	<50	--	1,290	109
	5/28/2003	<100	<50	<50	<100	402	<50	72	9,510	<50	<50	270	<50	--	841	114
11/11/2003	<50	<50	<50	<50	252	<50	<50	9,710	<50	<50	516	<50	--	1,020	58	

Please refer to notes at end of table.

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Well Number	Sample Date	Concentrations in µg/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)	1/27/2004	<50	<25	<25	<50	290	<25	54.5	8,160	53.5	<25	393	<25	--	808	95
	5/3/2004	<100	<100	<100	<100	370	<100	<100	12,300	<100	<100	830	<100	--	1,520	111
	8/17/2004	<100	<50	<50	<100	401	<50	114	12,700	109	<50	1,540	<50	--	2,340	151
	11/15/2004	<120	<120	<120	<120	270	<120	<120	9,600	<120	<120	1,400	<120	--	1,600	<120
	3/24/2005	<100	<50	<50	<100	481	<50	148	15,600	135	<50	1,390	<50	--	2,090	266
	5/16/2005	<50	<25	<25	<50	327	<25	89	9,670	83	<25	802	<25	--	1,410	157
	5/17/2005	<100	<50	<50	<100	353	<50	86	10,600	94	<50	920	<50	--	1,660	173
	11/17/2005	<100	<50	<50	<100	392	<50	121	13,400	133	<50	1,310	<50	--	2,280	186
	6/6/2006	<100	<100	<100	<100	385	<100	<100	11,800	115	<100	628	<100	--	1,370	192
	12/6/2006	<100	<50	<50	<100	256	<50	72	9,960	92	<50	843	<50	--	1,260	155
	5/22/2007	<100	<100	<100	<100	439	<100	119	14,200	152	<100	910	<100	--	1,920	245
	9/11/2007	<100	<50	<50	<100	303	<50	109	11,700	128	<50	1,100	<50	--	2,060	189
	12/12/2007	<100	<50	<50	<100	270	<50	75	8,740	93	<50	1,010	<50	--	1,540	167
	3/5/2008	<50	<25	<25	<50	370	<25	128	6,740	220	<25	1,480	36	<25	2,350	234
	9/16/2008	<100	<50	<50	<100	302	<50	112	10,400	139	<50	2,700	<50	<50	2,500	171
	12/8/2008	<4	<4	<4	<4	190	<4	63	6,000	78	<4	1,300	19	<4	1,200	100
	3/25/2009	<15	<15	<15	<15	110	<15	66	3,500	34	<15	3,600	49	<15	2,100	49
	9/15/2009	<15	<15	<15	<15	140	<15	74	4,200	45	<15	4,300	44	<15	2,300	84
	12/14/2009	<15	<15	<15	<15	140	<15	46	4,000	55	<15	1,500	15	<15	1,100	67
	3/17/2010	<15	<15	<15	<15	160	<15	63	4,600	44	<15	2,800	32	<15	1,900	78
6/14/2010	<25	<25	<25	<25	220	<25	46	5,400	69	<25	790	<25	<25	900	85	
9/21/2010	<15	<15	<15	<15	130	<15	55	3,800	43	<15	2,900	37	<15	1,900	68	
12/7/2010	<15	<15	<15	<15	190	<15	63	5,500	69	<15	2,500	23	<15	1,800	96	
3/8/2011	<20	<20	<20	<20	170	<20	52	4,600	56	<20	1,400	<20	<20	1,300	86	
6/6/2011	<15	<15	<15	<15	190	<15	36	4,700	71	<15	610	<15	<15	790	97	
9/13/2011	<20	<20	<20	<20	290	<20	78	8,000	160	<20	900	<20	<20	1,800	160	
3/8/2012	<4	<40	<40	<40	340	<40	62	9,500	150	<40	240	<40	<40	690	890	
6/21/2012	<20	<20	<20	<20	220	<20	25	4,400	76	<20	74	<20	<20	260	1,100	
9/12/2012	<20	<20	<20	<20	280	<20	72	8,800	180	<20	360	<20	<20	970	890	
12/11/2012	<20	<20	<20	<20	220	<20	40	6,100	110	<20	160	<20	<20	430	680	

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Well Number	Sample Date	Concentrations in µg/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)	3/12/2013	<20	<20	<20	<20	220	<20	21	4,700	74	<20	110	<20	<20	340	1,600
	6/11/2013	<20	<20	<20	<20	190	<20	<20	3,900	56	<20	78	<20	<20	260	1,100
	9/17/2013	<15	<15	<15	<15	190	<15	21	4,600	66	<15	100	<15	<15	350	1,100
	12/10/2013	<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
	3/22/2018	<0.500	<2.50	<0.500	<0.500	192	<0.500	18.0	2,450	34.9	<0.500	80	0.8	0.200 J	278	236
	7/1/2018	<0.500	<2.50 J3	<0.500	<0.500	116	<0.500	13.8	1,880	32.8	<0.500	107	0.6	<0.500	246	118
	9/28/2018	<20.0	<100	<20.0	<20.0	141	<8.00	27.8	3,150	47.4	<10.0	252	<8.00	<10.0	528	134
12/4/2018	<1.00	<5.00	<1.00	<1.00	148	<0.400	22.5	2,750	48.1	<0.500	146	1.1	<0.500	388	129	
3/26/2019	<40.0	<100	<20.0	<20.0	160	<8.00	22.3	3,210	42.2	<10.0	145	<8.00	<10.0	372	105	
6/7/2019	<20.0	<100	<20.0	<20.0	169	<8.00	26.5	3090	40.8	<10.0	115	<8.00	<10.0	315	145	
9/27/2019	<20.0	<100	<20.0	<20.0	156	<8.00	30.5	3240	53.9	<10.0	212	<8.00	<10.0	434	113	
12/4/2019	<20.0	<100	<20.0	<20.0	124	<8.00	17.5	2860	40.9	<10.0	162	<8.00	<10.0	398	11.8	
3/11/2020	<25.0	<125	<25.0	<25.0	157	<10.0	29.7	3230	60.4	<12.5	228	<10.0	<12.5	495	157	
6/16/2020	<25.0	<125	<25.0	<25.0	114	<10.0	21.8	2520	31.5	<12.5	116	<10.0	<12.5	264	152	
MGMS1-2(60)	6/28/2000	<10	<50	<5	<5	53.6	<5	<5	369	<5	<5	658	19.7	--	240	<5
	8/30/2000	<20	<100	<10	<10	21.7	<10	13.1	267	<10	<10	2,590	108	--	586	<10
	11/29/2000	<2	<10	<1	<1	1.58	<1	1.09	57.7	<1	<1	121	4.58	--	40.3	<1

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Well Number	Sample Date	Concentrations in µg/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)	2/27/2001	<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
	5/31/2001	<1	<5	<0.50	<0.50	0.662	<0.50	0.581	39	<0.50	<0.50	69.4	<1	--	27.8	0.52
	9/24/2001	<13	<13	<13	<13	<13	<13	<13	89	<13	<13	830	14	--	150	<13
	12/18/2001	<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
	3/19/2002	<1	<0.50	<0.50	<1	2.52	<0.50	0.99	68	<0.50	<0.50	62.9	1.2	--	34	3.48
	5/29/2002	<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
	8/29/2002	<10	<5	<5	<10	30.6	<5	5.1	661	<5	<5	138	<5	--	116	<5
	11/11/2002	<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
	1/23/2003	<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
	5/28/2003	<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
	11/11/2003	<1	<1	<1	<1	1.84	<1	<1	48.8	<1	<1	45.9	<1	--	36	<1
	1/27/2004	<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
	5/3/2004	<1	<1	<1	<1	4.07	<1	1.22	70.7	<1	<1	54.8	1.36	--	43.5	2.53
	8/17/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/2/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/15/2004	<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
	2/1/2005	<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
	5/16/2005	<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
	05/16/2005 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
	8/18/2005	<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
	11/17/2005	<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
	2/20/2006	<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
	6/6/2006	<1	<1	<1	<1	1.02	<1	<1	33.7	<1	<1	23.4	<1	--	18.7	<1
	9/5/2006	<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
	12/6/2006	<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
	2/7/2007	<1	<0.50	<0.50	<1	4.37	<0.50	1.37	116	0.93	<0.50	55.9	0.58	--	40.7	3
	5/22/2007	<1	<1	<1	<1	1.18	<1	<1	38.5	<1	<1	31.6	<1	--	25.2	<1
	9/11/2007	<5	<2.50	<2.50	<5	26.6	<2.50	8.75	711	7.2	<2.50	81.4	2.95	--	216	11.9
12/12/2007	<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	
3/4/2008	<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	
9/16/2008	<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	
12/8/2008	<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	
12/08/2008 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 µg/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)	3/25/2009	<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
	6/15/2009	<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
	9/15/2009	<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
	12/14/2009	<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
	3/17/2010	<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
	6/14/2010	<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
	9/21/2010	<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
	12/7/2010	<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
	3/8/2011	<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
	6/6/2011	<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
	9/13/2011	<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
	12/6/2011	<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
	3/8/2012	<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
	6/19/2012	<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
	9/12/2012	<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
	12/11/2012	<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
	3/12/2013	<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
	6/11/2013	<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
	9/17/2013	<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
	12/10/2013	<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	

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 µg/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)	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
	3/22/2018	<0.500	<2.50	<0.500	<0.500	1.30	<0.500	<0.500	13.4	<0.500	<0.500	23.3	<0.500	<0.500	13.9	<0.500
	7/1/2018	<0.500	<2.50	<0.500	<0.500	0.89	<0.500	<0.500	11.8	<0.500	<0.500	18.4	<0.500	<0.500	8.5	<0.500
	10/1/2018	<1.00	<5.00	<1.00	<1.00	6.66	<0.400	<0.400	23.9	<0.400	<0.500	29.4	<0.400	<0.500	16.6	20.00
	12/4/2018	<1.00	<5.00	<1.00	<1.00	0.67	<0.400	<0.400	9.6	<0.400	<0.500	14.4	<0.400	<0.500	8.2	<0.400
	3/26/2019	<1.00	<5.00	<1.00	<1.00	0.439	<0.400	<0.400	9.10	<0.400	<0.500	12.9	<0.400	<0.500	8.37	<0.400
	6/7/2019	<1.00	<5.00	<1.00	<1.00	0.651	<0.400	<0.400	11.4	<0.400	<0.500	15.5	<0.400	<0.500	9.57	<0.400
	9/27/2019	<1.00	<5.00	<1.00	<1.00	4.58	<0.400	0.44	27.9	<0.400	<0.500	33.2	<0.400	<0.500	19	7.9
	12/4/2019	<1.00	<5.00	<1.00	<1.00	0.465	<0.400	<0.400	8.86	<0.400	<0.500	16.8	<0.400	<0.500	9.35	<0.400
	3/12/2020	<1.00	<5.00	<1.00	<1.00	1.32	<0.400	<0.400	15.6	<0.400	<0.500	26.5	<0.400	<0.500	11.8	<0.400
	6/16/2020	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	4.23	<0.400	<0.500	12.4	<0.400	<0.500	6.01	<0.400
	MGMS1-1(110)	6/28/2000	<1	<5	<0.50	<0.50	<0.50	<0.50	<0.50	3.78	<0.50	<0.50	3.9	<1	--	3.35
8/30/2000		<5	<25	<2.5	<2.5	3.7	<2.5	3.32	55	<2.5	<2.5	510	24	--	130	<2.5
11/29/2000		<5	<25	<2.5	<2.5	4.21	<2.5	4.59	51	<2.5	<2.5	583	23.2	--	166	<2.5
2/27/2001		<5	<25	<2.5	<2.5	5.21	<2.5	3.39	47.5	<2.5	<2.5	385	16.5	--	105	<2.5
5/31/2001		<10	<50	<5	<5	<5	<5	<5	55.8	<5	<5	639	13.8	--	141	<5
9/24/2001		<1.3	<1.3	<1.3	<1.3	6.1	<1.3	2.9	57	<1.3	<1.3	580	20	--	120	<1.3
12/18/2001		<5	<25	<2.5	<2.5	5.04	<2.5	2.68	54.8	<2.5	<2.5	527	20.2	--	131	<2.5
3/19/2002		<5	<2.5	<2.5	<5	5.25	<2.5	<2.5	54	<2.5	<2.5	454	10.8	--	98	<2.5
5/29/2002		<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
8/29/2002		<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
11/11/2002		<2	<1	<1	<2	4.74	<1	1.2	46.1	<1	<1	208	7.84	--	66.1	<1
1/23/2003		<2	<1	<1	<2	4.44	<1	1.24	65.3	<1	<1	210	6.54	--	74.1	<1
5/28/2003		<2	<1	<1	<2	3.96	<1	<1	69.2	<1	<1	109	2.48	--	57.5	<1
11/11/2003		<2	<2	<2	<2	4.14	<2	<2	44.8	<2	<2	256	3.6	--	60.2	<2
1/27/2004		<2	<1	<1	<2	4.22	<1	1.1	67.1	<1	<1	167	4.16	--	69.7	<1
5/3/2004		<1	<1	<1	<1	3.66	<1	<1	47.2	<1	<1	190	2.18	--	55.9	<1
11/15/2004		<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
6/20/2005		<2	<1	<1	<2	9.22	<1	2.58	283	1.8	<1	23.6	1.62	--	70	1.24
11/17/2005	<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	
6/6/2006	<1	<1	<1	<1	2.15	<1	<1	44	<1	<1	94.4	1.36	--	66.8	<1	
12/6/2006	<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	

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Historical Groundwater Analytical Results  
NuStar Vancouver Facility  
Vancouver, Washington

Well Number	Sample Date	Concentrations in µg/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)	9/11/2007	<2	<1	<1	<2	3.78	<1	1.2	189	<1	<1	31.6	<1	--	61.1	<1
	3/4/2008	<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
	3/25/2009	<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
	6/15/2009	<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
	9/15/2009	<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
	3/17/2010	<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
	9/21/2010	<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
	3/10/2011	<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
	9/13/2011	<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
	3/8/2012	<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
	9/12/2012	<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
	3/12/2013	<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
	9/17/2013	<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
	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	<20	<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	
7/1/2018	<0.500	<2.50	<0.500	<0.500	3.3	<0.500	0.462 J	104	0.357 J	<0.500	18.5	0.132 J	<0.500	37	0.6	
10/1/2018	<1.00	<5.00	<1.00	<1.00	6.1	<0.400	0.7	153	0.5	<0.500	13.0	<0.400	<0.500	39	0.7	
6/7/2019	<1.00	<5.00	<1.00	<1.00	3.6	<0.400	<0.400	102	<0.400	<0.500	13.8	<0.400	<0.500	24	<0.400	
12/4/2019	<1.00	<5.00	<1.00	<1.00	4.6	<0.400	<0.400	134	<0.400	<0.500	14.0	<0.400	<0.500	32	<0.400	
6/16/2020	<1.00	<5.00	<1.00	<1.00	4.2	<0.400	0.5	141	<0.400	<0.500	17.6	<0.400	<0.500	33	<0.400	
MGMS2-4(40)	6/28/2000	<50	<250	<25	<25	44.9	<25	<25	1,210	<25	<25	5,030	215	--	3,090	<25
	8/30/2000	<10	<50	<5	<5	23.4	<5	31.3	644	7.28	<5	2,980	152	--	1,850	<5
	11/29/2000	<100	<500	<50	<50	51.3	<50	94	1,420	<50	<50	8,740	424	--	3,980	<50
	2/27/2001	<50	<250	<25	<25	35.6	<25	66.2	753	<25	<25	7,360	280	--	3,360	<25
	5/31/2001	<50	<250	<25	<25	<25	<25	<25	604	<25	<25	3,610	94.4	--	2,050	<25
	9/24/2001	<5	<5	<5	<5	28	<5	26	780	13	<5	2,600	170	--	1,700	<5
	12/18/2001	<50	<250	<25	<25	175	<25	77	1,350	<25	<25	5,590	374	--	3,220	<25

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 µg/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)	3/19/2002	<50	<25	<25	<50	36	<25	36	868	<25	<25	6,240	180	--	3,040	<25
	5/29/2002	<50	<25	<25	<50	76	<25	53	1,330	<25	<25	6,580	230	--	2,530	<25
	11/11/2002	<20	<10	<10	<20	19.8	<10	13.6	639	<10	<10	3,080	89.4	--	1,820	<10
	1/23/2003	<20	<10	<10	<20	13.4	<10	<10	353	<10	<10	2,290	52.6	--	1,480	<10
	5/28/2003	<10	<5	<5	<10	5.4	<5	<5	110	<5	<5	1,190	19.1	--	474	<5
	11/11/2003	<10	<10	<10	<10	<10	<10	<10	54.1	<10	<10	1,820	14	--	398	<10
	1/27/2004	<20	<10	<10	<20	45.2	<10	10	397	<10	<10	1,740	55.8	--	688	<10
	5/3/2004	<10	<10	<10	<10	<10	<10	<10	41.2	<10	<10	599	<10	--	200	<10
	8/17/2004	<10	<5	<5	<10	9.7	<5	6.1	158	<5	<5	1,530	30.7	--	705	<5
	11/15/2004	<25	<25	<25	<25	<25	<25	<25	310	<25	<25	2,900	<25	--	1,300	<25
	3/24/2005	<20	<10	<10	<20	10.8	<10	<10	159	<10	<10	1,900	25.8	--	834	<10
	5/16/2005	<20	<10	<10	<20	34.2	<10	28.2	489	<10	<10	2,540	52.2	--	1,150	<10
	11/16/2005	<50	<25	<25	<50	43.5	<25	<25	396	<25	<25	4,240	82.5	--	1,750	<25
	6/6/2006	<50	<50	<50	<50	62	<50	<50	917	<50	<50	4,820	55	--	1,770	<50
	12/5/2006	<50	<25	<25	<50	<25	<25	<25	370	<25	<25	3,090	31.5	--	1,200	<25
	5/21/2007	<20	<20	<20	<20	27.4	<20	<20	359	<20	<20	2,880	38.2	--	1,080	<20
	9/10/2007	<50	<25	<25	<50	<25	<25	<25	402	<25	<25	2,010	52.5	--	1,600	<25
	12/12/2007	<50	<25	<25	<50	26	<25	<25	330	<25	<25	2,080	35.5	--	914	<25
	03/04/2008 <sup>7</sup>	<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
	9/16/2008	<50	<25	<25	<25	<25	<25	<25	208	<25	<25	2,330	32	<25	1,130	<25
	12/8/2008	Not sampled. Air leak in sampling point prohibited the collection of the sample.														
	3/24/2009	<2	<2	<2	<2	8.4	<2	3.6	100	2	<2	990	14	<2	430	<2
	9/15/2009	<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
	12/14/2009	<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
	3/16/2010	<7	<7	<7	<7	16	<7	<7	140	<7	<7	1,800	19	<7	810	<7
	6/14/2010	<25	<25	<25	<25	72	<25	41	1,400	<25	<25	6,400	68	<25	1,500	43
9/21/2010	<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	
12/7/2010	<15	<15	<15	<15	69	<15	26	700	<15	<15	4,100	83	<15	1,600	<15	
3/7/2011	<15	<15	<15	<15	88	<15	30	930	<15	<15	3,700	91	<15	1,600	<15	
6/7/2011	<15	<15	<15	<15	65	<15	30	1,600	17	<15	4,400	57	<15	1,400	48	
9/12/2011	<15	<15	<15	<15	44	<15	28	7,400	20	<15	790	48	<15	380	58	
12/7/2011	<15	<15	<15	<15	35	<15	<15	5,300	<15	<15	61	<15	<15	39	460	

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Appendix B  
Historical Groundwater Analytical Results  
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Well Number	Sample Date	Concentrations in µg/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)	3/8/2012	<2	<2	<2	<2	38	<2	2.3	470	2.8	<2	9.9	5.2	<2	5.4	260
	6/19/2012	<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
	9/13/2012	<1.5	1.8	<1.5	<1.5	39	<1.5	2.8	310	3.2	<1.5	89	5	<1.5	80	440
	12/11/2012	<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
	3/12/2013	<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
	6/11/2013	<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
	9/17/2013	<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
	12/16/2013	<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
	3/22/2018	<0.500	<2.50	<0.500	<0.500	25.9	<0.500	4.2	109.0	0.57	<0.500	46.0	0.259 J	<0.500	27.3	122.0
	7/1/2018	<0.500	<2.50	<0.500	<0.500	12.7	<0.500	5.9	151.0	0.97	<0.500	62.1	1.04	<0.500	48.9	38.2
	9/28/2018	<2.00	<10.00	<2.00	<2.00	8.7	<0.800	1.4	140.0	<0.800	<1.00	66.9	<0.800	<1.00	43.3	106.0
	12/10/2018	<1.00	<5.00	<1.00	<1.00	20.9	<0.400	0.6	24.9	<0.400	<0.500	18.7	<0.400	<0.500	12.0	123.0
3/25/2019	<1.00	<5.00	<1.00	<1.00	26.6	<0.400	2.58	136	0.752	<0.500	62.0	0.581	<0.500	35.9	155	
6/4/2019	<1.00	<5.00	<1.00	<1.00	28.2	<0.400	0.960	37.8	<0.400	<0.500	14.6	<0.400	<0.500	10.4	145	
9/27/2019	<1.00	<5.00	<1.00	<1.00	11.2	<0.400	0.729	73.8	<0.400	<0.500	17	<0.400	<0.500	13.1	101	
12/4/2019	<1.00	<5.00	<1.00	<1.00	20.6	<0.400	0.778	40.5	<0.400	<0.500	32.3	<0.400	<0.500	17.9	65.4	
3/12/2020	<1.00	<5.00	<1.00	<1.00	24.1	<0.400	2.730	105	0.64	<0.500	86.3	0.45	<0.500	43.3	134	
6/16/2020	<1.00	<5.00	<1.00	<1.00	27.3	<0.400	1.250	85	<0.400	<0.500	14.8	<0.400	<0.500	9.09	138	

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Well Number	Sample Date	Concentrations in µg/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)	6/28/2000	<5	<25	<2.5	<2.5	35.6	<2.5	8.3	433	<2.5	<2.5	110	22.3	--	198	<2.5
	8/30/2000	<10	<50	<5	<5	36	<5	13	1,120	<5	<5	164	32	--	136	<5
	11/29/2000	<5	<25	<2.5	<2.5	5.08	<2.5	3.88	279	<2.5	<2.5	26.8	<5	--	38	<2.5
	2/27/2001	<2	<10	<1	<1	40.2	<1	2.65	46.6	<1	<1	20.7	12.4	--	27	173
	5/31/2001	<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
	9/24/2001	<2.5	<2.5	<2.5	<2.5	14	<2.5	11	180	3.6	<2.5	340	11	--	220	48
	12/18/2001	<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
	3/19/2002	<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
	5/29/2002	<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
	1/23/2003	<1	<0.50	<0.50	<1	10.1	<0.50	2.7	114	1.12	<0.50	111	6.06	--	96	22.8
	5/28/2003	<2	<1	<1	<2	15	<1	3.28	178	1.48	<1	131	9.3	--	126	15.6
	11/11/2003	<2	<2	<2	<2	21.3	<2	4.56	208	<2	<2	223	9.06	--	139	20.6
	1/27/2004	<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
	5/3/2004	<1	<1	<1	<1	4.79	<1	1.96	86.4	<1	<1	121	3.31	--	84	<1
	11/15/2004	<2.5	<2.5	<2.5	<2.5	<2.5	13	4.4	220	2.8	<2.5	170	6.4	--	140	11
	2/1/2005	<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
	5/16/2005	<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
	8/18/2005	<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
	11/16/2005	<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
	2/20/2006	<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
	6/6/2006	<1	<1	<1	<1	<1	<1	<1	55	<1	<1	76.3	1.01	--	36.2	<1
	9/5/2006	<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
	12/5/2006	<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
	2/7/2007	<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
	5/21/2007	<1	<1	<1	<1	2.45	<1	1.33	73.7	<1	<1	99.1	1.51	--	54.5	<1
	9/10/2007	<10	<5	<5	<10	31.2	<5	8.2	559	<5	<5	221	10.8	--	192	26.7
	12/12/2007	<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
	3/4/2008	<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
	9/16/2008	<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
	12/8/2008	<0.80	<0.80	<0.80	<0.80	11	<0.80	3	160	1.7	<0.80	110	3.2	<0.80	80	10
	3/24/2009	<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
	9/15/2009	<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
	12/14/2009	<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

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 µg/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)	3/16/2010	<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
	6/14/2010	<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
	9/21/2010	<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
	12/7/2010	<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
	3/7/2011	<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
	6/6/2011	<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
	9/12/2011	<0.50	<0.50	<0.50	<0.50	10	<0.50	3.2	110	1.4	<0.50	170	6	<0.50	100	2
	12/5/2011	<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
	3/8/2012	<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
	6/19/2012	<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
	9/12/2012	<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
	12/11/2012	<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
	3/12/2013	<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
	6/11/2013	<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
	9/17/2013	<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
	12/10/2013	<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	

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 µg/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)	3/22/2018	<0.500	<2.50	<0.500	<0.500	0.82	<0.500	0.244 J	17.3	0.164 J	<0.500	20.6	0.205 J	<0.500	11.6	1.2
	7/1/2018	<0.500	<2.50	<0.500	<0.500	0.73	<0.500	<0.500	14.1	<0.500	<0.500	19.6	0.20	<0.500	10.1	1.6
	12/10/2018	<0.500	<2.50	<0.500	<0.500	2.26	<0.500	0.43	41.7	0.43	<0.500	36.1	<0.400	<0.500	20.7	4.4
	3/25/2019	<1.00	<5.00	<1.00	<1.00	1.86	<0.400	<0.400	36.8	0.415	<0.500	40.1	<0.400	<0.500	23.3	0.773
	6/4/2019	<1.00	<5.00	<1.00	<1.00	0.580	<0.400	<0.400	18.00	<0.400	<0.500	32.3	<0.400	<0.500	15.7	0.420
	9/27/2019	<1.00	<5.00	<1.00	<1.00	1.590	<0.400	<0.400	35.20	0.47	<0.500	25	<0.400	<0.500	13.8	3.080
	12/4/2019	<1.00	<5.00	<1.00	<1.00	2.030	<0.400	0.427	54.50	0.42	<0.500	28.9	<0.400	<0.500	19.4	2.850
	3/12/2020	<1.00	<5.00	<1.00	<1.00	0.541	<0.400	<0.400	12.30	<0.400	<0.500	21.7	<0.400	<0.500	9.24	0.642
	6/16/2020	<1.00	<5.00	<1.00	<1.00	0.820	<0.400	<0.400	16.50	<0.400	<0.500	23.7	<0.400	<0.500	10.4	0.850
MGMS2-2(110)	6/28/2000	<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
	8/30/2000	<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
	11/29/2000	<1	<5	<0.50	<0.50	<0.50	<0.50	0.717	8.23	<0.50	<0.50	13	<1	--	19.3	<0.50
	2/27/2001	<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
	5/31/2001	<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
	9/24/2001	<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
	12/18/2001	<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
	3/19/2002	<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
	5/29/2002	<1	<0.50	<0.50	<1	<0.50	<0.50	1.21	31.9	<0.50	<0.50	114	2.39	--	51	0.61
	1/23/2003	<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
	5/28/2003	<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
	11/11/2003	<1	<1	<1	<1	1.14	<1	<1	76.7	1.07	<1	32.4	2.19	--	30.8	2.03
	1/27/2004	<1	<0.50	<0.50	<1	0.63	<0.50	<0.50	49	<0.50	<0.50	67.9	1.17	--	30	1
	5/3/2004	<1	<1	<1	<1	<1	<1	<1	14	<1	<1	28	<1	--	13.6	<1
	11/15/2004	<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
	5/16/2005	<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
	11/16/2005	<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
	6/6/2006	<1	<1	<1	<1	<1	<1	<1	30.9	<1	<1	13.9	<1	--	6.59	<1
	12/5/2006	<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
	9/10/2007	<5	<2.50	<2.50	<5	<2.50	<2.50	3.2	512	<2.50	<2.50	146	5.65	--	94.4	14.9
3/4/2008	<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	
9/16/2008	<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	
3/24/2009	<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	
6/15/2009	<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	
9/15/2009	<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	
3/15/2010	<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	
9/21/2010	<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	

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 µg/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)	3/7/2011	<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
	9/12/2011	<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
	3/8/2012	<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
	9/12/2012	<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
	3/12/2013	<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
	9/17/2013	<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
	7/1/2018	<0.500	<2.50	<0.500	<0.500	0.446 J	<0.500	<0.500	<0.500	6.7	<0.500	4.4	0.175 J	<0.500	3.4	3.87
	9/28/2018	<1.00	<5.00	<1.00	<1.00	0.4	<0.400	<0.400	11.3	<0.400	<0.500	5.0	<0.400	<0.500	4.3	4.63
	6/4/2019	<4.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	2.37	<0.400	<0.500	3.44	<0.400	<0.500	2.04	0.770
12/4/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	5.49	<0.400	<0.500	4.29	<0.400	<0.500	2.73	2.320	
6/16/2020	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	2.91	<0.400	<0.500	4.19	<0.400	<0.500	2.5	1.170	
MGMS2-1(132)	6/28/2000	<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
	8/30/2000	<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
	11/29/2000	<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
	2/27/2001	<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
	5/31/2001	<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
	9/24/2001	<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
	12/18/2001	<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
	3/19/2002	<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
	5/29/2002	<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
	1/23/2003	<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
	5/28/2003	<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
	11/11/2003	<1	<1	<1	<1	<1	<1	<1	46.3	<1	<1	28.8	1.56	--	29.7	1.49

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 µg/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)	1/27/2004	<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
	5/4/2004	<1	<1	<1	<1	<1	<1	<1	38.2	<1	<1	7.55	<1	--	5.22	<1
	11/15/2004	<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
	5/16/2005	<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
	11/16/2005	<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
	6/6/2006	<1	<1	<1	<1	<1	<1	<1	23.1	<1	<1	14.8	<1	--	6.71	<1
	12/5/2006	<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
	9/10/2007	<5	<2.50	<2.50	<5	4.55	<2.50	3	615	<2.50	<2.50	93.2	5.5	--	61	21.5
	3/4/2008	<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
	9/16/2008	<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
	3/24/2009	<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
	6/15/2009	<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
	9/15/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	26	<0.50	<0.50	18	<0.50		8	1.5
	3/15/2010	<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
	9/21/2010	<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
	3/7/2011	<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
	3/8/2012	<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
	9/12/2012	<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
	3/12/2013	<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
	9/17/2013	<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
	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
7/1/2018	<0.500	<2.50	<0.500	<0.500	0.5	<0.500	<0.500	13.8	<0.500	<0.500	4.5	0.191 J	<0.500	4.9	4.6	
9/28/2018	<1.00	<5.00	<1.00	<1.00	0.5	<0.400	<0.400	17.8	<0.400	<0.500	4.8	<0.400	<0.500	5.6	6.7	
6/4/2019	<4.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	5.43	<0.400	<0.500	2.76	<0.400	<0.500	2.13	2.07	
12/4/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	7.96	<0.400	<0.500	3.66	<0.400	<0.500	3.07	3.29	
6/16/2020	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	4.37	<0.400	<0.500	3.79	<0.400	<0.500	2.5	1.99	

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 µg/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)	8/30/2000	<10	<50	<5	<5	13.2	<5	5.01	858	14.1	<5	580	10.8	--	205	6.65
	11/29/2000	<20	<100	<10	<10	<10	<10	<10	820	10.6	<10	2,810	<20	--	395	<10
	2/27/2001	<50	<250	<25	<25	39.4	<25	29.2	4,570	<25	<25	2,970	<50	--	756	79.3
	5/31/2001	<50	<250	<25	<25	<25	<25	<25	2,920	38.5	<25	3,960	<50	--	716	<25
	9/24/2001	<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
	12/18/2001	<50	<250	<25	<25	<25	<25	<25	2,550	<25	<25	3,310	<50	--	631	31
	3/19/2002	<20	<10	<10	<20	34.6	<10	15.4	3,370	30.2	<10	3,560	23.8	--	707	57
	5/29/2002	<50	<25	<25	<50	71.5	<25	26	5,180	38.5	<25	2,470	33.5	--	728	86
	11/11/2002	<50	<25	<25	<50	<25	<25	<25	1,520	<25	<25	2,750	<25	--	309	<25
	1/23/2003	<20	<10	<10	<20	137	<10	38.4	3,530	32.6	<10	2,380	118	--	1,400	83.6
	5/28/2003	<50	<25	<25	<50	56	<25	28.5	1,720	<25	<25	3,560	<25	--	1,470	<25
	11/11/2003	<10	<10	<10	<10	<10	<10	<10	672	<10	<10	58.3	<10	--	32.4	<10
	1/27/2004	<20	<10	<10	<20	20	<10	<10	1,900	19.4	<10	1,350	10	--	246	20
	5/3/2004	<20	<20	<20	<20	50	<20	<20	1,420	<20	<20	2,700	34.2	--	913	24.8
	8/17/2004	<20	<10	<10	<20	71.6	<10	17	3,300	31	<10	1,360	29.2	--	569	45.2
	11/15/2004	<25	<25	<25	<25	<25	<25	<25	1,400	<25	<25	1,600	<25	--	290	<25
	3/24/2005	<20	<10	<10	<20	79.4	<10	30	3,440	34.2	<10	2,330	43.8	--	1,080	60.2
	03/24/2005 DUP	<20	<10	<10	<20	83.2	<10	29.2	3,450	34	<10	2,150	44	--	1,040	58.6
	5/16/2005	<10	<5	<5	<10	7	<5	<5	657	11.3	<5	1,130	8.1	--	224	<5
	11/16/2005	<10	<5	<5	<10	5.8	<5	<5	794	8.4	<5	1,180	7.6	--	210	<5
	3/14/2006	<50	<50	<50	<50	51	<50	<50	4,130	<50	<50	1,410	<50	--	484	<50
	6/6/2006	<20	<20	<20	<20	20.4	<20	<20	2,290	32.2	<20	1,410	<20	--	401	23.6
	12/5/2006	<20	<10	<10	<20	29.8	<10	<10	3,570	29	<10	1,020	<10	--	360	95.4
	5/22/2007	<20	<20	<20	<20	20.8	<20	<20	2,640	20.2	<20	952	<20	--	349	22.6
	9/10/2007	<50	<25	<25	<50	<25	<25	<25	2,340	<25	<25	499	<25	--	215	25.5
	12/12/2007	<50	<25	<25	<50	<25	<25	<25	723	<25	<25	536	<25	--	133	<25
	3/4/2008	<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
	9/16/2008	<50	<25	<25	<50	64.5	<25	<25	2,700	<25	<25	714	<25	<25	462	47
	12/8/2008	<9	<9	<9	<9	24	<9	<9	1,800	20	<9	350	<9	<9	160	90
	3/24/2009	<7	<7	<7	<7	36	<7	7.9	1,600	12	<7	600	11	<7	280	33
9/15/2009	<5	<5	<5	<5	15	<5	<5	1,500	13	<5	550	<5	<5	180	8.2	
09/15/2009 DUP	<5	<5	<5	<5	15	<5	<5	1,400	13	<5	540	<5	<5	170	9.8	

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Historical Groundwater Analytical Results  
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Well Number	Sample Date	Concentrations in µg/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)	12/14/2009	<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
	3/17/2010	<2.5	<2.5	<2.5	<2.5	52	<2.5	14	1,800	18	2.9	810	16	<2.5	490	41
	03/17/2010 DUP	<5	<5	<5	<5	51	<5	14	1,600	18	<5	780	16	<5	470	39
	6/14/2010	<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
	9/20/2010	<7	<7	<7	<7	32	<7	8.6	1,800	16	<7	530	7.9	<7	230	31
	09/20/2010 DUP	<6	<6	<6	<6	31	<6	7.4	1,700	15	<6	510	7.4	<6	220	29
	12/7/2010	<2	<2	<2	<2	5.3	<2	<2	460	3.9	<2	330	2.2	<2	95	3.2
	3/7/2011	<2	<2	<2	<2	20	<2	4.7	1,300	10	<2	330	4	<2	140	53
	03/07/2011 DUP	<4	<4	<4	<4	19	<4	4.9	1,200	10	<4	320	<4	<4	140	46
	6/6/2011	<3	<3	<3	<3	6.5	<3	4.1	780	7	<3	370	5.4	<3	150	8.5
	9/13/2011	<5	<5	<5	<5	45	<5	13	1,800	19	<5	560	15	<5	380	29
	09/13/2011 DUP	<7	<7	<7	<7	40	<7	12	1,700	16	<7	570	12	<7	330	23
	12/6/2011	<5	<5	<5	<5	14	<5	<5	1,000	9.3	<5	140	<5	<5	64	44
	3/8/2012	<5	<5	<5	<5	33	<5	13	1,400	14	<5	930	17	<5	450	28
	03/08/2012 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
	9/12/2012	<5	<5	<5	<5	23	<5	6.2	1,400	13	<5	220	<5	<5	120	85
	09/12/2012 DUP	<5	<5	<5	<5	23	<5	5.3	1,400	13	<5	230	<5	<5	120	86
	12/11/2012	<2	<2	<2	<2	7.1	<2	<2	510	6.5	<2	180	<2	<2	72	6.5
	3/12/2013	<2	<2	<2	<2	30	<2	8.4	1,400	12	<2	510	8.7	<2	260	35
	03/12/2013 DUP	<2	<2	<2	<2	29	<2	8.8	1,300	12	<2	470	8.4	<2	250	35
	6/11/2013	<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
	9/16/2013	<2	<2	<2	<2	7.7	<2	<2	360	4.6	<2	100	<2	<2	48	24
	09/16/2013 DUP	<2	<2	<2	<2	8.5	<2	<2	380	5.1	<2	100	<2	<2	49	25
	12/10/2013	<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
	12/10/2013 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	
6/26/2014 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	

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Historical Groundwater Analytical Results  
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Well Number	Sample Date	Concentrations in µg/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
	3/22/2018	<0.500	<2.50	<0.500	<0.500	8.6	<0.500	<0.500	9.8	0.179 J	0.63	1.45	<0.500	<0.500	0.53	39.80
	7/1/2018	<0.500	<2.50	<0.500	<0.500	1.4	<0.500	<0.500	7.6	<0.500	0.279 J	0.498 J	<0.500	<0.500	0.169 J	8.98
	7/1/2018 DUP	<0.500	<2.50	<0.500	<0.500	2.0	<0.500	<0.500	9.4	<0.500	0.318 J	0.63	<0.500	<0.500	0.163 J	17.30
	9/28/2018	<1.00	<5.00	<1.00	<1.00	6.7	<0.400	<0.400	116.0	<0.400	<0.500	0.97	<0.400	<0.500	<0.400	129.0
	9/28/2018 DUP	<1.00	<5.00	<1.00	<1.00	9.1	<0.400	0.56	143.0	<0.400	<0.500	0.69	<0.400	<0.500	<0.400	129.0
	12/10/2018	<1.00	<5.00	<1.00	<1.00	1.5	<0.400	<0.400	1.8	<0.400	<0.500	0.60	<0.400	<0.500	<0.400	5.44
	3/26/2019	<2.00	<5.00	<1.00	<1.00	8.36	<0.400	0.709	117	<0.400	<0.500	0.680	<0.400	<0.500	<0.400	151
	6/3/2019	<2	<5	<0.5	<0.5	7.22	<0.400	0.440	74.7	<0.400	0.520	0.530	<0.400	<0.500	<0.400	157
	6/3/2019 DUP	<2	<5	<0.5	<0.5	7.40	<0.400	0.420	75.6	<0.400	0.610	0.560	<0.400	<0.500	<0.400	144
	9/27/2019	<1.00	<5.00	<1.00	<1.00	5.09	<0.400	<0.400	80.5	<0.400	<0.500	0.497	<0.400	<0.500	<0.400	106
	9/27/2019 DUP	<1.00	<5.00	<1.00	<1.00	5.09	<0.400	0.413	80.4	<0.400	<0.500	0.578	<0.400	<0.500	<0.400	104
	12/4/2019	<1.00	<5.00	<1.00	<1.00	1.63	<0.400	<0.400	2.57	<0.400	<0.500	1.350	<0.400	<0.500	0.45	4.5
12/4/2019 DUP	<1.00	<5.00	<1.00	<1.00	1.67	<0.400	<0.400	2.66	<0.400	<0.500	1.130	<0.400	<0.500	<0.400	5.79	
3/12/2020	<1.00	<5.00	<1.00	<1.00	12.80	<0.400	2.430	418	0.64	<0.500	0.529	<0.400	<0.500	0.44	330	
6/16/2020	<1.00	<5.00	<1.00	<1.00	3.54	<0.400	<0.400	135	<0.400	0.670	0.660	<0.400	<0.500	<0.400	129	
6/16/2020 DUP	<1.00	<5.00	<1.00	<1.00	3.71	<0.400	<0.400	138	<0.400	0.700	0.600	<0.400	<0.500	<0.400	134	

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 µg/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)	8/30/2000	<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
	11/29/2000	<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
	2/27/2001	<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
	5/31/2001	<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
	9/24/2001	<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
	12/18/2001	<1	<5	<0.50	<0.50	<0.50	<0.50	<0.50	3.26	<0.50	<0.50	17	<1	--	3.84	<0.50
	3/19/2002	<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
	5/29/2002	<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
	1/23/2003	<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
	5/28/2003	<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
	11/11/2003	<2	<2	<2	<2	<2	<2	<2	298	<2	<2	36.1	<2	--	23	<2
	1/27/2004	<2	<1	<1	<2	1.2	<1	<1	274	1.24	<1	25.2	<1	--	23.4	1.28
	5/3/2004	<2	<2	<2	<2	<2	<2	<2	274	<2	<2	46.6	<2	--	27	<2
	11/15/2004	<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
	2/1/2005	<2	<1	<1	<2	<1	<1	<1	179	1.72	<1	15.6	<1	--	7.9	<1
	5/16/2005	<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
	8/18/2005	<1	<0.500	<0.500	<1	<0.500	<0.500	<0.500	47.9	<0.500	<0.500	4.39	<0.500	--	1.96	0.66
	11/16/2005	<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
	2/21/2006	<5	<2.50	<2.50	<5	2.65	<2.50	<2.50	558	<2.50	<2.50	25	<2.50	--	14.4	21.6
	3/14/2006	<1	<1	<1	<1	2.92	<1	1.37	97.1	<1	<1	50.6	<1	--	39.2	<1
	6/6/2006	<1	<1	<1	<1	<1	<1	<1	7.97	<1	<1	2.84	<1	--	1.04	<1
	9/5/2006	<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
	12/5/2006	<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
	2/7/2007	<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
	5/22/2007	<1	<1	<1	<1	<1	<1	<1	32.5	<1	<1	45.2	<1	--	18.2	<1
	9/10/2007	<2	<1	<1	<2	2.98	<1	<1	148	<1	<1	28.8	<1	--	31.6	1.67
	12/12/2007	<2	<1	<1	<2	<1	<1	<1	11.5	<1	<1	4.22	<1	--	1.9	1.18
	3/4/2008	<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
	12/8/2008	<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
	3/24/2009	<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
	9/15/2009	<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
	12/14/2009	<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

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 µg/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)	3/17/2010	<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
	6/14/2010	<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
	9/20/2010	<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
	12/7/2010	<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
	3/7/2011	<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
	6/6/2011	<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
	9/13/2011	<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
	12/5/2011	<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
	3/8/2012	<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
	6/21/2012	<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
	9/12/2012	<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
	12/11/2012	<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
	3/12/2013	<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
	6/11/2013	<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
	9/16/2013	<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
	12/10/2013	<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
	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	

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 µg/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)	3/22/2018	<0.500	<2.50	<0.500	<0.500	0.76	<0.500	<0.500	15.6	<0.500	<0.500	2.2	<0.500	<0.500	1.76	5.89
	7/2/2018	<0.500	<2.50 J3	<0.500	<0.500	0.67	<0.500	<0.500	12.7	<0.500	<0.500	2.7	<0.500	<0.500	1.92	3.36
	9/28/2018	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	9.3	<0.400	<0.500	3.3	<0.400	<0.500	2.31	<0.400
	12/10/2018	<1.00	<5.00	<1.00	<1.00	1.21	<0.400	<0.400	17.7	<0.400	<0.500	0.9	<0.400	<0.500	1.16	0.86
	3/26/2019	<2.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	1.23	<0.400	<0.500	1.04	<0.400	<0.500	0.420	<0.400
	6/3/2019	<4.00	<5.00	<1.00	<1.00	0.420	<0.400	<0.400	8.52	<0.400	<0.500	0.790	<0.400	<0.500	0.730	<0.400
	9/27/2019	<1.00	<5.00	<1.00	<1.00	1.130	<0.4	<0.4	21.8	<0.400	<0.500	1.030	<0.400	<0.500	1.230	3.980
	12/4/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	3.62	<0.400	<0.500	1.170	<0.400	<0.500	0.634	<0.400
	3/12/2020	<1.00	<5.00	<1.00	<1.00	0.761	<0.400	<0.400	14.7	<0.400	<0.500	1.660	<0.400	<0.500	1.720	0.659
	6/16/2020	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	3.92	<0.400	<0.500	1.170	<0.400	<0.500	0.510	<0.400
MGMS3-2(101)	8/30/2000	<10	<50	<5	<5	7.28	<5	<5	120	<5	<5	154	12.1	--	98.2	<5
	11/29/2000	<5	<25	<2.5	<2.5	<2.5	<2.5	<2.5	11.4	<2.5	<2.5	11.5	<5	--	13	<2.5
	2/27/2001	<2	<10	<1	<1	<1	<1	<1	2.4	<1	<1	3.36	<2	--	1.98	<1
	5/31/2001	<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
	9/24/2001	<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
	12/18/2001	<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
	3/19/2002	<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
	5/29/2002	<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
	1/23/2003	<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
	5/28/2003	<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
	11/11/2003	<1	<1	<1	<1	<1	<1	<1	53.7	<1	<1	18.3	<1	--	9.3	<1
	1/27/2004	<1	<0.50	<0.50	<1	0.53	<0.50	<0.50	114	0.8	<0.50	24	<0.50	--	15.1	<0.50
	5/3/2004	<1	<1	<1	<1	<1	<1	<1	22.1	<1	<1	6.74	<1	--	4.21	<1
	11/15/2004	<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
	5/16/2005	<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
	11/16/2005	<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
	3/14/2006	<1	<1	<1	<1	<1	<1	<1	23.1	<1	<1	2.91	<1	--	1.14	1.06
	6/6/2006	<1	<1	<1	<1	<1	<1	<1	15.9	<1	<1	3.56	<1	--	1.88	1.06
	12/5/2006	<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
	9/10/2007	<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
3/4/2008	<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	
9/16/2008	<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	
3/24/2009	<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	
6/15/2009	<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	
9/15/2009	<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	

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 µg/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)	3/17/2010	<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
	9/20/2010	<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
	3/7/2011	<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
	3/8/2012	<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
	9/12/2012	<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
	3/12/2013	<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
	9/16/2013	<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
	7/1/2018	<0.500	<2.50	<0.500	<0.500	<0.500	<0.500	<0.500	2	<0.500	<0.500	1.82	<0.500	<0.500	1	0.359 J
	9/28/2018	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	2	<0.400	<0.500	1.98	<0.400	<0.500	1	<0.400
	6/3/2019	<4.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	0.930	<0.400	<0.500	1.89	<0.400	<0.500	1.11	<0.400
12/4/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	0.852	<0.400	<0.500	1.84	<0.400	<0.500	0.958	<0.400	
6/16/2020	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	1.000	<0.400	<0.500	3.01	<0.400	<0.500	1.33	<0.400	
MGMS3-1(132)	8/30/2000	<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
	11/29/2000	<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
	2/27/2001	<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
	5/31/2001	<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
	9/24/2001	<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
	12/18/2001	<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
	3/19/2002	<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
	5/29/2002	<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
	1/23/2003	<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
	5/28/2003	<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
	11/11/2003	<1	<1	<1	<1	<1	<1	<1	72.4	<1	<1	12.2	<1	--	8	<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 µg/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)	1/27/2004	<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
	5/3/2004	<1	<1	<1	<1	<1	<1	<1	11.9	<1	<1	<1	<1	--	14.2	<1
	11/15/2004	<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
	5/16/2005	<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
	11/16/2005	<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
	3/14/2006	<1	<1	<1	<1	<1	<1	<1	20.3	<1	<1	2.13	<1	--	<1	<1
	6/6/2006	<1	<1	<1	<1	<1	<1	<1	18.6	<1	<1	1.57	<1	--	<1	1.36
	12/5/2006	<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
	9/10/2007	<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
	3/4/2008	<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
	9/16/2008	<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
	3/24/2009	<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
	03/24/2009 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
	6/15/2009	<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
	9/15/2009	<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
	3/17/2010	<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
	9/20/2010	<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
	3/7/2011	<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
	9/13/2011	<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
	3/8/2012	<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
	9/12/2012	<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
	3/12/2013	<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
	9/16/2013	<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	

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 µg/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)	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
	7/1/2018	<0.500	<2.50	<0.500	<0.500	0.247 J	<0.500	<0.500	4.0	<0.500	<0.500	5.6	<0.500	<0.500	4.1	0.359 J
	9/28/2018	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	3.5	<0.400	<0.500	3.8	<0.400	<0.500	3.2	<0.400
	6/5/2019	<4.00	<5.00	<1.00	<1.00	0.412	<0.400	<0.400	5.97	<0.400	<0.500	9.45	<0.400	<0.500	6.79	<0.400
	12/4/2019	<1.00	<5.00	<1.00	<1.00	<0.400	<0.400	<0.400	5.34	<0.400	<0.500	8.69	<0.400	<0.500	6.21	<0.400
	6/16/2020	<1.00	<5.00	<1.00	<1.00	0.43	<0.400	<0.400	4.61	<0.400	<0.500	9.87	<0.400	<0.500	6.01	<0.400
CMT1-1	11/11/2003	<1	<1	2.87	<1	<1	<1	<1	<1	<1	<1	<1	<1	--	<1	<1
	1/26/2004	<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
	5/3/2004	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	--	<1	<1
	8/19/2004	<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
	11/17/2004	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	--	<5	<5
	3/23/2005	<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
	5/17/2005	<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
	11/17/2005	<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
5/26/2006	Well Abandoned															
CMT1-2	11/11/2003	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	--	<1	<1
	1/26/2004	<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
	5/3/2004	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	--	<1	<1
	8/19/2004	<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
	11/17/2004	<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
	2/1/2005	<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
	5/16/2005	<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
	11/17/2005	<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
5/26/2006	Well Abandoned															
CMT1-3	11/11/2003	<2	<2	3.56	<2	<2	<2	<2	<2	<2	<2	<2	<2	--	<2	<2
	1/26/2004	<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
	5/3/2004	<1	<1	2.97	<1	<1	<1	<1	<1	<1	<1	<1	<1	--	<1	<1
	8/19/2004	<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
	11/17/2004	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	--	<25	<25
	5/16/2005	<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
	11/17/2005	<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
	5/26/2006	Well Abandoned														

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 µg/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	3/23/2009	<5	<5	<5	<5	<5	<5	<5	50	<5	<5	1,400	43	<5	420	<5
	6/18/2009	<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
	9/18/2009	<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
	12/18/2009	<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
	3/16/2010	<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
	6/17/2010	<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
	9/23/2010	<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
	12/21/2010	<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
	3/31/2011	<4	<4	<4	<4	8.2	<4	8.1	240	<4	<4	6,800	110	<4	910	5.1
	6/7/2011	<4	<4	<4	<4	<4	<4	<4	140	<4	<4	1,400	15	<4	170	<4
	9/19/2011	<5	<5	<5	<5	7.9	<5	11	290	<5	<5	4,100	73	<5	460	14
	12/7/2011	<5	<5	<5	<5	16	<5	19	12,000	9.3	<5	<50	17	<5	<50	140
	3/9/2012	<4	<4	<4	<4	5	<4	<4	1,400	8.6	<4	33	<4	<4	10	290
	6/22/2012	<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
	9/14/2012	<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
	12/14/2012	<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
	3/15/2013	<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
	6/14/2013	<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
	9/20/2013	<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
	12/16/2013	<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	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

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 µg/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)	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
	3/21/2018	<0.500	1.45 J	<0.500	<0.500	1.3	<0.500	<0.500	22.6	<0.500	<0.500	1.5	<0.500	<0.500	2.7	10.8
	6/28/2018	<0.500	42.9	<0.500	<0.500	4.6	<0.500	1.11	722.0	8.72	<0.500	1.9	<0.500	<0.500	0.8	424.0
	9/24/2018	<1.00	<5.00	<1.00	<1.00	1.4	<0.400	<0.400	3.4	0.75	<0.500	3.1	<0.400	<0.500	2.4	7.6
	12/4/2018	<1.00	<5.00	<1.00	<1.00	0.9	<0.400	<0.400	8.2	<0.400	<0.500	6.4	<0.400	<0.500	3.6	1.9
	MP-1	3/23/2009	<4	<4	<4	<4	6	<4	<4	89	<4	<4	1,200	10	<4	180
6/18/2009		<4	<4	<4	<4	4.3	<4	<4	43	<4	<4	1,500	12	<4	180	<4
9/18/2009		<4	<4	<4	<4	14	<4	<4	240	8.9	<4	1,100	8.2	<4	310	7.3
12/18/2009		<4	<4	<4	<4	<4	<4	<4	58	<4	<4	1,000	7.1	<4	180	<4
3/16/2010		<3	<3	<3	<3	22	<3	4.7	410	13	<3	1,500	8.6	<3	400	10
6/17/2010		<3	<3	<3	<3	3.2	<3	<3	120	<3	<3	800	5.4	<3	140	<3
9/23/2010		<3	<3	<3	<3	<3	<3	<3	41	<3	<3	730	4	<3	120	<3
12/10/2010		<3	<3	<3	<3	<3	<3	<3	27	<3	<3	1,000	4.5	<3	150	<3
3/14/2011		<3	<3	<3	<3	7.1	<3	<3	150	<3	<3	1,200	6.4	<3	180	5.9
6/7/2011		<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
9/19/2011		<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
12/7/2011		<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
3/9/2012		<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
6/22/2012		<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
9/14/2012		<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
12/14/2012		<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
3/15/2013		<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
6/14/2013		<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
9/20/2013		<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
12/16/2013		<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	

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 µg/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	3/20/2015	<1	<1	<1	<1	3.6	<1	1.5	188	1.5	<1	565	1	<1	95.6	24.8
(continued)	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
	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
	3/21/2018	<0.500	<2.50	<0.500	<0.500	3.2	<0.500	4.04	151	1.0	<0.500	245.0	<0.500	<0.500	64.5	1.6
	6/28/2018	<0.500	<2.50	<0.500	<0.500	10.2	<0.500	9.34	353	1.7	<0.500	747.0	0.56	<0.500	140.0	5.3
	9/26/2018	<20.0	<100	<20.0	<20.0	<8.00	<8.00	<8.00	60	<8.00	<10.0	322.0	<8.00	<10.0	57.0	<8.00
	12/4/2018	<1.00	<5.00	<1.00	<1.00	<0.400	2.79	6.59	130	0.8	<0.500	355.0	<0.400	<0.500	76.7	1.2
	3/20/2019	<2.00	<5.00	<1.00	<1.00	1.43	<0.400	3.08	69.0	<0.400	<0.500	146	<0.400	<0.500	36.6	1.55
	6/7/2019	<10	<100	<10	<10	<8.00	<8.00	<8.00	205	<8.00	<10.0	769	<8.00	<10.0	111	<8.00
	9/26/2019	<2.00	<5.00	<2.00	<2.00	1.36	<0.800	1.14	37.1	<0.800	<1.00	176	<0.800	<1.00	26.8	<0.800
	12/3/2019	<2.00	<10.0	<2.00	<2.00	1.57	<0.800	1.8	40.6	<0.800	<1.00	306	<0.800	<1.00	57.8	<0.800
	3/11/2020	<2.00	<10.0	<2.00	<2.00	3.94	<0.800	5.63	177	1.14	<1.00	1370	1.77	<1.00	190	<0.800
	6/17/2020	<10.0	<50.0	<10.0	<10.0	<4.00	<4.00	<4.00	72	<4.00	<5.00	427	<4.00	<5.00	61.2	<4.00
MP-3	6/28/2018	<0.500	<2.50	<0.500	<0.500	5.24	<0.500	1.78	203	1.31	<0.500	398	1.82	<0.500	65.1	8.96
	9/27/2018	<1.00	<5.00	<1.00	<1.00	4.06	<0.400	3.52	187	1.60	<0.500	721	0.950	<0.500	148	0.730

- 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 field blank/equipment blanks (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.
  10. E = Chloroform was detected in the equipment blank during the March 2010 and September 2010 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)



## 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 March and June 2020 groundwater sampling events, and air samples collected during the January 2020 soil vapor extraction (SVE) effluent sampling events. The samples were collected at the NuStar Terminals Services, Inc. (NuStar) Vancouver Facility (Facility) in Vancouver, Washington, and submitted to Eurofins Air Toxics in Folsom, California, and Apex Labs in Tigard, Oregon. A list of the laboratory reports is presented below. A copy of each analytical laboratory report is included in this appendix.

Report	Report Date	Sampling Event
J56029	January 6, 2020	Soil Vapor Monitoring
A0C0454	March 26, 2020	First Quarter Groundwater Monitoring
A0C0387	March 31, 2020	First Quarter Groundwater Monitoring
A0C0428	March 31, 2020	First Quarter Groundwater Monitoring
A0C0333	March 31, 2020	First Quarter Groundwater Monitoring
A0F0455	June 30, 2020	Second Quarter Groundwater Monitoring
A0F0495	July 2, 2020	Second Quarter Groundwater Monitoring
A0F0534	July 9, 2020	Second Quarter Groundwater Monitoring

## 2.0 DATA VALIDATION

The QA review outlines the applicable QC 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;
- 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; and
- 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 for water samples consisted of volatile organic compounds (VOCs) by U.S. Environmental Protection Agency (EPA) Method 8260C. 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 4500-NH<sub>3</sub> G 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 with the exception of 1 of 3 bottles from sample MW-17 in report A0C0333, 1 of 3 bottles from sample MW-16 in report A0C0387, 3 of 5 bottles from sample MW-19 in report A0F0534, and 1 of 3 bottles from sample MW-19 Dup in report A0F0534.

**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.** Samples were analyzed within the recommended method holding time, except for analysis of nitrate in samples MP-1, MW-7, MW-7 Dup, MW-8, MW-9, MW-10, MW-17, and MW-26, and nitrite in samples MW-10 and MW-26.

**Calibration and Analysis.** Calibration verification was outside of acceptable limits for select VOCs in each sample batch. As the corresponding sample results are all below method reporting limits and are not considered chemicals of concern for this project, no data were flagged. All other calibrations were within the control limits for analytes presented in Table 3.

**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 water analyses

**Laboratory Control Samples and Laboratory Control Sample Duplicate.** Laboratory Control Samples (LCS) and Laboratory Control Sample Duplicates (LCSD) were analyzed to assess the accuracy of the analytical equipment and methods. 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. The LCS and LCSD recovery for each QC batch were within acceptable recovery limits, with the following exceptions:

- Report A0C0333. The LCS recovery of bromoform, bromomethane, chloroethane, dibromochloromethane, dichlorodifluoromethane, 1,1,1,2-tetrachloroethane, and trichlorofluoromethane were above acceptable limits. No associated sample data were detected; therefore, no sample data were flagged.
- Report A0C0387. The LCS recovery of bromoform, bromomethane, carbon tetrachloride, chloroethane, dichlorodifluoromethane, 2,2-dichloropropane, 1,1,1,2-tetrachloroethane, and trichlorofluoromethane were above acceptable limits. No associated sample data were detected; therefore, no sample data were flagged.
- Report A0C0428. The LCS recovery of bromochloromethane, bromoform, bromomethane, chloroethane, chloromethane, dibromochloromethane, 1,1,1,2-tetrachloroethane, and trichlorofluoromethane were above acceptable limits. No associated sample data were detected; therefore, no sample data were flagged.
- Report A0F0455. The LCS recovery of 2,2-dichloropropane was above acceptable limits. No associated sample data were detected; therefore, no sample data were flagged.

- Report A0F0495. The LCS recovery of carbon tetrachloride, 2,2-dichloropropane, and hexachlorobutadiene were above acceptable limits. No associated sample data were detected; therefore, no sample data were flagged.
- Report A0F0534. The LCS recovery of 2,2-dichloropropane was above acceptable limits. No associated sample data were detected; therefore, no sample data were flagged.

The LCS is then compared to the LCSD of the same batch and expressed as a relative percent difference (RPD) value. The percent recovery and RPD values are then compared to control limits to assess data quality. The RPD between the LCS and LCSD were within an acceptable range.

**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. An MS sample uses an environmental sample that is spiked with known concentrations of analytes of interest. The MS is then prepared and analyzed with the same analytical procedures as environmental samples in the analytical batch. The resulting concentration of the MS is then compared to the known—or true—values plus the non-spiked environmental sample concentration. This comparison is expressed as a percent recovery. The MSD is then compared to the MS 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.

The recovery from the following MS and MSD samples were outside of control limits:

- Report A0C0454. The MS recovery percentage (using sample MW-32s) was slightly outside acceptable limits for carbon tetrachloride.
- Report A0C0387. The MS and MSD recovery percentage (using sample MW-19 Dup) was outside acceptable limits for bromoform, bromomethane, carbon tetrachloride, chloroethane, dichlorodifluoromethane, 1,1,1,2-tetrachloroethane, and trichlorofluoromethane. The MS and MSD recovery percentage (using sample MW-19 Dup) was outside of acceptable limits for tetrachloroethene due to high concentration of the analyte in the sample.
- Report A0C0428. The MSD recovery percentage (using sample MGMS1-60) of ammonia was outside acceptable recovery limits. The associated MS recovery of ammonia was within an acceptable range.
- Report A0F0455. The MS recovery percentage (using sample MGMS2-110) of carbon tetrachloride and 2,2-dichloropropane was outside acceptable recovery limits.
- Report A0F0495. The MS recovery percentage (using sample MW-1) of carbon tetrachloride, 2,2-dichloropropane, hexachlorobutadiene, and 1,1,1,2-tetrachloroethane was outside acceptable recovery limits.

The RPD between the corresponding MS and MSD samples was within an acceptable range, indicating that the precision of the analysis process was acceptable.

No MS or MSD samples were analyzed as part of the air sample QC batch.

**Surrogate Recovery.** Surrogates are organic compounds that are similar in chemical composition to the COI and spiked into environmental and batch QC 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.

**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 concentration is compared to the primary sample concentration to assess the precision of the analytical method. This comparison can be expressed by the RPD between the original and duplicate samples. The laboratory duplicate sample RPD values were within recommended control limits.

**Field Duplicate.** A field duplicate is a second field sample collected from a selected monitoring point. 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 primary sample to assess the precision of the analytical method. This comparison can be expressed by the RPD between the primary and duplicate samples. The field duplicate sample RPD values were within recommended limits.

**Trip Blank.** A trip blank is a sample of analyte-free water that is transported 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 with appropriate lab qualifiers.

1/28/2020

Ms. Lindsay Wallis  
Cascadia Associates, LLC  
5820 SW Kelly Ave  
Unit B  
Portland OR 97239

Project Name: Nustar VANCOUVER

Project #:

Workorder #: 2001261

Dear Ms. Lindsay Wallis

The following report includes the data for the above referenced project for sample(s) received on 1/14/2020 at Air Toxics Ltd.

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

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

Regards,



Kelly Buettner  
Project Manager

**WORK ORDER #: 2001261**

Work Order Summary

<b>CLIENT:</b>	Ms. Lindsay Wallis Cascadia Associates, LLC 5820 SW Kelly Ave Unit B Portland, OR 97239	<b>BILL TO:</b>	Ms. Lindsay Wallis Cascadia Associates, LLC 5820 SW Kelly Ave Unit B Portland, OR 97239
<b>PHONE:</b>	(503)906-6577	<b>P.O. #</b>	0060-002-004
<b>FAX:</b>	(503)906-6567	<b>PROJECT #</b>	Nustar VANCOUVER
<b>DATE RECEIVED:</b>	01/14/2020	<b>CONTACT:</b>	Kelly Buettner
<b>DATE COMPLETED:</b>	01/28/2020		

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
01A	SVE-South-PostCarbon-011020	TO-15	1.4 "Hg	5.4 psi
02A	SVE-South-PreCarbon-011020	TO-15	2.6 "Hg	5 psi
03A	Lab Blank	TO-15	NA	NA
04A	CCV	TO-15	NA	NA
05A	LCS	TO-15	NA	NA
05AA	LCSD	TO-15	NA	NA

CERTIFIED BY:   
 \_\_\_\_\_  
 Technical Director

DATE: 01/28/20

Certification numbers: AZ Licensure AZ0775, FL NELAP – E87680, LA NELAP – 02089, NH NELAP - 209218, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-18-13, UT NELAP – CA009332019-11, VA NELAP - 460197, WA NELAP - C935

Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)

Accreditation number: CA300005-011, Effective date: 10/18/2019, Expiration date: 10/17/2020.

Eurofins Air Toxics, LLC certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins Air Toxics, LLC.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630

(916) 985-1000 . (800) 985-5955 . FAX (916) 351-8279

**LABORATORY NARRATIVE**  
**EPA Method TO-15**  
**Cascadia Associates, LLC**  
**Workorder# 2001261**

Two 6 Liter Summa Canister samples were received on January 14, 2020. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

**Receiving Notes**

There were no receiving discrepancies.

**Analytical Notes**

Dilution was performed on sample SVE-South-PreCarbon-011020 due to the presence of high level target species.

**Definition of Data Qualifying Flags**

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

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

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

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

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

N - The identification is based on presumptive evidence.

M - Reported value may be biased due to apparent matrix interferences.

CN - See Case Narrative.

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

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue



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

**Client Sample ID: SVE-South-PostCarbon-011020**

**Lab ID#: 2001261-01A**

<b>Compound</b>	<b>Rpt. Limit (ppbv)</b>	<b>Amount (ppbv)</b>	<b>Rpt. Limit (ug/m3)</b>	<b>Amount (ug/m3)</b>
cis-1,2-Dichloroethene	0.57	34	2.3	130
1,1,1-Trichloroethane	0.43	0.94	2.3	5.1

**Client Sample ID: SVE-South-PreCarbon-011020**

**Lab ID#: 2001261-02A**

<b>Compound</b>	<b>Rpt. Limit (ppbv)</b>	<b>Amount (ppbv)</b>	<b>Rpt. Limit (ug/m3)</b>	<b>Amount (ug/m3)</b>
cis-1,2-Dichloroethene	3.9	27	16	110
1,1,1-Trichloroethane	2.9	6.0	16	33
Trichloroethene	3.9	78	21	420
Tetrachloroethene	3.9	1400	26	9200



Air Toxics

Client Sample ID: SVE-South-PostCarbon-011020

Lab ID#: 2001261-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3012416	Date of Collection:	1/10/20 9:10:00 AM
Dil. Factor:	1.43	Date of Analysis:	1/24/20 05:27 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.57	Not Detected	2.8	Not Detected
Freon 114	0.57	Not Detected	4.0	Not Detected
Chloromethane	7.2	Not Detected	15	Not Detected
Vinyl Chloride	0.57	Not Detected	1.5	Not Detected
Bromomethane	1.1	Not Detected	4.4	Not Detected
Chloroethane	1.1	Not Detected	3.0	Not Detected
Freon 11	0.57	Not Detected	3.2	Not Detected
Freon 113	0.57	Not Detected	4.4	Not Detected
1,1-Dichloroethene	1.1	Not Detected	4.5	Not Detected
Acetone	7.2	Not Detected	17	Not Detected
Carbon Disulfide	2.9	Not Detected	8.9	Not Detected
Methylene Chloride	0.57	Not Detected	2.0	Not Detected
trans-1,2-Dichloroethene	0.57	Not Detected	2.3	Not Detected
1,1-Dichloroethane	0.43	Not Detected	1.7	Not Detected
2-Butanone (Methyl Ethyl Ketone)	1.1	Not Detected	3.4	Not Detected
cis-1,2-Dichloroethene	0.57	34	2.3	130
Chloroform	0.43	Not Detected	2.1	Not Detected
1,1,1-Trichloroethane	0.43	0.94	2.3	5.1
Carbon Tetrachloride	1.1	Not Detected	7.2	Not Detected
Benzene	0.57	Not Detected	1.8	Not Detected
1,2-Dichloroethane	0.57	Not Detected	2.3	Not Detected
Trichloroethene	0.57	Not Detected	3.1	Not Detected
1,2-Dichloropropane	0.57	Not Detected	2.6	Not Detected
Bromodichloromethane	0.43	Not Detected	2.9	Not Detected
cis-1,3-Dichloropropene	0.57	Not Detected	2.6	Not Detected
4-Methyl-2-pentanone	0.57	Not Detected	2.3	Not Detected
Toluene	0.57	Not Detected	2.2	Not Detected
trans-1,3-Dichloropropene	0.57	Not Detected	2.6	Not Detected
1,1,2-Trichloroethane	0.57	Not Detected	3.1	Not Detected
Tetrachloroethene	0.57	Not Detected	3.9	Not Detected
2-Hexanone	0.57	Not Detected	2.3	Not Detected
Dibromochloromethane	0.57	Not Detected	4.9	Not Detected
1,2-Dibromoethane (EDB)	1.1	Not Detected	8.8	Not Detected
Chlorobenzene	0.43	Not Detected	2.0	Not Detected
Ethyl Benzene	0.57	Not Detected	2.5	Not Detected
m,p-Xylene	1.1	Not Detected	5.0	Not Detected
o-Xylene	0.57	Not Detected	2.5	Not Detected
Styrene	0.57	Not Detected	2.4	Not Detected
Bromoform	0.57	Not Detected	5.9	Not Detected
1,1,2,2-Tetrachloroethane	0.57	Not Detected	3.9	Not Detected
4-Ethyltoluene	0.57	Not Detected	2.8	Not Detected
1,3,5-Trimethylbenzene	0.57	Not Detected	2.8	Not Detected



Air Toxics

Client Sample ID: SVE-South-PostCarbon-011020

Lab ID#: 2001261-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3012416	Date of Collection:	1/10/20 9:10:00 AM
Dil. Factor:	1.43	Date of Analysis:	1/24/20 05:27 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,2,4-Trimethylbenzene	1.1	Not Detected	5.6	Not Detected
1,3-Dichlorobenzene	0.57	Not Detected	3.4	Not Detected
1,4-Dichlorobenzene	0.57	Not Detected	3.4	Not Detected
alpha-Chlorotoluene	1.1	Not Detected	5.9	Not Detected
1,2-Dichlorobenzene	0.57	Not Detected	3.4	Not Detected
1,2,4-Trichlorobenzene	2.9	Not Detected	21	Not Detected
Hexachlorobutadiene	2.9	Not Detected	30	Not Detected
Vinyl Acetate	1.1	Not Detected	4.0	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	99	70-130



Air Toxics

Client Sample ID: SVE-South-PreCarbon-011020

Lab ID#: 2001261-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3012417	Date of Collection:	1/10/20 9:20:00 AM
Dil. Factor:	9.78	Date of Analysis:	1/24/20 05:52 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	3.9	Not Detected	19	Not Detected
Freon 114	3.9	Not Detected	27	Not Detected
Chloromethane	49	Not Detected	100	Not Detected
Vinyl Chloride	3.9	Not Detected	10	Not Detected
Bromomethane	7.8	Not Detected	30	Not Detected
Chloroethane	7.8	Not Detected	21	Not Detected
Freon 11	3.9	Not Detected	22	Not Detected
Freon 113	3.9	Not Detected	30	Not Detected
1,1-Dichloroethene	7.8	Not Detected	31	Not Detected
Acetone	49	Not Detected	120	Not Detected
Carbon Disulfide	20	Not Detected	61	Not Detected
Methylene Chloride	3.9	Not Detected	14	Not Detected
trans-1,2-Dichloroethene	3.9	Not Detected	16	Not Detected
1,1-Dichloroethane	2.9	Not Detected	12	Not Detected
2-Butanone (Methyl Ethyl Ketone)	7.8	Not Detected	23	Not Detected
cis-1,2-Dichloroethene	3.9	27	16	110
Chloroform	2.9	Not Detected	14	Not Detected
1,1,1-Trichloroethane	2.9	6.0	16	33
Carbon Tetrachloride	7.8	Not Detected	49	Not Detected
Benzene	3.9	Not Detected	12	Not Detected
1,2-Dichloroethane	3.9	Not Detected	16	Not Detected
Trichloroethene	3.9	78	21	420
1,2-Dichloropropane	3.9	Not Detected	18	Not Detected
Bromodichloromethane	2.9	Not Detected	20	Not Detected
cis-1,3-Dichloropropene	3.9	Not Detected	18	Not Detected
4-Methyl-2-pentanone	3.9	Not Detected	16	Not Detected
Toluene	3.9	Not Detected	15	Not Detected
trans-1,3-Dichloropropene	3.9	Not Detected	18	Not Detected
1,1,2-Trichloroethane	3.9	Not Detected	21	Not Detected
Tetrachloroethene	3.9	1400	26	9200
2-Hexanone	3.9	Not Detected	16	Not Detected
Dibromochloromethane	3.9	Not Detected	33	Not Detected
1,2-Dibromoethane (EDB)	7.8	Not Detected	60	Not Detected
Chlorobenzene	2.9	Not Detected	14	Not Detected
Ethyl Benzene	3.9	Not Detected	17	Not Detected
m,p-Xylene	7.8	Not Detected	34	Not Detected
o-Xylene	3.9	Not Detected	17	Not Detected
Styrene	3.9	Not Detected	17	Not Detected
Bromoform	3.9	Not Detected	40	Not Detected
1,1,2,2-Tetrachloroethane	3.9	Not Detected	27	Not Detected
4-Ethyltoluene	3.9	Not Detected	19	Not Detected
1,3,5-Trimethylbenzene	3.9	Not Detected	19	Not Detected



Air Toxics

Client Sample ID: SVE-South-PreCarbon-011020

Lab ID#: 2001261-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3012417	Date of Collection:	1/10/20 9:20:00 AM
Dil. Factor:	9.78	Date of Analysis:	1/24/20 05:52 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,2,4-Trimethylbenzene	7.8	Not Detected	38	Not Detected
1,3-Dichlorobenzene	3.9	Not Detected	24	Not Detected
1,4-Dichlorobenzene	3.9	Not Detected	24	Not Detected
alpha-Chlorotoluene	7.8	Not Detected	40	Not Detected
1,2-Dichlorobenzene	3.9	Not Detected	24	Not Detected
1,2,4-Trichlorobenzene	20	Not Detected	140	Not Detected
Hexachlorobutadiene	20	Not Detected	210	Not Detected
Vinyl Acetate	7.8	Not Detected	28	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	99	70-130
4-Bromofluorobenzene	97	70-130



Air Toxics

Client Sample ID: Lab Blank

Lab ID#: 2001261-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3012405e	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 1/24/20 11:48 AM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.40	Not Detected	2.0	Not Detected
Freon 114	0.40	Not Detected	2.8	Not Detected
Chloromethane	5.0	Not Detected	10	Not Detected
Vinyl Chloride	0.40	Not Detected	1.0	Not Detected
Bromomethane	0.80	Not Detected	3.1	Not Detected
Chloroethane	0.80	Not Detected	2.1	Not Detected
Freon 11	0.40	Not Detected	2.2	Not Detected
Freon 113	0.40	Not Detected	3.1	Not Detected
1,1-Dichloroethene	0.80	Not Detected	3.2	Not Detected
Acetone	5.0	Not Detected	12	Not Detected
Carbon Disulfide	2.0	Not Detected	6.2	Not Detected
Methylene Chloride	0.40	Not Detected	1.4	Not Detected
trans-1,2-Dichloroethene	0.40	Not Detected	1.6	Not Detected
1,1-Dichloroethane	0.30	Not Detected	1.2	Not Detected
2-Butanone (Methyl Ethyl Ketone)	0.80	Not Detected	2.4	Not Detected
cis-1,2-Dichloroethene	0.40	Not Detected	1.6	Not Detected
Chloroform	0.30	Not Detected	1.5	Not Detected
1,1,1-Trichloroethane	0.30	Not Detected	1.6	Not Detected
Carbon Tetrachloride	0.80	Not Detected	5.0	Not Detected
Benzene	0.40	Not Detected	1.3	Not Detected
1,2-Dichloroethane	0.40	Not Detected	1.6	Not Detected
Trichloroethene	0.40	Not Detected	2.1	Not Detected
1,2-Dichloropropane	0.40	Not Detected	1.8	Not Detected
Bromodichloromethane	0.30	Not Detected	2.0	Not Detected
cis-1,3-Dichloropropene	0.40	Not Detected	1.8	Not Detected
4-Methyl-2-pentanone	0.40	Not Detected	1.6	Not Detected
Toluene	0.40	Not Detected	1.5	Not Detected
trans-1,3-Dichloropropene	0.40	Not Detected	1.8	Not Detected
1,1,2-Trichloroethane	0.40	Not Detected	2.2	Not Detected
Tetrachloroethene	0.40	Not Detected	2.7	Not Detected
2-Hexanone	0.40	Not Detected	1.6	Not Detected
Dibromochloromethane	0.40	Not Detected	3.4	Not Detected
1,2-Dibromoethane (EDB)	0.80	Not Detected	6.1	Not Detected
Chlorobenzene	0.30	Not Detected	1.4	Not Detected
Ethyl Benzene	0.40	Not Detected	1.7	Not Detected
m,p-Xylene	0.80	Not Detected	3.5	Not Detected
o-Xylene	0.40	Not Detected	1.7	Not Detected
Styrene	0.40	Not Detected	1.7	Not Detected
Bromoform	0.40	Not Detected	4.1	Not Detected
1,1,2,2-Tetrachloroethane	0.40	Not Detected	2.7	Not Detected
4-Ethyltoluene	0.40	Not Detected	2.0	Not Detected
1,3,5-Trimethylbenzene	0.40	Not Detected	2.0	Not Detected

Client Sample ID: Lab Blank

Lab ID#: 2001261-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3012405e	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 1/24/20 11:48 AM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,2,4-Trimethylbenzene	0.80	Not Detected	3.9	Not Detected
1,3-Dichlorobenzene	0.40	Not Detected	2.4	Not Detected
1,4-Dichlorobenzene	0.40	Not Detected	2.4	Not Detected
alpha-Chlorotoluene	0.80	Not Detected	4.1	Not Detected
1,2-Dichlorobenzene	0.40	Not Detected	2.4	Not Detected
1,2,4-Trichlorobenzene	2.0	Not Detected	15	Not Detected
Hexachlorobutadiene	2.0	Not Detected	21	Not Detected
Vinyl Acetate	0.80	Not Detected	2.8	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	102	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	96	70-130

Client Sample ID: CCV

Lab ID#: 2001261-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3012402	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 1/24/20 10:31 AM

Compound	%Recovery
Freon 12	100
Freon 114	100
Chloromethane	102
Vinyl Chloride	89
Bromomethane	101
Chloroethane	98
Freon 11	104
Freon 113	102
1,1-Dichloroethene	95
Acetone	99
Carbon Disulfide	92
Methylene Chloride	104
trans-1,2-Dichloroethene	98
1,1-Dichloroethane	97
2-Butanone (Methyl Ethyl Ketone)	94
cis-1,2-Dichloroethene	99
Chloroform	98
1,1,1-Trichloroethane	98
Carbon Tetrachloride	108
Benzene	98
1,2-Dichloroethane	105
Trichloroethene	106
1,2-Dichloropropane	103
Bromodichloromethane	104
cis-1,3-Dichloropropene	103
4-Methyl-2-pentanone	97
Toluene	94
trans-1,3-Dichloropropene	101
1,1,2-Trichloroethane	103
Tetrachloroethene	106
2-Hexanone	98
Dibromochloromethane	108
1,2-Dibromoethane (EDB)	106
Chlorobenzene	103
Ethyl Benzene	103
m,p-Xylene	104
o-Xylene	101
Styrene	101
Bromoform	113
1,1,2,2-Tetrachloroethane	102
4-Ethyltoluene	105
1,3,5-Trimethylbenzene	103



Client Sample ID: CCV

Lab ID#: 2001261-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3012402	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 1/24/20 10:31 AM

Compound	%Recovery
1,2,4-Trimethylbenzene	103
1,3-Dichlorobenzene	108
1,4-Dichlorobenzene	108
alpha-Chlorotoluene	102
1,2-Dichlorobenzene	108
1,2,4-Trichlorobenzene	109
Hexachlorobutadiene	109
Vinyl Acetate	100

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	97	70-130
4-Bromofluorobenzene	100	70-130

Client Sample ID: LCS

Lab ID#: 2001261-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3012403	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 1/24/20 10:56 AM

Compound	%Recovery	Method Limits
Freon 12	93	70-130
Freon 114	95	70-130
Chloromethane	98	70-130
Vinyl Chloride	86	70-130
Bromomethane	100	70-130
Chloroethane	93	70-130
Freon 11	99	70-130
Freon 113	99	70-130
1,1-Dichloroethene	93	70-130
Acetone	97	70-130
Carbon Disulfide	86	70-130
Methylene Chloride	100	70-130
trans-1,2-Dichloroethene	85	70-130
1,1-Dichloroethane	95	70-130
2-Butanone (Methyl Ethyl Ketone)	91	70-130
cis-1,2-Dichloroethene	103	70-130
Chloroform	94	70-130
1,1,1-Trichloroethane	94	70-130
Carbon Tetrachloride	106	70-130
Benzene	92	70-130
1,2-Dichloroethane	99	70-130
Trichloroethene	97	70-130
1,2-Dichloropropane	97	70-130
Bromodichloromethane	96	70-130
cis-1,3-Dichloropropene	97	70-130
4-Methyl-2-pentanone	91	70-130
Toluene	92	70-130
trans-1,3-Dichloropropene	98	70-130
1,1,2-Trichloroethane	98	70-130
Tetrachloroethene	101	70-130
2-Hexanone	92	70-130
Dibromochloromethane	103	70-130
1,2-Dibromoethane (EDB)	100	70-130
Chlorobenzene	97	70-130
Ethyl Benzene	99	70-130
m,p-Xylene	100	70-130
o-Xylene	98	70-130
Styrene	93	70-130
Bromoform	104	70-130
1,1,2,2-Tetrachloroethane	97	70-130
4-Ethyltoluene	95	70-130
1,3,5-Trimethylbenzene	96	70-130

Client Sample ID: LCS

Lab ID#: 2001261-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3012403	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 1/24/20 10:56 AM

Compound	%Recovery	Method Limits
1,2,4-Trimethylbenzene	95	70-130
1,3-Dichlorobenzene	99	70-130
1,4-Dichlorobenzene	97	70-130
alpha-Chlorotoluene	89	70-130
1,2-Dichlorobenzene	99	70-130
1,2,4-Trichlorobenzene	83	70-130
Hexachlorobutadiene	85	70-130
Vinyl Acetate	99	60-140

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	97	70-130
4-Bromofluorobenzene	98	70-130

Client Sample ID: LCSD

Lab ID#: 2001261-05AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3012404	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 1/24/20 11:21 AM

Compound	%Recovery	Method Limits
Freon 12	93	70-130
Freon 114	94	70-130
Chloromethane	99	70-130
Vinyl Chloride	85	70-130
Bromomethane	100	70-130
Chloroethane	91	70-130
Freon 11	98	70-130
Freon 113	99	70-130
1,1-Dichloroethene	93	70-130
Acetone	97	70-130
Carbon Disulfide	85	70-130
Methylene Chloride	98	70-130
trans-1,2-Dichloroethene	85	70-130
1,1-Dichloroethane	94	70-130
2-Butanone (Methyl Ethyl Ketone)	87	70-130
cis-1,2-Dichloroethene	102	70-130
Chloroform	94	70-130
1,1,1-Trichloroethane	93	70-130
Carbon Tetrachloride	104	70-130
Benzene	91	70-130
1,2-Dichloroethane	98	70-130
Trichloroethene	96	70-130
1,2-Dichloropropane	96	70-130
Bromodichloromethane	95	70-130
cis-1,3-Dichloropropene	96	70-130
4-Methyl-2-pentanone	90	70-130
Toluene	90	70-130
trans-1,3-Dichloropropene	98	70-130
1,1,2-Trichloroethane	98	70-130
Tetrachloroethene	102	70-130
2-Hexanone	92	70-130
Dibromochloromethane	103	70-130
1,2-Dibromoethane (EDB)	100	70-130
Chlorobenzene	97	70-130
Ethyl Benzene	99	70-130
m,p-Xylene	101	70-130
o-Xylene	99	70-130
Styrene	94	70-130
Bromoform	103	70-130
1,1,2,2-Tetrachloroethane	98	70-130
4-Ethyltoluene	95	70-130
1,3,5-Trimethylbenzene	96	70-130

Client Sample ID: LCSD

Lab ID#: 2001261-05AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3012404	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 1/24/20 11:21 AM

Compound	%Recovery	Method Limits
1,2,4-Trimethylbenzene	96	70-130
1,3-Dichlorobenzene	99	70-130
1,4-Dichlorobenzene	98	70-130
alpha-Chlorotoluene	89	70-130
1,2-Dichlorobenzene	100	70-130
1,2,4-Trichlorobenzene	86	70-130
Hexachlorobutadiene	86	70-130
Vinyl Acetate	97	60-140

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	96	70-130
4-Bromofluorobenzene	98	70-130



**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

Tuesday, March 31, 2020

Stephanie Salisbury  
Cascadia Associates  
5820 SW Kelly Ave Unit B  
Portland, OR 97239

RE: A0C0333 - Shore Terminal-Vancouver - NuStar Vancouver GWM 1Q20

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A0C0333, which was received by the laboratory on 3/10/2020 at 4:24:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [ldomenighini@apex-labs.com](mailto:ldomenighini@apex-labs.com), or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of sample receipt, unless prior arrangements have been made.

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Cooler Receipt Information

(See Cooler Receipt Form for details)

Cooler #1                      5.1 degC

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This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.

All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

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Lisa Domenighini, Client Services Manager



**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 10</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0333 - 03 31 20 0753
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**ANALYTICAL REPORT FOR SAMPLES**

**SAMPLE INFORMATION**

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-3	A0C0333-01	Water	03/10/20 09:51	03/10/20 16:24
MW-1	A0C0333-02	Water	03/10/20 10:55	03/10/20 16:24
MW-13	A0C0333-03	Water	03/10/20 11:52	03/10/20 16:24
S-1	A0C0333-04	Water	03/10/20 12:45	03/10/20 16:24
S-2	A0C0333-05	Water	03/10/20 13:35	03/10/20 16:24
MW-17	A0C0333-06	Water	03/10/20 14:22	03/10/20 16:24
Trip Blank	A0C0333-07	Water	03/10/20 00:00	03/10/20 16:24

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Lisa Domenighini, Client Services Manager

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6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

Cascadia Associates

5820 SW Kelly Ave Unit B  
Portland, OR 97239

Project: Shore Terminal-Vancouver

Project Number: NuStar Vancouver GWM 10

Project Manager: Stephanie Salisbury

Report ID:

A0C0333 - 03 31 20 0753

**ANALYTICAL CASE NARRATIVE**

Work Order: A0C0333

Subcontract

This report is not complete without the attached subcontract laboratory report for RSK 175 from Air Technology.

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Lisa Domenighini, Client Services Manager





<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 10</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0C0333 - 03 31 20 0753</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-3 (A0C0333-01)</b>				<b>Matrix: Water</b>		<b>Batch: 0030369</b>		
Bromobenzene	ND	---	0.500	ug/L	1	03/11/20 21:34	EPA 8260C	
Bromochloromethane	ND	---	1.00	ug/L	1	03/11/20 21:34	EPA 8260C	
Bromodichloromethane	ND	---	1.00	ug/L	1	03/11/20 21:34	EPA 8260C	
Bromoform	ND	---	1.00	ug/L	1	03/11/20 21:34	EPA 8260C	
Bromomethane	ND	---	5.00	ug/L	1	03/11/20 21:34	EPA 8260C	
Carbon tetrachloride	ND	---	1.00	ug/L	1	03/11/20 21:34	EPA 8260C	
Chlorobenzene	ND	---	0.500	ug/L	1	03/11/20 21:34	EPA 8260C	
Chloroethane	ND	---	5.00	ug/L	1	03/11/20 21:34	EPA 8260C	EST
Chloroform	ND	---	1.00	ug/L	1	03/11/20 21:34	EPA 8260C	
Chloromethane	ND	---	5.00	ug/L	1	03/11/20 21:34	EPA 8260C	
2-Chlorotoluene	ND	---	1.00	ug/L	1	03/11/20 21:34	EPA 8260C	
4-Chlorotoluene	ND	---	1.00	ug/L	1	03/11/20 21:34	EPA 8260C	
Dibromochloromethane	ND	---	1.00	ug/L	1	03/11/20 21:34	EPA 8260C	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	03/11/20 21:34	EPA 8260C	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	03/11/20 21:34	EPA 8260C	
Dibromomethane	ND	---	1.00	ug/L	1	03/11/20 21:34	EPA 8260C	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	03/11/20 21:34	EPA 8260C	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	03/11/20 21:34	EPA 8260C	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	03/11/20 21:34	EPA 8260C	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	03/11/20 21:34	EPA 8260C	
<b>1,1-Dichloroethane</b>	<b>1.77</b>	---	0.400	ug/L	1	03/11/20 21:34	EPA 8260C	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	03/11/20 21:34	EPA 8260C	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	03/11/20 21:34	EPA 8260C	
<b>cis-1,2-Dichloroethene</b>	<b>48.9</b>	---	0.400	ug/L	1	03/11/20 21:34	EPA 8260C	
<b>trans-1,2-Dichloroethene</b>	<b>1.97</b>	---	0.400	ug/L	1	03/11/20 21:34	EPA 8260C	
<b>1,2-Dichloropropane</b>	<b>1.03</b>	---	0.500	ug/L	1	03/11/20 21:34	EPA 8260C	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	03/11/20 21:34	EPA 8260C	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	03/11/20 21:34	EPA 8260C	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	03/11/20 21:34	EPA 8260C	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/11/20 21:34	EPA 8260C	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/11/20 21:34	EPA 8260C	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	03/11/20 21:34	EPA 8260C	
Methylene chloride	ND	---	10.0	ug/L	1	03/11/20 21:34	EPA 8260C	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	03/11/20 21:34	EPA 8260C	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	03/11/20 21:34	EPA 8260C	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	03/11/20 21:34	EPA 8260C	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	03/11/20 21:34	EPA 8260C	
<b>1,1,1-Trichloroethane</b>	<b>2.74</b>	---	0.400	ug/L	1	03/11/20 21:34	EPA 8260C	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	03/11/20 21:34	EPA 8260C	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 10</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0333 - 03 31 20 0753
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-3 (A0C0333-01)</b>			<b>Matrix: Water</b>		<b>Batch: 0030369</b>			
Trichloroethene (TCE)	50.9	---	0.400	ug/L	1	03/11/20 21:34	EPA 8260C	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	03/11/20 21:34	EPA 8260C	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	03/11/20 21:34	EPA 8260C	
Vinyl chloride	ND	---	0.400	ug/L	1	03/11/20 21:34	EPA 8260C	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 104 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>03/11/20 21:34</i>	<i>EPA 8260C</i>
<i>Toluene-d8 (Surr)</i>		<i>99 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/11/20 21:34</i>	<i>EPA 8260C</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>99 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/11/20 21:34</i>	<i>EPA 8260C</i>
<b>MW-3 (A0C0333-01RE1)</b>			<b>Matrix: Water</b>		<b>Batch: 0030468</b>			
Tetrachloroethene (PCE)	192	---	4.00	ug/L	10	03/13/20 15:21	EPA 8260C	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 102 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>03/13/20 15:21</i>	<i>EPA 8260C</i>
<i>Toluene-d8 (Surr)</i>		<i>102 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/13/20 15:21</i>	<i>EPA 8260C</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>99 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/13/20 15:21</i>	<i>EPA 8260C</i>
<b>MW-1 (A0C0333-02)</b>			<b>Matrix: Water</b>		<b>Batch: 0030369</b>			
Bromobenzene	ND	---	0.500	ug/L	1	03/11/20 19:19	EPA 8260C	
Bromochloromethane	ND	---	1.00	ug/L	1	03/11/20 19:19	EPA 8260C	
Bromodichloromethane	ND	---	1.00	ug/L	1	03/11/20 19:19	EPA 8260C	
Bromoform	ND	---	1.00	ug/L	1	03/11/20 19:19	EPA 8260C	
Bromomethane	ND	---	5.00	ug/L	1	03/11/20 19:19	EPA 8260C	
Carbon tetrachloride	ND	---	1.00	ug/L	1	03/11/20 19:19	EPA 8260C	
Chlorobenzene	ND	---	0.500	ug/L	1	03/11/20 19:19	EPA 8260C	
Chloroethane	ND	---	5.00	ug/L	1	03/11/20 19:19	EPA 8260C	EST
Chloroform	ND	---	1.00	ug/L	1	03/11/20 19:19	EPA 8260C	
Chloromethane	ND	---	5.00	ug/L	1	03/11/20 19:19	EPA 8260C	
2-Chlorotoluene	ND	---	1.00	ug/L	1	03/11/20 19:19	EPA 8260C	
4-Chlorotoluene	ND	---	1.00	ug/L	1	03/11/20 19:19	EPA 8260C	
Dibromochloromethane	ND	---	1.00	ug/L	1	03/11/20 19:19	EPA 8260C	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	03/11/20 19:19	EPA 8260C	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	03/11/20 19:19	EPA 8260C	
Dibromomethane	ND	---	1.00	ug/L	1	03/11/20 19:19	EPA 8260C	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	03/11/20 19:19	EPA 8260C	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	03/11/20 19:19	EPA 8260C	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	03/11/20 19:19	EPA 8260C	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	03/11/20 19:19	EPA 8260C	
<b>1,1-Dichloroethane</b>	<b>4.45</b>	---	0.400	ug/L	1	03/11/20 19:19	EPA 8260C	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	03/11/20 19:19	EPA 8260C	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	03/11/20 19:19	EPA 8260C	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 10</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0333 - 03 31 20 0753
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-1 (A0C0333-02)</b>				<b>Matrix: Water</b>		<b>Batch: 0030369</b>		
cis-1,2-Dichloroethene	13.4	---	0.400	ug/L	1	03/11/20 19:19	EPA 8260C	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	03/11/20 19:19	EPA 8260C	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	03/11/20 19:19	EPA 8260C	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	03/11/20 19:19	EPA 8260C	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	03/11/20 19:19	EPA 8260C	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	03/11/20 19:19	EPA 8260C	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/11/20 19:19	EPA 8260C	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/11/20 19:19	EPA 8260C	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	03/11/20 19:19	EPA 8260C	
Methylene chloride	ND	---	10.0	ug/L	1	03/11/20 19:19	EPA 8260C	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	03/11/20 19:19	EPA 8260C	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	03/11/20 19:19	EPA 8260C	
<b>Tetrachloroethene (PCE)</b>	<b>5.96</b>	---	0.400	ug/L	1	03/11/20 19:19	EPA 8260C	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	03/11/20 19:19	EPA 8260C	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	03/11/20 19:19	EPA 8260C	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	03/11/20 19:19	EPA 8260C	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	03/11/20 19:19	EPA 8260C	
<b>Trichloroethene (TCE)</b>	<b>5.22</b>	---	0.400	ug/L	1	03/11/20 19:19	EPA 8260C	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	03/11/20 19:19	EPA 8260C	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	03/11/20 19:19	EPA 8260C	
Vinyl chloride	ND	---	0.400	ug/L	1	03/11/20 19:19	EPA 8260C	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 100 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>03/11/20 19:19</i>	<i>EPA 8260C</i>
<i>Toluene-d8 (Surr)</i>		<i>101 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/11/20 19:19</i>	<i>EPA 8260C</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>99 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/11/20 19:19</i>	<i>EPA 8260C</i>

<b>MW-13 (A0C0333-03)</b>				<b>Matrix: Water</b>		<b>Batch: 0030369</b>		
Bromobenzene	ND	---	0.500	ug/L	1	03/11/20 21:07	EPA 8260C	
Bromochloromethane	ND	---	1.00	ug/L	1	03/11/20 21:07	EPA 8260C	
Bromodichloromethane	ND	---	1.00	ug/L	1	03/11/20 21:07	EPA 8260C	
Bromoform	ND	---	1.00	ug/L	1	03/11/20 21:07	EPA 8260C	
Bromomethane	ND	---	5.00	ug/L	1	03/11/20 21:07	EPA 8260C	
Carbon tetrachloride	ND	---	1.00	ug/L	1	03/11/20 21:07	EPA 8260C	
Chlorobenzene	ND	---	0.500	ug/L	1	03/11/20 21:07	EPA 8260C	
Chloroethane	ND	---	5.00	ug/L	1	03/11/20 21:07	EPA 8260C	EST
Chloroform	ND	---	1.00	ug/L	1	03/11/20 21:07	EPA 8260C	
Chloromethane	ND	---	5.00	ug/L	1	03/11/20 21:07	EPA 8260C	
2-Chlorotoluene	ND	---	1.00	ug/L	1	03/11/20 21:07	EPA 8260C	
4-Chlorotoluene	ND	---	1.00	ug/L	1	03/11/20 21:07	EPA 8260C	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 10</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0C0333 - 03 31 20 0753</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-13 (A0C0333-03)</b>				<b>Matrix: Water</b>		<b>Batch: 0030369</b>		
Dibromochloromethane	ND	---	1.00	ug/L	1	03/11/20 21:07	EPA 8260C	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	03/11/20 21:07	EPA 8260C	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	03/11/20 21:07	EPA 8260C	
Dibromomethane	ND	---	1.00	ug/L	1	03/11/20 21:07	EPA 8260C	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	03/11/20 21:07	EPA 8260C	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	03/11/20 21:07	EPA 8260C	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	03/11/20 21:07	EPA 8260C	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	03/11/20 21:07	EPA 8260C	
<b>1,1-Dichloroethane</b>	<b>9.19</b>	---	0.400	ug/L	1	03/11/20 21:07	EPA 8260C	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	03/11/20 21:07	EPA 8260C	
<b>1,1-Dichloroethene</b>	<b>1.97</b>	---	0.400	ug/L	1	03/11/20 21:07	EPA 8260C	
<b>cis-1,2-Dichloroethene</b>	<b>72.5</b>	---	0.400	ug/L	1	03/11/20 21:07	EPA 8260C	
<b>trans-1,2-Dichloroethene</b>	<b>2.04</b>	---	0.400	ug/L	1	03/11/20 21:07	EPA 8260C	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	03/11/20 21:07	EPA 8260C	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	03/11/20 21:07	EPA 8260C	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	03/11/20 21:07	EPA 8260C	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	03/11/20 21:07	EPA 8260C	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/11/20 21:07	EPA 8260C	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/11/20 21:07	EPA 8260C	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	03/11/20 21:07	EPA 8260C	
Methylene chloride	ND	---	10.0	ug/L	1	03/11/20 21:07	EPA 8260C	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	03/11/20 21:07	EPA 8260C	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	03/11/20 21:07	EPA 8260C	
Tetrachloroethene (PCE)	ND	---	0.400	ug/L	1	03/11/20 21:07	EPA 8260C	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	03/11/20 21:07	EPA 8260C	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	03/11/20 21:07	EPA 8260C	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	03/11/20 21:07	EPA 8260C	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	03/11/20 21:07	EPA 8260C	
<b>Trichloroethene (TCE)</b>	<b>7.59</b>	---	0.400	ug/L	1	03/11/20 21:07	EPA 8260C	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	03/11/20 21:07	EPA 8260C	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	03/11/20 21:07	EPA 8260C	
<b>Vinyl chloride</b>	<b>134</b>	---	0.400	ug/L	1	03/11/20 21:07	EPA 8260C	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 100 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>03/11/20 21:07</i>	<i>EPA 8260C</i>
<i>Toluene-d8 (Surr)</i>		<i>102 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/11/20 21:07</i>	<i>EPA 8260C</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>99 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/11/20 21:07</i>	<i>EPA 8260C</i>

<b>S-1 (A0C0333-04)</b>				<b>Matrix: Water</b>		<b>Batch: 0030369</b>		
Bromobenzene	ND	---	0.500	ug/L	1	03/11/20 19:46	EPA 8260C	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 10</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0C0333 - 03 31 20 0753</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>S-1 (A0C0333-04)</b>				<b>Matrix: Water</b>		<b>Batch: 0030369</b>		
Bromochloromethane	ND	---	1.00	ug/L	1	03/11/20 19:46	EPA 8260C	
Bromodichloromethane	ND	---	1.00	ug/L	1	03/11/20 19:46	EPA 8260C	
Bromoform	ND	---	1.00	ug/L	1	03/11/20 19:46	EPA 8260C	
Bromomethane	ND	---	5.00	ug/L	1	03/11/20 19:46	EPA 8260C	
Carbon tetrachloride	ND	---	1.00	ug/L	1	03/11/20 19:46	EPA 8260C	
Chlorobenzene	ND	---	0.500	ug/L	1	03/11/20 19:46	EPA 8260C	
Chloroethane	ND	---	5.00	ug/L	1	03/11/20 19:46	EPA 8260C	EST
Chloroform	ND	---	1.00	ug/L	1	03/11/20 19:46	EPA 8260C	
Chloromethane	ND	---	5.00	ug/L	1	03/11/20 19:46	EPA 8260C	
2-Chlorotoluene	ND	---	1.00	ug/L	1	03/11/20 19:46	EPA 8260C	
4-Chlorotoluene	ND	---	1.00	ug/L	1	03/11/20 19:46	EPA 8260C	
Dibromochloromethane	ND	---	1.00	ug/L	1	03/11/20 19:46	EPA 8260C	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	03/11/20 19:46	EPA 8260C	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	03/11/20 19:46	EPA 8260C	
Dibromomethane	ND	---	1.00	ug/L	1	03/11/20 19:46	EPA 8260C	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	03/11/20 19:46	EPA 8260C	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	03/11/20 19:46	EPA 8260C	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	03/11/20 19:46	EPA 8260C	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	03/11/20 19:46	EPA 8260C	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	03/11/20 19:46	EPA 8260C	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	03/11/20 19:46	EPA 8260C	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	03/11/20 19:46	EPA 8260C	
cis-1,2-Dichloroethene	ND	---	0.400	ug/L	1	03/11/20 19:46	EPA 8260C	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	03/11/20 19:46	EPA 8260C	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	03/11/20 19:46	EPA 8260C	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	03/11/20 19:46	EPA 8260C	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	03/11/20 19:46	EPA 8260C	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	03/11/20 19:46	EPA 8260C	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/11/20 19:46	EPA 8260C	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/11/20 19:46	EPA 8260C	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	03/11/20 19:46	EPA 8260C	
Methylene chloride	ND	---	10.0	ug/L	1	03/11/20 19:46	EPA 8260C	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	03/11/20 19:46	EPA 8260C	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	03/11/20 19:46	EPA 8260C	
Tetrachloroethene (PCE)	ND	---	0.400	ug/L	1	03/11/20 19:46	EPA 8260C	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	03/11/20 19:46	EPA 8260C	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	03/11/20 19:46	EPA 8260C	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	03/11/20 19:46	EPA 8260C	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	03/11/20 19:46	EPA 8260C	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 10</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0C0333 - 03 31 20 0753</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>S-1 (A0C0333-04)</b>			<b>Matrix: Water</b>		<b>Batch: 0030369</b>			
Trichloroethene (TCE)	1.06	---	0.400	ug/L	1	03/11/20 19:46	EPA 8260C	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	03/11/20 19:46	EPA 8260C	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	03/11/20 19:46	EPA 8260C	
Vinyl chloride	ND	---	0.400	ug/L	1	03/11/20 19:46	EPA 8260C	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 100 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>03/11/20 19:46</i>	<i>EPA 8260C</i>
<i>Toluene-d8 (Surr)</i>		<i>102 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/11/20 19:46</i>	<i>EPA 8260C</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>101 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/11/20 19:46</i>	<i>EPA 8260C</i>

<b>S-2 (A0C0333-05)</b>			<b>Matrix: Water</b>		<b>Batch: 0030369</b>			
Bromobenzene	ND	---	0.500	ug/L	1	03/11/20 20:13	EPA 8260C	
Bromochloromethane	ND	---	1.00	ug/L	1	03/11/20 20:13	EPA 8260C	
Bromodichloromethane	ND	---	1.00	ug/L	1	03/11/20 20:13	EPA 8260C	
Bromoform	ND	---	1.00	ug/L	1	03/11/20 20:13	EPA 8260C	
Bromomethane	ND	---	5.00	ug/L	1	03/11/20 20:13	EPA 8260C	
Carbon tetrachloride	ND	---	1.00	ug/L	1	03/11/20 20:13	EPA 8260C	
Chlorobenzene	ND	---	0.500	ug/L	1	03/11/20 20:13	EPA 8260C	
Chloroethane	ND	---	5.00	ug/L	1	03/11/20 20:13	EPA 8260C	EST
Chloroform	ND	---	1.00	ug/L	1	03/11/20 20:13	EPA 8260C	
Chloromethane	ND	---	5.00	ug/L	1	03/11/20 20:13	EPA 8260C	
2-Chlorotoluene	ND	---	1.00	ug/L	1	03/11/20 20:13	EPA 8260C	
4-Chlorotoluene	ND	---	1.00	ug/L	1	03/11/20 20:13	EPA 8260C	
Dibromochloromethane	ND	---	1.00	ug/L	1	03/11/20 20:13	EPA 8260C	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	03/11/20 20:13	EPA 8260C	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	03/11/20 20:13	EPA 8260C	
Dibromomethane	ND	---	1.00	ug/L	1	03/11/20 20:13	EPA 8260C	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	03/11/20 20:13	EPA 8260C	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	03/11/20 20:13	EPA 8260C	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	03/11/20 20:13	EPA 8260C	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	03/11/20 20:13	EPA 8260C	
<b>1,1-Dichloroethane</b>	<b>6.54</b>	---	0.400	ug/L	1	03/11/20 20:13	EPA 8260C	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	03/11/20 20:13	EPA 8260C	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	03/11/20 20:13	EPA 8260C	
<b>cis-1,2-Dichloroethene</b>	<b>26.4</b>	---	0.400	ug/L	1	03/11/20 20:13	EPA 8260C	
<b>trans-1,2-Dichloroethene</b>	<b>0.516</b>	---	0.400	ug/L	1	03/11/20 20:13	EPA 8260C	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	03/11/20 20:13	EPA 8260C	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	03/11/20 20:13	EPA 8260C	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	03/11/20 20:13	EPA 8260C	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	03/11/20 20:13	EPA 8260C	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 10</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0C0333 - 03 31 20 0753</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>S-2 (A0C0333-05)</b>				<b>Matrix: Water</b>		<b>Batch: 0030369</b>		
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/11/20 20:13	EPA 8260C	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/11/20 20:13	EPA 8260C	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	03/11/20 20:13	EPA 8260C	
Methylene chloride	ND	---	10.0	ug/L	1	03/11/20 20:13	EPA 8260C	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	03/11/20 20:13	EPA 8260C	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	03/11/20 20:13	EPA 8260C	
Tetrachloroethene (PCE)	ND	---	0.400	ug/L	1	03/11/20 20:13	EPA 8260C	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	03/11/20 20:13	EPA 8260C	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	03/11/20 20:13	EPA 8260C	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	03/11/20 20:13	EPA 8260C	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	03/11/20 20:13	EPA 8260C	
<b>Trichloroethene (TCE)</b>	<b>1.15</b>	---	0.400	ug/L	1	03/11/20 20:13	EPA 8260C	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	03/11/20 20:13	EPA 8260C	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	03/11/20 20:13	EPA 8260C	
Vinyl chloride	ND	---	0.400	ug/L	1	03/11/20 20:13	EPA 8260C	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 99 %</i>		<i>Limits: 80-120 %</i>	<i>1</i>	<i>03/11/20 20:13</i>	<i>EPA 8260C</i>	
<i>Toluene-d8 (Surr)</i>		<i>102 %</i>		<i>80-120 %</i>	<i>1</i>	<i>03/11/20 20:13</i>	<i>EPA 8260C</i>	
<i>4-Bromofluorobenzene (Surr)</i>		<i>102 %</i>		<i>80-120 %</i>	<i>1</i>	<i>03/11/20 20:13</i>	<i>EPA 8260C</i>	

<b>MW-17 (A0C0333-06)</b>				<b>Matrix: Water</b>		<b>Batch: 0030369</b>		
Bromobenzene	ND	---	0.500	ug/L	1	03/11/20 20:40	EPA 8260C	
Bromochloromethane	ND	---	1.00	ug/L	1	03/11/20 20:40	EPA 8260C	
Bromodichloromethane	ND	---	1.00	ug/L	1	03/11/20 20:40	EPA 8260C	
Bromoform	ND	---	1.00	ug/L	1	03/11/20 20:40	EPA 8260C	
Bromomethane	ND	---	5.00	ug/L	1	03/11/20 20:40	EPA 8260C	
Carbon tetrachloride	ND	---	1.00	ug/L	1	03/11/20 20:40	EPA 8260C	
Chlorobenzene	ND	---	0.500	ug/L	1	03/11/20 20:40	EPA 8260C	
Chloroethane	ND	---	5.00	ug/L	1	03/11/20 20:40	EPA 8260C	EST
Chloroform	ND	---	1.00	ug/L	1	03/11/20 20:40	EPA 8260C	
Chloromethane	ND	---	5.00	ug/L	1	03/11/20 20:40	EPA 8260C	
2-Chlorotoluene	ND	---	1.00	ug/L	1	03/11/20 20:40	EPA 8260C	
4-Chlorotoluene	ND	---	1.00	ug/L	1	03/11/20 20:40	EPA 8260C	
Dibromochloromethane	ND	---	1.00	ug/L	1	03/11/20 20:40	EPA 8260C	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	03/11/20 20:40	EPA 8260C	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	03/11/20 20:40	EPA 8260C	
Dibromomethane	ND	---	1.00	ug/L	1	03/11/20 20:40	EPA 8260C	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	03/11/20 20:40	EPA 8260C	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	03/11/20 20:40	EPA 8260C	

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<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 10</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0C0333 - 03 31 20 0753</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-17 (A0C0333-06)</b>				<b>Matrix: Water</b>		<b>Batch: 0030369</b>		
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	03/11/20 20:40	EPA 8260C	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	03/11/20 20:40	EPA 8260C	
<b>1,1-Dichloroethane</b>	<b>1.06</b>	---	0.400	ug/L	1	03/11/20 20:40	EPA 8260C	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	03/11/20 20:40	EPA 8260C	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	03/11/20 20:40	EPA 8260C	
<b>cis-1,2-Dichloroethene</b>	<b>18.7</b>	---	0.400	ug/L	1	03/11/20 20:40	EPA 8260C	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	03/11/20 20:40	EPA 8260C	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	03/11/20 20:40	EPA 8260C	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	03/11/20 20:40	EPA 8260C	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	03/11/20 20:40	EPA 8260C	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	03/11/20 20:40	EPA 8260C	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/11/20 20:40	EPA 8260C	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/11/20 20:40	EPA 8260C	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	03/11/20 20:40	EPA 8260C	
Methylene chloride	ND	---	10.0	ug/L	1	03/11/20 20:40	EPA 8260C	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	03/11/20 20:40	EPA 8260C	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	03/11/20 20:40	EPA 8260C	
<b>Tetrachloroethene (PCE)</b>	<b>4.74</b>	---	0.400	ug/L	1	03/11/20 20:40	EPA 8260C	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	03/11/20 20:40	EPA 8260C	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	03/11/20 20:40	EPA 8260C	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	03/11/20 20:40	EPA 8260C	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	03/11/20 20:40	EPA 8260C	
<b>Trichloroethene (TCE)</b>	<b>11.6</b>	---	0.400	ug/L	1	03/11/20 20:40	EPA 8260C	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	03/11/20 20:40	EPA 8260C	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	03/11/20 20:40	EPA 8260C	
Vinyl chloride	ND	---	0.400	ug/L	1	03/11/20 20:40	EPA 8260C	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 101 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>03/11/20 20:40</i>	<i>EPA 8260C</i>
<i>Toluene-d8 (Surr)</i>		<i>101 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/11/20 20:40</i>	<i>EPA 8260C</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>98 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/11/20 20:40</i>	<i>EPA 8260C</i>





<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 10</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0333 - 03 31 20 0753
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**ANALYTICAL SAMPLE RESULTS**

**Ammonia by Gas Diffusion and Colorimetric Detection**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-3 (A0C0333-01)</b>				<b>Matrix: Water</b>		<b>Batch: 0030414</b>		
Ammonia as N	0.0210	---	0.0200	mg/L	1	03/12/20 14:42	SM 4500-NH3 G	
<b>MW-1 (A0C0333-02RE2)</b>				<b>Matrix: Water</b>		<b>Batch: 0030686</b>		
Ammonia as N	14.4	---	0.100	mg/L	5	03/19/20 13:44	SM 4500-NH3 G	
<b>MW-13 (A0C0333-03)</b>				<b>Matrix: Water</b>		<b>Batch: 0030414</b>		
Ammonia as N	52.0	---	0.400	mg/L	20	03/12/20 14:45	SM 4500-NH3 G	
<b>S-1 (A0C0333-04)</b>				<b>Matrix: Water</b>		<b>Batch: 0030414</b>		
Ammonia as N	ND	---	0.0200	mg/L	1	03/12/20 14:46	SM 4500-NH3 G	
<b>S-2 (A0C0333-05)</b>				<b>Matrix: Water</b>		<b>Batch: 0030414</b>		
Ammonia as N	6.96	---	0.0400	mg/L	2	03/12/20 14:48	SM 4500-NH3 G	
<b>MW-17 (A0C0333-06)</b>				<b>Matrix: Water</b>		<b>Batch: 0030414</b>		
Ammonia as N	1.21	---	0.0200	mg/L	1	03/12/20 14:49	SM 4500-NH3 G	

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**ANALYTICAL SAMPLE RESULTS**

**Anions by Ion Chromatography**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes	
<b>MW-3 (A0C0333-01)</b>				<b>Matrix: Water</b>					
Batch: 0030371									
Nitrate-Nitrogen	14.7	---	1.25	mg/L	5	03/11/20 11:37	EPA 300.0		
<b>MW-3 (A0C0333-01RE1)</b>				<b>Matrix: Water</b>					
Batch: 0030371									
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	03/11/20 15:34	EPA 300.0		
<b>MW-1 (A0C0333-02RE1)</b>				<b>Matrix: Water</b>					
Batch: 0030371									
Nitrate-Nitrogen	0.393	---	0.250	mg/L	1	03/11/20 16:17	EPA 300.0		
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	03/11/20 16:17	EPA 300.0		
<b>MW-13 (A0C0333-03)</b>				<b>Matrix: Water</b>					
Batch: 0030371									
Nitrate-Nitrogen	ND	---	0.250	mg/L	1	03/11/20 12:20	EPA 300.0		
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	03/11/20 12:20	EPA 300.0		
<b>S-1 (A0C0333-04)</b>				<b>Matrix: Water</b>					
Batch: 0030371									
Nitrate-Nitrogen	1.08	---	0.250	mg/L	1	03/11/20 13:25	EPA 300.0		
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	03/11/20 13:25	EPA 300.0		
<b>S-2 (A0C0333-05)</b>				<b>Matrix: Water</b>					
Batch: 0030371									
Nitrate-Nitrogen	0.906	---	0.250	mg/L	1	03/11/20 13:47	EPA 300.0		
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	03/11/20 13:47	EPA 300.0		
<b>MW-17 (A0C0333-06)</b>				<b>Matrix: Water</b>					
Batch: 0030371									
Nitrate-Nitrogen	11.5	---	1.25	mg/L	5	03/11/20 15:13	EPA 300.0		
<b>MW-17 (A0C0333-06RE1)</b>				<b>Matrix: Water</b>					
Batch: 0030371									
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	03/11/20 15:56	EPA 300.0		

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Lisa Domenighini, Client Services Manager



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6700 S.W. Sandburg Street  
 Tigard, OR 97223  
 503-718-2323  
EPA ID: OR01039

<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 10</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0333 - 03 31 20 0753
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**ANALYTICAL SAMPLE RESULTS**

**Total Organic Carbon (Non-Purgeable) by Persulfate Oxidation by Standard Method 5310C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-13 (A0C0333-03RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0030595</b>		
<b>Total Organic Carbon</b>	<b>20.1</b>	---	2.00	mg/L	2	03/17/20 16:56	SM 5310 C	

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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030369 - EPA 5030B</b>						<b>Water</b>						
<b>Blank (0030369-BLK1)</b>		Prepared: 03/11/20 09:00		Analyzed: 03/11/20 10:45								
<u>EPA 8260C</u>												
Bromobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Bromochloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Bromodichloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Bromoform	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Bromomethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	
Carbon tetrachloride	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Chlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Chloroethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	EST
Chloroform	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Chloromethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	
2-Chlorotoluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
4-Chlorotoluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Dibromochloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Dibromomethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
cis-1,2-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	---	---	---	---	---	---	
Methylene chloride	ND	---	10.0	ug/L	1	---	---	---	---	---	---	

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<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 1C</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0333 - 03 31 20 0753
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030369 - EPA 5030B</b>												
<b>Water</b>												
<b>Blank (0030369-BLK1)</b>	Prepared: 03/11/20 09:00 Analyzed: 03/11/20 10:45											
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Tetrachloroethene (PCE)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Trichloroethene (TCE)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Vinyl chloride	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
Surr: 1,4-Difluorobenzene (Surr)	Recovery: 99 %		Limits: 80-120 %		Dilution: 1x							
Toluene-d8 (Surr)	102 %		80-120 %		"							
4-Bromofluorobenzene (Surr)	99 %		80-120 %		"							

<b>LCS (0030369-BS1)</b>												
Prepared: 03/11/20 09:00 Analyzed: 03/11/20 09:51												
<b>EPA 8260C</b>												
Bromobenzene	22.1	---	0.500	ug/L	1	20.0	---	111	80 - 120%	---	---	
Bromochloromethane	20.6	---	1.00	ug/L	1	20.0	---	103	80 - 120%	---	---	
Bromodichloromethane	21.7	---	1.00	ug/L	1	20.0	---	108	80 - 120%	---	---	
Bromoform	27.4	---	1.00	ug/L	1	20.0	---	<b>137</b>	<b>80 - 120%</b>	---	---	Q-56
Bromomethane	28.8	---	5.00	ug/L	1	20.0	---	<b>144</b>	<b>80 - 120%</b>	---	---	Q-56
Carbon tetrachloride	23.8	---	1.00	ug/L	1	20.0	---	119	80 - 120%	---	---	
Chlorobenzene	20.9	---	0.500	ug/L	1	20.0	---	105	80 - 120%	---	---	
Chloroethane	27.0	---	5.00	ug/L	1	20.0	---	<b>135</b>	<b>80 - 120%</b>	---	---	EST, Q-56
Chloroform	19.5	---	1.00	ug/L	1	20.0	---	97	80 - 120%	---	---	
Chloromethane	18.3	---	5.00	ug/L	1	20.0	---	92	80 - 120%	---	---	
2-Chlorotoluene	20.9	---	1.00	ug/L	1	20.0	---	105	80 - 120%	---	---	
4-Chlorotoluene	19.5	---	1.00	ug/L	1	20.0	---	98	80 - 120%	---	---	
Dibromochloromethane	24.5	---	1.00	ug/L	1	20.0	---	<b>123</b>	<b>80 - 120%</b>	---	---	Q-56
1,2-Dibromo-3-chloropropane	20.9	---	5.00	ug/L	1	20.0	---	104	80 - 120%	---	---	
1,2-Dibromoethane (EDB)	21.4	---	0.500	ug/L	1	20.0	---	107	80 - 120%	---	---	
Dibromomethane	20.1	---	1.00	ug/L	1	20.0	---	101	80 - 120%	---	---	
1,2-Dichlorobenzene	21.3	---	0.500	ug/L	1	20.0	---	106	80 - 120%	---	---	

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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030369 - EPA 5030B</b>												
<b>Water</b>												
<b>LCS (0030369-BS1)</b>	Prepared: 03/11/20 09:00 Analyzed: 03/11/20 09:51											
1,3-Dichlorobenzene	21.0	---	0.500	ug/L	1	20.0	---	105	80 - 120%	---	---	
1,4-Dichlorobenzene	20.4	---	0.500	ug/L	1	20.0	---	102	80 - 120%	---	---	
Dichlorodifluoromethane	24.1	---	1.00	ug/L	1	20.0	---	<b>121</b>	<b>80 - 120%</b>	---	---	Q-56
1,1-Dichloroethane	18.5	---	0.400	ug/L	1	20.0	---	93	80 - 120%	---	---	
1,2-Dichloroethane (EDC)	20.5	---	0.400	ug/L	1	20.0	---	103	80 - 120%	---	---	
1,1-Dichloroethene	20.2	---	0.400	ug/L	1	20.0	---	101	80 - 120%	---	---	
cis-1,2-Dichloroethene	18.3	---	0.400	ug/L	1	20.0	---	92	80 - 120%	---	---	
trans-1,2-Dichloroethene	18.9	---	0.400	ug/L	1	20.0	---	95	80 - 120%	---	---	
1,2-Dichloropropane	18.3	---	0.500	ug/L	1	20.0	---	91	80 - 120%	---	---	
1,3-Dichloropropane	20.3	---	1.00	ug/L	1	20.0	---	102	80 - 120%	---	---	
2,2-Dichloropropane	21.5	---	1.00	ug/L	1	20.0	---	108	80 - 120%	---	---	
1,1-Dichloropropene	19.4	---	1.00	ug/L	1	20.0	---	97	80 - 120%	---	---	
cis-1,3-Dichloropropene	20.8	---	1.00	ug/L	1	20.0	---	104	80 - 120%	---	---	
trans-1,3-Dichloropropene	22.5	---	1.00	ug/L	1	20.0	---	113	80 - 120%	---	---	
Hexachlorobutadiene	22.4	---	5.00	ug/L	1	20.0	---	112	80 - 120%	---	---	
Methylene chloride	17.8	---	10.0	ug/L	1	20.0	---	89	80 - 120%	---	---	
1,1,1,2-Tetrachloroethane	24.5	---	0.400	ug/L	1	20.0	---	<b>122</b>	<b>80 - 120%</b>	---	---	Q-56
1,1,2,2-Tetrachloroethane	22.7	---	0.500	ug/L	1	20.0	---	113	80 - 120%	---	---	
Tetrachloroethene (PCE)	22.5	---	0.400	ug/L	1	20.0	---	113	80 - 120%	---	---	
1,2,3-Trichlorobenzene	20.8	---	2.00	ug/L	1	20.0	---	104	80 - 120%	---	---	
1,2,4-Trichlorobenzene	21.3	---	2.00	ug/L	1	20.0	---	106	80 - 120%	---	---	
1,1,1-Trichloroethane	20.9	---	0.400	ug/L	1	20.0	---	104	80 - 120%	---	---	
1,1,2-Trichloroethane	21.2	---	0.500	ug/L	1	20.0	---	106	80 - 120%	---	---	
Trichloroethene (TCE)	19.7	---	0.400	ug/L	1	20.0	---	99	80 - 120%	---	---	
Trichlorofluoromethane	32.0	---	2.00	ug/L	1	20.0	---	<b>160</b>	<b>80 - 120%</b>	---	---	Q-56
1,2,3-Trichloropropane	22.3	---	1.00	ug/L	1	20.0	---	111	80 - 120%	---	---	
Vinyl chloride	21.8	---	0.400	ug/L	1	20.0	---	109	80 - 120%	---	---	
Surr: 1,4-Difluorobenzene (Surr) Recovery: 96 % Limits: 80-120 % Dilution: 1x												
Toluene-d8 (Surr) 100 % 80-120 % "												
4-Bromofluorobenzene (Surr) 96 % 80-120 % "												



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 10</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0333 - 03 31 20 0753
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030468 - EPA 5030B</b>						<b>Water</b>						
<b>Blank (0030468-BLK1)</b>	Prepared: 03/13/20 09:00					Analyzed: 03/13/20 11:45						
<u>EPA 8260C</u>												
Bromobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Bromochloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Bromodichloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Bromoform	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Bromomethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	
Carbon tetrachloride	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Chlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Chloroethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	EST
Chloroform	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Chloromethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	
2-Chlorotoluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
4-Chlorotoluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Dibromochloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Dibromomethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
cis-1,2-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	---	---	---	---	---	---	
Methylene chloride	ND	---	10.0	ug/L	1	---	---	---	---	---	---	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 1C</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0333 - 03 31 20 0753
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030468 - EPA 5030B</b>												
<b>Water</b>												
<b>Blank (0030468-BLK1)</b>												
			Prepared: 03/13/20 09:00			Analyzed: 03/13/20 11:45						
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Tetrachloroethene (PCE)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Trichloroethene (TCE)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Vinyl chloride	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 102 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>102 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>99 %</i>		<i>80-120 %</i>		<i>"</i>						

<b>LCS (0030468-BS1)</b>												
			Prepared: 03/13/20 09:00			Analyzed: 03/13/20 10:51						
<b>EPA 8260C</b>												
Bromobenzene	21.8	---	0.500	ug/L	1	20.0	---	109	80 - 120%	---	---	
Bromochloromethane	20.8	---	1.00	ug/L	1	20.0	---	104	80 - 120%	---	---	
Bromodichloromethane	21.4	---	1.00	ug/L	1	20.0	---	107	80 - 120%	---	---	
Bromoform	28.1	---	1.00	ug/L	1	20.0	---	<b>140</b>	<b>80 - 120%</b>	---	---	Q-56
Bromomethane	29.3	---	5.00	ug/L	1	20.0	---	<b>147</b>	<b>80 - 120%</b>	---	---	Q-56
Carbon tetrachloride	24.1	---	1.00	ug/L	1	20.0	---	120	80 - 120%	---	---	
Chlorobenzene	21.0	---	0.500	ug/L	1	20.0	---	105	80 - 120%	---	---	
Chloroethane	26.9	---	5.00	ug/L	1	20.0	---	<b>135</b>	<b>80 - 120%</b>	---	---	Q-56, EST
Chloroform	19.3	---	1.00	ug/L	1	20.0	---	97	80 - 120%	---	---	
Chloromethane	17.9	---	5.00	ug/L	1	20.0	---	90	80 - 120%	---	---	
2-Chlorotoluene	20.2	---	1.00	ug/L	1	20.0	---	101	80 - 120%	---	---	
4-Chlorotoluene	18.8	---	1.00	ug/L	1	20.0	---	94	80 - 120%	---	---	
Dibromochloromethane	24.5	---	1.00	ug/L	1	20.0	---	<b>123</b>	<b>80 - 120%</b>	---	---	Q-56
1,2-Dibromo-3-chloropropane	20.3	---	5.00	ug/L	1	20.0	---	102	80 - 120%	---	---	
1,2-Dibromoethane (EDB)	21.3	---	0.500	ug/L	1	20.0	---	107	80 - 120%	---	---	
Dibromomethane	20.3	---	1.00	ug/L	1	20.0	---	102	80 - 120%	---	---	
1,2-Dichlorobenzene	21.0	---	0.500	ug/L	1	20.0	---	105	80 - 120%	---	---	

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Lisa Domenighini, Client Services Manager





<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 1C</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0333 - 03 31 20 0753
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030468 - EPA 5030B</b>						<b>Water</b>						
<b>LCS (0030468-BS1)</b>			Prepared: 03/13/20 09:00		Analyzed: 03/13/20 10:51							
1,3-Dichlorobenzene	20.7	---	0.500	ug/L	1	20.0	---	104	80 - 120%	---	---	
1,4-Dichlorobenzene	20.6	---	0.500	ug/L	1	20.0	---	103	80 - 120%	---	---	
Dichlorodifluoromethane	23.2	---	1.00	ug/L	1	20.0	---	116	80 - 120%	---	---	
1,1-Dichloroethane	18.1	---	0.400	ug/L	1	20.0	---	91	80 - 120%	---	---	
1,2-Dichloroethane (EDC)	20.3	---	0.400	ug/L	1	20.0	---	101	80 - 120%	---	---	
1,1-Dichloroethene	19.6	---	0.400	ug/L	1	20.0	---	98	80 - 120%	---	---	
cis-1,2-Dichloroethene	17.9	---	0.400	ug/L	1	20.0	---	89	80 - 120%	---	---	
trans-1,2-Dichloroethene	18.3	---	0.400	ug/L	1	20.0	---	91	80 - 120%	---	---	
1,2-Dichloropropane	17.7	---	0.500	ug/L	1	20.0	---	89	80 - 120%	---	---	
1,3-Dichloropropane	20.2	---	1.00	ug/L	1	20.0	---	101	80 - 120%	---	---	
2,2-Dichloropropane	20.8	---	1.00	ug/L	1	20.0	---	104	80 - 120%	---	---	
1,1-Dichloropropene	18.7	---	1.00	ug/L	1	20.0	---	94	80 - 120%	---	---	
cis-1,3-Dichloropropene	20.1	---	1.00	ug/L	1	20.0	---	100	80 - 120%	---	---	
trans-1,3-Dichloropropene	22.2	---	1.00	ug/L	1	20.0	---	111	80 - 120%	---	---	
Hexachlorobutadiene	22.2	---	5.00	ug/L	1	20.0	---	111	80 - 120%	---	---	
Methylene chloride	17.7	---	10.0	ug/L	1	20.0	---	88	80 - 120%	---	---	
1,1,1,2-Tetrachloroethane	24.8	---	0.400	ug/L	1	20.0	---	<b>124</b>	<b>80 - 120%</b>	---	---	Q-56
1,1,1,2,2-Tetrachloroethane	22.8	---	0.500	ug/L	1	20.0	---	114	80 - 120%	---	---	
Tetrachloroethene (PCE)	22.7	---	0.400	ug/L	1	20.0	---	113	80 - 120%	---	---	
1,2,3-Trichlorobenzene	21.8	---	2.00	ug/L	1	20.0	---	109	80 - 120%	---	---	
1,2,4-Trichlorobenzene	21.3	---	2.00	ug/L	1	20.0	---	106	80 - 120%	---	---	
1,1,1-Trichloroethane	20.8	---	0.400	ug/L	1	20.0	---	104	80 - 120%	---	---	
1,1,2-Trichloroethane	21.3	---	0.500	ug/L	1	20.0	---	107	80 - 120%	---	---	
Trichloroethene (TCE)	19.6	---	0.400	ug/L	1	20.0	---	98	80 - 120%	---	---	
Trichlorofluoromethane	33.1	---	2.00	ug/L	1	20.0	---	<b>166</b>	<b>80 - 120%</b>	---	---	Q-56
1,2,3-Trichloropropane	22.5	---	1.00	ug/L	1	20.0	---	113	80 - 120%	---	---	
Vinyl chloride	20.9	---	0.400	ug/L	1	20.0	---	105	80 - 120%	---	---	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 97 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>100 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>94 %</i>		<i>80-120 %</i>		<i>"</i>						



**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
 Tigard, OR 97223  
 503-718-2323  
 EPA ID: OR01039

<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 10</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0333 - 03 31 20 0753
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Ammonia by Gas Diffusion and Colorimetric Detection**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030414 - Method Prep: Aq</b>						<b>Water</b>						
<b>Blank (0030414-BLK1)</b>		Prepared: 03/12/20 08:06 Analyzed: 03/12/20 14:36										
<b>SM 4500-NH3 G</b>												
Ammonia as N	ND	---	0.0200	mg/L	1	---	---	---	---	---	---	
<b>LCS (0030414-BS1)</b>		Prepared: 03/12/20 08:06 Analyzed: 03/12/20 14:37										
<b>SM 4500-NH3 G</b>												
Ammonia as N	2.02	---	0.0200	mg/L	1	2.00	---	101	90 - 110%	---	---	

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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Ammonia by Gas Diffusion and Colorimetric Detection**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030686 - Method Prep: Aq</b>						<b>Water</b>						
<b>Blank (0030686-BLK1)</b>		Prepared: 03/19/20 09:52 Analyzed: 03/19/20 12:55										
<b>SM 4500-NH3 G</b>												
Ammonia as N	ND	---	0.0200	mg/L	1	---	---	---	---	---	---	---
<b>LCS (0030686-BS1)</b>		Prepared: 03/19/20 09:52 Analyzed: 03/19/20 12:57										
<b>SM 4500-NH3 G</b>												
Ammonia as N	2.02	---	0.0200	mg/L	1	2.00	---	101	90 - 110%	---	---	---

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 10</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0333 - 03 31 20 0753
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Anions by Ion Chromatography**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030371 - Method Prep: Aq</b>						<b>Water</b>						
<b>Blank (0030371-BLK1)</b>		Prepared: 03/11/20 09:11 Analyzed: 03/11/20 10:54										
<b>EPA 300.0</b>												
Nitrate-Nitrogen	ND	---	0.250	mg/L	1	---	---	---	---	---	---	---
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	---	---	---	---	---	---	---
<b>LCS (0030371-BS1)</b>		Prepared: 03/11/20 09:11 Analyzed: 03/11/20 11:16										
<b>EPA 300.0</b>												
Nitrate-Nitrogen	2.06	---	0.250	mg/L	1	2.00	---	103	90 - 110%	---	---	---
Nitrite-Nitrogen	2.17	---	0.250	mg/L	1	2.00	---	108	90 - 110%	---	---	---
<b>Duplicate (0030371-DUP1)</b>		Prepared: 03/11/20 09:11 Analyzed: 03/11/20 12:42										
<b>QC Source Sample: MW-13 (A0C0333-03)</b>												
<b>EPA 300.0</b>												
Nitrate-Nitrogen	ND	---	0.250	mg/L	1	---	ND	---	---	---	10%	---
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	---	ND	---	---	---	10%	---
<b>Matrix Spike (0030371-MS1)</b>		Prepared: 03/11/20 09:11 Analyzed: 03/11/20 13:03										
<b>QC Source Sample: MW-13 (A0C0333-03)</b>												
<b>EPA 300.0</b>												
Nitrate-Nitrogen	2.49	---	0.312	mg/L	1	2.50	ND	100	80 - 120%	---	---	---
Nitrite-Nitrogen	2.75	---	0.312	mg/L	1	2.50	ND	110	80 - 120%	---	---	---



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 10</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0333 - 03 31 20 0753
--	---	--

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Total Organic Carbon (Non-Purgeable) by Persulfate Oxidation by Standard Method 5310C**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030456 - Method Prep: Aq</b>						<b>Water</b>						
<b>Blank (0030456-BLK1)</b>		Prepared: 03/13/20 10:21 Analyzed: 03/13/20 15:59										
<b>SM 5310 C</b>												
Total Organic Carbon	ND	---	1.00	mg/L	1	---	---	---	---	---	---	---
<b>LCS (0030456-BS1)</b>		Prepared: 03/13/20 10:21 Analyzed: 03/13/20 16:33										
<b>SM 5310 C</b>												
Total Organic Carbon	10.3	---	1.00	mg/L	1	10.0	---	103	85 - 115%	---	---	---
<b>LCS (0030456-BS2)</b>		Prepared: 03/13/20 10:21 Analyzed: 03/13/20 15:29										
<b>SM 5310 C</b>												
Total Organic Carbon	ND	---	1.00	mg/L	1	0.00	---		<b>85 - 115%</b>	---	---	TOC_1



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 10</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0333 - 03 31 20 0753
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Total Organic Carbon (Non-Purgeable) by Persulfate Oxidation by Standard Method 5310C**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030595 - Method Prep: Aq</b>						<b>Water</b>						
<b>Blank (0030595-BLK1)</b>		Prepared: 03/17/20 11:26 Analyzed: 03/17/20 15:49										
<b>SM 5310 C</b>												
Total Organic Carbon	ND	---	1.00	mg/L	1	---	---	---	---	---	---	
<b>LCS (0030595-BS1)</b>		Prepared: 03/17/20 11:26 Analyzed: 03/17/20 16:23										
<b>SM 5310 C</b>												
Total Organic Carbon	10.4	---	1.00	mg/L	1	10.0	---	104	85 - 115%	---	---	
<b>LCS (0030595-BS2)</b>		Prepared: 03/17/20 11:26 Analyzed: 03/17/20 15:18										
<b>SM 5310 C</b>												
Total Organic Carbon	ND	---	1.00	mg/L	1	0.00	---		85 - 115%	---	---	TOC_I
<b>LCS (0030595-BS3)</b>		Prepared: 03/17/20 11:26 Analyzed: 03/18/20 13:27										
<b>SM 5310 C</b>												
Total Organic Carbon	ND	---	1.00	mg/L	1	0.00	---		85 - 115%	---	---	Q-16, TOC_I



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 10</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0333 - 03 31 20 0753
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**SAMPLE PREPARATION INFORMATION**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Prep: EPA 5030B

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 0030369</u>							
A0C0333-01	Water	EPA 8260C	03/10/20 09:51	03/11/20 10:51	5mL/5mL	5mL/5mL	1.00
A0C0333-02	Water	EPA 8260C	03/10/20 10:55	03/11/20 10:51	5mL/5mL	5mL/5mL	1.00
A0C0333-03	Water	EPA 8260C	03/10/20 11:52	03/11/20 10:51	5mL/5mL	5mL/5mL	1.00
A0C0333-04	Water	EPA 8260C	03/10/20 12:45	03/11/20 10:51	5mL/5mL	5mL/5mL	1.00
A0C0333-05	Water	EPA 8260C	03/10/20 13:35	03/11/20 10:51	5mL/5mL	5mL/5mL	1.00
A0C0333-06	Water	EPA 8260C	03/10/20 14:22	03/11/20 10:51	5mL/5mL	5mL/5mL	1.00
<u>Batch: 0030468</u>							
A0C0333-01RE1	Water	EPA 8260C	03/10/20 09:51	03/12/20 11:36	5mL/5mL	5mL/5mL	1.00

**Ammonia by Gas Diffusion and Colorimetric Detection**

Prep: Method Prep: Aq

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 0030414</u>							
A0C0333-01	Water	SM 4500-NH3 G	03/10/20 09:51	03/12/20 08:06	10mL/10mL	10mL/10mL	1.00
A0C0333-03	Water	SM 4500-NH3 G	03/10/20 11:52	03/12/20 08:06	10mL/10mL	10mL/10mL	1.00
A0C0333-04	Water	SM 4500-NH3 G	03/10/20 12:45	03/12/20 08:06	10mL/10mL	10mL/10mL	1.00
A0C0333-05	Water	SM 4500-NH3 G	03/10/20 13:35	03/12/20 08:06	10mL/10mL	10mL/10mL	1.00
A0C0333-06	Water	SM 4500-NH3 G	03/10/20 14:22	03/12/20 08:06	10mL/10mL	10mL/10mL	1.00
<u>Batch: 0030686</u>							
A0C0333-02RE2	Water	SM 4500-NH3 G	03/10/20 10:55	03/19/20 09:52	10mL/10mL	10mL/10mL	1.00

**Anions by Ion Chromatography**

Prep: Method Prep: Aq

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 0030371</u>							
A0C0333-01	Water	EPA 300.0	03/10/20 09:51	03/11/20 09:11	5mL/5mL	5mL/5mL	1.00
A0C0333-01RE1	Water	EPA 300.0	03/10/20 09:51	03/11/20 09:11	5mL/5mL	5mL/5mL	1.00
A0C0333-02RE1	Water	EPA 300.0	03/10/20 10:55	03/11/20 09:11	5mL/5mL	5mL/5mL	1.00
A0C0333-03	Water	EPA 300.0	03/10/20 11:52	03/11/20 09:11	5mL/5mL	5mL/5mL	1.00
A0C0333-04	Water	EPA 300.0	03/10/20 12:45	03/11/20 09:11	5mL/5mL	5mL/5mL	1.00
A0C0333-05	Water	EPA 300.0	03/10/20 13:35	03/11/20 09:11	5mL/5mL	5mL/5mL	1.00
A0C0333-06	Water	EPA 300.0	03/10/20 14:22	03/11/20 09:11	5mL/5mL	5mL/5mL	1.00
A0C0333-06RE1	Water	EPA 300.0	03/10/20 14:22	03/11/20 09:11	5mL/5mL	5mL/5mL	1.00

Apex Laboratories

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Lisa Domenighini, Client Services Manager



**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 10</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0333 - 03 31 20 0753
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**SAMPLE PREPARATION INFORMATION**

Anions by Ion Chromatography

Total Organic Carbon (Non-Purgeable) by Persulfate Oxidation by Standard Method 5310C

Prep: Method Prep: Aq					Sample	Default	RL Prep
Lab Number	Matrix	Method	Sampled	Prepared	Initial/Final	Initial/Final	Factor
<u>Batch: 0030595</u>							
A0C0333-03RE1	Water	SM 5310 C	03/10/20 11:52	03/17/20 11:26	40mL/40mL	40mL/40mL	1.00

Apex Laboratories

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Lisa Domenighini, Client Services Manager





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**QUALIFIER DEFINITIONS**

**Client Sample and Quality Control (QC) Sample Qualifier Definitions:**

**Apex Laboratories**

- EST** Result reported as an Estimated Value. Results estimated. Initial Calibration Verification Standard (ICV) failed low.
- Q-16** Reanalysis of an original Batch QC sample.
- Q-56** Daily CCV/LCS recovery for this analyte was above the +/-20% criteria listed in EPA 8260C
- TOC\_I** Inorganic Carbon Spike Check. Results are valid if Non Detect (No Inorganic Carbon detected.)

Apex Laboratories

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**REPORTING NOTES AND CONVENTIONS:**

**Abbreviations:**

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported.
- RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

**Detection Limits: Limit of Detection (LOD)**

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('----'), then the data has not been evaluated below the Reporting Limit.

**Reporting Limits: Limit of Quantitation (LOQ)**

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

**Reporting Conventions:**

- Basis: Results for soil samples are generally reported on a 100% dry weight basis. The Result Basis is listed following the units as "dry", "wet", or "" (blank) designation.
  - "dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.
  - "wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
  - "" Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

**QC Source:**

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) are not included in this report. Please request a Full QC report if this data is required.

**Miscellaneous Notes:**

- " --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- " \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

**Blanks:**

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 1/2 the Reporting Limit (RL).  
-For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.  
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.  
For further details, please request a copy of this document.

Apex Laboratories

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 10</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0333 - 03 31 20 0753
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**REPORTING NOTES AND CONVENTIONS (Cont.):**

**Blanks (Cont.):**

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

**Preparation Notes:**

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

**Sampling and Preservation Notes:**

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

Apex Laboratories

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Lisa Domenighini, Client Services Manager



**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
**EPA ID: OR01039**

<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 10</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0333 - 03 31 20 0753
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**LABORATORY ACCREDITATION INFORMATION**

**TNI Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039**

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

**Apex Laboratories**

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation
<u>All reported analytes are included in Apex Laboratories' current ORELAP scope.</u>					

**Secondary Accreditations**

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

**Subcontract Laboratory Accreditations**

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

**Field Testing Parameters**

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

Lisa Domenighini, Client Services Manager

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

**Cascadia Associates** Project: **Shore Terminal-Vancouver**  
 5820 SW Kelly Ave Unit B Project Number: **NuStar Vancouver GWM 1C**  
 Portland, OR 97239 Project Manager: **Stephanie Salisbury** Report ID:  
**A0C0333 - 03 31 20 0753**

**APEX LABS** 6700 SW Sandburg St., Tigard, OR 97223 Ph: 503-718-2323  
**CHAIN OF CUSTODY** Lab # A0C0333 COC # of 1

Company: Cascadia Associates Project Mgr: Stephanie Salisbury Project Name: NuStar Vancouver GWM 1C Project #:  
 Address: 5820 SW Kelly Ave, Portland, OR Phone: 904-6577 Email: stephsalibury@cascadiassociates.com

Sampled by: J. Weatherford

Site Location:  
 OR WA CA  
 AK ID

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-DX	NWTPH-GX	8260 RBDM VOCs	8260 Halo VOCs	8260 VOCs Full List	8270 SIM PAHs	8270 Semi-Vols Full List	8082 PCBs	8081 Pest	RCA Metals (8)	Priority Metals (13)	AL, Sb, As, Ba, Be, Cd, Ca, Cr, Cu, Fe, Pb, Hg, Mn, Ni, Zn, Mo, Ni, K, Se, Ag, Na, TL	TCLP Metals (8)	TOTAL DISS. TCLP	ARCHIVE	
MW-3		3/10/19	957	GW																		
MW-1			055																			
MW-13			1152																			
S-1			1245																			
S-2			1335																			
MW-17			1422																			
Trip Blank																						

ANALYSIS REQUEST

SPECIAL INSTRUCTIONS:  
 \* Same list as Nu Star Vancouver HQ 19 + Ethane/Ethane/Methane, and TDC by RSL-175 for MW-15

TAT Requested (circle):  
 1 Day 2 Day 3 Day 4 DAY 5 DAY Other:

SAMPLES ARE HELD FOR 30 DAYS

RELINQUISHED BY:  
 Signature: [Signature] Date: 3/10  
 Printed Name: Jon Weatherford Time: 1624  
 Company: Cascadia Assoc.

RECEIVED BY:  
 Signature: [Signature] Date: 3/10/20  
 Printed Name: Charmis Haysan Time: 1624  
 Company: Apex Lab

*Lisa Domenighini*



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 1C</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0333 - 03 31 20 0753
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**APEX LABS COOLER RECEIPT FORM**

Client: Cascadia Element WO#: A0 C0333

Project/Project #: NuStar Vancouver GWM 1C20

**Delivery Info:**  
Date/time received: 3/10/20 @ 1624 By: CFH  
Delivered by: Apex  Client  ESS  FedEx  UPS  Swift  Servoy  SDS  Other

**Cooler Inspection** Date/time inspected: 3/10/20 @ 1719 By: CFH  
Chain of Custody included? Yes  No  Custody seals? Yes  No   
Signed/dated by client? Yes  No   
Signed/dated by Apex? Yes  No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	<u>5.1</u>						
Received on ice? (Y/N)	<u>Y</u>						
Temp. blanks? (Y/N)	<u>Y</u>						
Ice type: (Gel/Real/Other)	<u>Real</u>						
Condition:	<u>Good</u>						

Cooler out of temp? (Y/N) Possible reason why: \_\_\_\_\_  
If some coolers are in temp and some out, were green dots applied to out of temperature samples? Yes/No/NA NA  
Out of temperature samples form initiated? Yes/No/NA NA

**Samples Inspection:** Date/time inspected: 3/10/20 @ 1815 By: CFH  
All samples intact? Yes  No  Comments: \_\_\_\_\_  
Bottle labels/COCs agree? Yes  No  Comments: \_\_\_\_\_  
COC/container discrepancies form initiated? Yes  No  NA   
Containers/volumes received appropriate for analysis? Yes  No  Comments: \_\_\_\_\_  
Do VOA vials have visible headspace? Yes  No  NA   
Comments: MW-17 1/3 HS  
Water samples: pH checked: Yes  No  NA  pH appropriate? Yes  No  NA   
Comments: \_\_\_\_\_  
Additional information: TB # 2264

Labeled by: CFH Witness: [Signature] Cooler Inspected by: CFH See Project Contact Form: Y

*Lisa Domenighini*

March 30, 2020

Apex Laboratories  
ATTN: Lisa Domenighini  
6700 S.W. Sandburg St.  
Tigard, OR 97223



LA Cert #04140  
EPA Methods TO3, TO14A, TO15, 25C/3C,  
RSK-175

TX Cert T104704450-14-6  
EPA Methods TO14A, TO15

UT Cert CA0133332015-3  
EPA Methods TO3, TO14A, TO15, RSK-175

### LABORATORY TEST RESULTS

Project Reference: A0C0333  
Lab Number: L031203-01

Enclosed are results for sample(s) received 3/12/20 by Air Technology Laboratories. Sample was received intact and chilled to 6° C. Analyses were performed according to specifications on the chain of custody provided with the sample(s).

#### Report Narrative:

- Unless otherwise noted in the report, sample analyses were performed within method performance criteria and meet all requirements of the TNI Standards.
- The enclosed results relate only to the sample(s).

ATL appreciates the opportunity to provide testing services to your company. If you have any questions regarding these results, please call me at (626) 964-4032.

Sincerely,

A handwritten signature in blue ink, appearing to read "M. Johnson".

Mark Johnson  
Operations Manager  
MJohnson@AirTechLabs.com

Note: The cover letter is an integral part of this analytical report.

SUBCONTRACT ORDER

Lo31203-01

Apex Laboratories

WAD 3/11/2020

A0C0333

OB 3/11/20

SENDING LABORATORY:

Apex Laboratories  
6700 S.W. Sandburg Street  
Tigard, OR 97223  
Phone: (503) 718-2323  
Fax: (503) 336-0745  
Project Manager: Lisa Domenighini

RECEIVING LABORATORY:

Air Technology Laboratories, Inc  
18501 E. Gale Ave Suite 130  
City of Industry, CA 91748  
Phone : (626) 964-4032  
Fax: (626) 964-5832


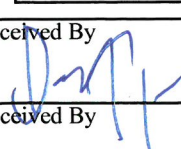
Sample Name: MW-13 Water Sampled: 03/10/20 11:52 (A0C0333-03)

Analysis	Due	Expires	Comments
RSK 175 Preserved (Meth, Eth, Eth) (Sub)	03/23/20 17:00	03/24/20 11:52	
<i>Containers Supplied:</i>			
(F)40 mL VOA - HCL			
(G)40 mL VOA - HCL			

Standard TAT

Tracking#: 1Zx4720R0196882107<sup>157</sup>

6°C

Released By 	Date 3/11/20	Received By 	Date 3/12/20
UPS (Shipper)		UPS (Shipper)	
Released By	Date	Received By	Date



Client: Apex Laboratories  
 Attn: Lisa Domenighini  
 Project Name: NA  
 Project No.: A0C0333  
 Date Received: 03/12/20  
 Matrix: Water  
 Reporting Units: ug/L

RSK175

Lab No.:	L031203-01						
Client Sample I.D.:	MW-13 (A0C0333-03)						
Date/Time Sampled:	3/10/20 11:52						
Date/Time Analyzed:	3/24/20 9:33						
QC Batch No.:	200324GC8A1						
Analyst Initials:	CM						
Dilution Factor:	1.0						
<b>ANALYTE</b>	<b>Result ug/L</b>	<b>RL ug/L</b>					
Ethene	18	1.0					
Ethane	40	1.0					
Methane	8,300	1.0					

ND = Not Detected (below RL)  
 RL = Reporting Limit

Reviewed/Approved By: Mark Johnson  
 Mark Johnson  
 Operations Manager

Date: 3/30/20

The cover letter is an integral part of this analytical report



QC Batch No: 200324GC8A1

Matrix: Water

Reporting Units: ug/L

**RSK 175**  
**LABORATORY CONTROL SAMPLE SUMMARY**

Lab No.:	METHOD BLANK		LCS			LCSD		Limits			
Date/Time Analyzed:	3/24/20 8:52		3/24/20 9:05			3/24/20 9:17					
Analyst Initials:	CM		CM			CM					
Dilution Factor:	1.1		1.0			1.0					
ANALYTE	Result ug/L	RL ug/L	SPIKE AMT. ug/L	Result ug/L	% Rec.	Result ug/L	% Rec.	RPD %	Low %Rec	High %Rec	Max. RPD
Ethene	ND	1.0	1,150	1,310	115	1,310	115	0.0	70	130	30
Ethane	ND	1.0	1,200	1,420	116	1,350	110	5.4	70	130	30
Methane	ND	1.0	650	740	113	693	106	6.6	70	130	30

ND = Not Detected (below RL)

RL = Reporting Limit

Reviewed/Approved By: Mark Johnson 1  
Mark Johnson  
Operations Manager

Date: 3/30/20

The cover letter is an integral part of this analytical report





**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

Tuesday, March 31, 2020

Stephanie Salisbury  
Cascadia Associates  
5820 SW Kelly Ave Unit B  
Portland, OR 97239

RE: A0C0428 - Shore Terminal-Vancouver - Nustar Vancouver GWM 1Q20

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A0C0428, which was received by the laboratory on 3/12/2020 at 4:21:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [ldomenighini@apex-labs.com](mailto:ldomenighini@apex-labs.com), or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of sample receipt, unless prior arrangements have been made.

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Cooler Receipt Information

(See Cooler Receipt Form for details)

Cooler #1	4.9 degC	Cooler #2	4.9 degC
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This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.

All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver GWM 1C</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0428 - 03 31 20 0912
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**ANALYTICAL REPORT FOR SAMPLES**

**SAMPLE INFORMATION**

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MGMS1-60	A0C0428-01	Water	03/12/20 10:15	03/12/20 16:21
MGMS2-40	A0C0428-02	Water	03/12/20 10:50	03/12/20 16:21
MGMS2-60	A0C0428-03	Water	03/12/20 11:20	03/12/20 16:21
MW-25i	A0C0428-04	Water	03/12/20 12:30	03/12/20 16:21
MW-24d	A0C0428-05	Water	03/12/20 13:20	03/12/20 16:21
MGMS3-40	A0C0428-06	Water	03/12/20 14:00	03/12/20 16:21
MGMS3-60	A0C0428-07	Water	03/12/20 14:50	03/12/20 16:21
MW-22i	A0C0428-08	Water	03/12/20 08:24	03/12/20 16:21
MW-21i-105	A0C0428-09	Water	03/12/20 09:33	03/12/20 16:21
MW-2	A0C0428-10	Water	03/12/20 10:35	03/12/20 16:21
MW-6	A0C0428-11	Water	03/12/20 11:24	03/12/20 16:21
MW-19i	A0C0428-12	Water	03/12/20 12:09	03/12/20 16:21
MW-5	A0C0428-13	Water	03/12/20 13:07	03/12/20 16:21
MW-23i	A0C0428-14	Water	03/12/20 14:03	03/12/20 16:21
MW-24i	A0C0428-15	Water	03/12/20 14:46	03/12/20 16:21
Trip Blank	A0C0428-16	Water	03/12/20 00:00	03/12/20 16:21



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Cascadia Associates

5820 SW Kelly Ave Unit B  
Portland, OR 97239

Project: Shore Terminal-Vancouver

Project Number: Nustar Vancouver GWM 1C

Project Manager: Stephanie Salisbury

Report ID:

A0C0428 - 03 31 20 0912

**ANALYTICAL CASE NARRATIVE**

Work Order: A0C0428

Subcontract

This report is not complete without the attached subcontract laboratory report for RSK 175 from Air Technology.

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver GWM 1C</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0C0428 - 03 31 20 0912</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MGMS1-60 (A0C0428-01)</b>				<b>Matrix: Water</b>		<b>Batch: 0030515</b>		
Bromobenzene	ND	---	0.500	ug/L	1	03/14/20 19:52	EPA 8260C	
Bromochloromethane	ND	---	1.00	ug/L	1	03/14/20 19:52	EPA 8260C	
Bromodichloromethane	ND	---	1.00	ug/L	1	03/14/20 19:52	EPA 8260C	
Bromoform	ND	---	1.00	ug/L	1	03/14/20 19:52	EPA 8260C	
Bromomethane	ND	---	5.00	ug/L	1	03/14/20 19:52	EPA 8260C	
Carbon tetrachloride	ND	---	1.00	ug/L	1	03/14/20 19:52	EPA 8260C	
Chlorobenzene	ND	---	0.500	ug/L	1	03/14/20 19:52	EPA 8260C	
Chloroethane	ND	---	5.00	ug/L	1	03/14/20 19:52	EPA 8260C	EST
Chloroform	ND	---	1.00	ug/L	1	03/14/20 19:52	EPA 8260C	
Chloromethane	ND	---	5.00	ug/L	1	03/14/20 19:52	EPA 8260C	
2-Chlorotoluene	ND	---	1.00	ug/L	1	03/14/20 19:52	EPA 8260C	
4-Chlorotoluene	ND	---	1.00	ug/L	1	03/14/20 19:52	EPA 8260C	
Dibromochloromethane	ND	---	1.00	ug/L	1	03/14/20 19:52	EPA 8260C	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	03/14/20 19:52	EPA 8260C	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	03/14/20 19:52	EPA 8260C	
Dibromomethane	ND	---	1.00	ug/L	1	03/14/20 19:52	EPA 8260C	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	03/14/20 19:52	EPA 8260C	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	03/14/20 19:52	EPA 8260C	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	03/14/20 19:52	EPA 8260C	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	03/14/20 19:52	EPA 8260C	
<b>1,1-Dichloroethane</b>	<b>1.32</b>	---	0.400	ug/L	1	03/14/20 19:52	EPA 8260C	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	03/14/20 19:52	EPA 8260C	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	03/14/20 19:52	EPA 8260C	
<b>cis-1,2-Dichloroethene</b>	<b>15.6</b>	---	0.400	ug/L	1	03/14/20 19:52	EPA 8260C	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	03/14/20 19:52	EPA 8260C	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	03/14/20 19:52	EPA 8260C	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	03/14/20 19:52	EPA 8260C	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	03/14/20 19:52	EPA 8260C	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	03/14/20 19:52	EPA 8260C	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/14/20 19:52	EPA 8260C	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/14/20 19:52	EPA 8260C	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	03/14/20 19:52	EPA 8260C	
Methylene chloride	ND	---	10.0	ug/L	1	03/14/20 19:52	EPA 8260C	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	03/14/20 19:52	EPA 8260C	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	03/14/20 19:52	EPA 8260C	
<b>Tetrachloroethene (PCE)</b>	<b>26.5</b>	---	0.400	ug/L	1	03/14/20 19:52	EPA 8260C	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	03/14/20 19:52	EPA 8260C	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	03/14/20 19:52	EPA 8260C	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	03/14/20 19:52	EPA 8260C	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver GWM 1C</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0C0428 - 03 31 20 0912</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MGMS1-60 (A0C0428-01)</b>				<b>Matrix: Water</b>		<b>Batch: 0030515</b>		
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	03/14/20 19:52	EPA 8260C	
<b>Trichloroethene (TCE)</b>	<b>11.8</b>	---	0.400	ug/L	1	03/14/20 19:52	EPA 8260C	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	03/14/20 19:52	EPA 8260C	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	03/14/20 19:52	EPA 8260C	
Vinyl chloride	ND	---	0.400	ug/L	1	03/14/20 19:52	EPA 8260C	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 102 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>03/14/20 19:52</i>	<i>EPA 8260C</i>
<i>Toluene-d8 (Surr)</i>		<i>101 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/14/20 19:52</i>	<i>EPA 8260C</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>100 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/14/20 19:52</i>	<i>EPA 8260C</i>

<b>MGMS2-40 (A0C0428-02)</b>				<b>Matrix: Water</b>		<b>Batch: 0030515</b>		
Bromobenzene	ND	---	0.500	ug/L	1	03/14/20 20:19	EPA 8260C	
Bromochloromethane	ND	---	1.00	ug/L	1	03/14/20 20:19	EPA 8260C	
Bromodichloromethane	ND	---	1.00	ug/L	1	03/14/20 20:19	EPA 8260C	
Bromoform	ND	---	1.00	ug/L	1	03/14/20 20:19	EPA 8260C	
Bromomethane	ND	---	5.00	ug/L	1	03/14/20 20:19	EPA 8260C	
Carbon tetrachloride	ND	---	1.00	ug/L	1	03/14/20 20:19	EPA 8260C	
Chlorobenzene	ND	---	0.500	ug/L	1	03/14/20 20:19	EPA 8260C	
Chloroethane	ND	---	5.00	ug/L	1	03/14/20 20:19	EPA 8260C	EST
Chloroform	ND	---	1.00	ug/L	1	03/14/20 20:19	EPA 8260C	
Chloromethane	ND	---	5.00	ug/L	1	03/14/20 20:19	EPA 8260C	
2-Chlorotoluene	ND	---	1.00	ug/L	1	03/14/20 20:19	EPA 8260C	
4-Chlorotoluene	ND	---	1.00	ug/L	1	03/14/20 20:19	EPA 8260C	
Dibromochloromethane	ND	---	1.00	ug/L	1	03/14/20 20:19	EPA 8260C	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	03/14/20 20:19	EPA 8260C	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	03/14/20 20:19	EPA 8260C	
Dibromomethane	ND	---	1.00	ug/L	1	03/14/20 20:19	EPA 8260C	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	03/14/20 20:19	EPA 8260C	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	03/14/20 20:19	EPA 8260C	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	03/14/20 20:19	EPA 8260C	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	03/14/20 20:19	EPA 8260C	
<b>1,1-Dichloroethane</b>	<b>24.1</b>	---	0.400	ug/L	1	03/14/20 20:19	EPA 8260C	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	03/14/20 20:19	EPA 8260C	
<b>1,1-Dichloroethene</b>	<b>2.73</b>	---	0.400	ug/L	1	03/14/20 20:19	EPA 8260C	
<b>cis-1,2-Dichloroethene</b>	<b>105</b>	---	0.400	ug/L	1	03/14/20 20:19	EPA 8260C	
<b>trans-1,2-Dichloroethene</b>	<b>0.641</b>	---	0.400	ug/L	1	03/14/20 20:19	EPA 8260C	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	03/14/20 20:19	EPA 8260C	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	03/14/20 20:19	EPA 8260C	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	03/14/20 20:19	EPA 8260C	

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<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver GWM 1C</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0C0428 - 03 31 20 0912</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MGMS2-40 (A0C0428-02)</b>				<b>Matrix: Water</b>		<b>Batch: 0030515</b>		
1,1-Dichloropropene	ND	---	1.00	ug/L	1	03/14/20 20:19	EPA 8260C	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/14/20 20:19	EPA 8260C	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/14/20 20:19	EPA 8260C	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	03/14/20 20:19	EPA 8260C	
Methylene chloride	ND	---	10.0	ug/L	1	03/14/20 20:19	EPA 8260C	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	03/14/20 20:19	EPA 8260C	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	03/14/20 20:19	EPA 8260C	
<b>Tetrachloroethene (PCE)</b>	<b>86.3</b>	---	0.400	ug/L	1	03/14/20 20:19	EPA 8260C	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	03/14/20 20:19	EPA 8260C	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	03/14/20 20:19	EPA 8260C	
<b>1,1,1-Trichloroethane</b>	<b>0.453</b>	---	0.400	ug/L	1	03/14/20 20:19	EPA 8260C	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	03/14/20 20:19	EPA 8260C	
<b>Trichloroethene (TCE)</b>	<b>43.3</b>	---	0.400	ug/L	1	03/14/20 20:19	EPA 8260C	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	03/14/20 20:19	EPA 8260C	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	03/14/20 20:19	EPA 8260C	
<b>Vinyl chloride</b>	<b>134</b>	---	0.400	ug/L	1	03/14/20 20:19	EPA 8260C	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 103 %</i>		<i>Limits: 80-120 %</i>	<i>1</i>	<i>03/14/20 20:19</i>	<i>EPA 8260C</i>	
<i>Toluene-d8 (Surr)</i>		<i>101 %</i>		<i>80-120 %</i>	<i>1</i>	<i>03/14/20 20:19</i>	<i>EPA 8260C</i>	
<i>4-Bromofluorobenzene (Surr)</i>		<i>98 %</i>		<i>80-120 %</i>	<i>1</i>	<i>03/14/20 20:19</i>	<i>EPA 8260C</i>	

<b>MGMS2-60 (A0C0428-03)</b>				<b>Matrix: Water</b>		<b>Batch: 0030515</b>		
Bromobenzene	ND	---	0.500	ug/L	1	03/14/20 20:46	EPA 8260C	
Bromochloromethane	ND	---	1.00	ug/L	1	03/14/20 20:46	EPA 8260C	
Bromodichloromethane	ND	---	1.00	ug/L	1	03/14/20 20:46	EPA 8260C	
Bromoform	ND	---	1.00	ug/L	1	03/14/20 20:46	EPA 8260C	
Bromomethane	ND	---	5.00	ug/L	1	03/14/20 20:46	EPA 8260C	
Carbon tetrachloride	ND	---	1.00	ug/L	1	03/14/20 20:46	EPA 8260C	
Chlorobenzene	ND	---	0.500	ug/L	1	03/14/20 20:46	EPA 8260C	
Chloroethane	ND	---	5.00	ug/L	1	03/14/20 20:46	EPA 8260C	EST
Chloroform	ND	---	1.00	ug/L	1	03/14/20 20:46	EPA 8260C	
Chloromethane	ND	---	5.00	ug/L	1	03/14/20 20:46	EPA 8260C	
2-Chlorotoluene	ND	---	1.00	ug/L	1	03/14/20 20:46	EPA 8260C	
4-Chlorotoluene	ND	---	1.00	ug/L	1	03/14/20 20:46	EPA 8260C	
Dibromochloromethane	ND	---	1.00	ug/L	1	03/14/20 20:46	EPA 8260C	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	03/14/20 20:46	EPA 8260C	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	03/14/20 20:46	EPA 8260C	
Dibromomethane	ND	---	1.00	ug/L	1	03/14/20 20:46	EPA 8260C	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	03/14/20 20:46	EPA 8260C	

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Lisa Domenighini, Client Services Manager





<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver GWM 1C</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0C0428 - 03 31 20 0912</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MGMS2-60 (A0C0428-03)</b>				<b>Matrix: Water</b>		<b>Batch: 0030515</b>		
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	03/14/20 20:46	EPA 8260C	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	03/14/20 20:46	EPA 8260C	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	03/14/20 20:46	EPA 8260C	
<b>1,1-Dichloroethane</b>	<b>0.541</b>	---	0.400	ug/L	1	03/14/20 20:46	EPA 8260C	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	03/14/20 20:46	EPA 8260C	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	03/14/20 20:46	EPA 8260C	
<b>cis-1,2-Dichloroethene</b>	<b>12.3</b>	---	0.400	ug/L	1	03/14/20 20:46	EPA 8260C	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	03/14/20 20:46	EPA 8260C	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	03/14/20 20:46	EPA 8260C	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	03/14/20 20:46	EPA 8260C	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	03/14/20 20:46	EPA 8260C	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	03/14/20 20:46	EPA 8260C	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/14/20 20:46	EPA 8260C	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/14/20 20:46	EPA 8260C	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	03/14/20 20:46	EPA 8260C	
Methylene chloride	ND	---	10.0	ug/L	1	03/14/20 20:46	EPA 8260C	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	03/14/20 20:46	EPA 8260C	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	03/14/20 20:46	EPA 8260C	
<b>Tetrachloroethene (PCE)</b>	<b>21.7</b>	---	0.400	ug/L	1	03/14/20 20:46	EPA 8260C	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	03/14/20 20:46	EPA 8260C	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	03/14/20 20:46	EPA 8260C	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	03/14/20 20:46	EPA 8260C	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	03/14/20 20:46	EPA 8260C	
<b>Trichloroethene (TCE)</b>	<b>9.24</b>	---	0.400	ug/L	1	03/14/20 20:46	EPA 8260C	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	03/14/20 20:46	EPA 8260C	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	03/14/20 20:46	EPA 8260C	
<b>Vinyl chloride</b>	<b>0.642</b>	---	0.400	ug/L	1	03/14/20 20:46	EPA 8260C	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 101 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>03/14/20 20:46</i>	<i>EPA 8260C</i>
<i>Toluene-d8 (Surr)</i>		<i>101 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/14/20 20:46</i>	<i>EPA 8260C</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>99 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/14/20 20:46</i>	<i>EPA 8260C</i>

<b>MW-25i (A0C0428-04)</b>				<b>Matrix: Water</b>		<b>Batch: 0030526</b>		
Bromobenzene	ND	---	0.500	ug/L	1	03/16/20 13:44	EPA 8260C	
Bromochloromethane	ND	---	1.00	ug/L	1	03/16/20 13:44	EPA 8260C	
Bromodichloromethane	ND	---	1.00	ug/L	1	03/16/20 13:44	EPA 8260C	
Bromoform	ND	---	1.00	ug/L	1	03/16/20 13:44	EPA 8260C	
Bromomethane	ND	---	5.00	ug/L	1	03/16/20 13:44	EPA 8260C	
Carbon tetrachloride	ND	---	2.00	ug/L	1	03/16/20 13:44	EPA 8260C	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver GWM 1C</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0428 - 03 31 20 0912
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-25i (A0C0428-04)</b>				<b>Matrix: Water</b>		<b>Batch: 0030526</b>		
Chlorobenzene	ND	---	0.500	ug/L	1	03/16/20 13:44	EPA 8260C	
Chloroethane	ND	---	5.00	ug/L	1	03/16/20 13:44	EPA 8260C	EST
Chloroform	ND	---	1.00	ug/L	1	03/16/20 13:44	EPA 8260C	
Chloromethane	ND	---	5.00	ug/L	1	03/16/20 13:44	EPA 8260C	
2-Chlorotoluene	ND	---	1.00	ug/L	1	03/16/20 13:44	EPA 8260C	
4-Chlorotoluene	ND	---	1.00	ug/L	1	03/16/20 13:44	EPA 8260C	
Dibromochloromethane	ND	---	1.00	ug/L	1	03/16/20 13:44	EPA 8260C	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	03/16/20 13:44	EPA 8260C	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	03/16/20 13:44	EPA 8260C	
Dibromomethane	ND	---	1.00	ug/L	1	03/16/20 13:44	EPA 8260C	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	03/16/20 13:44	EPA 8260C	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	03/16/20 13:44	EPA 8260C	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	03/16/20 13:44	EPA 8260C	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	03/16/20 13:44	EPA 8260C	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	03/16/20 13:44	EPA 8260C	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	03/16/20 13:44	EPA 8260C	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	03/16/20 13:44	EPA 8260C	
cis-1,2-Dichloroethene	ND	---	0.400	ug/L	1	03/16/20 13:44	EPA 8260C	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	03/16/20 13:44	EPA 8260C	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	03/16/20 13:44	EPA 8260C	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	03/16/20 13:44	EPA 8260C	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	03/16/20 13:44	EPA 8260C	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	03/16/20 13:44	EPA 8260C	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/16/20 13:44	EPA 8260C	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/16/20 13:44	EPA 8260C	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	03/16/20 13:44	EPA 8260C	
Methylene chloride	ND	---	10.0	ug/L	1	03/16/20 13:44	EPA 8260C	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	03/16/20 13:44	EPA 8260C	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	03/16/20 13:44	EPA 8260C	
Tetrachloroethene (PCE)	ND	---	0.400	ug/L	1	03/16/20 13:44	EPA 8260C	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	03/16/20 13:44	EPA 8260C	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	03/16/20 13:44	EPA 8260C	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	03/16/20 13:44	EPA 8260C	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	03/16/20 13:44	EPA 8260C	
Trichloroethene (TCE)	ND	---	0.400	ug/L	1	03/16/20 13:44	EPA 8260C	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	03/16/20 13:44	EPA 8260C	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	03/16/20 13:44	EPA 8260C	
Vinyl chloride	ND	---	0.400	ug/L	1	03/16/20 13:44	EPA 8260C	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver GWM 1C</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0C0428 - 03 31 20 0912</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-25i (A0C0428-04)</b>				<b>Matrix: Water</b>		<b>Batch: 0030526</b>		
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 108 %</i>	<i>Limits: 80-120 %</i>	<i>1</i>		<i>03/16/20 13:44</i>	<i>EPA 8260C</i>	
<i>Toluene-d8 (Surr)</i>		<i>102 %</i>	<i>80-120 %</i>	<i>1</i>		<i>03/16/20 13:44</i>	<i>EPA 8260C</i>	
<i>4-Bromofluorobenzene (Surr)</i>		<i>96 %</i>	<i>80-120 %</i>	<i>1</i>		<i>03/16/20 13:44</i>	<i>EPA 8260C</i>	

<b>MW-24d (A0C0428-05)</b>				<b>Matrix: Water</b>		<b>Batch: 0030526</b>		
Bromobenzene	ND	---	0.500	ug/L	1	03/16/20 14:11	EPA 8260C	
Bromochloromethane	ND	---	1.00	ug/L	1	03/16/20 14:11	EPA 8260C	
Bromodichloromethane	ND	---	1.00	ug/L	1	03/16/20 14:11	EPA 8260C	
Bromoform	ND	---	1.00	ug/L	1	03/16/20 14:11	EPA 8260C	
Bromomethane	ND	---	5.00	ug/L	1	03/16/20 14:11	EPA 8260C	
Carbon tetrachloride	ND	---	2.00	ug/L	1	03/16/20 14:11	EPA 8260C	
Chlorobenzene	ND	---	0.500	ug/L	1	03/16/20 14:11	EPA 8260C	
Chloroethane	ND	---	5.00	ug/L	1	03/16/20 14:11	EPA 8260C	EST
Chloroform	ND	---	1.00	ug/L	1	03/16/20 14:11	EPA 8260C	
Chloromethane	ND	---	5.00	ug/L	1	03/16/20 14:11	EPA 8260C	
2-Chlorotoluene	ND	---	1.00	ug/L	1	03/16/20 14:11	EPA 8260C	
4-Chlorotoluene	ND	---	1.00	ug/L	1	03/16/20 14:11	EPA 8260C	
Dibromochloromethane	ND	---	1.00	ug/L	1	03/16/20 14:11	EPA 8260C	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	03/16/20 14:11	EPA 8260C	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	03/16/20 14:11	EPA 8260C	
Dibromomethane	ND	---	1.00	ug/L	1	03/16/20 14:11	EPA 8260C	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	03/16/20 14:11	EPA 8260C	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	03/16/20 14:11	EPA 8260C	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	03/16/20 14:11	EPA 8260C	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	03/16/20 14:11	EPA 8260C	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	03/16/20 14:11	EPA 8260C	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	03/16/20 14:11	EPA 8260C	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	03/16/20 14:11	EPA 8260C	
cis-1,2-Dichloroethene	ND	---	0.400	ug/L	1	03/16/20 14:11	EPA 8260C	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	03/16/20 14:11	EPA 8260C	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	03/16/20 14:11	EPA 8260C	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	03/16/20 14:11	EPA 8260C	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	03/16/20 14:11	EPA 8260C	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	03/16/20 14:11	EPA 8260C	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/16/20 14:11	EPA 8260C	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/16/20 14:11	EPA 8260C	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	03/16/20 14:11	EPA 8260C	
Methylene chloride	ND	---	10.0	ug/L	1	03/16/20 14:11	EPA 8260C	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	03/16/20 14:11	EPA 8260C	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver GWM 1C</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0428 - 03 31 20 0912
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-24d (A0C0428-05)</b>				<b>Matrix: Water</b>		<b>Batch: 0030526</b>		
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	03/16/20 14:11	EPA 8260C	
Tetrachloroethene (PCE)	ND	---	0.400	ug/L	1	03/16/20 14:11	EPA 8260C	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	03/16/20 14:11	EPA 8260C	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	03/16/20 14:11	EPA 8260C	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	03/16/20 14:11	EPA 8260C	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	03/16/20 14:11	EPA 8260C	
Trichloroethene (TCE)	ND	---	0.400	ug/L	1	03/16/20 14:11	EPA 8260C	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	03/16/20 14:11	EPA 8260C	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	03/16/20 14:11	EPA 8260C	
Vinyl chloride	ND	---	0.400	ug/L	1	03/16/20 14:11	EPA 8260C	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 110 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>03/16/20 14:11</i>	<i>EPA 8260C</i>
<i>Toluene-d8 (Surr)</i>		<i>103 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/16/20 14:11</i>	<i>EPA 8260C</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>99 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/16/20 14:11</i>	<i>EPA 8260C</i>

<b>MGMS3-40 (A0C0428-06)</b>				<b>Matrix: Water</b>		<b>Batch: 0030514</b>		
Bromobenzene	ND	---	0.500	ug/L	1	03/14/20 19:35	EPA 8260C	
Bromochloromethane	ND	---	1.00	ug/L	1	03/14/20 19:35	EPA 8260C	
Bromodichloromethane	ND	---	1.00	ug/L	1	03/14/20 19:35	EPA 8260C	
Bromoform	ND	---	1.00	ug/L	1	03/14/20 19:35	EPA 8260C	
Bromomethane	ND	---	5.00	ug/L	1	03/14/20 19:35	EPA 8260C	
Carbon tetrachloride	ND	---	2.00	ug/L	1	03/14/20 19:35	EPA 8260C	
Chlorobenzene	ND	---	0.500	ug/L	1	03/14/20 19:35	EPA 8260C	
Chloroethane	ND	---	5.00	ug/L	1	03/14/20 19:35	EPA 8260C	EST
Chloroform	ND	---	1.00	ug/L	1	03/14/20 19:35	EPA 8260C	
Chloromethane	ND	---	5.00	ug/L	1	03/14/20 19:35	EPA 8260C	
2-Chlorotoluene	ND	---	1.00	ug/L	1	03/14/20 19:35	EPA 8260C	
4-Chlorotoluene	ND	---	1.00	ug/L	1	03/14/20 19:35	EPA 8260C	
Dibromochloromethane	ND	---	1.00	ug/L	1	03/14/20 19:35	EPA 8260C	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	03/14/20 19:35	EPA 8260C	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	03/14/20 19:35	EPA 8260C	
Dibromomethane	ND	---	1.00	ug/L	1	03/14/20 19:35	EPA 8260C	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	03/14/20 19:35	EPA 8260C	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	03/14/20 19:35	EPA 8260C	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	03/14/20 19:35	EPA 8260C	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	03/14/20 19:35	EPA 8260C	
<b>1,1-Dichloroethane</b>	<b>12.8</b>	---	0.400	ug/L	1	03/14/20 19:35	EPA 8260C	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	03/14/20 19:35	EPA 8260C	
<b>1,1-Dichloroethene</b>	<b>2.43</b>	---	0.400	ug/L	1	03/14/20 19:35	EPA 8260C	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver GWM 1C</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0C0428 - 03 31 20 0912</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MGMS3-40 (A0C0428-06)</b>				<b>Matrix: Water</b>		<b>Batch: 0030514</b>		
<b>trans-1,2-Dichloroethene</b>	<b>0.638</b>	---	0.400	ug/L	1	03/14/20 19:35	EPA 8260C	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	03/14/20 19:35	EPA 8260C	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	03/14/20 19:35	EPA 8260C	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	03/14/20 19:35	EPA 8260C	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	03/14/20 19:35	EPA 8260C	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/14/20 19:35	EPA 8260C	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/14/20 19:35	EPA 8260C	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	03/14/20 19:35	EPA 8260C	
Methylene chloride	ND	---	10.0	ug/L	1	03/14/20 19:35	EPA 8260C	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	03/14/20 19:35	EPA 8260C	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	03/14/20 19:35	EPA 8260C	
<b>Tetrachloroethene (PCE)</b>	<b>0.529</b>	---	0.400	ug/L	1	03/14/20 19:35	EPA 8260C	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	03/14/20 19:35	EPA 8260C	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	03/14/20 19:35	EPA 8260C	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	03/14/20 19:35	EPA 8260C	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	03/14/20 19:35	EPA 8260C	
<b>Trichloroethene (TCE)</b>	<b>0.439</b>	---	0.400	ug/L	1	03/14/20 19:35	EPA 8260C	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	03/14/20 19:35	EPA 8260C	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	03/14/20 19:35	EPA 8260C	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 106 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>03/14/20 19:35</i>	<i>EPA 8260C</i>
<i>Toluene-d8 (Surr)</i>		<i>99 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/14/20 19:35</i>	<i>EPA 8260C</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>95 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/14/20 19:35</i>	<i>EPA 8260C</i>

<b>MGMS3-40 (A0C0428-06RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0030526</b>		
<b>cis-1,2-Dichloroethene</b>	<b>418</b>	---	4.00	ug/L	10	03/16/20 18:15	EPA 8260C	
<b>Vinyl chloride</b>	<b>330</b>	---	4.00	ug/L	10	03/16/20 18:15	EPA 8260C	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 109 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>03/16/20 18:15</i>	<i>EPA 8260C</i>
<i>Toluene-d8 (Surr)</i>		<i>99 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/16/20 18:15</i>	<i>EPA 8260C</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>96 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/16/20 18:15</i>	<i>EPA 8260C</i>

<b>MGMS3-60 (A0C0428-07RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0030526</b>		
Bromobenzene	ND	---	0.500	ug/L	1	03/16/20 17:48	EPA 8260C	
Bromochloromethane	ND	---	1.00	ug/L	1	03/16/20 17:48	EPA 8260C	
Bromodichloromethane	ND	---	1.00	ug/L	1	03/16/20 17:48	EPA 8260C	
Bromoform	ND	---	1.00	ug/L	1	03/16/20 17:48	EPA 8260C	
Bromomethane	ND	---	5.00	ug/L	1	03/16/20 17:48	EPA 8260C	
Carbon tetrachloride	ND	---	2.00	ug/L	1	03/16/20 17:48	EPA 8260C	
Chlorobenzene	ND	---	0.500	ug/L	1	03/16/20 17:48	EPA 8260C	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver GWM 1C</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0C0428 - 03 31 20 0912</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MGMS3-60 (A0C0428-07RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0030526</b>		
Chloroethane	ND	---	5.00	ug/L	1	03/16/20 17:48	EPA 8260C	EST
Chloroform	ND	---	1.00	ug/L	1	03/16/20 17:48	EPA 8260C	
Chloromethane	ND	---	5.00	ug/L	1	03/16/20 17:48	EPA 8260C	
2-Chlorotoluene	ND	---	1.00	ug/L	1	03/16/20 17:48	EPA 8260C	
4-Chlorotoluene	ND	---	1.00	ug/L	1	03/16/20 17:48	EPA 8260C	
Dibromochloromethane	ND	---	1.00	ug/L	1	03/16/20 17:48	EPA 8260C	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	03/16/20 17:48	EPA 8260C	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	03/16/20 17:48	EPA 8260C	
Dibromomethane	ND	---	1.00	ug/L	1	03/16/20 17:48	EPA 8260C	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	03/16/20 17:48	EPA 8260C	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	03/16/20 17:48	EPA 8260C	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	03/16/20 17:48	EPA 8260C	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	03/16/20 17:48	EPA 8260C	
<b>1,1-Dichloroethane</b>	<b>0.761</b>	---	0.400	ug/L	1	03/16/20 17:48	EPA 8260C	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	03/16/20 17:48	EPA 8260C	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	03/16/20 17:48	EPA 8260C	
<b>cis-1,2-Dichloroethene</b>	<b>14.7</b>	---	0.400	ug/L	1	03/16/20 17:48	EPA 8260C	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	03/16/20 17:48	EPA 8260C	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	03/16/20 17:48	EPA 8260C	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	03/16/20 17:48	EPA 8260C	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	03/16/20 17:48	EPA 8260C	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	03/16/20 17:48	EPA 8260C	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/16/20 17:48	EPA 8260C	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/16/20 17:48	EPA 8260C	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	03/16/20 17:48	EPA 8260C	
Methylene chloride	ND	---	10.0	ug/L	1	03/16/20 17:48	EPA 8260C	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	03/16/20 17:48	EPA 8260C	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	03/16/20 17:48	EPA 8260C	
<b>Tetrachloroethene (PCE)</b>	<b>1.66</b>	---	0.400	ug/L	1	03/16/20 17:48	EPA 8260C	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	03/16/20 17:48	EPA 8260C	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	03/16/20 17:48	EPA 8260C	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	03/16/20 17:48	EPA 8260C	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	03/16/20 17:48	EPA 8260C	
<b>Trichloroethene (TCE)</b>	<b>1.72</b>	---	0.400	ug/L	1	03/16/20 17:48	EPA 8260C	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	03/16/20 17:48	EPA 8260C	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	03/16/20 17:48	EPA 8260C	
<b>Vinyl chloride</b>	<b>0.659</b>	---	0.400	ug/L	1	03/16/20 17:48	EPA 8260C	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 109 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>03/16/20 17:48</i>	<i>EPA 8260C</i>

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver GWM 1C</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0C0428 - 03 31 20 0912</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MGMS3-60 (A0C0428-07RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0030526</b>		
<i>Surrogate: Toluene-d8 (Surr)</i>		<i>Recovery: 100 %</i>		<i>Limits: 80-120 %</i>		<i>1 03/16/20 17:48</i>		<i>EPA 8260C</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>98 %</i>		<i>80-120 %</i>		<i>1 03/16/20 17:48</i>		<i>EPA 8260C</i>
<b>MW-22i (A0C0428-08)</b>				<b>Matrix: Water</b>		<b>Batch: 0030514</b>		
Bromobenzene	ND	---	0.500	ug/L	1	03/14/20 20:29	EPA 8260C	
Bromochloromethane	ND	---	1.00	ug/L	1	03/14/20 20:29	EPA 8260C	
Bromodichloromethane	ND	---	1.00	ug/L	1	03/14/20 20:29	EPA 8260C	
Bromoform	ND	---	1.00	ug/L	1	03/14/20 20:29	EPA 8260C	
Bromomethane	ND	---	5.00	ug/L	1	03/14/20 20:29	EPA 8260C	
Carbon tetrachloride	ND	---	2.00	ug/L	1	03/14/20 20:29	EPA 8260C	
Chlorobenzene	ND	---	0.500	ug/L	1	03/14/20 20:29	EPA 8260C	
Chloroethane	ND	---	5.00	ug/L	1	03/14/20 20:29	EPA 8260C	EST
Chloroform	ND	---	1.00	ug/L	1	03/14/20 20:29	EPA 8260C	
Chloromethane	ND	---	5.00	ug/L	1	03/14/20 20:29	EPA 8260C	
2-Chlorotoluene	ND	---	1.00	ug/L	1	03/14/20 20:29	EPA 8260C	
4-Chlorotoluene	ND	---	1.00	ug/L	1	03/14/20 20:29	EPA 8260C	
Dibromochloromethane	ND	---	1.00	ug/L	1	03/14/20 20:29	EPA 8260C	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	03/14/20 20:29	EPA 8260C	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	03/14/20 20:29	EPA 8260C	
Dibromomethane	ND	---	1.00	ug/L	1	03/14/20 20:29	EPA 8260C	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	03/14/20 20:29	EPA 8260C	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	03/14/20 20:29	EPA 8260C	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	03/14/20 20:29	EPA 8260C	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	03/14/20 20:29	EPA 8260C	
<b>1,1-Dichloroethane</b>	<b>0.587</b>	---	0.400	ug/L	1	03/14/20 20:29	EPA 8260C	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	03/14/20 20:29	EPA 8260C	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	03/14/20 20:29	EPA 8260C	
<b>cis-1,2-Dichloroethene</b>	<b>16.1</b>	---	0.400	ug/L	1	03/14/20 20:29	EPA 8260C	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	03/14/20 20:29	EPA 8260C	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	03/14/20 20:29	EPA 8260C	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	03/14/20 20:29	EPA 8260C	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	03/14/20 20:29	EPA 8260C	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	03/14/20 20:29	EPA 8260C	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/14/20 20:29	EPA 8260C	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/14/20 20:29	EPA 8260C	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	03/14/20 20:29	EPA 8260C	
Methylene chloride	ND	---	10.0	ug/L	1	03/14/20 20:29	EPA 8260C	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	03/14/20 20:29	EPA 8260C	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver GWM 1C</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0C0428 - 03 31 20 0912</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-22i (A0C0428-08)</b>				<b>Matrix: Water</b>		<b>Batch: 0030514</b>		
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	03/14/20 20:29	EPA 8260C	
<b>Tetrachloroethene (PCE)</b>	<b>3.32</b>	---	0.400	ug/L	1	03/14/20 20:29	EPA 8260C	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	03/14/20 20:29	EPA 8260C	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	03/14/20 20:29	EPA 8260C	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	03/14/20 20:29	EPA 8260C	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	03/14/20 20:29	EPA 8260C	
<b>Trichloroethene (TCE)</b>	<b>8.23</b>	---	0.400	ug/L	1	03/14/20 20:29	EPA 8260C	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	03/14/20 20:29	EPA 8260C	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	03/14/20 20:29	EPA 8260C	
Vinyl chloride	ND	---	0.400	ug/L	1	03/14/20 20:29	EPA 8260C	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 108 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>03/14/20 20:29</i>	<i>EPA 8260C</i>
<i>Toluene-d8 (Surr)</i>		<i>101 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/14/20 20:29</i>	<i>EPA 8260C</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>97 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/14/20 20:29</i>	<i>EPA 8260C</i>

<b>MW-21i-105 (A0C0428-09)</b>				<b>Matrix: Water</b>		<b>Batch: 0030514</b>		
Bromobenzene	ND	---	0.500	ug/L	1	03/14/20 20:56	EPA 8260C	
Bromochloromethane	ND	---	1.00	ug/L	1	03/14/20 20:56	EPA 8260C	
Bromodichloromethane	ND	---	1.00	ug/L	1	03/14/20 20:56	EPA 8260C	
Bromoform	ND	---	1.00	ug/L	1	03/14/20 20:56	EPA 8260C	
Bromomethane	ND	---	5.00	ug/L	1	03/14/20 20:56	EPA 8260C	
Carbon tetrachloride	ND	---	2.00	ug/L	1	03/14/20 20:56	EPA 8260C	
Chlorobenzene	ND	---	0.500	ug/L	1	03/14/20 20:56	EPA 8260C	
Chloroethane	ND	---	5.00	ug/L	1	03/14/20 20:56	EPA 8260C	EST
Chloroform	ND	---	1.00	ug/L	1	03/14/20 20:56	EPA 8260C	
Chloromethane	ND	---	5.00	ug/L	1	03/14/20 20:56	EPA 8260C	
2-Chlorotoluene	ND	---	1.00	ug/L	1	03/14/20 20:56	EPA 8260C	
4-Chlorotoluene	ND	---	1.00	ug/L	1	03/14/20 20:56	EPA 8260C	
Dibromochloromethane	ND	---	1.00	ug/L	1	03/14/20 20:56	EPA 8260C	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	03/14/20 20:56	EPA 8260C	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	03/14/20 20:56	EPA 8260C	
Dibromomethane	ND	---	1.00	ug/L	1	03/14/20 20:56	EPA 8260C	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	03/14/20 20:56	EPA 8260C	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	03/14/20 20:56	EPA 8260C	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	03/14/20 20:56	EPA 8260C	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	03/14/20 20:56	EPA 8260C	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	03/14/20 20:56	EPA 8260C	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	03/14/20 20:56	EPA 8260C	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	03/14/20 20:56	EPA 8260C	

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Lisa Domenighini, Client Services Manager





<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver GWM 1C</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0428 - 03 31 20 0912
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-21i-105 (A0C0428-09)</b>				<b>Matrix: Water</b>		<b>Batch: 0030514</b>		
cis-1,2-Dichloroethene	2.48	---	0.400	ug/L	1	03/14/20 20:56	EPA 8260C	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	03/14/20 20:56	EPA 8260C	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	03/14/20 20:56	EPA 8260C	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	03/14/20 20:56	EPA 8260C	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	03/14/20 20:56	EPA 8260C	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	03/14/20 20:56	EPA 8260C	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/14/20 20:56	EPA 8260C	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/14/20 20:56	EPA 8260C	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	03/14/20 20:56	EPA 8260C	
Methylene chloride	ND	---	10.0	ug/L	1	03/14/20 20:56	EPA 8260C	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	03/14/20 20:56	EPA 8260C	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	03/14/20 20:56	EPA 8260C	
<b>Tetrachloroethene (PCE)</b>	<b>3.60</b>	---	0.400	ug/L	1	03/14/20 20:56	EPA 8260C	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	03/14/20 20:56	EPA 8260C	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	03/14/20 20:56	EPA 8260C	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	03/14/20 20:56	EPA 8260C	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	03/14/20 20:56	EPA 8260C	
<b>Trichloroethene (TCE)</b>	<b>2.02</b>	---	0.400	ug/L	1	03/14/20 20:56	EPA 8260C	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	03/14/20 20:56	EPA 8260C	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	03/14/20 20:56	EPA 8260C	
Vinyl chloride	ND	---	0.400	ug/L	1	03/14/20 20:56	EPA 8260C	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 109 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>03/14/20 20:56</i>	<i>EPA 8260C</i>
<i>Toluene-d8 (Surr)</i>		<i>98 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/14/20 20:56</i>	<i>EPA 8260C</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>96 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/14/20 20:56</i>	<i>EPA 8260C</i>

<b>MW-2 (A0C0428-10)</b>				<b>Matrix: Water</b>		<b>Batch: 0030526</b>		
Bromobenzene	ND	---	0.500	ug/L	1	03/16/20 14:38	EPA 8260C	
Bromochloromethane	ND	---	1.00	ug/L	1	03/16/20 14:38	EPA 8260C	
Bromodichloromethane	ND	---	1.00	ug/L	1	03/16/20 14:38	EPA 8260C	
Bromoform	ND	---	1.00	ug/L	1	03/16/20 14:38	EPA 8260C	
Bromomethane	ND	---	5.00	ug/L	1	03/16/20 14:38	EPA 8260C	
Carbon tetrachloride	ND	---	2.00	ug/L	1	03/16/20 14:38	EPA 8260C	
Chlorobenzene	ND	---	0.500	ug/L	1	03/16/20 14:38	EPA 8260C	
Chloroethane	ND	---	5.00	ug/L	1	03/16/20 14:38	EPA 8260C	EST
Chloroform	ND	---	1.00	ug/L	1	03/16/20 14:38	EPA 8260C	
Chloromethane	ND	---	5.00	ug/L	1	03/16/20 14:38	EPA 8260C	
2-Chlorotoluene	ND	---	1.00	ug/L	1	03/16/20 14:38	EPA 8260C	
4-Chlorotoluene	ND	---	1.00	ug/L	1	03/16/20 14:38	EPA 8260C	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver GWM 1C</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0428 - 03 31 20 0912
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-2 (A0C0428-10)</b>				<b>Matrix: Water</b>		<b>Batch: 0030526</b>		
Dibromochloromethane	ND	---	1.00	ug/L	1	03/16/20 14:38	EPA 8260C	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	03/16/20 14:38	EPA 8260C	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	03/16/20 14:38	EPA 8260C	
Dibromomethane	ND	---	1.00	ug/L	1	03/16/20 14:38	EPA 8260C	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	03/16/20 14:38	EPA 8260C	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	03/16/20 14:38	EPA 8260C	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	03/16/20 14:38	EPA 8260C	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	03/16/20 14:38	EPA 8260C	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	03/16/20 14:38	EPA 8260C	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	03/16/20 14:38	EPA 8260C	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	03/16/20 14:38	EPA 8260C	
cis-1,2-Dichloroethene	ND	---	0.400	ug/L	1	03/16/20 14:38	EPA 8260C	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	03/16/20 14:38	EPA 8260C	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	03/16/20 14:38	EPA 8260C	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	03/16/20 14:38	EPA 8260C	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	03/16/20 14:38	EPA 8260C	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	03/16/20 14:38	EPA 8260C	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/16/20 14:38	EPA 8260C	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/16/20 14:38	EPA 8260C	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	03/16/20 14:38	EPA 8260C	
Methylene chloride	ND	---	10.0	ug/L	1	03/16/20 14:38	EPA 8260C	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	03/16/20 14:38	EPA 8260C	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	03/16/20 14:38	EPA 8260C	
Tetrachloroethene (PCE)	ND	---	0.400	ug/L	1	03/16/20 14:38	EPA 8260C	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	03/16/20 14:38	EPA 8260C	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	03/16/20 14:38	EPA 8260C	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	03/16/20 14:38	EPA 8260C	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	03/16/20 14:38	EPA 8260C	
Trichloroethene (TCE)	ND	---	0.400	ug/L	1	03/16/20 14:38	EPA 8260C	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	03/16/20 14:38	EPA 8260C	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	03/16/20 14:38	EPA 8260C	
Vinyl chloride	ND	---	0.400	ug/L	1	03/16/20 14:38	EPA 8260C	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 112 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>03/16/20 14:38</i>	<i>EPA 8260C</i>
<i>Toluene-d8 (Surr)</i>		<i>100 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/16/20 14:38</i>	<i>EPA 8260C</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>96 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/16/20 14:38</i>	<i>EPA 8260C</i>

<b>MW-6 (A0C0428-11)</b>				<b>Matrix: Water</b>		<b>Batch: 0030526</b>		
Bromobenzene	ND	---	0.500	ug/L	1	03/16/20 15:06	EPA 8260C	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver GWM 1C</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0428 - 03 31 20 0912
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-6 (A0C0428-11)</b>				<b>Matrix: Water</b>		<b>Batch: 0030526</b>		
Bromochloromethane	ND	---	1.00	ug/L	1	03/16/20 15:06	EPA 8260C	
Bromodichloromethane	ND	---	1.00	ug/L	1	03/16/20 15:06	EPA 8260C	
Bromoform	ND	---	1.00	ug/L	1	03/16/20 15:06	EPA 8260C	
Bromomethane	ND	---	5.00	ug/L	1	03/16/20 15:06	EPA 8260C	
Carbon tetrachloride	ND	---	2.00	ug/L	1	03/16/20 15:06	EPA 8260C	
Chlorobenzene	ND	---	0.500	ug/L	1	03/16/20 15:06	EPA 8260C	
Chloroethane	ND	---	5.00	ug/L	1	03/16/20 15:06	EPA 8260C	EST
Chloroform	ND	---	1.00	ug/L	1	03/16/20 15:06	EPA 8260C	
Chloromethane	ND	---	5.00	ug/L	1	03/16/20 15:06	EPA 8260C	
2-Chlorotoluene	ND	---	1.00	ug/L	1	03/16/20 15:06	EPA 8260C	
4-Chlorotoluene	ND	---	1.00	ug/L	1	03/16/20 15:06	EPA 8260C	
Dibromochloromethane	ND	---	1.00	ug/L	1	03/16/20 15:06	EPA 8260C	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	03/16/20 15:06	EPA 8260C	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	03/16/20 15:06	EPA 8260C	
Dibromomethane	ND	---	1.00	ug/L	1	03/16/20 15:06	EPA 8260C	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	03/16/20 15:06	EPA 8260C	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	03/16/20 15:06	EPA 8260C	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	03/16/20 15:06	EPA 8260C	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	03/16/20 15:06	EPA 8260C	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	03/16/20 15:06	EPA 8260C	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	03/16/20 15:06	EPA 8260C	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	03/16/20 15:06	EPA 8260C	
cis-1,2-Dichloroethene	ND	---	0.400	ug/L	1	03/16/20 15:06	EPA 8260C	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	03/16/20 15:06	EPA 8260C	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	03/16/20 15:06	EPA 8260C	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	03/16/20 15:06	EPA 8260C	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	03/16/20 15:06	EPA 8260C	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	03/16/20 15:06	EPA 8260C	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/16/20 15:06	EPA 8260C	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/16/20 15:06	EPA 8260C	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	03/16/20 15:06	EPA 8260C	
Methylene chloride	ND	---	10.0	ug/L	1	03/16/20 15:06	EPA 8260C	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	03/16/20 15:06	EPA 8260C	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	03/16/20 15:06	EPA 8260C	
Tetrachloroethene (PCE)	ND	---	0.400	ug/L	1	03/16/20 15:06	EPA 8260C	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	03/16/20 15:06	EPA 8260C	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	03/16/20 15:06	EPA 8260C	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	03/16/20 15:06	EPA 8260C	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	03/16/20 15:06	EPA 8260C	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver GWM 1C</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0C0428 - 03 31 20 0912</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-6 (A0C0428-11)</b>				<b>Matrix: Water</b>		<b>Batch: 0030526</b>		
Trichloroethene (TCE)	ND	---	0.400	ug/L	1	03/16/20 15:06	EPA 8260C	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	03/16/20 15:06	EPA 8260C	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	03/16/20 15:06	EPA 8260C	
Vinyl chloride	ND	---	0.400	ug/L	1	03/16/20 15:06	EPA 8260C	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 111 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>03/16/20 15:06</i>	<i>EPA 8260C</i>
<i>Toluene-d8 (Surr)</i>		<i>100 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/16/20 15:06</i>	<i>EPA 8260C</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>96 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/16/20 15:06</i>	<i>EPA 8260C</i>

<b>MW-19i (A0C0428-12)</b>				<b>Matrix: Water</b>		<b>Batch: 0030526</b>		
Bromobenzene	ND	---	0.500	ug/L	1	03/16/20 15:33	EPA 8260C	
Bromochloromethane	ND	---	1.00	ug/L	1	03/16/20 15:33	EPA 8260C	
Bromodichloromethane	ND	---	1.00	ug/L	1	03/16/20 15:33	EPA 8260C	
Bromoform	ND	---	1.00	ug/L	1	03/16/20 15:33	EPA 8260C	
Bromomethane	ND	---	5.00	ug/L	1	03/16/20 15:33	EPA 8260C	
Carbon tetrachloride	ND	---	2.00	ug/L	1	03/16/20 15:33	EPA 8260C	
Chlorobenzene	ND	---	0.500	ug/L	1	03/16/20 15:33	EPA 8260C	
Chloroethane	ND	---	5.00	ug/L	1	03/16/20 15:33	EPA 8260C	EST
Chloroform	ND	---	1.00	ug/L	1	03/16/20 15:33	EPA 8260C	
Chloromethane	ND	---	5.00	ug/L	1	03/16/20 15:33	EPA 8260C	
2-Chlorotoluene	ND	---	1.00	ug/L	1	03/16/20 15:33	EPA 8260C	
4-Chlorotoluene	ND	---	1.00	ug/L	1	03/16/20 15:33	EPA 8260C	
Dibromochloromethane	ND	---	1.00	ug/L	1	03/16/20 15:33	EPA 8260C	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	03/16/20 15:33	EPA 8260C	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	03/16/20 15:33	EPA 8260C	
Dibromomethane	ND	---	1.00	ug/L	1	03/16/20 15:33	EPA 8260C	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	03/16/20 15:33	EPA 8260C	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	03/16/20 15:33	EPA 8260C	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	03/16/20 15:33	EPA 8260C	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	03/16/20 15:33	EPA 8260C	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	03/16/20 15:33	EPA 8260C	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	03/16/20 15:33	EPA 8260C	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	03/16/20 15:33	EPA 8260C	
cis-1,2-Dichloroethene	ND	---	0.400	ug/L	1	03/16/20 15:33	EPA 8260C	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	03/16/20 15:33	EPA 8260C	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	03/16/20 15:33	EPA 8260C	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	03/16/20 15:33	EPA 8260C	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	03/16/20 15:33	EPA 8260C	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	03/16/20 15:33	EPA 8260C	

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<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver GWM 1C</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0428 - 03 31 20 0912
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-19i (A0C0428-12)</b>				<b>Matrix: Water</b>		<b>Batch: 0030526</b>		
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/16/20 15:33	EPA 8260C	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/16/20 15:33	EPA 8260C	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	03/16/20 15:33	EPA 8260C	
Methylene chloride	ND	---	10.0	ug/L	1	03/16/20 15:33	EPA 8260C	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	03/16/20 15:33	EPA 8260C	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	03/16/20 15:33	EPA 8260C	
Tetrachloroethene (PCE)	ND	---	0.400	ug/L	1	03/16/20 15:33	EPA 8260C	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	03/16/20 15:33	EPA 8260C	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	03/16/20 15:33	EPA 8260C	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	03/16/20 15:33	EPA 8260C	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	03/16/20 15:33	EPA 8260C	
Trichloroethene (TCE)	ND	---	0.400	ug/L	1	03/16/20 15:33	EPA 8260C	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	03/16/20 15:33	EPA 8260C	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	03/16/20 15:33	EPA 8260C	
Vinyl chloride	ND	---	0.400	ug/L	1	03/16/20 15:33	EPA 8260C	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 110 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>03/16/20 15:33</i>	<i>EPA 8260C</i>
<i>Toluene-d8 (Surr)</i>		<i>101 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/16/20 15:33</i>	<i>EPA 8260C</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>99 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/16/20 15:33</i>	<i>EPA 8260C</i>

<b>MW-5 (A0C0428-13)</b>				<b>Matrix: Water</b>		<b>Batch: 0030526</b>		
Bromobenzene	ND	---	0.500	ug/L	1	03/16/20 16:00	EPA 8260C	
Bromochloromethane	ND	---	1.00	ug/L	1	03/16/20 16:00	EPA 8260C	
Bromodichloromethane	ND	---	1.00	ug/L	1	03/16/20 16:00	EPA 8260C	
Bromoform	ND	---	1.00	ug/L	1	03/16/20 16:00	EPA 8260C	
Bromomethane	ND	---	5.00	ug/L	1	03/16/20 16:00	EPA 8260C	
Carbon tetrachloride	ND	---	2.00	ug/L	1	03/16/20 16:00	EPA 8260C	
Chlorobenzene	ND	---	0.500	ug/L	1	03/16/20 16:00	EPA 8260C	
Chloroethane	ND	---	5.00	ug/L	1	03/16/20 16:00	EPA 8260C	EST
Chloroform	ND	---	1.00	ug/L	1	03/16/20 16:00	EPA 8260C	
Chloromethane	ND	---	5.00	ug/L	1	03/16/20 16:00	EPA 8260C	
2-Chlorotoluene	ND	---	1.00	ug/L	1	03/16/20 16:00	EPA 8260C	
4-Chlorotoluene	ND	---	1.00	ug/L	1	03/16/20 16:00	EPA 8260C	
Dibromochloromethane	ND	---	1.00	ug/L	1	03/16/20 16:00	EPA 8260C	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	03/16/20 16:00	EPA 8260C	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	03/16/20 16:00	EPA 8260C	
Dibromomethane	ND	---	1.00	ug/L	1	03/16/20 16:00	EPA 8260C	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	03/16/20 16:00	EPA 8260C	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	03/16/20 16:00	EPA 8260C	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver GWM 1C</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0428 - 03 31 20 0912
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-5 (A0C0428-13)</b>				<b>Matrix: Water</b>		<b>Batch: 0030526</b>		
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	03/16/20 16:00	EPA 8260C	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	03/16/20 16:00	EPA 8260C	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	03/16/20 16:00	EPA 8260C	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	03/16/20 16:00	EPA 8260C	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	03/16/20 16:00	EPA 8260C	
<b>cis-1,2-Dichloroethene</b>	<b>14.3</b>	---	0.400	ug/L	1	03/16/20 16:00	EPA 8260C	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	03/16/20 16:00	EPA 8260C	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	03/16/20 16:00	EPA 8260C	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	03/16/20 16:00	EPA 8260C	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	03/16/20 16:00	EPA 8260C	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	03/16/20 16:00	EPA 8260C	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/16/20 16:00	EPA 8260C	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/16/20 16:00	EPA 8260C	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	03/16/20 16:00	EPA 8260C	
Methylene chloride	ND	---	10.0	ug/L	1	03/16/20 16:00	EPA 8260C	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	03/16/20 16:00	EPA 8260C	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	03/16/20 16:00	EPA 8260C	
<b>Tetrachloroethene (PCE)</b>	<b>18.7</b>	---	0.400	ug/L	1	03/16/20 16:00	EPA 8260C	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	03/16/20 16:00	EPA 8260C	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	03/16/20 16:00	EPA 8260C	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	03/16/20 16:00	EPA 8260C	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	03/16/20 16:00	EPA 8260C	
<b>Trichloroethene (TCE)</b>	<b>7.11</b>	---	0.400	ug/L	1	03/16/20 16:00	EPA 8260C	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	03/16/20 16:00	EPA 8260C	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	03/16/20 16:00	EPA 8260C	
<b>Vinyl chloride</b>	<b>2.58</b>	---	0.400	ug/L	1	03/16/20 16:00	EPA 8260C	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 109 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>03/16/20 16:00</i>	<i>EPA 8260C</i>
<i>Toluene-d8 (Surr)</i>		<i>100 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/16/20 16:00</i>	<i>EPA 8260C</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>97 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/16/20 16:00</i>	<i>EPA 8260C</i>

<b>MW-23i (A0C0428-14)</b>				<b>Matrix: Water</b>		<b>Batch: 0030526</b>		
Bromobenzene	ND	---	0.500	ug/L	1	03/16/20 16:27	EPA 8260C	
Bromochloromethane	ND	---	1.00	ug/L	1	03/16/20 16:27	EPA 8260C	
Bromodichloromethane	ND	---	1.00	ug/L	1	03/16/20 16:27	EPA 8260C	
Bromoform	ND	---	1.00	ug/L	1	03/16/20 16:27	EPA 8260C	
Bromomethane	ND	---	5.00	ug/L	1	03/16/20 16:27	EPA 8260C	
Carbon tetrachloride	ND	---	2.00	ug/L	1	03/16/20 16:27	EPA 8260C	
Chlorobenzene	ND	---	0.500	ug/L	1	03/16/20 16:27	EPA 8260C	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver GWM 1C</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0428 - 03 31 20 0912
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-23i (A0C0428-14)</b>				<b>Matrix: Water</b>		<b>Batch: 0030526</b>		
Chloroethane	ND	---	5.00	ug/L	1	03/16/20 16:27	EPA 8260C	EST
Chloroform	ND	---	1.00	ug/L	1	03/16/20 16:27	EPA 8260C	
Chloromethane	ND	---	5.00	ug/L	1	03/16/20 16:27	EPA 8260C	
2-Chlorotoluene	ND	---	1.00	ug/L	1	03/16/20 16:27	EPA 8260C	
4-Chlorotoluene	ND	---	1.00	ug/L	1	03/16/20 16:27	EPA 8260C	
Dibromochloromethane	ND	---	1.00	ug/L	1	03/16/20 16:27	EPA 8260C	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	03/16/20 16:27	EPA 8260C	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	03/16/20 16:27	EPA 8260C	
Dibromomethane	ND	---	1.00	ug/L	1	03/16/20 16:27	EPA 8260C	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	03/16/20 16:27	EPA 8260C	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	03/16/20 16:27	EPA 8260C	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	03/16/20 16:27	EPA 8260C	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	03/16/20 16:27	EPA 8260C	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	03/16/20 16:27	EPA 8260C	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	03/16/20 16:27	EPA 8260C	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	03/16/20 16:27	EPA 8260C	
cis-1,2-Dichloroethene	ND	---	0.400	ug/L	1	03/16/20 16:27	EPA 8260C	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	03/16/20 16:27	EPA 8260C	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	03/16/20 16:27	EPA 8260C	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	03/16/20 16:27	EPA 8260C	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	03/16/20 16:27	EPA 8260C	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	03/16/20 16:27	EPA 8260C	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/16/20 16:27	EPA 8260C	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/16/20 16:27	EPA 8260C	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	03/16/20 16:27	EPA 8260C	
Methylene chloride	ND	---	10.0	ug/L	1	03/16/20 16:27	EPA 8260C	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	03/16/20 16:27	EPA 8260C	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	03/16/20 16:27	EPA 8260C	
Tetrachloroethene (PCE)	ND	---	0.400	ug/L	1	03/16/20 16:27	EPA 8260C	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	03/16/20 16:27	EPA 8260C	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	03/16/20 16:27	EPA 8260C	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	03/16/20 16:27	EPA 8260C	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	03/16/20 16:27	EPA 8260C	
Trichloroethene (TCE)	ND	---	0.400	ug/L	1	03/16/20 16:27	EPA 8260C	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	03/16/20 16:27	EPA 8260C	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	03/16/20 16:27	EPA 8260C	
Vinyl chloride	ND	---	0.400	ug/L	1	03/16/20 16:27	EPA 8260C	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 110 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>03/16/20 16:27</i>	<i>EPA 8260C</i>

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver GWM 1C</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0C0428 - 03 31 20 0912</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-23i (A0C0428-14)</b>				<b>Matrix: Water</b>		<b>Batch: 0030526</b>		
<i>Surrogate: Toluene-d8 (Surr)</i>			Recovery: 99 %	Limits: 80-120 %	1	03/16/20 16:27	EPA 8260C	
<i>4-Bromofluorobenzene (Surr)</i>			93 %	80-120 %	1	03/16/20 16:27	EPA 8260C	

<b>MW-24i (A0C0428-15)</b>				<b>Matrix: Water</b>		<b>Batch: 0030526</b>		
Bromobenzene	ND	---	0.500	ug/L	1	03/16/20 16:54	EPA 8260C	
Bromochloromethane	ND	---	1.00	ug/L	1	03/16/20 16:54	EPA 8260C	
Bromodichloromethane	ND	---	1.00	ug/L	1	03/16/20 16:54	EPA 8260C	
Bromoform	ND	---	1.00	ug/L	1	03/16/20 16:54	EPA 8260C	
Bromomethane	ND	---	5.00	ug/L	1	03/16/20 16:54	EPA 8260C	
Carbon tetrachloride	ND	---	2.00	ug/L	1	03/16/20 16:54	EPA 8260C	
Chlorobenzene	ND	---	0.500	ug/L	1	03/16/20 16:54	EPA 8260C	
Chloroethane	ND	---	5.00	ug/L	1	03/16/20 16:54	EPA 8260C	EST
Chloroform	ND	---	1.00	ug/L	1	03/16/20 16:54	EPA 8260C	
Chloromethane	ND	---	5.00	ug/L	1	03/16/20 16:54	EPA 8260C	
2-Chlorotoluene	ND	---	1.00	ug/L	1	03/16/20 16:54	EPA 8260C	
4-Chlorotoluene	ND	---	1.00	ug/L	1	03/16/20 16:54	EPA 8260C	
Dibromochloromethane	ND	---	1.00	ug/L	1	03/16/20 16:54	EPA 8260C	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	03/16/20 16:54	EPA 8260C	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	03/16/20 16:54	EPA 8260C	
Dibromomethane	ND	---	1.00	ug/L	1	03/16/20 16:54	EPA 8260C	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	03/16/20 16:54	EPA 8260C	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	03/16/20 16:54	EPA 8260C	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	03/16/20 16:54	EPA 8260C	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	03/16/20 16:54	EPA 8260C	
<b>1,1-Dichloroethane</b>	<b>1.30</b>	---	0.400	ug/L	1	03/16/20 16:54	EPA 8260C	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	03/16/20 16:54	EPA 8260C	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	03/16/20 16:54	EPA 8260C	
<b>cis-1,2-Dichloroethene</b>	<b>15.4</b>	---	0.400	ug/L	1	03/16/20 16:54	EPA 8260C	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	03/16/20 16:54	EPA 8260C	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	03/16/20 16:54	EPA 8260C	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	03/16/20 16:54	EPA 8260C	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	03/16/20 16:54	EPA 8260C	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	03/16/20 16:54	EPA 8260C	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/16/20 16:54	EPA 8260C	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/16/20 16:54	EPA 8260C	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	03/16/20 16:54	EPA 8260C	
Methylene chloride	ND	---	10.0	ug/L	1	03/16/20 16:54	EPA 8260C	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	03/16/20 16:54	EPA 8260C	

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Lisa Domenighini, Client Services Manager





<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver GWM 1C</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0428 - 03 31 20 0912
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-24i (A0C0428-15)</b>				<b>Matrix: Water</b>		<b>Batch: 0030526</b>		
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	03/16/20 16:54	EPA 8260C	
<b>Tetrachloroethene (PCE)</b>	<b>17.0</b>	---	0.400	ug/L	1	03/16/20 16:54	EPA 8260C	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	03/16/20 16:54	EPA 8260C	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	03/16/20 16:54	EPA 8260C	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	03/16/20 16:54	EPA 8260C	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	03/16/20 16:54	EPA 8260C	
<b>Trichloroethene (TCE)</b>	<b>8.42</b>	---	0.400	ug/L	1	03/16/20 16:54	EPA 8260C	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	03/16/20 16:54	EPA 8260C	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	03/16/20 16:54	EPA 8260C	
Vinyl chloride	ND	---	0.400	ug/L	1	03/16/20 16:54	EPA 8260C	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>			<i>Recovery: 110 %</i>	<i>Limits: 80-120 %</i>	<i>1</i>	<i>03/16/20 16:54</i>	<i>EPA 8260C</i>	
<i>Toluene-d8 (Surr)</i>			<i>100 %</i>	<i>80-120 %</i>	<i>1</i>	<i>03/16/20 16:54</i>	<i>EPA 8260C</i>	
<i>4-Bromofluorobenzene (Surr)</i>			<i>96 %</i>	<i>80-120 %</i>	<i>1</i>	<i>03/16/20 16:54</i>	<i>EPA 8260C</i>	

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<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver GWM 1C</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0428 - 03 31 20 0912
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**ANALYTICAL SAMPLE RESULTS**

**Ammonia by Gas Diffusion and Colorimetric Detection**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MGMS1-60 (A0C0428-01)</b>				<b>Matrix: Water</b>		<b>Batch: 0030587</b>		
Ammonia as N	ND	---	0.0200	mg/L	1	03/17/20 16:58	SM 4500-NH3 G	
<b>MGMS2-40 (A0C0428-02)</b>				<b>Matrix: Water</b>		<b>Batch: 0030587</b>		
Ammonia as N	74.9	---	0.400	mg/L	20	03/17/20 17:03	SM 4500-NH3 G	
<b>MGMS2-60 (A0C0428-03RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0030686</b>		
Ammonia as N	0.0280	---	0.0200	mg/L	1	03/19/20 13:51	SM 4500-NH3 G	
<b>MW-25i (A0C0428-04)</b>				<b>Matrix: Water</b>		<b>Batch: 0030587</b>		
Ammonia as N	ND	---	0.0200	mg/L	1	03/17/20 17:13	SM 4500-NH3 G	
<b>MW-24d (A0C0428-05)</b>				<b>Matrix: Water</b>		<b>Batch: 0030587</b>		
Ammonia as N	0.130	---	0.0200	mg/L	1	03/17/20 17:15	SM 4500-NH3 G	
<b>MGMS3-40 (A0C0428-06)</b>				<b>Matrix: Water</b>		<b>Batch: 0030587</b>		
Ammonia as N	2.09	---	0.0200	mg/L	1	03/17/20 17:16	SM 4500-NH3 G	
<b>MGMS3-60 (A0C0428-07)</b>				<b>Matrix: Water</b>		<b>Batch: 0030587</b>		
Ammonia as N	ND	---	0.0200	mg/L	1	03/17/20 17:18	SM 4500-NH3 G	
<b>MW-22i (A0C0428-08)</b>				<b>Matrix: Water</b>		<b>Batch: 0030587</b>		
Ammonia as N	0.111	---	0.0200	mg/L	1	03/17/20 17:19	SM 4500-NH3 G	
<b>MW-21i-105 (A0C0428-09)</b>				<b>Matrix: Water</b>		<b>Batch: 0030587</b>		
Ammonia as N	32.6	---	0.200	mg/L	10	03/17/20 17:21	SM 4500-NH3 G	
<b>MW-2 (A0C0428-10)</b>				<b>Matrix: Water</b>		<b>Batch: 0030587</b>		
Ammonia as N	9.04	---	0.100	mg/L	5	03/17/20 17:22	SM 4500-NH3 G	
<b>MW-6 (A0C0428-11)</b>				<b>Matrix: Water</b>		<b>Batch: 0030587</b>		
Ammonia as N	9.42	---	0.0400	mg/L	2	03/17/20 17:24	SM 4500-NH3 G	
<b>MW-19i (A0C0428-12)</b>				<b>Matrix: Water</b>		<b>Batch: 0030587</b>		
Ammonia as N	ND	---	0.0200	mg/L	1	03/17/20 17:25	SM 4500-NH3 G	
<b>MW-5 (A0C0428-13RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0030686</b>		

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Lisa Domenighini, Client Services Manager



**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
 Tigard, OR 97223  
 503-718-2323  
 EPA ID: OR01039

<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver GWM 1C</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0428 - 03 31 20 0912
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**ANALYTICAL SAMPLE RESULTS**

**Ammonia by Gas Diffusion and Colorimetric Detection**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-5 (A0C0428-13RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0030686</b>		
Ammonia as N	0.114	---	0.0200	mg/L	1	03/19/20 13:53	SM 4500-NH3 G	
<b>MW-23i (A0C0428-14RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0030686</b>		
Ammonia as N	ND	---	0.0200	mg/L	1	03/19/20 13:54	SM 4500-NH3 G	
<b>MW-24i (A0C0428-15RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0030686</b>		
Ammonia as N	ND	---	0.0200	mg/L	1	03/19/20 13:56	SM 4500-NH3 G	

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Lisa Domenighini, Client Services Manager

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<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver GWM 1C</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0C0428 - 03 31 20 0912</b>
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**ANALYTICAL SAMPLE RESULTS**

**Anions by Ion Chromatography**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MGMS1-60 (A0C0428-01) Matrix: Water</b>								
Batch: 0030465								
Nitrate-Nitrogen	3.25	---	0.250	mg/L	1	03/13/20 13:24	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	03/13/20 13:24	EPA 300.0	
<b>MGMS2-40 (A0C0428-02) Matrix: Water</b>								
Batch: 0030465								
Nitrate-Nitrogen	ND	---	0.250	mg/L	1	03/13/20 13:46	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	03/13/20 13:46	EPA 300.0	
<b>MGMS2-60 (A0C0428-03) Matrix: Water</b>								
Batch: 0030465								
Nitrate-Nitrogen	0.678	---	0.250	mg/L	1	03/13/20 14:51	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	03/13/20 14:51	EPA 300.0	
<b>MW-25i (A0C0428-04) Matrix: Water</b>								
Batch: 0030465								
Nitrate-Nitrogen	0.453	---	0.250	mg/L	1	03/13/20 15:12	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	03/13/20 15:12	EPA 300.0	
<b>MW-24d (A0C0428-05) Matrix: Water</b>								
Batch: 0030465								
Nitrate-Nitrogen	ND	---	0.250	mg/L	1	03/13/20 15:34	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	03/13/20 15:34	EPA 300.0	
<b>MGMS3-40 (A0C0428-06) Matrix: Water</b>								
Batch: 0030465								
Nitrate-Nitrogen	ND	---	0.250	mg/L	1	03/13/20 15:55	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	03/13/20 15:55	EPA 300.0	
<b>MGMS3-60 (A0C0428-07) Matrix: Water</b>								
Batch: 0030465								
Nitrate-Nitrogen	0.257	---	0.250	mg/L	1	03/13/20 17:00	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	03/13/20 17:00	EPA 300.0	
<b>MW-22i (A0C0428-08) Matrix: Water</b>								
Batch: 0030465								

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver GWM 1C</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0428 - 03 31 20 0912
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**ANALYTICAL SAMPLE RESULTS**

**Anions by Ion Chromatography**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-22i (A0C0428-08)</b>				<b>Matrix: Water</b>				
Nitrate-Nitrogen	ND	---	0.250	mg/L	1	03/13/20 17:21	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	03/13/20 17:21	EPA 300.0	
<b>MW-21i-105 (A0C0428-09)</b>				<b>Matrix: Water</b>				
Batch: 0030465								
Nitrate-Nitrogen	<b>3.54</b>	---	0.250	mg/L	1	03/13/20 17:43	EPA 300.0	
Nitrite-Nitrogen	<b>4.79</b>	---	0.250	mg/L	1	03/13/20 17:43	EPA 300.0	
<b>MW-2 (A0C0428-10)</b>				<b>Matrix: Water</b>				
Batch: 0030465								
Nitrate-Nitrogen	ND	---	0.250	mg/L	1	03/13/20 18:05	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	03/13/20 18:05	EPA 300.0	
<b>MW-6 (A0C0428-11)</b>				<b>Matrix: Water</b>				
Batch: 0030465								
Nitrate-Nitrogen	ND	---	0.250	mg/L	1	03/13/20 18:26	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	03/13/20 18:26	EPA 300.0	
<b>MW-19i (A0C0428-12)</b>				<b>Matrix: Water</b>				
Batch: 0030465								
Nitrate-Nitrogen	ND	---	0.250	mg/L	1	03/13/20 18:48	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	03/13/20 18:48	EPA 300.0	
<b>MW-5 (A0C0428-13)</b>				<b>Matrix: Water</b>				
Batch: 0030465								
Nitrate-Nitrogen	ND	---	0.250	mg/L	1	03/13/20 19:09	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	03/13/20 19:09	EPA 300.0	
<b>MW-23i (A0C0428-14)</b>				<b>Matrix: Water</b>				
Batch: 0030465								
Nitrate-Nitrogen	<b>0.639</b>	---	0.250	mg/L	1	03/13/20 20:14	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	03/13/20 20:14	EPA 300.0	
<b>MW-24i (A0C0428-15)</b>				<b>Matrix: Water</b>				
Batch: 0030465								
Nitrate-Nitrogen	<b>4.87</b>	---	0.250	mg/L	1	03/13/20 21:19	EPA 300.0	

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Lisa Domenighini, Client Services Manager



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6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver GWM 1C</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0C0428 - 03 31 20 0912</b>
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**ANALYTICAL SAMPLE RESULTS**

**Anions by Ion Chromatography**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-24i (A0C0428-15)</b>				<b>Matrix: Water</b>				
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	03/13/20 21:19	EPA 300.0	

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**ANALYTICAL SAMPLE RESULTS**

**Total Organic Carbon (Non-Purgeable) by Persulfate Oxidation by Standard Method 5310C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MGMS2-40 (A0C0428-02)</b>				<b>Matrix: Water</b>		<b>Batch: 0030456</b>		
Total Organic Carbon	5.13	---	1.00	mg/L	1	03/14/20 00:17	SM 5310 C	
<b>MGMS3-40 (A0C0428-06)</b>				<b>Matrix: Water</b>		<b>Batch: 0030456</b>		
Total Organic Carbon	4.00	---	1.00	mg/L	1	03/14/20 00:51	SM 5310 C	
<b>MW-24i (A0C0428-15)</b>				<b>Matrix: Water</b>		<b>Batch: 0030456</b>		
Total Organic Carbon	ND	---	1.00	mg/L	1	03/14/20 01:22	SM 5310 C	

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<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver GWM 1C</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0428 - 03 31 20 0912
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030514 - EPA 5030B</b>						<b>Water</b>						
<b>Blank (0030514-BLK1)</b>	Prepared: 03/14/20 08:33					Analyzed: 03/14/20 10:28						
<b>EPA 8260C</b>												
Bromobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Bromochloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Bromodichloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Bromoform	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Bromomethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	
Carbon tetrachloride	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
Chlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Chloroethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	EST
Chloroform	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Chloromethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	
2-Chlorotoluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
4-Chlorotoluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Dibromochloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Dibromomethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
cis-1,2-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	---	---	---	---	---	---	
Methylene chloride	ND	---	10.0	ug/L	1	---	---	---	---	---	---	

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Lisa Domenighini, Client Services Manager





<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver GWM 1C</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0428 - 03 31 20 0912
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030514 - EPA 5030B</b>						<b>Water</b>						
<b>Blank (0030514-BLK1)</b>	Prepared: 03/14/20 08:33			Analyzed: 03/14/20 10:28								
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Tetrachloroethene (PCE)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Trichloroethene (TCE)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Vinyl chloride	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>	<i>Recovery:</i>		<i>109 %</i>	<i>Limits:</i>		<i>80-120 %</i>		<i>Dilution: 1x</i>				
<i>Toluene-d8 (Surr)</i>			<i>99 %</i>			<i>80-120 %</i>		<i>"</i>				
<i>4-Bromofluorobenzene (Surr)</i>			<i>96 %</i>			<i>80-120 %</i>		<i>"</i>				

<b>LCS (0030514-BS2)</b>						Prepared: 03/14/20 08:33 Analyzed: 03/14/20 10:01						
<b>EPA 8260C</b>												
Bromobenzene	20.4	---	0.500	ug/L	1	20.0	---	102	80 - 120%	---	---	
Bromochloromethane	24.4	---	1.00	ug/L	1	20.0	---	<b>122</b>	<b>80 - 120%</b>	---	---	Q-56
Bromodichloromethane	21.1	---	1.00	ug/L	1	20.0	---	106	80 - 120%	---	---	
Bromoform	20.1	---	1.00	ug/L	1	20.0	---	101	80 - 120%	---	---	
Bromomethane	14.6	---	5.00	ug/L	1	20.0	---	<b>73</b>	<b>80 - 120%</b>	---	---	Q-55
Carbon tetrachloride	20.0	---	2.00	ug/L	1	20.0	---	100	80 - 120%	---	---	
Chlorobenzene	19.9	---	0.500	ug/L	1	20.0	---	100	80 - 120%	---	---	
Chloroethane	14.4	---	5.00	ug/L	1	20.0	---	<b>72</b>	<b>80 - 120%</b>	---	---	Q-55, EST
Chloroform	22.2	---	1.00	ug/L	1	20.0	---	111	80 - 120%	---	---	
Chloromethane	29.9	---	5.00	ug/L	1	20.0	---	<b>149</b>	<b>80 - 120%</b>	---	---	Q-56
2-Chlorotoluene	19.0	---	1.00	ug/L	1	20.0	---	95	80 - 120%	---	---	
4-Chlorotoluene	18.2	---	1.00	ug/L	1	20.0	---	91	80 - 120%	---	---	
Dibromochloromethane	19.9	---	1.00	ug/L	1	20.0	---	99	80 - 120%	---	---	
1,2-Dibromo-3-chloropropane	16.8	---	5.00	ug/L	1	20.0	---	84	80 - 120%	---	---	
1,2-Dibromoethane (EDB)	21.2	---	0.500	ug/L	1	20.0	---	106	80 - 120%	---	---	
Dibromomethane	21.4	---	1.00	ug/L	1	20.0	---	107	80 - 120%	---	---	
1,2-Dichlorobenzene	19.7	---	0.500	ug/L	1	20.0	---	98	80 - 120%	---	---	

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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030514 - EPA 5030B</b>												
<b>Water</b>												
<b>LCS (0030514-BS2)</b>	Prepared: 03/14/20 08:33 Analyzed: 03/14/20 10:01											
1,3-Dichlorobenzene	20.2	---	0.500	ug/L	1	20.0	---	101	80 - 120%	---	---	
1,4-Dichlorobenzene	18.8	---	0.500	ug/L	1	20.0	---	94	80 - 120%	---	---	
Dichlorodifluoromethane	23.9	---	1.00	ug/L	1	20.0	---	120	80 - 120%	---	---	
1,1-Dichloroethane	21.9	---	0.400	ug/L	1	20.0	---	110	80 - 120%	---	---	
1,2-Dichloroethane (EDC)	20.6	---	0.400	ug/L	1	20.0	---	103	80 - 120%	---	---	
1,1-Dichloroethene	21.4	---	0.400	ug/L	1	20.0	---	107	80 - 120%	---	---	
cis-1,2-Dichloroethene	22.3	---	0.400	ug/L	1	20.0	---	111	80 - 120%	---	---	
trans-1,2-Dichloroethene	22.3	---	0.400	ug/L	1	20.0	---	111	80 - 120%	---	---	
1,2-Dichloropropane	22.9	---	0.500	ug/L	1	20.0	---	114	80 - 120%	---	---	
1,3-Dichloropropane	20.9	---	1.00	ug/L	1	20.0	---	104	80 - 120%	---	---	
2,2-Dichloropropane	21.6	---	1.00	ug/L	1	20.0	---	108	80 - 120%	---	---	
1,1-Dichloropropene	21.4	---	1.00	ug/L	1	20.0	---	107	80 - 120%	---	---	
cis-1,3-Dichloropropene	19.9	---	1.00	ug/L	1	20.0	---	100	80 - 120%	---	---	
trans-1,3-Dichloropropene	19.9	---	1.00	ug/L	1	20.0	---	99	80 - 120%	---	---	
Hexachlorobutadiene	19.1	---	5.00	ug/L	1	20.0	---	95	80 - 120%	---	---	
Methylene chloride	21.5	---	10.0	ug/L	1	20.0	---	108	80 - 120%	---	---	
1,1,1,2-Tetrachloroethane	21.0	---	0.400	ug/L	1	20.0	---	105	80 - 120%	---	---	
1,1,2,2-Tetrachloroethane	21.9	---	0.500	ug/L	1	20.0	---	109	80 - 120%	---	---	
Tetrachloroethene (PCE)	21.6	---	0.400	ug/L	1	20.0	---	108	80 - 120%	---	---	
1,2,3-Trichlorobenzene	20.8	---	2.00	ug/L	1	20.0	---	104	80 - 120%	---	---	
1,2,4-Trichlorobenzene	19.1	---	2.00	ug/L	1	20.0	---	95	80 - 120%	---	---	
1,1,1-Trichloroethane	20.8	---	0.400	ug/L	1	20.0	---	104	80 - 120%	---	---	
1,1,2-Trichloroethane	21.5	---	0.500	ug/L	1	20.0	---	108	80 - 120%	---	---	
Trichloroethene (TCE)	22.2	---	0.400	ug/L	1	20.0	---	111	80 - 120%	---	---	
Trichlorofluoromethane	16.9	---	2.00	ug/L	1	20.0	---	84	80 - 120%	---	---	
1,2,3-Trichloropropane	19.9	---	1.00	ug/L	1	20.0	---	100	80 - 120%	---	---	
Vinyl chloride	21.1	---	0.400	ug/L	1	20.0	---	105	80 - 120%	---	---	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>			<i>Recovery: 106 %</i>			<i>Limits: 80-120 %</i>			<i>Dilution: 1x</i>			
<i>Toluene-d8 (Surr)</i>			<i>98 %</i>			<i>80-120 %</i>			<i>"</i>			
<i>4-Bromofluorobenzene (Surr)</i>			<i>94 %</i>			<i>80-120 %</i>			<i>"</i>			



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver GWM 1C</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0428 - 03 31 20 0912
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030515 - EPA 5030B</b>						<b>Water</b>						
<b>Blank (0030515-BLK1)</b>		Prepared: 03/14/20 08:00		Analyzed: 03/14/20 10:01								
<b>EPA 8260C</b>												
Bromobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Bromochloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Bromodichloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Bromoform	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Bromomethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	
Carbon tetrachloride	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Chlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Chloroethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	EST
Chloroform	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Chloromethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	
2-Chlorotoluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
4-Chlorotoluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Dibromochloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Dibromomethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
cis-1,2-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	---	---	---	---	---	---	
Methylene chloride	ND	---	10.0	ug/L	1	---	---	---	---	---	---	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver GWM 1C</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0428 - 03 31 20 0912
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QUALITY CONTROL (QC) SAMPLE RESULTS

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030515 - EPA 5030B</b>												
<b>Water</b>												
<b>Blank (0030515-BLK1)</b>	Prepared: 03/14/20 08:00 Analyzed: 03/14/20 10:01											
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Tetrachloroethene (PCE)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Trichloroethene (TCE)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Vinyl chloride	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
Surr: 1,4-Difluorobenzene (Surr)	Recovery: 100 %		Limits: 80-120 %		Dilution: 1x							
Toluene-d8 (Surr)	101 %		80-120 %		"							
4-Bromofluorobenzene (Surr)	99 %		80-120 %		"							

<b>LCS (0030515-BS1)</b>	Prepared: 03/14/20 08:00 Analyzed: 03/14/20 09:07											
<b>EPA 8260C</b>												
Bromobenzene	22.3	---	0.500	ug/L	1	20.0	---	112	80 - 120%	---	---	
Bromochloromethane	21.2	---	1.00	ug/L	1	20.0	---	106	80 - 120%	---	---	
Bromodichloromethane	21.7	---	1.00	ug/L	1	20.0	---	108	80 - 120%	---	---	
Bromoform	27.6	---	1.00	ug/L	1	20.0	---	<b>138</b>	<b>80 - 120%</b>	---	---	Q-56
Bromomethane	30.6	---	5.00	ug/L	1	20.0	---	<b>153</b>	<b>80 - 120%</b>	---	---	Q-56
Carbon tetrachloride	22.2	---	1.00	ug/L	1	20.0	---	111	80 - 120%	---	---	
Chlorobenzene	21.2	---	0.500	ug/L	1	20.0	---	106	80 - 120%	---	---	
Chloroethane	28.4	---	5.00	ug/L	1	20.0	---	<b>142</b>	<b>80 - 120%</b>	---	---	EST, Q-56
Chloroform	19.4	---	1.00	ug/L	1	20.0	---	97	80 - 120%	---	---	
Chloromethane	19.0	---	5.00	ug/L	1	20.0	---	95	80 - 120%	---	---	
2-Chlorotoluene	20.8	---	1.00	ug/L	1	20.0	---	104	80 - 120%	---	---	
4-Chlorotoluene	19.2	---	1.00	ug/L	1	20.0	---	96	80 - 120%	---	---	
Dibromochloromethane	24.4	---	1.00	ug/L	1	20.0	---	<b>122</b>	<b>80 - 120%</b>	---	---	Q-56
1,2-Dibromo-3-chloropropane	20.6	---	5.00	ug/L	1	20.0	---	103	80 - 120%	---	---	
1,2-Dibromoethane (EDB)	21.2	---	0.500	ug/L	1	20.0	---	106	80 - 120%	---	---	
Dibromomethane	20.5	---	1.00	ug/L	1	20.0	---	102	80 - 120%	---	---	
1,2-Dichlorobenzene	21.6	---	0.500	ug/L	1	20.0	---	108	80 - 120%	---	---	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver GWM 1C</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0428 - 03 31 20 0912
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030515 - EPA 5030B</b>												
						<b>Water</b>						
<b>LCS (0030515-BS1)</b>	Prepared: 03/14/20 08:00			Analyzed: 03/14/20 09:07								
1,3-Dichlorobenzene	21.3	---	0.500	ug/L	1	20.0	---	106	80 - 120%	---	---	
1,4-Dichlorobenzene	20.9	---	0.500	ug/L	1	20.0	---	104	80 - 120%	---	---	
Dichlorodifluoromethane	23.5	---	1.00	ug/L	1	20.0	---	118	80 - 120%	---	---	
1,1-Dichloroethane	18.0	---	0.400	ug/L	1	20.0	---	90	80 - 120%	---	---	
1,2-Dichloroethane (EDC)	20.5	---	0.400	ug/L	1	20.0	---	103	80 - 120%	---	---	
1,1-Dichloroethene	18.7	---	0.400	ug/L	1	20.0	---	94	80 - 120%	---	---	
cis-1,2-Dichloroethene	17.8	---	0.400	ug/L	1	20.0	---	89	80 - 120%	---	---	
trans-1,2-Dichloroethene	17.9	---	0.400	ug/L	1	20.0	---	90	80 - 120%	---	---	
1,2-Dichloropropane	18.1	---	0.500	ug/L	1	20.0	---	90	80 - 120%	---	---	
1,3-Dichloropropane	20.2	---	1.00	ug/L	1	20.0	---	101	80 - 120%	---	---	
2,2-Dichloropropane	19.9	---	1.00	ug/L	1	20.0	---	100	80 - 120%	---	---	
1,1-Dichloropropene	17.6	---	1.00	ug/L	1	20.0	---	88	80 - 120%	---	---	
cis-1,3-Dichloropropene	20.0	---	1.00	ug/L	1	20.0	---	100	80 - 120%	---	---	
trans-1,3-Dichloropropene	22.2	---	1.00	ug/L	1	20.0	---	111	80 - 120%	---	---	
Hexachlorobutadiene	19.5	---	5.00	ug/L	1	20.0	---	97	80 - 120%	---	---	
Methylene chloride	18.0	---	10.0	ug/L	1	20.0	---	90	80 - 120%	---	---	
1,1,1,2-Tetrachloroethane	24.8	---	0.400	ug/L	1	20.0	---	<b>124</b>	<b>80 - 120%</b>	---	---	Q-56
1,1,1,2,2-Tetrachloroethane	22.8	---	0.500	ug/L	1	20.0	---	114	80 - 120%	---	---	
Tetrachloroethene (PCE)	21.2	---	0.400	ug/L	1	20.0	---	106	80 - 120%	---	---	
1,2,3-Trichlorobenzene	20.8	---	2.00	ug/L	1	20.0	---	104	80 - 120%	---	---	
1,2,4-Trichlorobenzene	20.1	---	2.00	ug/L	1	20.0	---	101	80 - 120%	---	---	
1,1,1-Trichloroethane	19.4	---	0.400	ug/L	1	20.0	---	97	80 - 120%	---	---	
1,1,2-Trichloroethane	21.3	---	0.500	ug/L	1	20.0	---	107	80 - 120%	---	---	
Trichloroethene (TCE)	18.9	---	0.400	ug/L	1	20.0	---	94	80 - 120%	---	---	
Trichlorofluoromethane	30.5	---	2.00	ug/L	1	20.0	---	<b>152</b>	<b>80 - 120%</b>	---	---	Q-56
1,2,3-Trichloropropane	22.3	---	1.00	ug/L	1	20.0	---	111	80 - 120%	---	---	
Vinyl chloride	20.8	---	0.400	ug/L	1	20.0	---	104	80 - 120%	---	---	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 97 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>98 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>96 %</i>		<i>80-120 %</i>		<i>"</i>						



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver GWM 1C</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0428 - 03 31 20 0912
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030526 - EPA 5030B</b>						<b>Water</b>						
<b>Blank (0030526-BLK1)</b>		Prepared: 03/16/20 09:00		Analyzed: 03/16/20 13:10								
<u>EPA 8260C</u>												
Bromobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Bromochloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Bromodichloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Bromoform	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Bromomethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	
Carbon tetrachloride	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
Chlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Chloroethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	EST
Chloroform	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Chloromethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	
2-Chlorotoluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
4-Chlorotoluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Dibromochloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Dibromomethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
cis-1,2-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	---	---	---	---	---	---	
Methylene chloride	ND	---	10.0	ug/L	1	---	---	---	---	---	---	

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<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver GWM 1C</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0428 - 03 31 20 0912
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030526 - EPA 5030B</b>												
<b>Water</b>												
<b>Blank (0030526-BLK1)</b>	Prepared: 03/16/20 09:00 Analyzed: 03/16/20 13:10											
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Tetrachloroethene (PCE)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Trichloroethene (TCE)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Vinyl chloride	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
Surr: 1,4-Difluorobenzene (Surr)	Recovery: 109 %		Limits: 80-120 %		Dilution: 1x							
Toluene-d8 (Surr)	103 %		80-120 %		"							
4-Bromofluorobenzene (Surr)	98 %		80-120 %		"							

<b>LCS (0030526-BS1)</b>												
Prepared: 03/16/20 09:00 Analyzed: 03/16/20 12:16												
<b>EPA 8260C</b>												
Bromobenzene	19.7	---	0.500	ug/L	1	20.0	---	98	80 - 120%	---	---	
Bromochloromethane	23.5	---	1.00	ug/L	1	20.0	---	118	80 - 120%	---	---	
Bromodichloromethane	20.2	---	1.00	ug/L	1	20.0	---	101	80 - 120%	---	---	
Bromoform	20.1	---	1.00	ug/L	1	20.0	---	100	80 - 120%	---	---	
Bromomethane	14.1	---	5.00	ug/L	1	20.0	---	<b>71</b>	<b>80 - 120%</b>	---	---	Q-55
Carbon tetrachloride	18.4	---	2.00	ug/L	1	20.0	---	92	80 - 120%	---	---	
Chlorobenzene	19.2	---	0.500	ug/L	1	20.0	---	96	80 - 120%	---	---	
Chloroethane	15.8	---	5.00	ug/L	1	20.0	---	<b>79</b>	<b>80 - 120%</b>	---	---	EST, Q-55
Chloroform	21.4	---	1.00	ug/L	1	20.0	---	107	80 - 120%	---	---	
Chloromethane	26.5	---	5.00	ug/L	1	20.0	---	<b>132</b>	<b>80 - 120%</b>	---	---	Q-56
2-Chlorotoluene	17.9	---	1.00	ug/L	1	20.0	---	90	80 - 120%	---	---	
4-Chlorotoluene	17.2	---	1.00	ug/L	1	20.0	---	86	80 - 120%	---	---	
Dibromochloromethane	19.6	---	1.00	ug/L	1	20.0	---	98	80 - 120%	---	---	
1,2-Dibromo-3-chloropropane	16.7	---	5.00	ug/L	1	20.0	---	83	80 - 120%	---	---	
1,2-Dibromoethane (EDB)	20.4	---	0.500	ug/L	1	20.0	---	102	80 - 120%	---	---	
Dibromomethane	20.7	---	1.00	ug/L	1	20.0	---	104	80 - 120%	---	---	
1,2-Dichlorobenzene	19.0	---	0.500	ug/L	1	20.0	---	95	80 - 120%	---	---	

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<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver GWM 1C</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0428 - 03 31 20 0912
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030526 - EPA 5030B</b>						<b>Water</b>						
<b>LCS (0030526-BS1)</b>	Prepared: 03/16/20 09:00					Analyzed: 03/16/20 12:16						
1,3-Dichlorobenzene	19.0	---	0.500	ug/L	1	20.0	---	95	80 - 120%	---	---	
1,4-Dichlorobenzene	17.9	---	0.500	ug/L	1	20.0	---	89	80 - 120%	---	---	
Dichlorodifluoromethane	19.6	---	1.00	ug/L	1	20.0	---	98	80 - 120%	---	---	
1,1-Dichloroethane	21.4	---	0.400	ug/L	1	20.0	---	107	80 - 120%	---	---	
1,2-Dichloroethane (EDC)	19.6	---	0.400	ug/L	1	20.0	---	98	80 - 120%	---	---	
1,1-Dichloroethene	20.2	---	0.400	ug/L	1	20.0	---	101	80 - 120%	---	---	
cis-1,2-Dichloroethene	21.2	---	0.400	ug/L	1	20.0	---	106	80 - 120%	---	---	
trans-1,2-Dichloroethene	21.2	---	0.400	ug/L	1	20.0	---	106	80 - 120%	---	---	
1,2-Dichloropropane	21.7	---	0.500	ug/L	1	20.0	---	108	80 - 120%	---	---	
1,3-Dichloropropane	19.9	---	1.00	ug/L	1	20.0	---	100	80 - 120%	---	---	
2,2-Dichloropropane	18.5	---	1.00	ug/L	1	20.0	---	93	80 - 120%	---	---	
1,1-Dichloropropene	20.0	---	1.00	ug/L	1	20.0	---	100	80 - 120%	---	---	
cis-1,3-Dichloropropene	18.6	---	1.00	ug/L	1	20.0	---	93	80 - 120%	---	---	
trans-1,3-Dichloropropene	18.7	---	1.00	ug/L	1	20.0	---	94	80 - 120%	---	---	
Hexachlorobutadiene	17.8	---	5.00	ug/L	1	20.0	---	89	80 - 120%	---	---	
Methylene chloride	20.9	---	10.0	ug/L	1	20.0	---	105	80 - 120%	---	---	
1,1,1,2-Tetrachloroethane	20.5	---	0.400	ug/L	1	20.0	---	103	80 - 120%	---	---	
1,1,2,2-Tetrachloroethane	21.2	---	0.500	ug/L	1	20.0	---	106	80 - 120%	---	---	
Tetrachloroethene (PCE)	20.1	---	0.400	ug/L	1	20.0	---	101	80 - 120%	---	---	
1,2,3-Trichlorobenzene	20.0	---	2.00	ug/L	1	20.0	---	100	80 - 120%	---	---	
1,2,4-Trichlorobenzene	17.8	---	2.00	ug/L	1	20.0	---	89	80 - 120%	---	---	
1,1,1-Trichloroethane	20.2	---	0.400	ug/L	1	20.0	---	101	80 - 120%	---	---	
1,1,2-Trichloroethane	20.8	---	0.500	ug/L	1	20.0	---	104	80 - 120%	---	---	
Trichloroethene (TCE)	21.2	---	0.400	ug/L	1	20.0	---	106	80 - 120%	---	---	
Trichlorofluoromethane	15.7	---	2.00	ug/L	1	20.0	---	<b>78</b>	<b>80 - 120%</b>	---	---	Q-55
1,2,3-Trichloropropane	19.6	---	1.00	ug/L	1	20.0	---	98	80 - 120%	---	---	
Vinyl chloride	19.4	---	0.400	ug/L	1	20.0	---	97	80 - 120%	---	---	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 106 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>98 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>94 %</i>		<i>80-120 %</i>		<i>"</i>						





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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Ammonia by Gas Diffusion and Colorimetric Detection**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030587 - Method Prep: Aq</b>						<b>Water</b>						
<b>Blank (0030587-BLK1)</b>		Prepared: 03/17/20 10:40 Analyzed: 03/17/20 16:45										
<b>SM 4500-NH3 G</b>												
Ammonia as N	ND	---	0.0200	mg/L	1	---	---	---	---	---	---	---
<b>LCS (0030587-BS1)</b>		Prepared: 03/17/20 10:40 Analyzed: 03/17/20 16:46										
<b>SM 4500-NH3 G</b>												
Ammonia as N	2.00	---	0.0200	mg/L	1	2.00	---	100	90 - 110%	---	---	---
<b>Matrix Spike (0030587-MS1)</b>		Prepared: 03/17/20 10:40 Analyzed: 03/17/20 17:00										
<b>QC Source Sample: MGMS1-60 (A0C0428-01)</b>												
<b>SM 4500-NH3 G</b>												
Ammonia as N	2.25	---	0.0250	mg/L	1	2.50	ND	90	90 - 110%	---	---	---
<b>Matrix Spike Dup (0030587-MSD1)</b>		Prepared: 03/17/20 10:40 Analyzed: 03/17/20 17:01										
<b>QC Source Sample: MGMS1-60 (A0C0428-01)</b>												
<b>SM 4500-NH3 G</b>												
Ammonia as N	2.03	---	0.0250	mg/L	1	2.50	ND	81	90 - 110%	10	10%	Q-01



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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Ammonia by Gas Diffusion and Colorimetric Detection**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030686 - Method Prep: Aq</b>						<b>Water</b>						
<b>Blank (0030686-BLK1)</b>		Prepared: 03/19/20 09:52 Analyzed: 03/19/20 12:55										
<b>SM 4500-NH3 G</b>												
Ammonia as N	ND	---	0.0200	mg/L	1	---	---	---	---	---	---	---
<b>LCS (0030686-BS1)</b>		Prepared: 03/19/20 09:52 Analyzed: 03/19/20 12:57										
<b>SM 4500-NH3 G</b>												
Ammonia as N	2.02	---	0.0200	mg/L	1	2.00	---	101	90 - 110%	---	---	---

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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Anions by Ion Chromatography**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030465 - Method Prep: Aq</b>						<b>Water</b>						
<b>Blank (0030465-BLK1)</b>			Prepared: 03/13/20 08:12		Analyzed: 03/13/20 12:41							
<u>EPA 300.0</u>												
Nitrate-Nitrogen	ND	---	0.250	mg/L	1	---	---	---	---	---	---	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	---	---	---	---	---	---	
<b>LCS (0030465-BS1)</b>			Prepared: 03/13/20 08:12		Analyzed: 03/13/20 13:03							
<u>EPA 300.0</u>												
Nitrate-Nitrogen	2.01	---	0.250	mg/L	1	2.00	---	100	90 - 110%	---	---	
Nitrite-Nitrogen	2.14	---	0.250	mg/L	1	2.00	---	107	90 - 110%	---	---	
<b>Duplicate (0030465-DUP1)</b>			Prepared: 03/13/20 08:12		Analyzed: 03/13/20 14:08							
<u>QC Source Sample: MGMS2-40 (A0C0428-02)</u>												
<u>EPA 300.0</u>												
Nitrate-Nitrogen	ND	---	0.250	mg/L	1	---	ND	---	---	---	10%	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	---	ND	---	---	---	10%	
<b>Duplicate (0030465-DUP2)</b>			Prepared: 03/13/20 08:12		Analyzed: 03/13/20 19:31							
<u>QC Source Sample: MW-5 (A0C0428-13)</u>												
<u>EPA 300.0</u>												
Nitrate-Nitrogen	ND	---	0.250	mg/L	1	---	ND	---	---	---	10%	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	---	ND	---	---	---	10%	
<b>Matrix Spike (0030465-MS1)</b>			Prepared: 03/13/20 08:12		Analyzed: 03/13/20 14:29							
<u>QC Source Sample: MGMS2-40 (A0C0428-02)</u>												
<u>EPA 300.0</u>												
Nitrate-Nitrogen	2.64	---	0.312	mg/L	1	2.50	ND	106	80 - 120%	---	---	
Nitrite-Nitrogen	2.74	---	0.312	mg/L	1	2.50	ND	109	80 - 120%	---	---	
<b>Matrix Spike (0030465-MS2)</b>			Prepared: 03/13/20 08:12		Analyzed: 03/13/20 19:52							
<u>QC Source Sample: MW-5 (A0C0428-13)</u>												
<u>EPA 300.0</u>												
Nitrate-Nitrogen	2.55	---	0.312	mg/L	1	2.50	ND	102	80 - 120%	---	---	
Nitrite-Nitrogen	2.69	---	0.312	mg/L	1	2.50	ND	107	80 - 120%	---	---	

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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Total Organic Carbon (Non-Purgeable) by Persulfate Oxidation by Standard Method 5310C**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030456 - Method Prep: Aq</b>						<b>Water</b>						
<b>Blank (0030456-BLK1)</b>		Prepared: 03/13/20 10:21 Analyzed: 03/13/20 15:59										
<b>SM 5310 C</b>												
Total Organic Carbon	ND	---	1.00	mg/L	1	---	---	---	---	---	---	
<b>LCS (0030456-BS1)</b>		Prepared: 03/13/20 10:21 Analyzed: 03/13/20 16:33										
<b>SM 5310 C</b>												
Total Organic Carbon	10.3	---	1.00	mg/L	1	10.0	---	103	85 - 115%	---	---	
<b>LCS (0030456-BS2)</b>		Prepared: 03/13/20 10:21 Analyzed: 03/13/20 15:29										
<b>SM 5310 C</b>												
Total Organic Carbon	ND	---	1.00	mg/L	1	0.00	---		<b>85 - 115%</b>	---	---	TOC_I



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**SAMPLE PREPARATION INFORMATION**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Prep: EPA 5030B

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 0030514</u>							
A0C0428-06	Water	EPA 8260C	03/12/20 14:00	03/14/20 10:33	5mL/5mL	5mL/5mL	1.00
A0C0428-08	Water	EPA 8260C	03/12/20 08:24	03/14/20 10:33	5mL/5mL	5mL/5mL	1.00
A0C0428-09	Water	EPA 8260C	03/12/20 09:33	03/14/20 10:33	5mL/5mL	5mL/5mL	1.00
<u>Batch: 0030515</u>							
A0C0428-01	Water	EPA 8260C	03/12/20 10:15	03/12/20 11:36	5mL/5mL	5mL/5mL	1.00
A0C0428-02	Water	EPA 8260C	03/12/20 10:50	03/12/20 11:36	5mL/5mL	5mL/5mL	1.00
A0C0428-03	Water	EPA 8260C	03/12/20 11:20	03/12/20 11:36	5mL/5mL	5mL/5mL	1.00
<u>Batch: 0030526</u>							
A0C0428-04	Water	EPA 8260C	03/12/20 12:30	03/16/20 13:20	5mL/5mL	5mL/5mL	1.00
A0C0428-05	Water	EPA 8260C	03/12/20 13:20	03/16/20 13:20	5mL/5mL	5mL/5mL	1.00
A0C0428-06RE1	Water	EPA 8260C	03/12/20 14:00	03/16/20 13:20	5mL/5mL	5mL/5mL	1.00
A0C0428-07RE1	Water	EPA 8260C	03/12/20 14:50	03/16/20 13:20	5mL/5mL	5mL/5mL	1.00
A0C0428-10	Water	EPA 8260C	03/12/20 10:35	03/16/20 13:20	5mL/5mL	5mL/5mL	1.00
A0C0428-11	Water	EPA 8260C	03/12/20 11:24	03/16/20 13:20	5mL/5mL	5mL/5mL	1.00
A0C0428-12	Water	EPA 8260C	03/12/20 12:09	03/16/20 13:20	5mL/5mL	5mL/5mL	1.00
A0C0428-13	Water	EPA 8260C	03/12/20 13:07	03/16/20 13:20	5mL/5mL	5mL/5mL	1.00
A0C0428-14	Water	EPA 8260C	03/12/20 14:03	03/16/20 13:20	5mL/5mL	5mL/5mL	1.00
A0C0428-15	Water	EPA 8260C	03/12/20 14:46	03/16/20 13:20	5mL/5mL	5mL/5mL	1.00

**Ammonia by Gas Diffusion and Colorimetric Detection**

Prep: Method Prep: Aq

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 0030587</u>							
A0C0428-01	Water	SM 4500-NH3 G	03/12/20 10:15	03/17/20 10:40	10mL/10mL	10mL/10mL	1.00
A0C0428-02	Water	SM 4500-NH3 G	03/12/20 10:50	03/17/20 10:40	10mL/10mL	10mL/10mL	1.00
A0C0428-04	Water	SM 4500-NH3 G	03/12/20 12:30	03/17/20 10:40	10mL/10mL	10mL/10mL	1.00
A0C0428-05	Water	SM 4500-NH3 G	03/12/20 13:20	03/17/20 10:40	10mL/10mL	10mL/10mL	1.00
A0C0428-06	Water	SM 4500-NH3 G	03/12/20 14:00	03/17/20 10:40	10mL/10mL	10mL/10mL	1.00
A0C0428-07	Water	SM 4500-NH3 G	03/12/20 14:50	03/17/20 10:40	10mL/10mL	10mL/10mL	1.00
A0C0428-08	Water	SM 4500-NH3 G	03/12/20 08:24	03/17/20 10:40	10mL/10mL	10mL/10mL	1.00
A0C0428-09	Water	SM 4500-NH3 G	03/12/20 09:33	03/17/20 10:40	10mL/10mL	10mL/10mL	1.00
A0C0428-10	Water	SM 4500-NH3 G	03/12/20 10:35	03/17/20 10:40	10mL/10mL	10mL/10mL	1.00
A0C0428-11	Water	SM 4500-NH3 G	03/12/20 11:24	03/17/20 10:40	10mL/10mL	10mL/10mL	1.00
A0C0428-12	Water	SM 4500-NH3 G	03/12/20 12:09	03/17/20 10:40	10mL/10mL	10mL/10mL	1.00

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**SAMPLE PREPARATION INFORMATION**

**Ammonia by Gas Diffusion and Colorimetric Detection**

<u>Prep: Method Prep: Aq</u>					Sample	Default	RL Prep
Lab Number	Matrix	Method	Sampled	Prepared	Initial/Final	Initial/Final	Factor
<u>Batch: 0030686</u>							
A0C0428-03RE1	Water	SM 4500-NH3 G	03/12/20 11:20	03/19/20 09:52	10mL/10mL	10mL/10mL	1.00
A0C0428-13RE1	Water	SM 4500-NH3 G	03/12/20 13:07	03/19/20 09:52	10mL/10mL	10mL/10mL	1.00
A0C0428-14RE1	Water	SM 4500-NH3 G	03/12/20 14:03	03/19/20 09:52	10mL/10mL	10mL/10mL	1.00
A0C0428-15RE1	Water	SM 4500-NH3 G	03/12/20 14:46	03/19/20 09:52	10mL/10mL	10mL/10mL	1.00

**Anions by Ion Chromatography**

<u>Prep: Method Prep: Aq</u>					Sample	Default	RL Prep
Lab Number	Matrix	Method	Sampled	Prepared	Initial/Final	Initial/Final	Factor
<u>Batch: 0030465</u>							
A0C0428-01	Water	EPA 300.0	03/12/20 10:15	03/13/20 08:12	5mL/5mL	5mL/5mL	1.00
A0C0428-02	Water	EPA 300.0	03/12/20 10:50	03/13/20 08:12	5mL/5mL	5mL/5mL	1.00
A0C0428-03	Water	EPA 300.0	03/12/20 11:20	03/13/20 08:12	5mL/5mL	5mL/5mL	1.00
A0C0428-04	Water	EPA 300.0	03/12/20 12:30	03/13/20 08:12	5mL/5mL	5mL/5mL	1.00
A0C0428-05	Water	EPA 300.0	03/12/20 13:20	03/13/20 08:12	5mL/5mL	5mL/5mL	1.00
A0C0428-06	Water	EPA 300.0	03/12/20 14:00	03/13/20 08:12	5mL/5mL	5mL/5mL	1.00
A0C0428-07	Water	EPA 300.0	03/12/20 14:50	03/13/20 08:12	5mL/5mL	5mL/5mL	1.00
A0C0428-08	Water	EPA 300.0	03/12/20 08:24	03/13/20 08:12	5mL/5mL	5mL/5mL	1.00
A0C0428-09	Water	EPA 300.0	03/12/20 09:33	03/13/20 08:12	5mL/5mL	5mL/5mL	1.00
A0C0428-10	Water	EPA 300.0	03/12/20 10:35	03/13/20 08:12	5mL/5mL	5mL/5mL	1.00
A0C0428-11	Water	EPA 300.0	03/12/20 11:24	03/13/20 08:12	5mL/5mL	5mL/5mL	1.00
A0C0428-12	Water	EPA 300.0	03/12/20 12:09	03/13/20 08:12	5mL/5mL	5mL/5mL	1.00
A0C0428-13	Water	EPA 300.0	03/12/20 13:07	03/13/20 08:12	5mL/5mL	5mL/5mL	1.00
A0C0428-14	Water	EPA 300.0	03/12/20 14:03	03/13/20 08:12	5mL/5mL	5mL/5mL	1.00
A0C0428-15	Water	EPA 300.0	03/12/20 14:46	03/13/20 08:12	5mL/5mL	5mL/5mL	1.00

**Total Organic Carbon (Non-Purgeable) by Persulfate Oxidation by Standard Method 5310C**

<u>Prep: Method Prep: Aq</u>					Sample	Default	RL Prep
Lab Number	Matrix	Method	Sampled	Prepared	Initial/Final	Initial/Final	Factor
<u>Batch: 0030456</u>							
A0C0428-02	Water	SM 5310 C	03/12/20 10:50	03/13/20 10:21	40mL/40mL	40mL/40mL	1.00
A0C0428-06	Water	SM 5310 C	03/12/20 14:00	03/13/20 10:21	40mL/40mL	40mL/40mL	1.00
A0C0428-15	Water	SM 5310 C	03/12/20 14:46	03/13/20 10:21	40mL/40mL	40mL/40mL	1.00

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**QUALIFIER DEFINITIONS**

**Client Sample and Quality Control (QC) Sample Qualifier Definitions:**

**Apex Laboratories**

- EST** Result reported as an Estimated Value. Results estimated. Initial Calibration Verification Standard (ICV) failed low.
- Q-01** Spike recovery and/or RPD is outside acceptance limits.
- Q-55** Daily CCV/LCS recovery for this analyte was below the +/-20% criteria listed in EPA 8260C, however there is adequate sensitivity to ensure detection at the reporting level.
- Q-56** Daily CCV/LCS recovery for this analyte was above the +/-20% criteria listed in EPA 8260C
- TOC\_I** Inorganic Carbon Spike Check. Results are valid if Non Detect (No Inorganic Carbon detected.)

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**REPORTING NOTES AND CONVENTIONS:**

**Abbreviations:**

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported.
- RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

**Detection Limits: Limit of Detection (LOD)**

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('----'), then the data has not been evaluated below the Reporting Limit.

**Reporting Limits: Limit of Quantitation (LOQ)**

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

**Reporting Conventions:**

- Basis: Results for soil samples are generally reported on a 100% dry weight basis. The Result Basis is listed following the units as "dry", "wet", or "" (blank) designation.
  - "dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.
  - "wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
  - "" Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

**QC Source:**

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) are not included in this report. Please request a Full QC report if this data is required.

**Miscellaneous Notes:**

- " --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- " \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

**Blanks:**

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 1/2 the Reporting Limit (RL).  
-For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.  
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.  
For further details, please request a copy of this document.

Apex Laboratories

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Lisa Domenighini, Client Services Manager





<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver GWM 1C</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0C0428 - 03 31 20 0912</b>
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**REPORTING NOTES AND CONVENTIONS (Cont.):**

**Blanks (Cont.):**

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

**Preparation Notes:**

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

**Sampling and Preservation Notes:**

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

Apex Laboratories

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Lisa Domenighini, Client Services Manager



**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
**EPA ID: OR01039**

<b><u>Cascadia Associates</u></b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b><u>Shore Terminal-Vancouver</u></b> Project Number: <b>Nustar Vancouver GWM 1C</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0C0428 - 03 31 20 0912</b>
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**LABORATORY ACCREDITATION INFORMATION**

**TNI Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039**

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

**Apex Laboratories**

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation
<u>All reported analytes are included in Apex Laboratories' current ORELAP scope.</u>					

**Secondary Accreditations**

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

**Subcontract Laboratory Accreditations**

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

**Field Testing Parameters**

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

Lisa Domenighini, Client Services Manager

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**Cascadia Associates**

5820 SW Kelly Ave Unit B

Portland, OR 97239

 Project: **Shore Terminal-Vancouver**

 Project Number: **Nustar Vancouver GWM 1C**

 Project Manager: **Stephanie Salisbury**
**Report ID:**
**A0C0428 - 03 31 20 0912**

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-DX	NWTPH-GX	8260 RTX	8260 RDM VOCs	8260 Halo VOCs	* 8260 VOCs Full List	8270 SIM PAHs	8270 Semi-Vols Full List	8082 PCBs	8081 Pest	RCRA Metals (8)	Priority Metals (13)	AL, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Hg, Mn, Ni, Mo, Ni, K, Se, Ag, Na, Tl, V, Zn	TOTAL DISS. TCLP	TCLP Metals (8)	NO3/NO2	NH3	Rsk H2S	TDC	Archive	
MGMS 1-60		3/11/15	6:45		5																						
MGMS 2-40		10/50			5																						
MGMS 2-60		11/20			5																						
MW-2-5i		12/30			5																						
MW-2-4d		13/20			5																						
MGMS 3-40		14/07			5																						
MGMS 3-60		14/50			5																						
MW-2-2i		8/24			5																						
MW-2j-105		9/33			5																						
MW-2		10/55			5																						

**SPECIAL INSTRUCTIONS:**  
 \* VOCs same list as Nu Star Vancouver 4/19  
 Ethene, Ethane, Methane by RSt 175

<p><b>RELINQUISHED BY:</b></p> <p>Signature: <i>[Signature]</i> Date: 3/12/10</p> <p>Printed Name: Jon Weatherford Time: 16:21</p> <p>Company: Cascadia Assoc.</p>	<p><b>RECEIVED BY:</b></p> <p>Signature: <i>[Signature]</i> Date: 3/11/10</p> <p>Printed Name: Charles Hartman Time: 16:21</p> <p>Company: Apex</p>
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Apex Laboratories

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Lisa Domenighini, Client Services Manager

**Cascadia Associates** Project: **Shore Terminal-Vancouver**  
 5820 SW Kelly Ave Unit B Project Number: **Nustar Vancouver GWM 1C**  
 Portland, OR 97239 Project Manager: **Stephanie Salisbury** Report ID: **A0C0428 - 03 31 20 0912**

**CHAIN OF CUSTODY**

**APEX LABS** 12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: *Cascadia Associates* Project Mgr: *Steph S* Project Name: *Nustar Vancouver* PO# *A0C0428*  
 Address: *5820 SW Kelly Ave Unit B* Phone: *503-906-1577* Fax: *503-906-1577* Email: *Steph.S@CascadiaAssoc.com*  
 Sampled by: *LW/LW*

LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	YES	NO
MW-6	3/12	12:46	5	5	<input checked="" type="radio"/>	<input type="radio"/>
MW-19	1209		5	5	<input checked="" type="radio"/>	<input type="radio"/>
MW-5	1307		5	5	<input checked="" type="radio"/>	<input type="radio"/>
MW-23i	1403		5	5	<input checked="" type="radio"/>	<input type="radio"/>
MW-24i	1446		7	7	<input checked="" type="radio"/>	<input type="radio"/>
<i>Trip blank</i>						

ANALYSIS REQUEST

8260 VOCs Full List	<input checked="" type="checkbox"/>
8260 RBDM VOCs	<input type="checkbox"/>
8260 HVOCs	<input type="checkbox"/>
8260 BTEX VOCs	<input type="checkbox"/>
8270 SVOC	<input type="checkbox"/>
8270 SIM PAHs	<input type="checkbox"/>
8082 PCBs	<input type="checkbox"/>
600 TTO	<input type="checkbox"/>
RCA Metals (8)	<input type="checkbox"/>
TCLP Metals (8)	<input type="checkbox"/>
Al, Sb, As, Ba, Be, Cd, Cr, Cu, Ni, Pb, Se, Zn	<input type="checkbox"/>
Hg, Mn, Mo, Ni, V, Zn	<input type="checkbox"/>
TOTAL DISS TCLP	<input type="checkbox"/>
1200-COLS	<input type="checkbox"/>
1200-Z	<input type="checkbox"/>
802/NO3	<input checked="" type="checkbox"/>
NH3	<input checked="" type="checkbox"/>
RSK175	<input checked="" type="checkbox"/>
TCL	<input checked="" type="checkbox"/>

SPECIAL INSTRUCTIONS: *MSDS same list as Nustar Vancouver 4/2/19. Ethoxyethanol purchased by RSK 1/15.*

RELINQUISHED BY: *[Signature]* Date: *3/12/20*  
 Signature: *[Signature]* Date: *3/12/20*  
 Printed Name: *Jon Weatherford* Printed Name: *Charlie Hahn*  
 Company: *Cascadia Assoc* Company: *Apex*

*Lisa Domenighini*



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver GWM 1C</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0428 - 03 31 20 0912
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**APEX LABS COOLER RECEIPT FORM**

Client: Cascadia Element WO#: A0 C0428

Project/Project #: Nustar Vancouver 1920

**Delivery Info:** 3/14/20  
Date/time received: 3/24/20 @ 1621 By: GH  
Delivered by: Apex  Client  ESS  FedEx  UPS  Swift  Senvoy  SDS  Other

**Cooler Inspection** Date/time inspected: 3/24/20 @ 1735 By: GH  
Chain of Custody included? Yes  No  3/14/20 Custody seals? Yes  No   
Signed/dated by client? Yes  No   
Signed/dated by Apex? Yes  No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	<u>3.4</u>	<u>4.9</u>					
Received on ice? (Y/N)	<u>Y</u>	<u>Y</u>					
Temp. blanks? (Y/N)	<u>Y</u>	<u>Y</u>					
Ice type: (Gel/Real/Other)	<u>Real</u>	<u>Real</u>					
Condition:	<u>Good</u>	<u>Good</u>					

Cooler out of temp? (Y/N) Possible reason why: \_\_\_\_\_  
If some coolers are in temp and some out, were green dots applied to out of temperature samples? Yes/No/NA  
Out of temperature samples form initiated? Yes/No/NA

**Samples Inspection:** Date/time inspected: 3/12/20 @ 1823 By: GH  
All samples intact? Yes  No  Comments: \_\_\_\_\_  
Bottle labels/COCs agree? Yes  No  Comments: \_\_\_\_\_  
COC/container discrepancies form initiated? Yes  No  NA   
Containers/volumes received appropriate for analysis? Yes  No  Comments: \_\_\_\_\_  
Do VOA vials have visible headspace? Yes  No  NA   
Comments: \_\_\_\_\_  
Water samples: pH checked: Yes  No  NA  pH appropriate? Yes  No  NA   
Comments: \_\_\_\_\_

**Additional information:**  
\_\_\_\_\_  
\_\_\_\_\_

Labeled by: ST Witness: GH Cooler Inspected by: GH See Project Contact Form: Y

*Lisa Domenighini*

March 30, 2020

Apex Laboratories  
ATTN: Lisa Domenighini  
6700 S.W. Sandburg St.  
Tigard, OR 97223



LA Cert #04140  
EPA Methods TO3, TO14A, TO15, 25C/3C,  
RSK-175

TX Cert T104704450-14-6  
EPA Methods TO14A, TO15

UT Cert CA0133332015-3  
EPA Methods TO3, TO14A, TO15, RSK-175

### LABORATORY TEST RESULTS

Project Reference: A0C0428  
Lab Number: L031706-01/03

Enclosed are results for sample(s) received 3/17/20 by Air Technology Laboratories. Sample was received intact and chilled to 5° C. Analyses were performed according to specifications on the chain of custody provided with the sample(s).

#### Report Narrative:

- Unless otherwise noted in the report, sample analyses were performed within method performance criteria and meet all requirements of the TNI Standards.
- The enclosed results relate only to the sample(s).

ATL appreciates the opportunity to provide testing services to your company. If you have any questions regarding these results, please call me at (626) 964-4032.

Sincerely,

A handwritten signature in blue ink, appearing to read "Mark Johnson".

Mark Johnson  
Operations Manager  
MJohnson@AirTechLabs.com

Note: The cover letter is an integral part of this analytical report.

SUBCONTRACT ORDER

Apex Laboratories

A0C0428

LO31706-01103

WAD  
3/13/2020

SENDING LABORATORY:

Apex Laboratories  
6700 S.W. Sandburg Street  
Tigard, OR 97223  
Phone: (503) 718-2323  
Fax: (503) 336-0745  
Project Manager: Lisa Domenighini

RECEIVING LABORATORY:

Air Technology Laboratories, Inc  
18501 E. Gale Ave Suite 130  
City of Industry, CA 91748  
Phone : (626) 964-4032  
Fax: (626) 964-5832

Sample Name: **MGMS2-40** Water Sampled: **03/12/20 10:50** (A0C0428-02)

Analysis	Due	Expires	Comments
<b>RSK 175 Preserved (Meth, Eth, Eth) (Sub)</b>	03/25/20 17:00	03/26/20 10:50	
<i>Containers Supplied:</i>			
(D) 40 mL VOA - HCL			
(E) 40 mL VOA - HCL			

Sample Name: **MGMS3-40** Water Sampled: **03/12/20 14:00** (A0C0428-06)


Analysis	Due	Expires	Comments
<b>RSK 175 Preserved (Meth, Eth, Eth) (Sub)</b>	03/25/20 17:00	03/26/20 14:00	
<i>Containers Supplied:</i>			
(D) 40 mL VOA - HCL			
(E) 40 mL VOA - HCL			


Sample Name: **MW-24i** Water Sampled: **03/12/20 14:46** (A0C0428-15)

Analysis	Due	Expires	Comments
<b>RSK 175 Preserved (Meth, Eth, Eth) (Sub)</b>	03/25/20 17:00	03/26/20 14:46	
<i>Containers Supplied:</i>			
(D) 40 mL VOA - HCL			
(E) 40 mL VOA - HCL			

Standard TAT

5°C

Released By  Date **3/16/20 14:55** Received By **UPS (Shipper)** Date

Released By **UPS (Shipper)** Date Received By  Date **3/17/20 10:22**

Client: Apex Laboratories  
 Attn: Lisa Domenighini  
 Project Name: NA  
 Project No.: A0C0428  
 Date Received: 03/17/20  
 Matrix: Water  
 Reporting Units: ug/L

**RSK175**

Lab No.:	L031706-01	L031706-02	L031706-03					
Client Sample I.D.:	MGMS2-40 (A0C0428-02)	MGMS3-40 (A0C0428-06)	MW-24i (A0C0428-15)					
Date/Time Sampled:	3/12/20 10:50	3/12/20 14:00	3/12/20 14:46					
Date/Time Analyzed:	3/24/20 11:18	3/24/20 11:29	3/24/20 11:46					
QC Batch No.:	200324GC8A1	200324GC8A1	200324GC8A1					
Analyst Initials:	CM	CM	CM					
Dilution Factor:	1.0	1.0	1.0					
ANALYTE	Result	RL	Result	RL	Result	RL		
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L		
Ethene	2.1	1.0	40	1.0	ND	1.0		
Ethane	9.7	1.0	110	1.0	ND	1.0		
Methane	98	1.0	6,700	1.0	ND	1.0		

ND = Not Detected (below RL)  
 RL = Reporting Limit

Reviewed/Approved By:                     *Mark Johnson*                      
 Mark Johnson  
 Operations Manager

Date           3/30/20          

The cover letter is an integral part of this analytical report





QC Batch No: 200324GC8A1

Matrix: Water

Reporting Units: ug/L

**RSK 175**  
**LABORATORY CONTROL SAMPLE SUMMARY**

Lab No.:	METHOD BLANK	LCS		LCSD		Limits					
Date/Time Analyzed:	3/24/20 8:52	3/24/20 9:05		3/24/20 9:17							
Analyst Initials:	CM	CM		CM							
Dilution Factor:	1.1	1.0		1.0							
ANALYTE	Result ug/L	RL ug/L	SPIKE AMT. ug/L	Result ug/L	% Rec.	Result ug/L	% Rec.	RPD %	Low %Rec	High %Rec	Max. RPD
Ethene	ND	1.0	1,150	1,310	115	1,310	115	0.0	70	130	30
Ethane	ND	1.0	1,200	1,420	116	1,350	110	5.4	70	130	30
Methane	ND	1.0	650	740	113	693	106	6.6	70	130	30

ND = Not Detected (below RL)

RL = Reporting Limit

Reviewed/Approved By: Mark Johnson  
Mark Johnson  
Operations Manager

Date: 3/30/20

The cover letter is an integral part of this analytical report





**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

Thursday, March 26, 2020  
Stephanie Salisbury  
Cascadia Associates  
5820 SW Kelly Ave Unit B  
Portland, OR 97239

RE: A0C0454 - Shore Terminal-Vancouver - Shore Terminal-Vancouver

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A0C0454, which was received by the laboratory on 3/13/2020 at 10:45:00AM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [ldomenighini@apex-labs.com](mailto:ldomenighini@apex-labs.com), or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of sample receipt, unless prior arrangements have been made.

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Cooler Receipt Information

(See Cooler Receipt Form for details)

Cooler#1                      1.4 degC

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This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.

All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

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Apex Laboratories

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Lisa Domenighini, Client Services Manager



**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

<b><u>Cascadia Associates</u></b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b><u>Shore Terminal-Vancouver</u></b> Project Number: <b><u>Shore Terminal-Vancouver</u></b> Project Manager: <b><u>Stephanie Salisbury</u></b>	<b><u>Report ID:</u></b> A0C0454 - 03 26 20 1322
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**ANALYTICAL REPORT FOR SAMPLES**

**SAMPLE INFORMATION**

<b>Client Sample ID</b>	<b>Laboratory ID</b>	<b>Matrix</b>	<b>Date Sampled</b>	<b>Date Received</b>
MW-32s	A0C0454-01	Water	03/13/20 08:00	03/13/20 10:45

Apex Laboratories

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Shore Terminal-Vancouver</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0454 - 03 26 20 1322
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-32s (A0C0454-01)</b>				<b>Matrix: Water</b>		<b>Batch: 0030628</b>		
Bromobenzene	ND	---	0.500	ug/L	1	03/18/20 13:23	EPA 8260C	
Bromochloromethane	ND	---	1.00	ug/L	1	03/18/20 13:23	EPA 8260C	
Bromodichloromethane	ND	---	1.00	ug/L	1	03/18/20 13:23	EPA 8260C	
Bromoform	ND	---	2.00	ug/L	1	03/18/20 13:23	EPA 8260C	
Bromomethane	ND	---	5.00	ug/L	1	03/18/20 13:23	EPA 8260C	
Carbon tetrachloride	ND	---	1.00	ug/L	1	03/18/20 13:23	EPA 8260C	
Chlorobenzene	ND	---	0.500	ug/L	1	03/18/20 13:23	EPA 8260C	
Chloroethane	ND	---	5.00	ug/L	1	03/18/20 13:23	EPA 8260C	
Chloroform	ND	---	1.00	ug/L	1	03/18/20 13:23	EPA 8260C	
Chloromethane	ND	---	5.00	ug/L	1	03/18/20 13:23	EPA 8260C	
2-Chlorotoluene	ND	---	1.00	ug/L	1	03/18/20 13:23	EPA 8260C	
4-Chlorotoluene	ND	---	1.00	ug/L	1	03/18/20 13:23	EPA 8260C	
Dibromochloromethane	ND	---	1.00	ug/L	1	03/18/20 13:23	EPA 8260C	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	03/18/20 13:23	EPA 8260C	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	03/18/20 13:23	EPA 8260C	
Dibromomethane	ND	---	1.00	ug/L	1	03/18/20 13:23	EPA 8260C	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	03/18/20 13:23	EPA 8260C	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	03/18/20 13:23	EPA 8260C	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	03/18/20 13:23	EPA 8260C	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	03/18/20 13:23	EPA 8260C	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	03/18/20 13:23	EPA 8260C	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	03/18/20 13:23	EPA 8260C	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	03/18/20 13:23	EPA 8260C	
cis-1,2-Dichloroethene	ND	---	0.400	ug/L	1	03/18/20 13:23	EPA 8260C	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	03/18/20 13:23	EPA 8260C	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	03/18/20 13:23	EPA 8260C	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	03/18/20 13:23	EPA 8260C	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	03/18/20 13:23	EPA 8260C	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	03/18/20 13:23	EPA 8260C	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/18/20 13:23	EPA 8260C	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/18/20 13:23	EPA 8260C	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	03/18/20 13:23	EPA 8260C	
Methylene chloride	ND	---	10.0	ug/L	1	03/18/20 13:23	EPA 8260C	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	03/18/20 13:23	EPA 8260C	
1,1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	03/18/20 13:23	EPA 8260C	
Tetrachloroethene (PCE)	ND	---	0.400	ug/L	1	03/18/20 13:23	EPA 8260C	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	03/18/20 13:23	EPA 8260C	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	03/18/20 13:23	EPA 8260C	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	03/18/20 13:23	EPA 8260C	

Apex Laboratories

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Shore Terminal-Vancouver</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0454 - 03 26 20 1322
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-32s (A0C0454-01)</b>				<b>Matrix: Water</b>		<b>Batch: 0030628</b>		
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	03/18/20 13:23	EPA 8260C	
Trichloroethene (TCE)	ND	---	0.400	ug/L	1	03/18/20 13:23	EPA 8260C	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	03/18/20 13:23	EPA 8260C	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	03/18/20 13:23	EPA 8260C	
Vinyl chloride	ND	---	0.400	ug/L	1	03/18/20 13:23	EPA 8260C	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 102 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>03/18/20 13:23</i>	<i>EPA 8260C</i>
<i>Toluene-d8 (Surr)</i>		<i>101 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/18/20 13:23</i>	<i>EPA 8260C</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>104 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/18/20 13:23</i>	<i>EPA 8260C</i>



**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
 Tigard, OR 97223  
 503-718-2323  
EPA ID: OR01039

<u>Cascadia Associates</u> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <u>Shore Terminal-Vancouver</u> Project Number: <u>Shore Terminal-Vancouver</u> Project Manager: <u>Stephanie Salisbury</u>	<b>Report ID:</b> A0C0454 - 03 26 20 1322
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**ANALYTICAL SAMPLE RESULTS**

**Ammonia by Gas Diffusion and Colorimetric Detection**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-32s (A0C0454-01RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0030686</b>		
Ammonia as N	ND	---	0.0200	mg/L	1	03/19/20 13:57	SM 4500-NH3 G	

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6700 S.W. Sandburg Street

Tigard, OR 97223

503-718-2323

EPA ID: OR01039

Cascadia Associates

5820 SW Kelly Ave Unit B

Portland, OR 97239

Project: Shore Terminal-Vancouver

Project Number: Shore Terminal-Vancouver

Project Manager: Stephanie Salisbury

**Report ID:**

**A0C0454 - 03 26 20 1322**

**ANALYTICAL SAMPLE RESULTS**

**Anions by Ion Chromatography**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-32s (A0C0454-01)</b>				<b>Matrix: Water</b>				
Batch: 0030465								
Nitrate-Nitrogen	ND	---	0.250	mg/L	1	03/13/20 21:40	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	03/13/20 21:40	EPA 300.0	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Shore Terminal-Vancouver</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0454 - 03 26 20 1322
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030628 - EPA 5030B</b>						<b>Water</b>						
<b>Blank (0030628-BLK1)</b>		Prepared: 03/18/20 09:00		Analyzed: 03/18/20 11:56								
<u>EPA 8260C</u>												
Bromobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Bromochloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Bromodichloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Bromoform	ND	---	2.00	ug/L	1	---	---	---	---	---	---	---
Bromomethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
Carbon tetrachloride	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Chlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Chloroethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
Chloroform	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Chloromethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
2-Chlorotoluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
4-Chlorotoluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Dibromochloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Dibromomethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
1,1-Dichloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
1,1-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
cis-1,2-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
1,2-Dichloropropane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
1,3-Dichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
2,2-Dichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
1,1-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Hexachlorobutadiene	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
Methylene chloride	ND	---	10.0	ug/L	1	---	---	---	---	---	---	---

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Lisa Domenighini, Client Services Manager





<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Shore Terminal-Vancouver</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0454 - 03 26 20 1322
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030628 - EPA 5030B</b>												
<b>Water</b>												
<b>Blank (0030628-BLK1)</b>	Prepared: 03/18/20 09:00 Analyzed: 03/18/20 11:56											
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Tetrachloroethene (PCE)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Trichloroethene (TCE)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Vinyl chloride	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
Surr: 1,4-Difluorobenzene (Surr)	Recovery: 103 %		Limits: 80-120 %		Dilution: 1x							
Toluene-d8 (Surr)	102 %		80-120 %		"							
4-Bromofluorobenzene (Surr)	104 %		80-120 %		"							

<b>LCS (0030628-BS1)</b>												
Prepared: 03/18/20 09:00 Analyzed: 03/18/20 11:02												
<b>EPA 8260C</b>												
Bromobenzene	19.3	---	0.500	ug/L	1	20.0	---	96	80 - 120%	---	---	
Bromochloromethane	20.1	---	1.00	ug/L	1	20.0	---	100	80 - 120%	---	---	
Bromodichloromethane	19.7	---	1.00	ug/L	1	20.0	---	98	80 - 120%	---	---	
Bromoform	16.8	---	2.00	ug/L	1	20.0	---	84	80 - 120%	---	---	
Bromomethane	17.4	---	5.00	ug/L	1	20.0	---	87	80 - 120%	---	---	
Carbon tetrachloride	15.4	---	1.00	ug/L	1	20.0	---	77	<b>80 - 120%</b>	---	---	Q-55
Chlorobenzene	19.5	---	0.500	ug/L	1	20.0	---	98	80 - 120%	---	---	
Chloroethane	18.5	---	5.00	ug/L	1	20.0	---	93	80 - 120%	---	---	
Chloroform	21.0	---	1.00	ug/L	1	20.0	---	105	80 - 120%	---	---	
Chloromethane	17.6	---	5.00	ug/L	1	20.0	---	88	80 - 120%	---	---	
2-Chlorotoluene	20.4	---	1.00	ug/L	1	20.0	---	102	80 - 120%	---	---	
4-Chlorotoluene	20.4	---	1.00	ug/L	1	20.0	---	102	80 - 120%	---	---	
Dibromochloromethane	16.0	---	1.00	ug/L	1	20.0	---	80	80 - 120%	---	---	
1,2-Dibromo-3-chloropropane	16.9	---	5.00	ug/L	1	20.0	---	84	80 - 120%	---	---	
1,2-Dibromoethane (EDB)	20.3	---	0.500	ug/L	1	20.0	---	102	80 - 120%	---	---	
Dibromomethane	21.1	---	1.00	ug/L	1	20.0	---	106	80 - 120%	---	---	
1,2-Dichlorobenzene	21.1	---	0.500	ug/L	1	20.0	---	106	80 - 120%	---	---	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Shore Terminal-Vancouver</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0454 - 03 26 20 1322
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030628 - EPA 5030B</b>												
<b>Water</b>												
<b>LCS (0030628-BS1)</b>	Prepared: 03/18/20 09:00 Analyzed: 03/18/20 11:02											
1,3-Dichlorobenzene	20.0	---	0.500	ug/L	1	20.0	---	100	80 - 120%	---	---	
1,4-Dichlorobenzene	18.9	---	0.500	ug/L	1	20.0	---	94	80 - 120%	---	---	
Dichlorodifluoromethane	17.0	---	1.00	ug/L	1	20.0	---	85	80 - 120%	---	---	
1,1-Dichloroethane	20.0	---	0.400	ug/L	1	20.0	---	100	80 - 120%	---	---	
1,2-Dichloroethane (EDC)	20.3	---	0.400	ug/L	1	20.0	---	102	80 - 120%	---	---	
1,1-Dichloroethene	20.3	---	0.400	ug/L	1	20.0	---	101	80 - 120%	---	---	
cis-1,2-Dichloroethene	20.7	---	0.400	ug/L	1	20.0	---	104	80 - 120%	---	---	
trans-1,2-Dichloroethene	19.8	---	0.400	ug/L	1	20.0	---	99	80 - 120%	---	---	
1,2-Dichloropropane	20.0	---	0.500	ug/L	1	20.0	---	100	80 - 120%	---	---	
1,3-Dichloropropane	21.2	---	1.00	ug/L	1	20.0	---	106	80 - 120%	---	---	
2,2-Dichloropropane	22.7	---	1.00	ug/L	1	20.0	---	114	80 - 120%	---	---	
1,1-Dichloropropene	21.1	---	1.00	ug/L	1	20.0	---	106	80 - 120%	---	---	
cis-1,3-Dichloropropene	19.0	---	1.00	ug/L	1	20.0	---	95	80 - 120%	---	---	
trans-1,3-Dichloropropene	18.3	---	1.00	ug/L	1	20.0	---	92	80 - 120%	---	---	
Hexachlorobutadiene	22.1	---	5.00	ug/L	1	20.0	---	111	80 - 120%	---	---	
Methylene chloride	19.1	---	10.0	ug/L	1	20.0	---	96	80 - 120%	---	---	
1,1,1,2-Tetrachloroethane	19.2	---	0.400	ug/L	1	20.0	---	96	80 - 120%	---	---	
1,1,2,2-Tetrachloroethane	21.7	---	0.500	ug/L	1	20.0	---	109	80 - 120%	---	---	
Tetrachloroethene (PCE)	20.1	---	0.400	ug/L	1	20.0	---	100	80 - 120%	---	---	
1,2,3-Trichlorobenzene	23.5	---	2.00	ug/L	1	20.0	---	117	80 - 120%	---	---	
1,2,4-Trichlorobenzene	22.8	---	2.00	ug/L	1	20.0	---	114	80 - 120%	---	---	
1,1,1-Trichloroethane	19.0	---	0.400	ug/L	1	20.0	---	95	80 - 120%	---	---	
1,1,2-Trichloroethane	21.3	---	0.500	ug/L	1	20.0	---	106	80 - 120%	---	---	
Trichloroethene (TCE)	19.6	---	0.400	ug/L	1	20.0	---	98	80 - 120%	---	---	
Trichlorofluoromethane	21.8	---	2.00	ug/L	1	20.0	---	109	80 - 120%	---	---	
1,2,3-Trichloropropane	20.3	---	1.00	ug/L	1	20.0	---	102	80 - 120%	---	---	
Vinyl chloride	18.7	---	0.400	ug/L	1	20.0	---	94	80 - 120%	---	---	
Surr: 1,4-Difluorobenzene (Surr)	Recovery: 100 %		Limits: 80-120 %		Dilution: 1x							
Toluene-d8 (Surr)	100 %		80-120 %		"							
4-Bromofluorobenzene (Surr)	96 %		80-120 %		"							

**Duplicate (0030628-DUP1)** Prepared: 03/18/20 13:00 Analyzed: 03/18/20 14:19

**QC Source Sample: MW-32s (A0C0454-01)**  
 EPA 8260C

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Shore Terminal-Vancouver</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0454 - 03 26 20 1322
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030628 - EPA 5030B</b>												
<b>Water</b>												
<b>Duplicate (0030628-DUP1)</b>			Prepared: 03/18/20 13:00 Analyzed: 03/18/20 14:19									
<b>QC Source Sample: MW-32s (A0C0454-01)</b>												
Bromobenzene	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Bromochloromethane	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromodichloromethane	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromoform	ND	---	2.00	ug/L	1	---	ND	---	---	---	30%	
Bromomethane	ND	---	5.00	ug/L	1	---	ND	---	---	---	30%	
Carbon tetrachloride	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Chlorobenzene	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Chloroethane	ND	---	5.00	ug/L	1	---	ND	---	---	---	30%	
Chloroform	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Chloromethane	ND	---	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Chlorotoluene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
4-Chlorotoluene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Dibromochloromethane	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Dibromomethane	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	---	ND	---	---	---	30%	
cis-1,2-Dichloroethene	ND	---	0.400	ug/L	1	---	ND	---	---	---	30%	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	---	ND	---	---	---	30%	
Methylene chloride	ND	---	10.0	ug/L	1	---	ND	---	---	---	30%	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Shore Terminal-Vancouver</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0454 - 03 26 20 1322
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030628 - EPA 5030B</b>												
<b>Water</b>												
<b>Duplicate (0030628-DUP1)</b>			Prepared: 03/18/20 13:00 Analyzed: 03/18/20 14:19									
<b>QC Source Sample: MW-32s (A0C0454-01)</b>												
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Tetrachloroethene (PCE)	ND	---	0.400	ug/L	1	---	ND	---	---	---	30%	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	---	ND	---	---	---	30%	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Trichloroethene (TCE)	ND	---	0.400	ug/L	1	---	ND	---	---	---	30%	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	---	ND	---	---	---	30%	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Vinyl chloride	ND	---	0.400	ug/L	1	---	ND	---	---	---	30%	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>			<i>Recovery: 102 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>					
<i>Toluene-d8 (Surr)</i>			<i>103 %</i>		<i>80-120 %</i>		<i>"</i>					
<i>4-Bromofluorobenzene (Surr)</i>			<i>102 %</i>		<i>80-120 %</i>		<i>"</i>					

<b>Matrix Spike (0030628-MS1)</b>												
Prepared: 03/18/20 13:00 Analyzed: 03/18/20 14:46												
<b>QC Source Sample: MW-32s (A0C0454-01)</b>												
<b>EPA 8260C</b>												
Bromobenzene	19.9	---	0.500	ug/L	1	20.0	ND	99	80 - 120%	---	---	
Bromochloromethane	20.0	---	1.00	ug/L	1	20.0	ND	100	78 - 123%	---	---	
Bromodichloromethane	20.5	---	1.00	ug/L	1	20.0	ND	103	79 - 125%	---	---	
Bromoform	17.7	---	2.00	ug/L	1	20.0	ND	88	66 - 130%	---	---	
Bromomethane	18.4	---	5.00	ug/L	1	20.0	ND	92	53 - 141%	---	---	
Carbon tetrachloride	16.8	---	1.00	ug/L	1	20.0	ND	84	72 - 136%	---	---	Q-54
Chlorobenzene	20.5	---	0.500	ug/L	1	20.0	ND	102	80 - 120%	---	---	
Chloroethane	19.7	---	5.00	ug/L	1	20.0	ND	98	60 - 138%	---	---	
Chloroform	21.7	---	1.00	ug/L	1	20.0	ND	108	79 - 124%	---	---	
Chloromethane	17.8	---	5.00	ug/L	1	20.0	ND	89	50 - 139%	---	---	
2-Chlorotoluene	21.5	---	1.00	ug/L	1	20.0	ND	107	79 - 122%	---	---	
4-Chlorotoluene	20.8	---	1.00	ug/L	1	20.0	ND	104	78 - 122%	---	---	
Dibromochloromethane	17.2	---	1.00	ug/L	1	20.0	ND	86	74 - 126%	---	---	
1,2-Dibromo-3-chloropropane	17.5	---	5.00	ug/L	1	20.0	ND	88	62 - 128%	---	---	
1,2-Dibromoethane (EDB)	20.6	---	0.500	ug/L	1	20.0	ND	103	77 - 121%	---	---	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Shore Terminal-Vancouver</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0454 - 03 26 20 1322
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030628 - EPA 5030B</b>												
<b>Water</b>												
<b>Matrix Spike (0030628-MS1)</b>		Prepared: 03/18/20 13:00 Analyzed: 03/18/20 14:46										
<b>QC Source Sample: MW-32s (A0C0454-01)</b>												
Dibromomethane	21.4	---	1.00	ug/L	1	20.0	ND	107	79 - 123%	---	---	
1,2-Dichlorobenzene	21.7	---	0.500	ug/L	1	20.0	ND	108	80 - 120%	---	---	
1,3-Dichlorobenzene	21.1	---	0.500	ug/L	1	20.0	ND	105	80 - 120%	---	---	
1,4-Dichlorobenzene	19.9	---	0.500	ug/L	1	20.0	ND	100	79 - 120%	---	---	
Dichlorodifluoromethane	18.1	---	1.00	ug/L	1	20.0	ND	90	32 - 152%	---	---	
1,1-Dichloroethane	20.4	---	0.400	ug/L	1	20.0	ND	102	77 - 125%	---	---	
1,2-Dichloroethane (EDC)	20.6	---	0.400	ug/L	1	20.0	ND	103	73 - 128%	---	---	
1,1-Dichloroethene	22.1	---	0.400	ug/L	1	20.0	ND	110	71 - 131%	---	---	
cis-1,2-Dichloroethene	21.3	---	0.400	ug/L	1	20.0	ND	106	78 - 123%	---	---	
trans-1,2-Dichloroethene	20.9	---	0.400	ug/L	1	20.0	ND	104	75 - 124%	---	---	
1,2-Dichloropropane	20.3	---	0.500	ug/L	1	20.0	ND	101	78 - 122%	---	---	
1,3-Dichloropropane	21.2	---	1.00	ug/L	1	20.0	ND	106	80 - 120%	---	---	
2,2-Dichloropropane	24.1	---	1.00	ug/L	1	20.0	ND	120	60 - 139%	---	---	
1,1-Dichloropropene	22.6	---	1.00	ug/L	1	20.0	ND	113	79 - 125%	---	---	
cis-1,3-Dichloropropene	18.4	---	1.00	ug/L	1	20.0	ND	92	75 - 124%	---	---	
trans-1,3-Dichloropropene	18.6	---	1.00	ug/L	1	20.0	ND	93	73 - 127%	---	---	
Hexachlorobutadiene	24.7	---	5.00	ug/L	1	20.0	ND	124	66 - 134%	---	---	
Methylene chloride	19.4	---	10.0	ug/L	1	20.0	ND	97	74 - 124%	---	---	
1,1,1,2-Tetrachloroethane	20.4	---	0.400	ug/L	1	20.0	ND	102	78 - 124%	---	---	
1,1,2,2-Tetrachloroethane	21.6	---	0.500	ug/L	1	20.0	ND	108	71 - 121%	---	---	
Tetrachloroethene (PCE)	22.0	---	0.400	ug/L	1	20.0	ND	110	74 - 129%	---	---	
1,2,3-Trichlorobenzene	24.9	---	2.00	ug/L	1	20.0	ND	124	69 - 129%	---	---	
1,2,4-Trichlorobenzene	24.0	---	2.00	ug/L	1	20.0	ND	120	69 - 130%	---	---	
1,1,1-Trichloroethane	20.4	---	0.400	ug/L	1	20.0	ND	102	74 - 131%	---	---	
1,1,2-Trichloroethane	21.5	---	0.500	ug/L	1	20.0	ND	108	80 - 120%	---	---	
Trichloroethene (TCE)	21.0	---	0.400	ug/L	1	20.0	ND	105	79 - 123%	---	---	
Trichlorofluoromethane	23.3	---	2.00	ug/L	1	20.0	ND	116	65 - 141%	---	---	
1,2,3-Trichloropropane	20.6	---	1.00	ug/L	1	20.0	ND	103	73 - 122%	---	---	
Vinyl chloride	20.0	---	0.400	ug/L	1	20.0	ND	100	58 - 137%	---	---	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 101 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>99 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>98 %</i>		<i>80-120 %</i>		<i>"</i>						

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Lisa Domenighini, Client Services Manager



**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
 Tigard, OR 97223  
 503-718-2323  
EPA ID: OR01039

<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Shore Terminal-Vancouver</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0454 - 03 26 20 1322
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Ammonia by Gas Diffusion and Colorimetric Detection**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030591 - Method Prep: Aq</b>						<b>Water</b>						
<b>Blank (0030591-BLK1)</b>		Prepared: 03/17/20 10:51 Analyzed: 03/17/20 16:49										
<b>SM 4500-NH3 G</b>												
Ammonia as N	ND	---	0.0200	mg/L	1	---	---	---	---	---	---	---
<b>LCS (0030591-BS1)</b>		Prepared: 03/17/20 10:51 Analyzed: 03/17/20 16:51										
<b>SM 4500-NH3 G</b>												
Ammonia as N	2.06	---	0.0200	mg/L	1	2.00	---	103	90 - 110%	---	---	---

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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Ammonia by Gas Diffusion and Colorimetric Detection**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030686 - Method Prep: Aq</b>						<b>Water</b>						
<b>Blank (0030686-BLK1)</b>		Prepared: 03/19/20 09:52 Analyzed: 03/19/20 12:55										
<b>SM 4500-NH3 G</b>												
Ammonia as N	ND	---	0.0200	mg/L	1	---	---	---	---	---	---	---
<b>LCS (0030686-BS1)</b>		Prepared: 03/19/20 09:52 Analyzed: 03/19/20 12:57										
<b>SM 4500-NH3 G</b>												
Ammonia as N	2.02	---	0.0200	mg/L	1	2.00	---	101	90 - 110%	---	---	---

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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Anions by Ion Chromatography**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030465 - Method Prep: Aq</b>						<b>Water</b>						
<b>Blank (0030465-BLK1)</b>		Prepared: 03/13/20 08:12 Analyzed: 03/13/20 12:41										
<u>EPA 300.0</u>												
Nitrate-Nitrogen	ND	---	0.250	mg/L	1	---	---	---	---	---	---	---
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	---	---	---	---	---	---	---
<b>LCS (0030465-BS1)</b>		Prepared: 03/13/20 08:12 Analyzed: 03/13/20 13:03										
<u>EPA 300.0</u>												
Nitrate-Nitrogen	2.01	---	0.250	mg/L	1	2.00	---	100	90 - 110%	---	---	---
Nitrite-Nitrogen	2.14	---	0.250	mg/L	1	2.00	---	107	90 - 110%	---	---	---

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**SAMPLE PREPARATION INFORMATION**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Prep: EPA 5030B

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 0030628</u>							
A0C0454-01	Water	EPA 8260C	03/13/20 08:00	03/18/20 13:00	5mL/5mL	5mL/5mL	1.00

**Ammonia by Gas Diffusion and Colorimetric Detection**

Prep: Method Prep: Aq

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 0030686</u>							
A0C0454-01RE1	Water	SM 4500-NH3 G	03/13/20 08:00	03/19/20 09:52	10mL/10mL	10mL/10mL	1.00

**Anions by Ion Chromatography**

Prep: Method Prep: Aq

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 0030465</u>							
A0C0454-01	Water	EPA 300.0	03/13/20 08:00	03/13/20 08:12	5mL/5mL	5mL/5mL	1.00



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**QUALIFIER DEFINITIONS**

**Client Sample and Quality Control (QC) Sample Qualifier Definitions:**

**Apex Laboratories**

- Q-54** Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260C/8270D by -3%. The results are reported as Estimated Values.
- Q-55** Daily CCV/LCS recovery for this analyte was below the +/-20% criteria listed in EPA 8260C, however there is adequate sensitivity to ensure detection at the reporting level.

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**REPORTING NOTES AND CONVENTIONS:**

**Abbreviations:**

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported.
- RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

**Detection Limits: Limit of Detection (LOD)**

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('----'), then the data has not been evaluated below the Reporting Limit.

**Reporting Limits: Limit of Quantitation (LOQ)**

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

**Reporting Conventions:**

- Basis: Results for soil samples are generally reported on a 100% dry weight basis. The Result Basis is listed following the units as "dry", "wet", or "" (blank) designation.
  - "dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.
  - "wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
  - "" Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

**QC Source:**

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) are not included in this report. Please request a Full QC report if this data is required.

**Miscellaneous Notes:**

- " --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- " \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

**Blanks:**

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 1/2 the Reporting Limit (RL).  
-For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.  
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.  
For further details, please request a copy of this document.



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Shore Terminal-Vancouver</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0454 - 03 26 20 1322
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**REPORTING NOTES AND CONVENTIONS (Cont.):**

**Blanks (Cont.):**

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

**Preparation Notes:**

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

**Sampling and Preservation Notes:**

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.



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**LABORATORY ACCREDITATION INFORMATION**

**TNI Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039**

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

**Apex Laboratories**

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation
<u>All reported analytes are included in Apex Laboratories' current ORELAP scope.</u>					

**Secondary Accreditations**

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

**Subcontract Laboratory Accreditations**

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

**Field Testing Parameters**

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

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Lisa Domenighini, Client Services Manager

**Cascadia Associates** Project: **Shore Terminal-Vancouver**  
 5820 SW Kelly Ave Unit B Project Number: **Shore Terminal-Vancouver**  
 Portland, OR 97239 Project Manager: **Stephanie Salisbury** Report ID: **A0C0454 - 03 26 20 1322**

**CHAIN OF CUSTODY**

Lab # **A0C0454** COC 1 of 1

POH

Company: **Cascadia Associates** Project Mgr: **Stephanie Salisbury** Project Name: **Shore Terminal-Vancouver** Email: **5820swkelly@casco.com**

Address: **5820 SW Kelly Ave** Phone: **503 718 2323** Fax: **503-718-0333**

Sampled by: **Lindsay Wallis**

Site Location: **OR WA**

Other: **Q**

SAMPLE ID: **M/W-325**

LAB ID #

DATE: **3/13/08**

TIME: **6:45**

MATRIX: **GW**

# OF CONTAINERS: **5**

NWTPH-HCID

NWTPH-DX

NWTPH-GX

8260 VOCs Full List

8260 RBDN VOCs

8260 HVOCs

8260 BTEX VOCs

8270 SVOC

8270 SIM PAHs

8082 PCBs

600 TTO

RCPA Metals (8)

TCLP Metals (8)

AP, AS, BA, BE, CE, CH, CU, CO, CR, FE, NI, PB, SE, SI, MN, MO, NI, KR, SG, AG, NA, TI, V, ZN

TOTAL DISS TCFP

1200-COLS

1200-Z

NH3

NH4

ANALYSIS REQUEST

Normal Turn Around Time (TAT) = 10 Business Days

YES  NO

TAT Requested (circle): 1 Day 2 Day 3 Day 4 DAY 5 DAY Other: \_\_\_\_\_

SPECIAL INSTRUCTIONS: **APUC list same as Nantux Vancouver 4/2/19**

SAMPLES ARE HELD FOR 30 DAYS

RECEIVED BY: **[Signature]** Date: **3/13**

RELINQUISHED BY: **[Signature]** Date: **3/13**

Signature: **Lindsay Wallis** Signature: **[Signature]**

Printed Name: **Lindsay Wallis** Printed Name: **[Signature]**

Time: **6:45** Time: **[Signature]**

Company: **Cascadia Associates** Company: **[Signature]**

*Lisa Domenighini*



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Shore Terminal-Vancouver</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0454 - 03 26 20 1322
--	--	--

**APEX LABS COOLER RECEIPT FORM**

Client: Cascadia Associates Element WO#: A0C0454

Project/Project #: Nustar Vancouver 1020 / Shore Terminal-Vancouver

**Delivery Info:**  
Date/time received: 3/13/20 @ 1045 By: JS  
Delivered by: Apex  Client  ESS  FedEx  UPS  Swift  Senvoy  SDS  Other

**Cooler Inspection** Date/time inspected: 3/13/20 @ 1045 By: JS  
Chain of Custody included? Yes  No  Custody seals? Yes  No   
Signed/dated by client? Yes  No   
Signed/dated by Apex? Yes  No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	<u>1.4</u>						
Received on ice? (Y/N)	<u>Y</u>						
Temp. blanks? (Y/N)	<u>N</u>						
Ice type: (Gel/Real/Other)	<u>Real</u>						
Condition:	<u>good</u>						

Cooler out of temp? (Y/N)  Possible reason why: \_\_\_\_\_  
If some coolers are in temp and some out, were green dots applied to out of temperature samples? Yes/No/NA   
Out of temperature samples form initiated? Yes/No/NA \_\_\_\_\_  
**Samples Inspection:** Date/time inspected: 3-12-20 @ 11:15 By: TAM  
All samples intact? Yes  No  Comments: \_\_\_\_\_  
Bottle labels/COCs agree? Yes  No  Comments: \_\_\_\_\_  
COC/container discrepancies form initiated? Yes  No  NA   
Containers/volumes received appropriate for analysis? Yes  No  Comments: \_\_\_\_\_  
Do VOA vials have visible headspace? Yes  No  NA   
Comments: \_\_\_\_\_  
Water samples: pH checked: Yes  No  NA  pH appropriate? Yes  No  NA   
Comments: \_\_\_\_\_  
Additional information: \_\_\_\_\_  
Labeled by: TAM Witness: JS Cooler Inspected by: TAM See Project Contact Form: Y

*Lisa Domenighini*



**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

Tuesday, March 31, 2020

Stephanie Salisbury  
Cascadia Associates  
5820 SW Kelly Ave Unit B  
Portland, OR 97239

RE: A0C0387 - Shore Terminal-Vancouver - Nustar Vancouver 1Q20

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A0C0387, which was received by the laboratory on 3/11/2020 at 4:12:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [ldomenighini@apex-labs.com](mailto:ldomenighini@apex-labs.com), or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of sample receipt, unless prior arrangements have been made.

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Cooler Receipt Information

(See Cooler Receipt Form for details)

Cooler #1	5.3 degC	Cooler #2	4.9 degC
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This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.

All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

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Apex Laboratories

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Lisa Domenighini, Client Services Manager





<u>Cascadia Associates</u> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <u>Shore Terminal-Vancouver</u> Project Number: Nustar Vancouver 1Q20 Project Manager: Stephanie Salisbury	<b>Report ID:</b> A0C0387 - 03 31 20 0822
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ANALYTICAL REPORT FOR SAMPLES

**SAMPLE INFORMATION**

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MGMS1-43	A0C0387-01	Water	03/11/20 08:40	03/11/20 16:12
MW-8	A0C0387-02	Water	03/11/20 09:50	03/11/20 16:12
MW-26	A0C0387-03	Water	03/11/20 10:35	03/11/20 16:12
MW-18i	A0C0387-04	Water	03/11/20 11:15	03/11/20 16:12
MW-20i	A0C0387-05	Water	03/11/20 12:00	03/11/20 16:12
MW-21i-40	A0C0387-06	Water	03/11/20 13:00	03/11/20 16:12
EW-1	A0C0387-07	Water	03/11/20 13:40	03/11/20 16:12
MW-16	A0C0387-08	Water	03/11/20 14:20	03/11/20 16:12
Trip Blank	A0C0387-09	Water	03/11/20 00:00	03/11/20 16:12
MW-12	A0C0387-10	Water	03/11/20 08:07	03/11/20 16:12
MW-12 Dup	A0C0387-11	Water	03/11/20 08:07	03/11/20 16:12
MW-14	A0C0387-12	Water	03/11/20 09:04	03/11/20 16:12
MW-10	A0C0387-13	Water	03/11/20 10:02	03/11/20 16:12
MW-9	A0C0387-14	Water	03/11/20 10:41	03/11/20 16:12
MW-7	A0C0387-15	Water	03/11/20 11:32	03/11/20 16:12
MW-7 Dup	A0C0387-16	Water	03/11/20 11:32	03/11/20 16:12
MP-1	A0C0387-17	Water	03/11/20 12:34	03/11/20 16:12
MW-19	A0C0387-18	Water	03/11/20 13:45	03/11/20 16:12
MW-19 Dup	A0C0387-19	Water	03/11/20 13:45	03/11/20 16:12



Apex Laboratories, LLC

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

Cascadia Associates

5820 SW Kelly Ave Unit B  
Portland, OR 97239

Project: Shore Terminal-Vancouver

Project Number: Nustar Vancouver 1Q20

Project Manager: Stephanie Salisbury

Report ID:

A0C0387 - 03 31 20 0822

**ANALYTICAL CASE NARRATIVE**

Work Order: A0C0387

Subcontract

This report is not complete without the attached subcontract laboratory report for RSK 175 from Air Technology.

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Apex Laboratories

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver 1Q20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0C0387 - 03 31 20 0822</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MGMS1-43 (A0C0387-01)</b>				<b>Matrix: Water</b>		<b>Batch: 0030426</b>		
Bromobenzene	ND	---	12.5	ug/L	25	03/12/20 18:24	EPA 8260C	
Bromochloromethane	ND	---	25.0	ug/L	25	03/12/20 18:24	EPA 8260C	
Bromodichloromethane	ND	---	25.0	ug/L	25	03/12/20 18:24	EPA 8260C	
Bromoform	ND	---	25.0	ug/L	25	03/12/20 18:24	EPA 8260C	
Bromomethane	ND	---	125	ug/L	25	03/12/20 18:24	EPA 8260C	
Carbon tetrachloride	ND	---	25.0	ug/L	25	03/12/20 18:24	EPA 8260C	
Chlorobenzene	ND	---	12.5	ug/L	25	03/12/20 18:24	EPA 8260C	
Chloroethane	ND	---	125	ug/L	25	03/12/20 18:24	EPA 8260C	EST
Chloroform	ND	---	25.0	ug/L	25	03/12/20 18:24	EPA 8260C	
Chloromethane	ND	---	125	ug/L	25	03/12/20 18:24	EPA 8260C	
2-Chlorotoluene	ND	---	25.0	ug/L	25	03/12/20 18:24	EPA 8260C	
4-Chlorotoluene	ND	---	25.0	ug/L	25	03/12/20 18:24	EPA 8260C	
Dibromochloromethane	ND	---	25.0	ug/L	25	03/12/20 18:24	EPA 8260C	
1,2-Dibromo-3-chloropropane	ND	---	125	ug/L	25	03/12/20 18:24	EPA 8260C	
1,2-Dibromoethane (EDB)	ND	---	12.5	ug/L	25	03/12/20 18:24	EPA 8260C	
Dibromomethane	ND	---	25.0	ug/L	25	03/12/20 18:24	EPA 8260C	
1,2-Dichlorobenzene	ND	---	12.5	ug/L	25	03/12/20 18:24	EPA 8260C	
1,3-Dichlorobenzene	ND	---	12.5	ug/L	25	03/12/20 18:24	EPA 8260C	
1,4-Dichlorobenzene	ND	---	12.5	ug/L	25	03/12/20 18:24	EPA 8260C	
Dichlorodifluoromethane	ND	---	25.0	ug/L	25	03/12/20 18:24	EPA 8260C	
<b>1,1-Dichloroethane</b>	<b>157</b>	---	10.0	ug/L	25	03/12/20 18:24	EPA 8260C	
1,2-Dichloroethane (EDC)	ND	---	10.0	ug/L	25	03/12/20 18:24	EPA 8260C	
<b>1,1-Dichloroethene</b>	<b>29.7</b>	---	10.0	ug/L	25	03/12/20 18:24	EPA 8260C	
<b>cis-1,2-Dichloroethene</b>	<b>3230</b>	---	10.0	ug/L	25	03/12/20 18:24	EPA 8260C	
<b>trans-1,2-Dichloroethene</b>	<b>60.4</b>	---	10.0	ug/L	25	03/12/20 18:24	EPA 8260C	
1,2-Dichloropropane	ND	---	12.5	ug/L	25	03/12/20 18:24	EPA 8260C	
1,3-Dichloropropane	ND	---	25.0	ug/L	25	03/12/20 18:24	EPA 8260C	
2,2-Dichloropropane	ND	---	25.0	ug/L	25	03/12/20 18:24	EPA 8260C	
1,1-Dichloropropene	ND	---	25.0	ug/L	25	03/12/20 18:24	EPA 8260C	
cis-1,3-Dichloropropene	ND	---	25.0	ug/L	25	03/12/20 18:24	EPA 8260C	
trans-1,3-Dichloropropene	ND	---	25.0	ug/L	25	03/12/20 18:24	EPA 8260C	
Hexachlorobutadiene	ND	---	125	ug/L	25	03/12/20 18:24	EPA 8260C	
Methylene chloride	ND	---	250	ug/L	25	03/12/20 18:24	EPA 8260C	
1,1,1,2-Tetrachloroethane	ND	---	10.0	ug/L	25	03/12/20 18:24	EPA 8260C	
1,1,2,2-Tetrachloroethane	ND	---	12.5	ug/L	25	03/12/20 18:24	EPA 8260C	
<b>Tetrachloroethene (PCE)</b>	<b>228</b>	---	10.0	ug/L	25	03/12/20 18:24	EPA 8260C	
1,2,3-Trichlorobenzene	ND	---	50.0	ug/L	25	03/12/20 18:24	EPA 8260C	
1,2,4-Trichlorobenzene	ND	---	50.0	ug/L	25	03/12/20 18:24	EPA 8260C	
1,1,1-Trichloroethane	ND	---	10.0	ug/L	25	03/12/20 18:24	EPA 8260C	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver 1Q20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0C0387 - 03 31 20 0822</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MGMS1-43 (A0C0387-01)</b>			<b>Matrix: Water</b>		<b>Batch: 0030426</b>			
1,1,2-Trichloroethane	ND	---	12.5	ug/L	25	03/12/20 18:24	EPA 8260C	
<b>Trichloroethene (TCE)</b>	<b>495</b>	---	10.0	ug/L	25	03/12/20 18:24	EPA 8260C	
Trichlorofluoromethane	ND	---	50.0	ug/L	25	03/12/20 18:24	EPA 8260C	
1,2,3-Trichloropropane	ND	---	25.0	ug/L	25	03/12/20 18:24	EPA 8260C	
<b>Vinyl chloride</b>	<b>157</b>	---	10.0	ug/L	25	03/12/20 18:24	EPA 8260C	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 100 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>03/12/20 18:24</i>	<i>EPA 8260C</i>
<i>Toluene-d8 (Surr)</i>		<i>103 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/12/20 18:24</i>	<i>EPA 8260C</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>98 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/12/20 18:24</i>	<i>EPA 8260C</i>

<b>MW-8 (A0C0387-02)</b>			<b>Matrix: Water</b>		<b>Batch: 0030426</b>			
Bromobenzene	ND	---	0.500	ug/L	1	03/12/20 12:33	EPA 8260C	
Bromochloromethane	ND	---	1.00	ug/L	1	03/12/20 12:33	EPA 8260C	
Bromodichloromethane	ND	---	1.00	ug/L	1	03/12/20 12:33	EPA 8260C	
Bromoform	ND	---	1.00	ug/L	1	03/12/20 12:33	EPA 8260C	
Bromomethane	ND	---	5.00	ug/L	1	03/12/20 12:33	EPA 8260C	
Carbon tetrachloride	ND	---	1.00	ug/L	1	03/12/20 12:33	EPA 8260C	
Chlorobenzene	ND	---	0.500	ug/L	1	03/12/20 12:33	EPA 8260C	
Chloroethane	ND	---	5.00	ug/L	1	03/12/20 12:33	EPA 8260C	EST
Chloroform	ND	---	1.00	ug/L	1	03/12/20 12:33	EPA 8260C	
Chloromethane	ND	---	5.00	ug/L	1	03/12/20 12:33	EPA 8260C	
2-Chlorotoluene	ND	---	1.00	ug/L	1	03/12/20 12:33	EPA 8260C	
4-Chlorotoluene	ND	---	1.00	ug/L	1	03/12/20 12:33	EPA 8260C	
Dibromochloromethane	ND	---	1.00	ug/L	1	03/12/20 12:33	EPA 8260C	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	03/12/20 12:33	EPA 8260C	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	03/12/20 12:33	EPA 8260C	
Dibromomethane	ND	---	1.00	ug/L	1	03/12/20 12:33	EPA 8260C	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	03/12/20 12:33	EPA 8260C	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	03/12/20 12:33	EPA 8260C	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	03/12/20 12:33	EPA 8260C	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	03/12/20 12:33	EPA 8260C	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	03/12/20 12:33	EPA 8260C	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	03/12/20 12:33	EPA 8260C	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	03/12/20 12:33	EPA 8260C	
<b>cis-1,2-Dichloroethene</b>	<b>3.44</b>	---	0.400	ug/L	1	03/12/20 12:33	EPA 8260C	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	03/12/20 12:33	EPA 8260C	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	03/12/20 12:33	EPA 8260C	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	03/12/20 12:33	EPA 8260C	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	03/12/20 12:33	EPA 8260C	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver 1Q20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0387 - 03 31 20 0822
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-8 (A0C0387-02)</b>				<b>Matrix: Water</b>		<b>Batch: 0030426</b>		
1,1-Dichloropropene	ND	---	1.00	ug/L	1	03/12/20 12:33	EPA 8260C	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/12/20 12:33	EPA 8260C	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/12/20 12:33	EPA 8260C	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	03/12/20 12:33	EPA 8260C	
Methylene chloride	ND	---	10.0	ug/L	1	03/12/20 12:33	EPA 8260C	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	03/12/20 12:33	EPA 8260C	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	03/12/20 12:33	EPA 8260C	
<b>Tetrachloroethene (PCE)</b>	<b>0.929</b>	---	0.400	ug/L	1	03/12/20 12:33	EPA 8260C	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	03/12/20 12:33	EPA 8260C	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	03/12/20 12:33	EPA 8260C	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	03/12/20 12:33	EPA 8260C	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	03/12/20 12:33	EPA 8260C	
Trichloroethene (TCE)	ND	---	0.400	ug/L	1	03/12/20 12:33	EPA 8260C	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	03/12/20 12:33	EPA 8260C	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	03/12/20 12:33	EPA 8260C	
Vinyl chloride	ND	---	0.400	ug/L	1	03/12/20 12:33	EPA 8260C	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 99 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>03/12/20 12:33</i>	<i>EPA 8260C</i>
<i>Toluene-d8 (Surr)</i>		<i>103 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/12/20 12:33</i>	<i>EPA 8260C</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>99 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/12/20 12:33</i>	<i>EPA 8260C</i>

<b>MW-26 (A0C0387-03)</b>				<b>Matrix: Water</b>		<b>Batch: 0030426</b>		
Bromobenzene	ND	---	2.50	ug/L	5	03/12/20 19:18	EPA 8260C	
Bromochloromethane	ND	---	5.00	ug/L	5	03/12/20 19:18	EPA 8260C	
Bromodichloromethane	ND	---	5.00	ug/L	5	03/12/20 19:18	EPA 8260C	
Bromoform	ND	---	5.00	ug/L	5	03/12/20 19:18	EPA 8260C	
Bromomethane	ND	---	25.0	ug/L	5	03/12/20 19:18	EPA 8260C	
Carbon tetrachloride	ND	---	5.00	ug/L	5	03/12/20 19:18	EPA 8260C	
Chlorobenzene	ND	---	2.50	ug/L	5	03/12/20 19:18	EPA 8260C	
Chloroethane	ND	---	25.0	ug/L	5	03/12/20 19:18	EPA 8260C	EST
Chloroform	ND	---	5.00	ug/L	5	03/12/20 19:18	EPA 8260C	
Chloromethane	ND	---	25.0	ug/L	5	03/12/20 19:18	EPA 8260C	
2-Chlorotoluene	ND	---	5.00	ug/L	5	03/12/20 19:18	EPA 8260C	
4-Chlorotoluene	ND	---	5.00	ug/L	5	03/12/20 19:18	EPA 8260C	
Dibromochloromethane	ND	---	5.00	ug/L	5	03/12/20 19:18	EPA 8260C	
1,2-Dibromo-3-chloropropane	ND	---	25.0	ug/L	5	03/12/20 19:18	EPA 8260C	
1,2-Dibromoethane (EDB)	ND	---	2.50	ug/L	5	03/12/20 19:18	EPA 8260C	
Dibromomethane	ND	---	5.00	ug/L	5	03/12/20 19:18	EPA 8260C	
1,2-Dichlorobenzene	ND	---	2.50	ug/L	5	03/12/20 19:18	EPA 8260C	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver 1Q20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0C0387 - 03 31 20 0822</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-26 (A0C0387-03)</b>				<b>Matrix: Water</b>		<b>Batch: 0030426</b>		
1,3-Dichlorobenzene	ND	---	2.50	ug/L	5	03/12/20 19:18	EPA 8260C	
1,4-Dichlorobenzene	ND	---	2.50	ug/L	5	03/12/20 19:18	EPA 8260C	
Dichlorodifluoromethane	ND	---	5.00	ug/L	5	03/12/20 19:18	EPA 8260C	
<b>1,1-Dichloroethane</b>	<b>3.65</b>	---	2.00	ug/L	5	03/12/20 19:18	EPA 8260C	
1,2-Dichloroethane (EDC)	ND	---	2.00	ug/L	5	03/12/20 19:18	EPA 8260C	
1,1-Dichloroethene	ND	---	2.00	ug/L	5	03/12/20 19:18	EPA 8260C	
<b>cis-1,2-Dichloroethene</b>	<b>59.7</b>	---	2.00	ug/L	5	03/12/20 19:18	EPA 8260C	
trans-1,2-Dichloroethene	ND	---	2.00	ug/L	5	03/12/20 19:18	EPA 8260C	
1,2-Dichloropropane	ND	---	2.50	ug/L	5	03/12/20 19:18	EPA 8260C	
1,3-Dichloropropane	ND	---	5.00	ug/L	5	03/12/20 19:18	EPA 8260C	
2,2-Dichloropropane	ND	---	5.00	ug/L	5	03/12/20 19:18	EPA 8260C	
1,1-Dichloropropene	ND	---	5.00	ug/L	5	03/12/20 19:18	EPA 8260C	
cis-1,3-Dichloropropene	ND	---	5.00	ug/L	5	03/12/20 19:18	EPA 8260C	
trans-1,3-Dichloropropene	ND	---	5.00	ug/L	5	03/12/20 19:18	EPA 8260C	
Hexachlorobutadiene	ND	---	25.0	ug/L	5	03/12/20 19:18	EPA 8260C	
Methylene chloride	ND	---	50.0	ug/L	5	03/12/20 19:18	EPA 8260C	
1,1,1,2-Tetrachloroethane	ND	---	2.00	ug/L	5	03/12/20 19:18	EPA 8260C	
1,1,2,2-Tetrachloroethane	ND	---	2.50	ug/L	5	03/12/20 19:18	EPA 8260C	
<b>Tetrachloroethene (PCE)</b>	<b>79.1</b>	---	2.00	ug/L	5	03/12/20 19:18	EPA 8260C	
1,2,3-Trichlorobenzene	ND	---	10.0	ug/L	5	03/12/20 19:18	EPA 8260C	
1,2,4-Trichlorobenzene	ND	---	10.0	ug/L	5	03/12/20 19:18	EPA 8260C	
1,1,1-Trichloroethane	ND	---	2.00	ug/L	5	03/12/20 19:18	EPA 8260C	
1,1,2-Trichloroethane	ND	---	2.50	ug/L	5	03/12/20 19:18	EPA 8260C	
<b>Trichloroethene (TCE)</b>	<b>205</b>	---	2.00	ug/L	5	03/12/20 19:18	EPA 8260C	
Trichlorofluoromethane	ND	---	10.0	ug/L	5	03/12/20 19:18	EPA 8260C	
1,2,3-Trichloropropane	ND	---	5.00	ug/L	5	03/12/20 19:18	EPA 8260C	
Vinyl chloride	ND	---	2.00	ug/L	5	03/12/20 19:18	EPA 8260C	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 104 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>03/12/20 19:18</i>	<i>EPA 8260C</i>
<i>Toluene-d8 (Surr)</i>		<i>102 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/12/20 19:18</i>	<i>EPA 8260C</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>99 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/12/20 19:18</i>	<i>EPA 8260C</i>

<b>MW-18i (A0C0387-04)</b>				<b>Matrix: Water</b>		<b>Batch: 0030426</b>		
Bromobenzene	ND	---	0.500	ug/L	1	03/12/20 13:00	EPA 8260C	
Bromochloromethane	ND	---	1.00	ug/L	1	03/12/20 13:00	EPA 8260C	
Bromodichloromethane	ND	---	1.00	ug/L	1	03/12/20 13:00	EPA 8260C	
Bromoform	ND	---	1.00	ug/L	1	03/12/20 13:00	EPA 8260C	
Bromomethane	ND	---	5.00	ug/L	1	03/12/20 13:00	EPA 8260C	
Carbon tetrachloride	ND	---	1.00	ug/L	1	03/12/20 13:00	EPA 8260C	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver 1Q20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0C0387 - 03 31 20 0822</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-18i (A0C0387-04)</b>				<b>Matrix: Water</b>		<b>Batch: 0030426</b>		
Chlorobenzene	ND	---	0.500	ug/L	1	03/12/20 13:00	EPA 8260C	
Chloroethane	ND	---	5.00	ug/L	1	03/12/20 13:00	EPA 8260C	EST
Chloroform	ND	---	1.00	ug/L	1	03/12/20 13:00	EPA 8260C	
Chloromethane	ND	---	5.00	ug/L	1	03/12/20 13:00	EPA 8260C	
2-Chlorotoluene	ND	---	1.00	ug/L	1	03/12/20 13:00	EPA 8260C	
4-Chlorotoluene	ND	---	1.00	ug/L	1	03/12/20 13:00	EPA 8260C	
Dibromochloromethane	ND	---	1.00	ug/L	1	03/12/20 13:00	EPA 8260C	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	03/12/20 13:00	EPA 8260C	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	03/12/20 13:00	EPA 8260C	
Dibromomethane	ND	---	1.00	ug/L	1	03/12/20 13:00	EPA 8260C	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	03/12/20 13:00	EPA 8260C	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	03/12/20 13:00	EPA 8260C	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	03/12/20 13:00	EPA 8260C	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	03/12/20 13:00	EPA 8260C	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	03/12/20 13:00	EPA 8260C	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	03/12/20 13:00	EPA 8260C	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	03/12/20 13:00	EPA 8260C	
<b>cis-1,2-Dichloroethene</b>	<b>1.60</b>	---	0.400	ug/L	1	03/12/20 13:00	EPA 8260C	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	03/12/20 13:00	EPA 8260C	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	03/12/20 13:00	EPA 8260C	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	03/12/20 13:00	EPA 8260C	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	03/12/20 13:00	EPA 8260C	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	03/12/20 13:00	EPA 8260C	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/12/20 13:00	EPA 8260C	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/12/20 13:00	EPA 8260C	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	03/12/20 13:00	EPA 8260C	
Methylene chloride	ND	---	10.0	ug/L	1	03/12/20 13:00	EPA 8260C	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	03/12/20 13:00	EPA 8260C	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	03/12/20 13:00	EPA 8260C	
<b>Tetrachloroethene (PCE)</b>	<b>0.896</b>	---	0.400	ug/L	1	03/12/20 13:00	EPA 8260C	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	03/12/20 13:00	EPA 8260C	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	03/12/20 13:00	EPA 8260C	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	03/12/20 13:00	EPA 8260C	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	03/12/20 13:00	EPA 8260C	
<b>Trichloroethene (TCE)</b>	<b>0.502</b>	---	0.400	ug/L	1	03/12/20 13:00	EPA 8260C	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	03/12/20 13:00	EPA 8260C	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	03/12/20 13:00	EPA 8260C	
Vinyl chloride	ND	---	0.400	ug/L	1	03/12/20 13:00	EPA 8260C	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver 1Q20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0C0387 - 03 31 20 0822</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-18i (A0C0387-04)</b>			<b>Matrix: Water</b>			<b>Batch: 0030426</b>		
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 100 %</i>	<i>Limits: 80-120 %</i>	<i>1</i>		<i>03/12/20 13:00</i>	<i>EPA 8260C</i>	
<i>Toluene-d8 (Surr)</i>		<i>102 %</i>	<i>80-120 %</i>	<i>1</i>		<i>03/12/20 13:00</i>	<i>EPA 8260C</i>	
<i>4-Bromofluorobenzene (Surr)</i>		<i>97 %</i>	<i>80-120 %</i>	<i>1</i>		<i>03/12/20 13:00</i>	<i>EPA 8260C</i>	
<b>MW-20i (A0C0387-05)</b>			<b>Matrix: Water</b>			<b>Batch: 0030426</b>		
Bromobenzene	ND	---	0.500	ug/L	1	03/12/20 13:27	EPA 8260C	
Bromochloromethane	ND	---	1.00	ug/L	1	03/12/20 13:27	EPA 8260C	
Bromodichloromethane	ND	---	1.00	ug/L	1	03/12/20 13:27	EPA 8260C	
Bromoform	ND	---	1.00	ug/L	1	03/12/20 13:27	EPA 8260C	
Bromomethane	ND	---	5.00	ug/L	1	03/12/20 13:27	EPA 8260C	
Carbon tetrachloride	ND	---	1.00	ug/L	1	03/12/20 13:27	EPA 8260C	
Chlorobenzene	ND	---	0.500	ug/L	1	03/12/20 13:27	EPA 8260C	
Chloroethane	ND	---	5.00	ug/L	1	03/12/20 13:27	EPA 8260C	EST
Chloroform	ND	---	1.00	ug/L	1	03/12/20 13:27	EPA 8260C	
Chloromethane	ND	---	5.00	ug/L	1	03/12/20 13:27	EPA 8260C	
2-Chlorotoluene	ND	---	1.00	ug/L	1	03/12/20 13:27	EPA 8260C	
4-Chlorotoluene	ND	---	1.00	ug/L	1	03/12/20 13:27	EPA 8260C	
Dibromochloromethane	ND	---	1.00	ug/L	1	03/12/20 13:27	EPA 8260C	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	03/12/20 13:27	EPA 8260C	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	03/12/20 13:27	EPA 8260C	
Dibromomethane	ND	---	1.00	ug/L	1	03/12/20 13:27	EPA 8260C	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	03/12/20 13:27	EPA 8260C	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	03/12/20 13:27	EPA 8260C	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	03/12/20 13:27	EPA 8260C	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	03/12/20 13:27	EPA 8260C	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	03/12/20 13:27	EPA 8260C	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	03/12/20 13:27	EPA 8260C	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	03/12/20 13:27	EPA 8260C	
<b>cis-1,2-Dichloroethene</b>	<b>9.21</b>	---	0.400	ug/L	1	03/12/20 13:27	EPA 8260C	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	03/12/20 13:27	EPA 8260C	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	03/12/20 13:27	EPA 8260C	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	03/12/20 13:27	EPA 8260C	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	03/12/20 13:27	EPA 8260C	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	03/12/20 13:27	EPA 8260C	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/12/20 13:27	EPA 8260C	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/12/20 13:27	EPA 8260C	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	03/12/20 13:27	EPA 8260C	
Methylene chloride	ND	---	10.0	ug/L	1	03/12/20 13:27	EPA 8260C	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	03/12/20 13:27	EPA 8260C	

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Lisa Domenighini, Client Services Manager





<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver 1Q20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0C0387 - 03 31 20 0822</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-20i (A0C0387-05)</b>				<b>Matrix: Water</b>		<b>Batch: 0030426</b>		
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	03/12/20 13:27	EPA 8260C	
<b>Tetrachloroethene (PCE)</b>	<b>2.32</b>	---	0.400	ug/L	1	03/12/20 13:27	EPA 8260C	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	03/12/20 13:27	EPA 8260C	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	03/12/20 13:27	EPA 8260C	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	03/12/20 13:27	EPA 8260C	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	03/12/20 13:27	EPA 8260C	
<b>Trichloroethene (TCE)</b>	<b>1.26</b>	---	0.400	ug/L	1	03/12/20 13:27	EPA 8260C	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	03/12/20 13:27	EPA 8260C	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	03/12/20 13:27	EPA 8260C	
Vinyl chloride	ND	---	0.400	ug/L	1	03/12/20 13:27	EPA 8260C	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 100 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>03/12/20 13:27</i>	<i>EPA 8260C</i>
<i>Toluene-d8 (Surr)</i>		<i>103 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/12/20 13:27</i>	<i>EPA 8260C</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>101 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/12/20 13:27</i>	<i>EPA 8260C</i>

<b>MW-21i-40 (A0C0387-06)</b>				<b>Matrix: Water</b>		<b>Batch: 0030426</b>		
Bromobenzene	ND	---	0.500	ug/L	1	03/12/20 13:54	EPA 8260C	
Bromochloromethane	ND	---	1.00	ug/L	1	03/12/20 13:54	EPA 8260C	
Bromodichloromethane	ND	---	1.00	ug/L	1	03/12/20 13:54	EPA 8260C	
Bromoform	ND	---	1.00	ug/L	1	03/12/20 13:54	EPA 8260C	
Bromomethane	ND	---	5.00	ug/L	1	03/12/20 13:54	EPA 8260C	
Carbon tetrachloride	ND	---	1.00	ug/L	1	03/12/20 13:54	EPA 8260C	
Chlorobenzene	ND	---	0.500	ug/L	1	03/12/20 13:54	EPA 8260C	
Chloroethane	ND	---	5.00	ug/L	1	03/12/20 13:54	EPA 8260C	EST
Chloroform	ND	---	1.00	ug/L	1	03/12/20 13:54	EPA 8260C	
Chloromethane	ND	---	5.00	ug/L	1	03/12/20 13:54	EPA 8260C	
2-Chlorotoluene	ND	---	1.00	ug/L	1	03/12/20 13:54	EPA 8260C	
4-Chlorotoluene	ND	---	1.00	ug/L	1	03/12/20 13:54	EPA 8260C	
Dibromochloromethane	ND	---	1.00	ug/L	1	03/12/20 13:54	EPA 8260C	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	03/12/20 13:54	EPA 8260C	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	03/12/20 13:54	EPA 8260C	
Dibromomethane	ND	---	1.00	ug/L	1	03/12/20 13:54	EPA 8260C	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	03/12/20 13:54	EPA 8260C	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	03/12/20 13:54	EPA 8260C	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	03/12/20 13:54	EPA 8260C	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	03/12/20 13:54	EPA 8260C	
<b>1,1-Dichloroethane</b>	<b>1.95</b>	---	0.400	ug/L	1	03/12/20 13:54	EPA 8260C	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	03/12/20 13:54	EPA 8260C	
<b>1,1-Dichloroethene</b>	<b>0.626</b>	---	0.400	ug/L	1	03/12/20 13:54	EPA 8260C	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver 1Q20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0387 - 03 31 20 0822
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-21i-40 (A0C0387-06)</b>				<b>Matrix: Water</b>		<b>Batch: 0030426</b>		
cis-1,2-Dichloroethene	47.4	---	0.400	ug/L	1	03/12/20 13:54	EPA 8260C	
trans-1,2-Dichloroethene	0.411	---	0.400	ug/L	1	03/12/20 13:54	EPA 8260C	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	03/12/20 13:54	EPA 8260C	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	03/12/20 13:54	EPA 8260C	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	03/12/20 13:54	EPA 8260C	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	03/12/20 13:54	EPA 8260C	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/12/20 13:54	EPA 8260C	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/12/20 13:54	EPA 8260C	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	03/12/20 13:54	EPA 8260C	
Methylene chloride	ND	---	10.0	ug/L	1	03/12/20 13:54	EPA 8260C	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	03/12/20 13:54	EPA 8260C	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	03/12/20 13:54	EPA 8260C	
<b>Tetrachloroethene (PCE)</b>	<b>31.2</b>	---	0.400	ug/L	1	03/12/20 13:54	EPA 8260C	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	03/12/20 13:54	EPA 8260C	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	03/12/20 13:54	EPA 8260C	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	03/12/20 13:54	EPA 8260C	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	03/12/20 13:54	EPA 8260C	
<b>Trichloroethene (TCE)</b>	<b>17.6</b>	---	0.400	ug/L	1	03/12/20 13:54	EPA 8260C	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	03/12/20 13:54	EPA 8260C	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	03/12/20 13:54	EPA 8260C	
Vinyl chloride	ND	---	0.400	ug/L	1	03/12/20 13:54	EPA 8260C	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 100 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>03/12/20 13:54</i>	<i>EPA 8260C</i>
<i>Toluene-d8 (Surr)</i>		<i>101 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/12/20 13:54</i>	<i>EPA 8260C</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>100 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/12/20 13:54</i>	<i>EPA 8260C</i>

<b>EW-1 (A0C0387-07)</b>				<b>Matrix: Water</b>		<b>Batch: 0030426</b>		
Bromobenzene	ND	---	0.500	ug/L	1	03/12/20 14:48	EPA 8260C	
Bromochloromethane	ND	---	1.00	ug/L	1	03/12/20 14:48	EPA 8260C	
Bromodichloromethane	ND	---	1.00	ug/L	1	03/12/20 14:48	EPA 8260C	
Bromoform	ND	---	1.00	ug/L	1	03/12/20 14:48	EPA 8260C	
Bromomethane	ND	---	5.00	ug/L	1	03/12/20 14:48	EPA 8260C	
Carbon tetrachloride	ND	---	1.00	ug/L	1	03/12/20 14:48	EPA 8260C	
Chlorobenzene	ND	---	0.500	ug/L	1	03/12/20 14:48	EPA 8260C	
Chloroethane	ND	---	5.00	ug/L	1	03/12/20 14:48	EPA 8260C	EST
<b>Chloroform</b>	<b>1.29</b>	---	1.00	ug/L	1	03/12/20 14:48	EPA 8260C	
Chloromethane	ND	---	5.00	ug/L	1	03/12/20 14:48	EPA 8260C	
2-Chlorotoluene	ND	---	1.00	ug/L	1	03/12/20 14:48	EPA 8260C	
4-Chlorotoluene	ND	---	1.00	ug/L	1	03/12/20 14:48	EPA 8260C	

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<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver 1Q20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0387 - 03 31 20 0822
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>EW-1 (A0C0387-07)</b>		<b>Matrix: Water</b>			<b>Batch: 0030426</b>			
Dibromochloromethane	ND	---	1.00	ug/L	1	03/12/20 14:48	EPA 8260C	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	03/12/20 14:48	EPA 8260C	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	03/12/20 14:48	EPA 8260C	
Dibromomethane	ND	---	1.00	ug/L	1	03/12/20 14:48	EPA 8260C	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	03/12/20 14:48	EPA 8260C	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	03/12/20 14:48	EPA 8260C	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	03/12/20 14:48	EPA 8260C	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	03/12/20 14:48	EPA 8260C	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	03/12/20 14:48	EPA 8260C	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	03/12/20 14:48	EPA 8260C	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	03/12/20 14:48	EPA 8260C	
<b>cis-1,2-Dichloroethene</b>	<b>0.811</b>	---	0.400	ug/L	1	03/12/20 14:48	EPA 8260C	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	03/12/20 14:48	EPA 8260C	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	03/12/20 14:48	EPA 8260C	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	03/12/20 14:48	EPA 8260C	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	03/12/20 14:48	EPA 8260C	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	03/12/20 14:48	EPA 8260C	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/12/20 14:48	EPA 8260C	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/12/20 14:48	EPA 8260C	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	03/12/20 14:48	EPA 8260C	
Methylene chloride	ND	---	10.0	ug/L	1	03/12/20 14:48	EPA 8260C	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	03/12/20 14:48	EPA 8260C	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	03/12/20 14:48	EPA 8260C	
<b>Tetrachloroethene (PCE)</b>	<b>15.0</b>	---	0.400	ug/L	1	03/12/20 14:48	EPA 8260C	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	03/12/20 14:48	EPA 8260C	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	03/12/20 14:48	EPA 8260C	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	03/12/20 14:48	EPA 8260C	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	03/12/20 14:48	EPA 8260C	
<b>Trichloroethene (TCE)</b>	<b>5.04</b>	---	0.400	ug/L	1	03/12/20 14:48	EPA 8260C	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	03/12/20 14:48	EPA 8260C	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	03/12/20 14:48	EPA 8260C	
Vinyl chloride	ND	---	0.400	ug/L	1	03/12/20 14:48	EPA 8260C	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 102 %</i>		<i>Limits: 80-120 %</i>	<i>1</i>	<i>03/12/20 14:48</i>	<i>EPA 8260C</i>	
<i>Toluene-d8 (Surr)</i>		<i>102 %</i>		<i>80-120 %</i>	<i>1</i>	<i>03/12/20 14:48</i>	<i>EPA 8260C</i>	
<i>4-Bromofluorobenzene (Surr)</i>		<i>100 %</i>		<i>80-120 %</i>	<i>1</i>	<i>03/12/20 14:48</i>	<i>EPA 8260C</i>	

<b>MW-16 (A0C0387-08)</b>		<b>Matrix: Water</b>			<b>Batch: 0030426</b>			
Bromobenzene	ND	---	0.500	ug/L	1	03/12/20 15:15	EPA 8260C	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver 1Q20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0C0387 - 03 31 20 0822</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-16 (A0C0387-08)</b>				<b>Matrix: Water</b>		<b>Batch: 0030426</b>		
Bromochloromethane	ND	---	1.00	ug/L	1	03/12/20 15:15	EPA 8260C	
Bromodichloromethane	ND	---	1.00	ug/L	1	03/12/20 15:15	EPA 8260C	
Bromoform	ND	---	1.00	ug/L	1	03/12/20 15:15	EPA 8260C	
Bromomethane	ND	---	5.00	ug/L	1	03/12/20 15:15	EPA 8260C	
Carbon tetrachloride	ND	---	1.00	ug/L	1	03/12/20 15:15	EPA 8260C	
Chlorobenzene	ND	---	0.500	ug/L	1	03/12/20 15:15	EPA 8260C	
Chloroethane	ND	---	5.00	ug/L	1	03/12/20 15:15	EPA 8260C	EST
Chloroform	ND	---	1.00	ug/L	1	03/12/20 15:15	EPA 8260C	
Chloromethane	ND	---	5.00	ug/L	1	03/12/20 15:15	EPA 8260C	
2-Chlorotoluene	ND	---	1.00	ug/L	1	03/12/20 15:15	EPA 8260C	
4-Chlorotoluene	ND	---	1.00	ug/L	1	03/12/20 15:15	EPA 8260C	
Dibromochloromethane	ND	---	1.00	ug/L	1	03/12/20 15:15	EPA 8260C	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	03/12/20 15:15	EPA 8260C	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	03/12/20 15:15	EPA 8260C	
Dibromomethane	ND	---	1.00	ug/L	1	03/12/20 15:15	EPA 8260C	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	03/12/20 15:15	EPA 8260C	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	03/12/20 15:15	EPA 8260C	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	03/12/20 15:15	EPA 8260C	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	03/12/20 15:15	EPA 8260C	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	03/12/20 15:15	EPA 8260C	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	03/12/20 15:15	EPA 8260C	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	03/12/20 15:15	EPA 8260C	
<b>cis-1,2-Dichloroethene</b>	<b>8.67</b>	---	0.400	ug/L	1	03/12/20 15:15	EPA 8260C	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	03/12/20 15:15	EPA 8260C	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	03/12/20 15:15	EPA 8260C	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	03/12/20 15:15	EPA 8260C	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	03/12/20 15:15	EPA 8260C	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	03/12/20 15:15	EPA 8260C	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/12/20 15:15	EPA 8260C	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/12/20 15:15	EPA 8260C	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	03/12/20 15:15	EPA 8260C	
Methylene chloride	ND	---	10.0	ug/L	1	03/12/20 15:15	EPA 8260C	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	03/12/20 15:15	EPA 8260C	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	03/12/20 15:15	EPA 8260C	
<b>Tetrachloroethene (PCE)</b>	<b>79.0</b>	---	0.400	ug/L	1	03/12/20 15:15	EPA 8260C	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	03/12/20 15:15	EPA 8260C	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	03/12/20 15:15	EPA 8260C	
<b>1,1,1-Trichloroethane</b>	<b>0.552</b>	---	0.400	ug/L	1	03/12/20 15:15	EPA 8260C	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	03/12/20 15:15	EPA 8260C	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver 1Q20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0C0387 - 03 31 20 0822</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-16 (A0C0387-08)</b>				<b>Matrix: Water</b>		<b>Batch: 0030426</b>		
Trichloroethene (TCE)	12.7	---	0.400	ug/L	1	03/12/20 15:15	EPA 8260C	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	03/12/20 15:15	EPA 8260C	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	03/12/20 15:15	EPA 8260C	
Vinyl chloride	ND	---	0.400	ug/L	1	03/12/20 15:15	EPA 8260C	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 102 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>03/12/20 15:15</i>	<i>EPA 8260C</i>
<i>Toluene-d8 (Surr)</i>		<i>101 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/12/20 15:15</i>	<i>EPA 8260C</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>99 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/12/20 15:15</i>	<i>EPA 8260C</i>

<b>MW-12 (A0C0387-10)</b>				<b>Matrix: Water</b>		<b>Batch: 0030426</b>		
Bromobenzene	ND	---	0.500	ug/L	1	03/12/20 15:42	EPA 8260C	
Bromochloromethane	ND	---	1.00	ug/L	1	03/12/20 15:42	EPA 8260C	
Bromodichloromethane	ND	---	1.00	ug/L	1	03/12/20 15:42	EPA 8260C	
Bromoform	ND	---	1.00	ug/L	1	03/12/20 15:42	EPA 8260C	
Bromomethane	ND	---	5.00	ug/L	1	03/12/20 15:42	EPA 8260C	
Carbon tetrachloride	ND	---	1.00	ug/L	1	03/12/20 15:42	EPA 8260C	
Chlorobenzene	ND	---	0.500	ug/L	1	03/12/20 15:42	EPA 8260C	
Chloroform	ND	---	1.00	ug/L	1	03/12/20 15:42	EPA 8260C	
Chloromethane	ND	---	5.00	ug/L	1	03/12/20 15:42	EPA 8260C	
2-Chlorotoluene	ND	---	1.00	ug/L	1	03/12/20 15:42	EPA 8260C	
4-Chlorotoluene	ND	---	1.00	ug/L	1	03/12/20 15:42	EPA 8260C	
Dibromochloromethane	ND	---	1.00	ug/L	1	03/12/20 15:42	EPA 8260C	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	03/12/20 15:42	EPA 8260C	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	03/12/20 15:42	EPA 8260C	
Dibromomethane	ND	---	1.00	ug/L	1	03/12/20 15:42	EPA 8260C	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	03/12/20 15:42	EPA 8260C	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	03/12/20 15:42	EPA 8260C	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	03/12/20 15:42	EPA 8260C	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	03/12/20 15:42	EPA 8260C	
<b>1,1-Dichloroethane</b>	<b>0.803</b>	---	0.400	ug/L	1	03/12/20 15:42	EPA 8260C	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	03/12/20 15:42	EPA 8260C	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	03/12/20 15:42	EPA 8260C	
<b>cis-1,2-Dichloroethene</b>	<b>8.18</b>	---	0.400	ug/L	1	03/12/20 15:42	EPA 8260C	
<b>trans-1,2-Dichloroethene</b>	<b>0.515</b>	---	0.400	ug/L	1	03/12/20 15:42	EPA 8260C	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	03/12/20 15:42	EPA 8260C	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	03/12/20 15:42	EPA 8260C	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	03/12/20 15:42	EPA 8260C	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	03/12/20 15:42	EPA 8260C	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/12/20 15:42	EPA 8260C	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver 1Q20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0387 - 03 31 20 0822
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-12 (A0C0387-10)</b>				<b>Matrix: Water</b>		<b>Batch: 0030426</b>		
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/12/20 15:42	EPA 8260C	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	03/12/20 15:42	EPA 8260C	
Methylene chloride	ND	---	10.0	ug/L	1	03/12/20 15:42	EPA 8260C	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	03/12/20 15:42	EPA 8260C	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	03/12/20 15:42	EPA 8260C	
<b>Tetrachloroethene (PCE)</b>	<b>7.01</b>	---	0.400	ug/L	1	03/12/20 15:42	EPA 8260C	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	03/12/20 15:42	EPA 8260C	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	03/12/20 15:42	EPA 8260C	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	03/12/20 15:42	EPA 8260C	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	03/12/20 15:42	EPA 8260C	
<b>Trichloroethene (TCE)</b>	<b>4.17</b>	---	0.400	ug/L	1	03/12/20 15:42	EPA 8260C	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	03/12/20 15:42	EPA 8260C	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	03/12/20 15:42	EPA 8260C	
<b>Vinyl chloride</b>	<b>0.423</b>	---	0.400	ug/L	1	03/12/20 15:42	EPA 8260C	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 101 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>03/12/20 15:42</i>	<i>EPA 8260C</i>
<i>Toluene-d8 (Surr)</i>		<i>101 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/12/20 15:42</i>	<i>EPA 8260C</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>99 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/12/20 15:42</i>	<i>EPA 8260C</i>

<b>MW-12 (A0C0387-10RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0030529</b>		
Chloroethane	ND	---	5.00	ug/L	1	03/16/20 14:51	EPA 8260C	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 101 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>03/16/20 14:51</i>	<i>EPA 8260C</i>
<i>Toluene-d8 (Surr)</i>		<i>102 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/16/20 14:51</i>	<i>EPA 8260C</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>103 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/16/20 14:51</i>	<i>EPA 8260C</i>

<b>MW-12 Dup (A0C0387-11)</b>				<b>Matrix: Water</b>		<b>Batch: 0030426</b>		
Bromobenzene	ND	---	0.500	ug/L	1	03/12/20 16:09	EPA 8260C	
Bromochloromethane	ND	---	1.00	ug/L	1	03/12/20 16:09	EPA 8260C	
Bromodichloromethane	ND	---	1.00	ug/L	1	03/12/20 16:09	EPA 8260C	
Bromoform	ND	---	1.00	ug/L	1	03/12/20 16:09	EPA 8260C	
Bromomethane	ND	---	5.00	ug/L	1	03/12/20 16:09	EPA 8260C	
Carbon tetrachloride	ND	---	1.00	ug/L	1	03/12/20 16:09	EPA 8260C	
Chlorobenzene	ND	---	0.500	ug/L	1	03/12/20 16:09	EPA 8260C	
Chloroform	ND	---	1.00	ug/L	1	03/12/20 16:09	EPA 8260C	
Chloromethane	ND	---	5.00	ug/L	1	03/12/20 16:09	EPA 8260C	
2-Chlorotoluene	ND	---	1.00	ug/L	1	03/12/20 16:09	EPA 8260C	
4-Chlorotoluene	ND	---	1.00	ug/L	1	03/12/20 16:09	EPA 8260C	
Dibromochloromethane	ND	---	1.00	ug/L	1	03/12/20 16:09	EPA 8260C	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	03/12/20 16:09	EPA 8260C	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver 1Q20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0C0387 - 03 31 20 0822</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-12 Dup (A0C0387-11)</b>				<b>Matrix: Water</b>		<b>Batch: 0030426</b>		
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	03/12/20 16:09	EPA 8260C	
Dibromomethane	ND	---	1.00	ug/L	1	03/12/20 16:09	EPA 8260C	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	03/12/20 16:09	EPA 8260C	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	03/12/20 16:09	EPA 8260C	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	03/12/20 16:09	EPA 8260C	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	03/12/20 16:09	EPA 8260C	
<b>1,1-Dichloroethane</b>	<b>0.806</b>	---	0.400	ug/L	1	03/12/20 16:09	EPA 8260C	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	03/12/20 16:09	EPA 8260C	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	03/12/20 16:09	EPA 8260C	
<b>cis-1,2-Dichloroethene</b>	<b>8.47</b>	---	0.400	ug/L	1	03/12/20 16:09	EPA 8260C	
<b>trans-1,2-Dichloroethene</b>	<b>0.561</b>	---	0.400	ug/L	1	03/12/20 16:09	EPA 8260C	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	03/12/20 16:09	EPA 8260C	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	03/12/20 16:09	EPA 8260C	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	03/12/20 16:09	EPA 8260C	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	03/12/20 16:09	EPA 8260C	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/12/20 16:09	EPA 8260C	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/12/20 16:09	EPA 8260C	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	03/12/20 16:09	EPA 8260C	
Methylene chloride	ND	---	10.0	ug/L	1	03/12/20 16:09	EPA 8260C	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	03/12/20 16:09	EPA 8260C	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	03/12/20 16:09	EPA 8260C	
<b>Tetrachloroethene (PCE)</b>	<b>6.95</b>	---	0.400	ug/L	1	03/12/20 16:09	EPA 8260C	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	03/12/20 16:09	EPA 8260C	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	03/12/20 16:09	EPA 8260C	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	03/12/20 16:09	EPA 8260C	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	03/12/20 16:09	EPA 8260C	
<b>Trichloroethene (TCE)</b>	<b>4.25</b>	---	0.400	ug/L	1	03/12/20 16:09	EPA 8260C	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	03/12/20 16:09	EPA 8260C	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	03/12/20 16:09	EPA 8260C	
Vinyl chloride	ND	---	0.400	ug/L	1	03/12/20 16:09	EPA 8260C	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 102 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>03/12/20 16:09</i>	<i>EPA 8260C</i>
<i>Toluene-d8 (Surr)</i>		<i>101 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/12/20 16:09</i>	<i>EPA 8260C</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>100 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/12/20 16:09</i>	<i>EPA 8260C</i>

<b>MW-12 Dup (A0C0387-11RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0030529</b>		
Chloroethane	ND	---	5.00	ug/L	1	03/16/20 15:18	EPA 8260C	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 100 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>03/16/20 15:18</i>	<i>EPA 8260C</i>
<i>Toluene-d8 (Surr)</i>		<i>102 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/16/20 15:18</i>	<i>EPA 8260C</i>

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver 1Q20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0C0387 - 03 31 20 0822</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-12 Dup (A0C0387-11RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0030529</b>		
<i>Surrogate: 4-Bromofluorobenzene (Surr)</i>		<i>Recovery: 103 %</i>		<i>Limits: 80-120 %</i>		<i>1 03/16/20 15:18</i>		<i>EPA 8260C</i>

<b>MW-14 (A0C0387-12)</b>				<b>Matrix: Water</b>		<b>Batch: 0030426</b>		
Bromobenzene	ND	---	2.50	ug/L	5	03/12/20 19:45	EPA 8260C	
Bromochloromethane	ND	---	5.00	ug/L	5	03/12/20 19:45	EPA 8260C	
Bromodichloromethane	ND	---	5.00	ug/L	5	03/12/20 19:45	EPA 8260C	
Bromoform	ND	---	5.00	ug/L	5	03/12/20 19:45	EPA 8260C	
Bromomethane	ND	---	25.0	ug/L	5	03/12/20 19:45	EPA 8260C	
Carbon tetrachloride	ND	---	5.00	ug/L	5	03/12/20 19:45	EPA 8260C	
Chlorobenzene	ND	---	2.50	ug/L	5	03/12/20 19:45	EPA 8260C	
Chloroethane	ND	---	25.0	ug/L	5	03/12/20 19:45	EPA 8260C	EST
Chloroform	ND	---	5.00	ug/L	5	03/12/20 19:45	EPA 8260C	
Chloromethane	ND	---	25.0	ug/L	5	03/12/20 19:45	EPA 8260C	
2-Chlorotoluene	ND	---	5.00	ug/L	5	03/12/20 19:45	EPA 8260C	
4-Chlorotoluene	ND	---	5.00	ug/L	5	03/12/20 19:45	EPA 8260C	
Dibromochloromethane	ND	---	5.00	ug/L	5	03/12/20 19:45	EPA 8260C	
1,2-Dibromo-3-chloropropane	ND	---	25.0	ug/L	5	03/12/20 19:45	EPA 8260C	
1,2-Dibromoethane (EDB)	ND	---	2.50	ug/L	5	03/12/20 19:45	EPA 8260C	
Dibromomethane	ND	---	5.00	ug/L	5	03/12/20 19:45	EPA 8260C	
1,2-Dichlorobenzene	ND	---	2.50	ug/L	5	03/12/20 19:45	EPA 8260C	
1,3-Dichlorobenzene	ND	---	2.50	ug/L	5	03/12/20 19:45	EPA 8260C	
1,4-Dichlorobenzene	ND	---	2.50	ug/L	5	03/12/20 19:45	EPA 8260C	
Dichlorodifluoromethane	ND	---	5.00	ug/L	5	03/12/20 19:45	EPA 8260C	
<b>1,1-Dichloroethane</b>	<b>6.80</b>	---	2.00	ug/L	5	03/12/20 19:45	EPA 8260C	
1,2-Dichloroethane (EDC)	ND	---	2.00	ug/L	5	03/12/20 19:45	EPA 8260C	
<b>1,1-Dichloroethene</b>	<b>2.72</b>	---	2.00	ug/L	5	03/12/20 19:45	EPA 8260C	
<b>cis-1,2-Dichloroethene</b>	<b>186</b>	---	2.00	ug/L	5	03/12/20 19:45	EPA 8260C	
<b>trans-1,2-Dichloroethene</b>	<b>2.45</b>	---	2.00	ug/L	5	03/12/20 19:45	EPA 8260C	
1,2-Dichloropropane	ND	---	2.50	ug/L	5	03/12/20 19:45	EPA 8260C	
1,3-Dichloropropane	ND	---	5.00	ug/L	5	03/12/20 19:45	EPA 8260C	
2,2-Dichloropropane	ND	---	5.00	ug/L	5	03/12/20 19:45	EPA 8260C	
1,1-Dichloropropene	ND	---	5.00	ug/L	5	03/12/20 19:45	EPA 8260C	
cis-1,3-Dichloropropene	ND	---	5.00	ug/L	5	03/12/20 19:45	EPA 8260C	
trans-1,3-Dichloropropene	ND	---	5.00	ug/L	5	03/12/20 19:45	EPA 8260C	
Hexachlorobutadiene	ND	---	25.0	ug/L	5	03/12/20 19:45	EPA 8260C	
Methylene chloride	ND	---	50.0	ug/L	5	03/12/20 19:45	EPA 8260C	
1,1,1,2-Tetrachloroethane	ND	---	2.00	ug/L	5	03/12/20 19:45	EPA 8260C	
1,1,2,2-Tetrachloroethane	ND	---	2.50	ug/L	5	03/12/20 19:45	EPA 8260C	

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Lisa Domenighini, Client Services Manager





<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver 1Q20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0C0387 - 03 31 20 0822</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-14 (A0C0387-12)</b>				<b>Matrix: Water</b>		<b>Batch: 0030426</b>		
<b>Tetrachloroethene (PCE)</b>	<b>85.9</b>	---	2.00	ug/L	5	03/12/20 19:45	EPA 8260C	
1,2,3-Trichlorobenzene	ND	---	10.0	ug/L	5	03/12/20 19:45	EPA 8260C	
1,2,4-Trichlorobenzene	ND	---	10.0	ug/L	5	03/12/20 19:45	EPA 8260C	
1,1,1-Trichloroethane	ND	---	2.00	ug/L	5	03/12/20 19:45	EPA 8260C	
1,1,2-Trichloroethane	ND	---	2.50	ug/L	5	03/12/20 19:45	EPA 8260C	
<b>Trichloroethene (TCE)</b>	<b>294</b>	---	2.00	ug/L	5	03/12/20 19:45	EPA 8260C	
Trichlorofluoromethane	ND	---	10.0	ug/L	5	03/12/20 19:45	EPA 8260C	
1,2,3-Trichloropropane	ND	---	5.00	ug/L	5	03/12/20 19:45	EPA 8260C	
Vinyl chloride	ND	---	2.00	ug/L	5	03/12/20 19:45	EPA 8260C	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 104 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>03/12/20 19:45</i>	<i>EPA 8260C</i>
<i>Toluene-d8 (Surr)</i>		<i>101 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/12/20 19:45</i>	<i>EPA 8260C</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>98 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/12/20 19:45</i>	<i>EPA 8260C</i>

<b>MW-10 (A0C0387-13)</b>				<b>Matrix: Water</b>		<b>Batch: 0030426</b>		
Bromobenzene	ND	---	0.500	ug/L	1	03/12/20 16:36	EPA 8260C	
Bromochloromethane	ND	---	1.00	ug/L	1	03/12/20 16:36	EPA 8260C	
Bromodichloromethane	ND	---	1.00	ug/L	1	03/12/20 16:36	EPA 8260C	
Bromoform	ND	---	1.00	ug/L	1	03/12/20 16:36	EPA 8260C	
Bromomethane	ND	---	5.00	ug/L	1	03/12/20 16:36	EPA 8260C	
Carbon tetrachloride	ND	---	1.00	ug/L	1	03/12/20 16:36	EPA 8260C	
Chlorobenzene	ND	---	0.500	ug/L	1	03/12/20 16:36	EPA 8260C	
Chloroethane	ND	---	5.00	ug/L	1	03/12/20 16:36	EPA 8260C	EST
Chloroform	ND	---	1.00	ug/L	1	03/12/20 16:36	EPA 8260C	
Chloromethane	ND	---	5.00	ug/L	1	03/12/20 16:36	EPA 8260C	
2-Chlorotoluene	ND	---	1.00	ug/L	1	03/12/20 16:36	EPA 8260C	
4-Chlorotoluene	ND	---	1.00	ug/L	1	03/12/20 16:36	EPA 8260C	
Dibromochloromethane	ND	---	1.00	ug/L	1	03/12/20 16:36	EPA 8260C	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	03/12/20 16:36	EPA 8260C	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	03/12/20 16:36	EPA 8260C	
Dibromomethane	ND	---	1.00	ug/L	1	03/12/20 16:36	EPA 8260C	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	03/12/20 16:36	EPA 8260C	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	03/12/20 16:36	EPA 8260C	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	03/12/20 16:36	EPA 8260C	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	03/12/20 16:36	EPA 8260C	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	03/12/20 16:36	EPA 8260C	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	03/12/20 16:36	EPA 8260C	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	03/12/20 16:36	EPA 8260C	
cis-1,2-Dichloroethene	ND	---	0.400	ug/L	1	03/12/20 16:36	EPA 8260C	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver 1Q20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0C0387 - 03 31 20 0822</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-10 (A0C0387-13)</b>				<b>Matrix: Water</b>		<b>Batch: 0030426</b>		
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	03/12/20 16:36	EPA 8260C	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	03/12/20 16:36	EPA 8260C	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	03/12/20 16:36	EPA 8260C	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	03/12/20 16:36	EPA 8260C	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	03/12/20 16:36	EPA 8260C	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/12/20 16:36	EPA 8260C	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/12/20 16:36	EPA 8260C	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	03/12/20 16:36	EPA 8260C	
Methylene chloride	ND	---	10.0	ug/L	1	03/12/20 16:36	EPA 8260C	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	03/12/20 16:36	EPA 8260C	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	03/12/20 16:36	EPA 8260C	
<b>Tetrachloroethene (PCE)</b>	<b>1.97</b>	---	0.400	ug/L	1	03/12/20 16:36	EPA 8260C	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	03/12/20 16:36	EPA 8260C	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	03/12/20 16:36	EPA 8260C	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	03/12/20 16:36	EPA 8260C	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	03/12/20 16:36	EPA 8260C	
<b>Trichloroethene (TCE)</b>	<b>1.53</b>	---	0.400	ug/L	1	03/12/20 16:36	EPA 8260C	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	03/12/20 16:36	EPA 8260C	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	03/12/20 16:36	EPA 8260C	
Vinyl chloride	ND	---	0.400	ug/L	1	03/12/20 16:36	EPA 8260C	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 103 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>03/12/20 16:36</i>	<i>EPA 8260C</i>
<i>Toluene-d8 (Surr)</i>		<i>102 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/12/20 16:36</i>	<i>EPA 8260C</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>100 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/12/20 16:36</i>	<i>EPA 8260C</i>

<b>MW-9 (A0C0387-14)</b>				<b>Matrix: Water</b>		<b>Batch: 0030426</b>		
Bromobenzene	ND	---	0.500	ug/L	1	03/12/20 17:03	EPA 8260C	
Bromochloromethane	ND	---	1.00	ug/L	1	03/12/20 17:03	EPA 8260C	
Bromodichloromethane	ND	---	1.00	ug/L	1	03/12/20 17:03	EPA 8260C	
Bromoform	ND	---	1.00	ug/L	1	03/12/20 17:03	EPA 8260C	
Bromomethane	ND	---	5.00	ug/L	1	03/12/20 17:03	EPA 8260C	
Carbon tetrachloride	ND	---	1.00	ug/L	1	03/12/20 17:03	EPA 8260C	
Chlorobenzene	ND	---	0.500	ug/L	1	03/12/20 17:03	EPA 8260C	
Chloroethane	ND	---	5.00	ug/L	1	03/12/20 17:03	EPA 8260C	EST
Chloroform	ND	---	1.00	ug/L	1	03/12/20 17:03	EPA 8260C	
Chloromethane	ND	---	5.00	ug/L	1	03/12/20 17:03	EPA 8260C	
2-Chlorotoluene	ND	---	1.00	ug/L	1	03/12/20 17:03	EPA 8260C	
4-Chlorotoluene	ND	---	1.00	ug/L	1	03/12/20 17:03	EPA 8260C	
Dibromochloromethane	ND	---	1.00	ug/L	1	03/12/20 17:03	EPA 8260C	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver 1Q20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0C0387 - 03 31 20 0822</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-9 (A0C0387-14)</b>				<b>Matrix: Water</b>		<b>Batch: 0030426</b>		
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	03/12/20 17:03	EPA 8260C	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	03/12/20 17:03	EPA 8260C	
Dibromomethane	ND	---	1.00	ug/L	1	03/12/20 17:03	EPA 8260C	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	03/12/20 17:03	EPA 8260C	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	03/12/20 17:03	EPA 8260C	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	03/12/20 17:03	EPA 8260C	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	03/12/20 17:03	EPA 8260C	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	03/12/20 17:03	EPA 8260C	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	03/12/20 17:03	EPA 8260C	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	03/12/20 17:03	EPA 8260C	
<b>cis-1,2-Dichloroethene</b>	<b>5.21</b>	---	0.400	ug/L	1	03/12/20 17:03	EPA 8260C	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	03/12/20 17:03	EPA 8260C	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	03/12/20 17:03	EPA 8260C	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	03/12/20 17:03	EPA 8260C	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	03/12/20 17:03	EPA 8260C	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	03/12/20 17:03	EPA 8260C	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/12/20 17:03	EPA 8260C	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/12/20 17:03	EPA 8260C	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	03/12/20 17:03	EPA 8260C	
Methylene chloride	ND	---	10.0	ug/L	1	03/12/20 17:03	EPA 8260C	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	03/12/20 17:03	EPA 8260C	
1,1,1,2-Tetrachloroethane	ND	---	0.500	ug/L	1	03/12/20 17:03	EPA 8260C	
<b>Tetrachloroethene (PCE)</b>	<b>55.4</b>	---	0.400	ug/L	1	03/12/20 17:03	EPA 8260C	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	03/12/20 17:03	EPA 8260C	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	03/12/20 17:03	EPA 8260C	
<b>1,1,1-Trichloroethane</b>	<b>1.41</b>	---	0.400	ug/L	1	03/12/20 17:03	EPA 8260C	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	03/12/20 17:03	EPA 8260C	
<b>Trichloroethene (TCE)</b>	<b>18.1</b>	---	0.400	ug/L	1	03/12/20 17:03	EPA 8260C	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	03/12/20 17:03	EPA 8260C	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	03/12/20 17:03	EPA 8260C	
Vinyl chloride	ND	---	0.400	ug/L	1	03/12/20 17:03	EPA 8260C	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 101 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>03/12/20 17:03</i>	<i>EPA 8260C</i>
<i>Toluene-d8 (Surr)</i>		<i>100 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/12/20 17:03</i>	<i>EPA 8260C</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>100 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/12/20 17:03</i>	<i>EPA 8260C</i>

<b>MW-7 (A0C0387-15)</b>				<b>Matrix: Water</b>		<b>Batch: 0030426</b>		
Bromobenzene	ND	---	0.500	ug/L	1	03/12/20 17:30	EPA 8260C	
Bromochloromethane	ND	---	1.00	ug/L	1	03/12/20 17:30	EPA 8260C	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver 1Q20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0C0387 - 03 31 20 0822</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-7 (A0C0387-15)</b>				<b>Matrix: Water</b>		<b>Batch: 0030426</b>		
Bromodichloromethane	ND	---	1.00	ug/L	1	03/12/20 17:30	EPA 8260C	
Bromoform	ND	---	1.00	ug/L	1	03/12/20 17:30	EPA 8260C	
Bromomethane	ND	---	5.00	ug/L	1	03/12/20 17:30	EPA 8260C	
Carbon tetrachloride	ND	---	1.00	ug/L	1	03/12/20 17:30	EPA 8260C	
Chlorobenzene	ND	---	0.500	ug/L	1	03/12/20 17:30	EPA 8260C	
Chloroethane	ND	---	5.00	ug/L	1	03/12/20 17:30	EPA 8260C	EST
Chloroform	ND	---	1.00	ug/L	1	03/12/20 17:30	EPA 8260C	
Chloromethane	ND	---	5.00	ug/L	1	03/12/20 17:30	EPA 8260C	
2-Chlorotoluene	ND	---	1.00	ug/L	1	03/12/20 17:30	EPA 8260C	
4-Chlorotoluene	ND	---	1.00	ug/L	1	03/12/20 17:30	EPA 8260C	
Dibromochloromethane	ND	---	1.00	ug/L	1	03/12/20 17:30	EPA 8260C	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	03/12/20 17:30	EPA 8260C	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	03/12/20 17:30	EPA 8260C	
Dibromomethane	ND	---	1.00	ug/L	1	03/12/20 17:30	EPA 8260C	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	03/12/20 17:30	EPA 8260C	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	03/12/20 17:30	EPA 8260C	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	03/12/20 17:30	EPA 8260C	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	03/12/20 17:30	EPA 8260C	
<b>1,1-Dichloroethane</b>	<b>0.936</b>	---	0.400	ug/L	1	03/12/20 17:30	EPA 8260C	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	03/12/20 17:30	EPA 8260C	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	03/12/20 17:30	EPA 8260C	
<b>cis-1,2-Dichloroethene</b>	<b>26.5</b>	---	0.400	ug/L	1	03/12/20 17:30	EPA 8260C	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	03/12/20 17:30	EPA 8260C	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	03/12/20 17:30	EPA 8260C	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	03/12/20 17:30	EPA 8260C	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	03/12/20 17:30	EPA 8260C	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	03/12/20 17:30	EPA 8260C	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/12/20 17:30	EPA 8260C	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/12/20 17:30	EPA 8260C	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	03/12/20 17:30	EPA 8260C	
Methylene chloride	ND	---	10.0	ug/L	1	03/12/20 17:30	EPA 8260C	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	03/12/20 17:30	EPA 8260C	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	03/12/20 17:30	EPA 8260C	
<b>Tetrachloroethene (PCE)</b>	<b>45.8</b>	---	0.400	ug/L	1	03/12/20 17:30	EPA 8260C	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	03/12/20 17:30	EPA 8260C	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	03/12/20 17:30	EPA 8260C	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	03/12/20 17:30	EPA 8260C	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	03/12/20 17:30	EPA 8260C	
<b>Trichloroethene (TCE)</b>	<b>14.1</b>	---	0.400	ug/L	1	03/12/20 17:30	EPA 8260C	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver 1Q20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0C0387 - 03 31 20 0822</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
				<b>Matrix: Water</b>		<b>Batch: 0030426</b>		
MW-7 (A0C0387-15)								
Trichlorofluoromethane	ND	---	2.00	ug/L	1	03/12/20 17:30	EPA 8260C	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	03/12/20 17:30	EPA 8260C	
<b>Vinyl chloride</b>	<b>0.476</b>	---	0.400	ug/L	1	03/12/20 17:30	EPA 8260C	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 101 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>03/12/20 17:30</i>	<i>EPA 8260C</i>
<i>Toluene-d8 (Surr)</i>		<i>103 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/12/20 17:30</i>	<i>EPA 8260C</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>100 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/12/20 17:30</i>	<i>EPA 8260C</i>

				<b>Matrix: Water</b>		<b>Batch: 0030426</b>		
MW-7 Dup (A0C0387-16)								
Bromobenzene	ND	---	0.500	ug/L	1	03/12/20 17:57	EPA 8260C	
Bromochloromethane	ND	---	1.00	ug/L	1	03/12/20 17:57	EPA 8260C	
Bromodichloromethane	ND	---	1.00	ug/L	1	03/12/20 17:57	EPA 8260C	
Bromoform	ND	---	1.00	ug/L	1	03/12/20 17:57	EPA 8260C	
Bromomethane	ND	---	5.00	ug/L	1	03/12/20 17:57	EPA 8260C	
Carbon tetrachloride	ND	---	1.00	ug/L	1	03/12/20 17:57	EPA 8260C	
Chlorobenzene	ND	---	0.500	ug/L	1	03/12/20 17:57	EPA 8260C	
Chloroethane	ND	---	5.00	ug/L	1	03/12/20 17:57	EPA 8260C	EST
Chloroform	ND	---	1.00	ug/L	1	03/12/20 17:57	EPA 8260C	
Chloromethane	ND	---	5.00	ug/L	1	03/12/20 17:57	EPA 8260C	
2-Chlorotoluene	ND	---	1.00	ug/L	1	03/12/20 17:57	EPA 8260C	
4-Chlorotoluene	ND	---	1.00	ug/L	1	03/12/20 17:57	EPA 8260C	
Dibromochloromethane	ND	---	1.00	ug/L	1	03/12/20 17:57	EPA 8260C	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	03/12/20 17:57	EPA 8260C	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	03/12/20 17:57	EPA 8260C	
Dibromomethane	ND	---	1.00	ug/L	1	03/12/20 17:57	EPA 8260C	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	03/12/20 17:57	EPA 8260C	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	03/12/20 17:57	EPA 8260C	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	03/12/20 17:57	EPA 8260C	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	03/12/20 17:57	EPA 8260C	
<b>1,1-Dichloroethane</b>	<b>0.912</b>	---	0.400	ug/L	1	03/12/20 17:57	EPA 8260C	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	03/12/20 17:57	EPA 8260C	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	03/12/20 17:57	EPA 8260C	
<b>cis-1,2-Dichloroethene</b>	<b>25.7</b>	---	0.400	ug/L	1	03/12/20 17:57	EPA 8260C	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	03/12/20 17:57	EPA 8260C	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	03/12/20 17:57	EPA 8260C	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	03/12/20 17:57	EPA 8260C	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	03/12/20 17:57	EPA 8260C	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	03/12/20 17:57	EPA 8260C	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/12/20 17:57	EPA 8260C	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver 1Q20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0387 - 03 31 20 0822
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-7 Dup (A0C0387-16)</b>			<b>Matrix: Water</b>			<b>Batch: 0030426</b>		
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/12/20 17:57	EPA 8260C	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	03/12/20 17:57	EPA 8260C	
Methylene chloride	ND	---	10.0	ug/L	1	03/12/20 17:57	EPA 8260C	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	03/12/20 17:57	EPA 8260C	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	03/12/20 17:57	EPA 8260C	
<b>Tetrachloroethene (PCE)</b>	<b>47.4</b>	---	0.400	ug/L	1	03/12/20 17:57	EPA 8260C	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	03/12/20 17:57	EPA 8260C	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	03/12/20 17:57	EPA 8260C	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	03/12/20 17:57	EPA 8260C	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	03/12/20 17:57	EPA 8260C	
<b>Trichloroethene (TCE)</b>	<b>14.3</b>	---	0.400	ug/L	1	03/12/20 17:57	EPA 8260C	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	03/12/20 17:57	EPA 8260C	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	03/12/20 17:57	EPA 8260C	
<b>Vinyl chloride</b>	<b>0.440</b>	---	0.400	ug/L	1	03/12/20 17:57	EPA 8260C	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 102 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>03/12/20 17:57</i>	<i>EPA 8260C</i>
<i>Toluene-d8 (Surr)</i>		<i>101 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/12/20 17:57</i>	<i>EPA 8260C</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>98 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/12/20 17:57</i>	<i>EPA 8260C</i>

<b>MP-1 (A0C0387-17)</b>			<b>Matrix: Water</b>			<b>Batch: 0030426</b>		
Bromobenzene	ND	---	1.00	ug/L	2	03/12/20 20:12	EPA 8260C	
Bromochloromethane	ND	---	2.00	ug/L	2	03/12/20 20:12	EPA 8260C	
Bromodichloromethane	ND	---	2.00	ug/L	2	03/12/20 20:12	EPA 8260C	
Bromoform	ND	---	2.00	ug/L	2	03/12/20 20:12	EPA 8260C	
Bromomethane	ND	---	10.0	ug/L	2	03/12/20 20:12	EPA 8260C	
Carbon tetrachloride	ND	---	2.00	ug/L	2	03/12/20 20:12	EPA 8260C	
Chlorobenzene	ND	---	1.00	ug/L	2	03/12/20 20:12	EPA 8260C	
Chloroethane	ND	---	10.0	ug/L	2	03/12/20 20:12	EPA 8260C	EST
Chloroform	ND	---	2.00	ug/L	2	03/12/20 20:12	EPA 8260C	
Chloromethane	ND	---	10.0	ug/L	2	03/12/20 20:12	EPA 8260C	
2-Chlorotoluene	ND	---	2.00	ug/L	2	03/12/20 20:12	EPA 8260C	
4-Chlorotoluene	ND	---	2.00	ug/L	2	03/12/20 20:12	EPA 8260C	
Dibromochloromethane	ND	---	2.00	ug/L	2	03/12/20 20:12	EPA 8260C	
1,2-Dibromo-3-chloropropane	ND	---	10.0	ug/L	2	03/12/20 20:12	EPA 8260C	
1,2-Dibromoethane (EDB)	ND	---	1.00	ug/L	2	03/12/20 20:12	EPA 8260C	
Dibromomethane	ND	---	2.00	ug/L	2	03/12/20 20:12	EPA 8260C	
1,2-Dichlorobenzene	ND	---	1.00	ug/L	2	03/12/20 20:12	EPA 8260C	
1,3-Dichlorobenzene	ND	---	1.00	ug/L	2	03/12/20 20:12	EPA 8260C	
1,4-Dichlorobenzene	ND	---	1.00	ug/L	2	03/12/20 20:12	EPA 8260C	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver 1Q20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0C0387 - 03 31 20 0822</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MP-1 (A0C0387-17)</b>				<b>Matrix: Water</b>		<b>Batch: 0030426</b>		
Dichlorodifluoromethane	ND	---	2.00	ug/L	2	03/12/20 20:12	EPA 8260C	
<b>1,1-Dichloroethane</b>	<b>3.94</b>	---	0.800	ug/L	2	03/12/20 20:12	EPA 8260C	
1,2-Dichloroethane (EDC)	ND	---	0.800	ug/L	2	03/12/20 20:12	EPA 8260C	
<b>1,1-Dichloroethene</b>	<b>5.63</b>	---	0.800	ug/L	2	03/12/20 20:12	EPA 8260C	
<b>cis-1,2-Dichloroethene</b>	<b>177</b>	---	0.800	ug/L	2	03/12/20 20:12	EPA 8260C	
<b>trans-1,2-Dichloroethene</b>	<b>1.14</b>	---	0.800	ug/L	2	03/12/20 20:12	EPA 8260C	
1,2-Dichloropropane	ND	---	1.00	ug/L	2	03/12/20 20:12	EPA 8260C	
1,3-Dichloropropane	ND	---	2.00	ug/L	2	03/12/20 20:12	EPA 8260C	
2,2-Dichloropropane	ND	---	2.00	ug/L	2	03/12/20 20:12	EPA 8260C	
1,1-Dichloropropene	ND	---	2.00	ug/L	2	03/12/20 20:12	EPA 8260C	
cis-1,3-Dichloropropene	ND	---	2.00	ug/L	2	03/12/20 20:12	EPA 8260C	
trans-1,3-Dichloropropene	ND	---	2.00	ug/L	2	03/12/20 20:12	EPA 8260C	
Hexachlorobutadiene	ND	---	10.0	ug/L	2	03/12/20 20:12	EPA 8260C	
Methylene chloride	ND	---	20.0	ug/L	2	03/12/20 20:12	EPA 8260C	
1,1,1,2-Tetrachloroethane	ND	---	0.800	ug/L	2	03/12/20 20:12	EPA 8260C	
1,1,2,2-Tetrachloroethane	ND	---	1.00	ug/L	2	03/12/20 20:12	EPA 8260C	
1,2,3-Trichlorobenzene	ND	---	4.00	ug/L	2	03/12/20 20:12	EPA 8260C	
1,2,4-Trichlorobenzene	ND	---	4.00	ug/L	2	03/12/20 20:12	EPA 8260C	
<b>1,1,1-Trichloroethane</b>	<b>1.77</b>	---	0.800	ug/L	2	03/12/20 20:12	EPA 8260C	
1,1,2-Trichloroethane	ND	---	1.00	ug/L	2	03/12/20 20:12	EPA 8260C	
<b>Trichloroethene (TCE)</b>	<b>190</b>	---	0.800	ug/L	2	03/12/20 20:12	EPA 8260C	
Trichlorofluoromethane	ND	---	4.00	ug/L	2	03/12/20 20:12	EPA 8260C	
1,2,3-Trichloropropane	ND	---	2.00	ug/L	2	03/12/20 20:12	EPA 8260C	
Vinyl chloride	ND	---	0.800	ug/L	2	03/12/20 20:12	EPA 8260C	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 105 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>03/12/20 20:12</i>	<i>EPA 8260C</i>
<i>Toluene-d8 (Surr)</i>		<i>99 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/12/20 20:12</i>	<i>EPA 8260C</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>99 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/12/20 20:12</i>	<i>EPA 8260C</i>

<b>MP-1 (A0C0387-17RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0030468</b>		
<b>Tetrachloroethene (PCE)</b>	<b>1370</b>	---	40.0	ug/L	100	03/13/20 15:48	EPA 8260C	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 102 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>03/13/20 15:48</i>	<i>EPA 8260C</i>
<i>Toluene-d8 (Surr)</i>		<i>102 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/13/20 15:48</i>	<i>EPA 8260C</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>99 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/13/20 15:48</i>	<i>EPA 8260C</i>

<b>MW-19 (A0C0387-18)</b>				<b>Matrix: Water</b>		<b>Batch: 0030426</b>		
Bromobenzene	ND	---	12.5	ug/L	25	03/12/20 20:39	EPA 8260C	
Bromochloromethane	ND	---	25.0	ug/L	25	03/12/20 20:39	EPA 8260C	
Bromodichloromethane	ND	---	25.0	ug/L	25	03/12/20 20:39	EPA 8260C	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver 1Q20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0387 - 03 31 20 0822
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-19 (A0C0387-18)</b>				<b>Matrix: Water</b>		<b>Batch: 0030426</b>		
Bromoform	ND	---	25.0	ug/L	25	03/12/20 20:39	EPA 8260C	
Bromomethane	ND	---	125	ug/L	25	03/12/20 20:39	EPA 8260C	
Carbon tetrachloride	ND	---	25.0	ug/L	25	03/12/20 20:39	EPA 8260C	
Chlorobenzene	ND	---	12.5	ug/L	25	03/12/20 20:39	EPA 8260C	
Chloroethane	ND	---	125	ug/L	25	03/12/20 20:39	EPA 8260C	EST
Chloroform	ND	---	25.0	ug/L	25	03/12/20 20:39	EPA 8260C	
Chloromethane	ND	---	125	ug/L	25	03/12/20 20:39	EPA 8260C	
2-Chlorotoluene	ND	---	25.0	ug/L	25	03/12/20 20:39	EPA 8260C	
4-Chlorotoluene	ND	---	25.0	ug/L	25	03/12/20 20:39	EPA 8260C	
Dibromochloromethane	ND	---	25.0	ug/L	25	03/12/20 20:39	EPA 8260C	
1,2-Dibromo-3-chloropropane	ND	---	125	ug/L	25	03/12/20 20:39	EPA 8260C	
1,2-Dibromoethane (EDB)	ND	---	12.5	ug/L	25	03/12/20 20:39	EPA 8260C	
Dibromomethane	ND	---	25.0	ug/L	25	03/12/20 20:39	EPA 8260C	
1,2-Dichlorobenzene	ND	---	12.5	ug/L	25	03/12/20 20:39	EPA 8260C	
1,3-Dichlorobenzene	ND	---	12.5	ug/L	25	03/12/20 20:39	EPA 8260C	
1,4-Dichlorobenzene	ND	---	12.5	ug/L	25	03/12/20 20:39	EPA 8260C	
Dichlorodifluoromethane	ND	---	25.0	ug/L	25	03/12/20 20:39	EPA 8260C	
<b>1,1-Dichloroethane</b>	<b>31.8</b>	---	10.0	ug/L	25	03/12/20 20:39	EPA 8260C	
1,2-Dichloroethane (EDC)	ND	---	10.0	ug/L	25	03/12/20 20:39	EPA 8260C	
<b>1,1-Dichloroethene</b>	<b>55.4</b>	---	10.0	ug/L	25	03/12/20 20:39	EPA 8260C	
<b>cis-1,2-Dichloroethene</b>	<b>1290</b>	---	10.0	ug/L	25	03/12/20 20:39	EPA 8260C	
trans-1,2-Dichloroethene	ND	---	10.0	ug/L	25	03/12/20 20:39	EPA 8260C	
1,2-Dichloropropane	ND	---	12.5	ug/L	25	03/12/20 20:39	EPA 8260C	
1,3-Dichloropropane	ND	---	25.0	ug/L	25	03/12/20 20:39	EPA 8260C	
2,2-Dichloropropane	ND	---	25.0	ug/L	25	03/12/20 20:39	EPA 8260C	
1,1-Dichloropropene	ND	---	25.0	ug/L	25	03/12/20 20:39	EPA 8260C	
cis-1,3-Dichloropropene	ND	---	25.0	ug/L	25	03/12/20 20:39	EPA 8260C	
trans-1,3-Dichloropropene	ND	---	25.0	ug/L	25	03/12/20 20:39	EPA 8260C	
Hexachlorobutadiene	ND	---	125	ug/L	25	03/12/20 20:39	EPA 8260C	
Methylene chloride	ND	---	250	ug/L	25	03/12/20 20:39	EPA 8260C	
1,1,1,2-Tetrachloroethane	ND	---	10.0	ug/L	25	03/12/20 20:39	EPA 8260C	
1,1,2,2-Tetrachloroethane	ND	---	12.5	ug/L	25	03/12/20 20:39	EPA 8260C	
<b>Tetrachloroethene (PCE)</b>	<b>4600</b>	---	10.0	ug/L	25	03/12/20 20:39	EPA 8260C	
1,2,3-Trichlorobenzene	ND	---	50.0	ug/L	25	03/12/20 20:39	EPA 8260C	
1,2,4-Trichlorobenzene	ND	---	50.0	ug/L	25	03/12/20 20:39	EPA 8260C	
<b>1,1,1-Trichloroethane</b>	<b>28.8</b>	---	10.0	ug/L	25	03/12/20 20:39	EPA 8260C	
1,1,2-Trichloroethane	ND	---	12.5	ug/L	25	03/12/20 20:39	EPA 8260C	
<b>Trichloroethene (TCE)</b>	<b>1800</b>	---	10.0	ug/L	25	03/12/20 20:39	EPA 8260C	
Trichlorofluoromethane	ND	---	50.0	ug/L	25	03/12/20 20:39	EPA 8260C	

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<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver 1Q20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0C0387 - 03 31 20 0822</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-19 (A0C0387-18)</b>			<b>Matrix: Water</b>		<b>Batch: 0030426</b>			
1,2,3-Trichloropropane	ND	---	25.0	ug/L	25	03/12/20 20:39	EPA 8260C	
<b>Vinyl chloride</b>	<b>143</b>	---	10.0	ug/L	25	03/12/20 20:39	EPA 8260C	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 105 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>03/12/20 20:39</i>	<i>EPA 8260C</i>
<i>Toluene-d8 (Surr)</i>		<i>100 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/12/20 20:39</i>	<i>EPA 8260C</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>100 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/12/20 20:39</i>	<i>EPA 8260C</i>

<b>MW-19 Dup (A0C0387-19)</b>			<b>Matrix: Water</b>		<b>Batch: 0030426</b>			
Bromobenzene	ND	---	12.5	ug/L	25	03/12/20 21:06	EPA 8260C	
Bromochloromethane	ND	---	25.0	ug/L	25	03/12/20 21:06	EPA 8260C	
Bromodichloromethane	ND	---	25.0	ug/L	25	03/12/20 21:06	EPA 8260C	
Bromoform	ND	---	25.0	ug/L	25	03/12/20 21:06	EPA 8260C	
Bromomethane	ND	---	125	ug/L	25	03/12/20 21:06	EPA 8260C	
Carbon tetrachloride	ND	---	25.0	ug/L	25	03/12/20 21:06	EPA 8260C	
Chlorobenzene	ND	---	12.5	ug/L	25	03/12/20 21:06	EPA 8260C	
Chloroethane	ND	---	125	ug/L	25	03/12/20 21:06	EPA 8260C	EST
Chloroform	ND	---	25.0	ug/L	25	03/12/20 21:06	EPA 8260C	
Chloromethane	ND	---	125	ug/L	25	03/12/20 21:06	EPA 8260C	
2-Chlorotoluene	ND	---	25.0	ug/L	25	03/12/20 21:06	EPA 8260C	
4-Chlorotoluene	ND	---	25.0	ug/L	25	03/12/20 21:06	EPA 8260C	
Dibromochloromethane	ND	---	25.0	ug/L	25	03/12/20 21:06	EPA 8260C	
1,2-Dibromo-3-chloropropane	ND	---	125	ug/L	25	03/12/20 21:06	EPA 8260C	
1,2-Dibromoethane (EDB)	ND	---	12.5	ug/L	25	03/12/20 21:06	EPA 8260C	
Dibromomethane	ND	---	25.0	ug/L	25	03/12/20 21:06	EPA 8260C	
1,2-Dichlorobenzene	ND	---	12.5	ug/L	25	03/12/20 21:06	EPA 8260C	
1,3-Dichlorobenzene	ND	---	12.5	ug/L	25	03/12/20 21:06	EPA 8260C	
1,4-Dichlorobenzene	ND	---	12.5	ug/L	25	03/12/20 21:06	EPA 8260C	
Dichlorodifluoromethane	ND	---	25.0	ug/L	25	03/12/20 21:06	EPA 8260C	
<b>1,1-Dichloroethane</b>	<b>35.4</b>	---	10.0	ug/L	25	03/12/20 21:06	EPA 8260C	
1,2-Dichloroethane (EDC)	ND	---	10.0	ug/L	25	03/12/20 21:06	EPA 8260C	
<b>1,1-Dichloroethene</b>	<b>60.4</b>	---	10.0	ug/L	25	03/12/20 21:06	EPA 8260C	
<b>cis-1,2-Dichloroethene</b>	<b>1450</b>	---	10.0	ug/L	25	03/12/20 21:06	EPA 8260C	
<b>trans-1,2-Dichloroethene</b>	<b>14.8</b>	---	10.0	ug/L	25	03/12/20 21:06	EPA 8260C	
1,2-Dichloropropane	ND	---	12.5	ug/L	25	03/12/20 21:06	EPA 8260C	
1,3-Dichloropropane	ND	---	25.0	ug/L	25	03/12/20 21:06	EPA 8260C	
2,2-Dichloropropane	ND	---	25.0	ug/L	25	03/12/20 21:06	EPA 8260C	
1,1-Dichloropropene	ND	---	25.0	ug/L	25	03/12/20 21:06	EPA 8260C	
cis-1,3-Dichloropropene	ND	---	25.0	ug/L	25	03/12/20 21:06	EPA 8260C	
trans-1,3-Dichloropropene	ND	---	25.0	ug/L	25	03/12/20 21:06	EPA 8260C	

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<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver 1Q20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0387 - 03 31 20 0822
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-19 Dup (A0C0387-19)</b>				<b>Matrix: Water</b>		<b>Batch: 0030426</b>		
Hexachlorobutadiene	ND	---	125	ug/L	25	03/12/20 21:06	EPA 8260C	
Methylene chloride	ND	---	250	ug/L	25	03/12/20 21:06	EPA 8260C	
1,1,1,2-Tetrachloroethane	ND	---	10.0	ug/L	25	03/12/20 21:06	EPA 8260C	
1,1,2,2-Tetrachloroethane	ND	---	12.5	ug/L	25	03/12/20 21:06	EPA 8260C	
<b>Tetrachloroethene (PCE)</b>	<b>4730</b>	---	10.0	ug/L	25	03/12/20 21:06	EPA 8260C	
1,2,3-Trichlorobenzene	ND	---	50.0	ug/L	25	03/12/20 21:06	EPA 8260C	
1,2,4-Trichlorobenzene	ND	---	50.0	ug/L	25	03/12/20 21:06	EPA 8260C	
<b>1,1,1-Trichloroethane</b>	<b>29.1</b>	---	10.0	ug/L	25	03/12/20 21:06	EPA 8260C	
1,1,2-Trichloroethane	ND	---	12.5	ug/L	25	03/12/20 21:06	EPA 8260C	
<b>Trichloroethene (TCE)</b>	<b>2010</b>	---	10.0	ug/L	25	03/12/20 21:06	EPA 8260C	
Trichlorofluoromethane	ND	---	50.0	ug/L	25	03/12/20 21:06	EPA 8260C	
1,2,3-Trichloropropane	ND	---	25.0	ug/L	25	03/12/20 21:06	EPA 8260C	
<b>Vinyl chloride</b>	<b>154</b>	---	10.0	ug/L	25	03/12/20 21:06	EPA 8260C	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 104 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>03/12/20 21:06</i>	<i>EPA 8260C</i>
<i>Toluene-d8 (Surr)</i>		<i>102 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/12/20 21:06</i>	<i>EPA 8260C</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>99 %</i>		<i>80-120 %</i>		<i>1</i>	<i>03/12/20 21:06</i>	<i>EPA 8260C</i>



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver 1Q20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0387 - 03 31 20 0822
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**ANALYTICAL SAMPLE RESULTS**

**Ammonia by Gas Diffusion and Colorimetric Detection**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MGMS1-43 (A0C0387-01)</b>				<b>Matrix: Water</b>		<b>Batch: 0030414</b>		
Ammonia as N	199	---	2.00	mg/L	100	03/12/20 15:10	SM 4500-NH3 G	
<b>MW-8 (A0C0387-02)</b>				<b>Matrix: Water</b>		<b>Batch: 0030414</b>		
Ammonia as N	0.732	---	0.0200	mg/L	1	03/12/20 15:12	SM 4500-NH3 G	
<b>MW-26 (A0C0387-03)</b>				<b>Matrix: Water</b>		<b>Batch: 0030414</b>		
Ammonia as N	48.9	---	0.200	mg/L	10	03/12/20 15:13	SM 4500-NH3 G	
<b>MW-18i (A0C0387-04)</b>				<b>Matrix: Water</b>		<b>Batch: 0030414</b>		
Ammonia as N	ND	---	0.0200	mg/L	1	03/12/20 15:22	SM 4500-NH3 G	
<b>MW-20i (A0C0387-05)</b>				<b>Matrix: Water</b>		<b>Batch: 0030414</b>		
Ammonia as N	ND	---	0.0200	mg/L	1	03/12/20 15:24	SM 4500-NH3 G	
<b>MW-21i-40 (A0C0387-06)</b>				<b>Matrix: Water</b>		<b>Batch: 0030414</b>		
Ammonia as N	ND	---	0.0200	mg/L	1	03/12/20 15:25	SM 4500-NH3 G	
<b>EW-1 (A0C0387-07)</b>				<b>Matrix: Water</b>		<b>Batch: 0030414</b>		
Ammonia as N	ND	---	0.0200	mg/L	1	03/12/20 15:27	SM 4500-NH3 G	
<b>MW-16 (A0C0387-08)</b>				<b>Matrix: Water</b>		<b>Batch: 0030415</b>		
Ammonia as N	0.465	---	0.0200	mg/L	1	03/12/20 15:37	SM 4500-NH3 G	
<b>MW-12 (A0C0387-10)</b>				<b>Matrix: Water</b>		<b>Batch: 0030415</b>		
Ammonia as N	26.6	---	0.200	mg/L	10	03/12/20 15:46	SM 4500-NH3 G	
<b>MW-12 Dup (A0C0387-11)</b>				<b>Matrix: Water</b>		<b>Batch: 0030415</b>		
Ammonia as N	25.6	---	0.200	mg/L	10	03/12/20 15:48	SM 4500-NH3 G	
<b>MW-14 (A0C0387-12RE2)</b>				<b>Matrix: Water</b>		<b>Batch: 0030686</b>		
Ammonia as N	32.0	---	0.400	mg/L	20	03/19/20 13:45	SM 4500-NH3 G	
<b>MW-10 (A0C0387-13)</b>				<b>Matrix: Water</b>		<b>Batch: 0030415</b>		
Ammonia as N	18.2	---	0.200	mg/L	10	03/12/20 15:51	SM 4500-NH3 G	
<b>MW-9 (A0C0387-14)</b>				<b>Matrix: Water</b>		<b>Batch: 0030415</b>		

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**ANALYTICAL SAMPLE RESULTS**

**Ammonia by Gas Diffusion and Colorimetric Detection**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-9 (A0C0387-14)</b>				<b>Matrix: Water</b>		<b>Batch: 0030415</b>		
Ammonia as N	0.0850	---	0.0200	mg/L	1	03/12/20 15:52	SM 4500-NH3 G	
<b>MW-7 (A0C0387-15RE2)</b>				<b>Matrix: Water</b>		<b>Batch: 0030686</b>		
Ammonia as N	6.89	---	0.0400	mg/L	2	03/19/20 13:47	SM 4500-NH3 G	
<b>MW-7 Dup (A0C0387-16RE2)</b>				<b>Matrix: Water</b>		<b>Batch: 0030686</b>		
Ammonia as N	6.89	---	0.0400	mg/L	2	03/19/20 13:48	SM 4500-NH3 G	
<b>MP-1 (A0C0387-17RE2)</b>				<b>Matrix: Water</b>		<b>Batch: 0030686</b>		
Ammonia as N	8.82	---	0.0400	mg/L	2	03/19/20 13:50	SM 4500-NH3 G	
<b>MW-19 (A0C0387-18)</b>				<b>Matrix: Water</b>		<b>Batch: 0030415</b>		
Ammonia as N	109	---	1.00	mg/L	50	03/12/20 15:58	SM 4500-NH3 G	
<b>MW-19 Dup (A0C0387-19)</b>				<b>Matrix: Water</b>		<b>Batch: 0030415</b>		
Ammonia as N	107	---	1.00	mg/L	50	03/12/20 16:00	SM 4500-NH3 G	



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**ANALYTICAL SAMPLE RESULTS**

**Anions by Ion Chromatography**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MGMS1-43 (A0C0387-01)</b>				<b>Matrix: Water</b>				
Batch: 0030413								
Nitrate-Nitrogen	12.3	---	1.25	mg/L	5	03/12/20 21:56	EPA 300.0	
<b>MGMS1-43 (A0C0387-01RE1)</b>				<b>Matrix: Water</b>				
Batch: 0030413								
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	03/13/20 02:36	EPA 300.0	
<b>MW-8 (A0C0387-02)</b>				<b>Matrix: Water</b>				
Batch: 0030413								
Nitrite-Nitrogen	ND	---	1.25	mg/L	5	03/12/20 12:36	EPA 300.0	R-04
<b>MW-8 (A0C0387-02RE2)</b>				<b>Matrix: Water</b>				
Batch: 0030413								
Nitrate-Nitrogen	311	---	12.5	mg/L	50	03/12/20 22:17	EPA 300.0	
<b>MW-26 (A0C0387-03RE1)</b>				<b>Matrix: Water</b>				
Batch: 0030413								
Nitrite-Nitrogen	ND	---	1.25	mg/L	5	03/12/20 22:39	EPA 300.0	R-04
<b>MW-26 (A0C0387-03RE2)</b>				<b>Matrix: Water</b>				
Batch: 0030413								
Nitrate-Nitrogen	628	---	25.0	mg/L	100	03/13/20 04:46	EPA 300.0	
<b>MW-18i (A0C0387-04)</b>				<b>Matrix: Water</b>				
Batch: 0030413								
Nitrate-Nitrogen	0.445	---	0.250	mg/L	1	03/12/20 13:40	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	03/12/20 13:40	EPA 300.0	
<b>MW-20i (A0C0387-05)</b>				<b>Matrix: Water</b>				
Batch: 0030413								
Nitrate-Nitrogen	0.332	---	0.250	mg/L	1	03/12/20 14:45	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	03/12/20 14:45	EPA 300.0	
<b>MW-21i-40 (A0C0387-06)</b>				<b>Matrix: Water</b>				
Batch: 0030413								
Nitrate-Nitrogen	2.90	---	0.250	mg/L	1	03/12/20 15:49	EPA 300.0	

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**ANALYTICAL SAMPLE RESULTS**

**Anions by Ion Chromatography**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-21i-40 (A0C0387-06)</b>				<b>Matrix: Water</b>				
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	03/12/20 15:49	EPA 300.0	
<b>EW-1 (A0C0387-07)</b>				<b>Matrix: Water</b>				
Batch: 0030413								
Nitrate-Nitrogen	2.56	---	0.250	mg/L	1	03/12/20 16:11	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	03/12/20 16:11	EPA 300.0	
<b>MW-16 (A0C0387-08)</b>				<b>Matrix: Water</b>				
Batch: 0030413								
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	03/12/20 16:32	EPA 300.0	
<b>MW-16 (A0C0387-08RE1)</b>				<b>Matrix: Water</b>				
Batch: 0030413								
Nitrate-Nitrogen	10.5	---	1.25	mg/L	5	03/13/20 05:07	EPA 300.0	
<b>MW-12 (A0C0387-10)</b>				<b>Matrix: Water</b>				
Batch: 0030413								
Nitrate-Nitrogen	12.0	---	2.50	mg/L	10	03/12/20 17:37	EPA 300.0	
<b>MW-12 (A0C0387-10RE1)</b>				<b>Matrix: Water</b>				
Batch: 0030413								
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	03/12/20 23:01	EPA 300.0	
<b>MW-12 Dup (A0C0387-11)</b>				<b>Matrix: Water</b>				
Batch: 0030413								
Nitrate-Nitrogen	11.9	---	2.50	mg/L	10	03/12/20 17:59	EPA 300.0	
<b>MW-12 Dup (A0C0387-11RE1)</b>				<b>Matrix: Water</b>				
Batch: 0030413								
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	03/12/20 23:22	EPA 300.0	
<b>MW-14 (A0C0387-12RE1)</b>				<b>Matrix: Water</b>				
Batch: 0030413								
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	03/13/20 00:27	EPA 300.0	
<b>MW-14 (A0C0387-12RE2)</b>				<b>Matrix: Water</b>				

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**ANALYTICAL SAMPLE RESULTS**

**Anions by Ion Chromatography**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-14 (A0C0387-12RE2)</b>				<b>Matrix: Water</b>				
Batch: 0030413								
Nitrate-Nitrogen	137	---	5.00	mg/L	20	03/13/20 06:12	EPA 300.0	
<b>MW-10 (A0C0387-13)</b>				<b>Matrix: Water</b>				
Batch: 0030413								
Nitrate-Nitrogen	491	---	12.5	mg/L	50	03/12/20 18:42	EPA 300.0	
<b>MW-10 (A0C0387-13RE1)</b>				<b>Matrix: Water</b>				
Batch: 0030413								
Nitrite-Nitrogen	ND	---	1.25	mg/L	5	03/13/20 00:48	EPA 300.0	R-04
<b>MW-9 (A0C0387-14RE1)</b>				<b>Matrix: Water</b>				
Batch: 0030413								
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	03/13/20 01:10	EPA 300.0	
<b>MW-9 (A0C0387-14RE2)</b>				<b>Matrix: Water</b>				
Batch: 0030413								
Nitrate-Nitrogen	264	---	12.5	mg/L	50	03/13/20 06:34	EPA 300.0	
<b>MW-7 (A0C0387-15)</b>				<b>Matrix: Water</b>				
Batch: 0030413								
Nitrate-Nitrogen	18.7	---	1.25	mg/L	5	03/12/20 20:08	EPA 300.0	
<b>MW-7 (A0C0387-15RE1)</b>				<b>Matrix: Water</b>				
Batch: 0030413								
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	03/13/20 01:32	EPA 300.0	
<b>MW-7 Dup (A0C0387-16)</b>				<b>Matrix: Water</b>				
Batch: 0030413								
Nitrate-Nitrogen	18.7	---	1.25	mg/L	5	03/12/20 20:30	EPA 300.0	
<b>MW-7 Dup (A0C0387-16RE1)</b>				<b>Matrix: Water</b>				
Batch: 0030413								
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	03/13/20 01:53	EPA 300.0	

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**ANALYTICAL SAMPLE RESULTS**

**Anions by Ion Chromatography**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MP-1 (A0C0387-17)</b>				<b>Matrix: Water</b>				
Batch: 0030413								
Nitrate-Nitrogen	110	---	5.00	mg/L	20	03/12/20 20:51	EPA 300.0	
<b>MP-1 (A0C0387-17RE1)</b>				<b>Matrix: Water</b>				
Batch: 0030413								
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	03/13/20 02:15	EPA 300.0	
<b>MW-19 (A0C0387-18)</b>				<b>Matrix: Water</b>				
Batch: 0030413								
Nitrate-Nitrogen	213	---	12.5	mg/L	50	03/12/20 21:13	EPA 300.0	
<b>MW-19 (A0C0387-18RE1)</b>				<b>Matrix: Water</b>				
Batch: 0030413								
Nitrite-Nitrogen	ND	---	1.25	mg/L	5	03/13/20 02:58	EPA 300.0	R-04
<b>MW-19 Dup (A0C0387-19)</b>				<b>Matrix: Water</b>				
Batch: 0030413								
Nitrate-Nitrogen	205	---	12.5	mg/L	50	03/12/20 21:34	EPA 300.0	
<b>MW-19 Dup (A0C0387-19RE1)</b>				<b>Matrix: Water</b>				
Batch: 0030413								
Nitrite-Nitrogen	ND	---	1.25	mg/L	5	03/13/20 03:19	EPA 300.0	R-04





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**ANALYTICAL SAMPLE RESULTS**

**Total Organic Carbon (Non-Purgeable) by Persulfate Oxidation by Standard Method 5310C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MGMS1-43 (A0C0387-01)</b>				<b>Matrix: Water</b>		<b>Batch: 0030456</b>		
Total Organic Carbon	4.82	---	1.00	mg/L	1	03/13/20 19:35	SM 5310 C	
<b>MW-26 (A0C0387-03)</b>				<b>Matrix: Water</b>		<b>Batch: 0030456</b>		
Total Organic Carbon	3.72	---	1.00	mg/L	1	03/13/20 20:09	SM 5310 C	
<b>MW-12 (A0C0387-10)</b>				<b>Matrix: Water</b>		<b>Batch: 0030456</b>		
Total Organic Carbon	12.0	---	2.00	mg/L	2	03/13/20 20:43	SM 5310 C	
<b>MW-7 (A0C0387-15)</b>				<b>Matrix: Water</b>		<b>Batch: 0030456</b>		
Total Organic Carbon	5.98	---	1.00	mg/L	1	03/13/20 22:36	SM 5310 C	
<b>MP-1 (A0C0387-17)</b>				<b>Matrix: Water</b>		<b>Batch: 0030456</b>		
Total Organic Carbon	2.28	---	1.00	mg/L	1	03/13/20 23:10	SM 5310 C	
<b>MW-19 (A0C0387-18)</b>				<b>Matrix: Water</b>		<b>Batch: 0030456</b>		
Total Organic Carbon	13.6	---	1.00	mg/L	1	03/13/20 23:43	SM 5310 C	

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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030426 - EPA 5030B</b>						<b>Water</b>						
<b>Blank (0030426-BLK1)</b>		Prepared: 03/12/20 10:00		Analyzed: 03/12/20 12:06								
<b>EPA 8260C</b>												
Bromobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Bromochloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Bromodichloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Bromoform	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Bromomethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	
Carbon tetrachloride	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Chlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Chloroethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	EST
Chloroform	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Chloromethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	
2-Chlorotoluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
4-Chlorotoluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Dibromochloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Dibromomethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
cis-1,2-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	---	---	---	---	---	---	
Methylene chloride	ND	---	10.0	ug/L	1	---	---	---	---	---	---	

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QUALITY CONTROL (QC) SAMPLE RESULTS

Halogenated Volatile Organic Compounds by EPA 8260C

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030426 - EPA 5030B</b>												
<b>Water</b>												
<b>Blank (0030426-BLK1)</b>	Prepared: 03/12/20 10:00 Analyzed: 03/12/20 12:06											
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Tetrachloroethene (PCE)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Trichloroethene (TCE)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Vinyl chloride	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
Surr: 1,4-Difluorobenzene (Surr)	Recovery: 100 %		Limits: 80-120 %		Dilution: 1x							
Toluene-d8 (Surr)	102 %		80-120 %		"							
4-Bromofluorobenzene (Surr)	100 %		80-120 %		"							

<b>LCS (0030426-BS1)</b>												
Prepared: 03/12/20 10:00 Analyzed: 03/12/20 11:12												
<b>EPA 8260C</b>												
Bromobenzene	21.6	---	0.500	ug/L	1	20.0	---	108	80 - 120%	---	---	
Bromochloromethane	20.8	---	1.00	ug/L	1	20.0	---	104	80 - 120%	---	---	
Bromodichloromethane	21.7	---	1.00	ug/L	1	20.0	---	109	80 - 120%	---	---	
Bromoform	27.1	---	1.00	ug/L	1	20.0	---	<b>136</b>	<b>80 - 120%</b>	---	---	Q-56
Bromomethane	27.9	---	5.00	ug/L	1	20.0	---	<b>139</b>	<b>80 - 120%</b>	---	---	Q-56
Carbon tetrachloride	24.3	---	1.00	ug/L	1	20.0	---	<b>121</b>	<b>80 - 120%</b>	---	---	Q-56
Chlorobenzene	20.8	---	0.500	ug/L	1	20.0	---	104	80 - 120%	---	---	
Chloroethane	29.0	---	5.00	ug/L	1	20.0	---	<b>145</b>	<b>80 - 120%</b>	---	---	Q-56, EST
Chloroform	19.9	---	1.00	ug/L	1	20.0	---	99	80 - 120%	---	---	
Chloromethane	18.4	---	5.00	ug/L	1	20.0	---	92	80 - 120%	---	---	
2-Chlorotoluene	20.5	---	1.00	ug/L	1	20.0	---	103	80 - 120%	---	---	
4-Chlorotoluene	19.1	---	1.00	ug/L	1	20.0	---	96	80 - 120%	---	---	
Dibromochloromethane	24.0	---	1.00	ug/L	1	20.0	---	120	80 - 120%	---	---	
1,2-Dibromo-3-chloropropane	20.2	---	5.00	ug/L	1	20.0	---	101	80 - 120%	---	---	
1,2-Dibromoethane (EDB)	21.1	---	0.500	ug/L	1	20.0	---	105	80 - 120%	---	---	
Dibromomethane	19.9	---	1.00	ug/L	1	20.0	---	100	80 - 120%	---	---	
1,2-Dichlorobenzene	21.0	---	0.500	ug/L	1	20.0	---	105	80 - 120%	---	---	

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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030426 - EPA 5030B</b>												
						<b>Water</b>						
<b>LCS (0030426-BS1)</b>			Prepared: 03/12/20 10:00			Analyzed: 03/12/20 11:12						
1,3-Dichlorobenzene	20.4	---	0.500	ug/L	1	20.0	---	102	80 - 120%	---	---	
1,4-Dichlorobenzene	20.2	---	0.500	ug/L	1	20.0	---	101	80 - 120%	---	---	
Dichlorodifluoromethane	25.4	---	1.00	ug/L	1	20.0	---	<b>127</b>	<b>80 - 120%</b>	---	---	Q-56
1,1-Dichloroethane	18.8	---	0.400	ug/L	1	20.0	---	94	80 - 120%	---	---	
1,2-Dichloroethane (EDC)	20.6	---	0.400	ug/L	1	20.0	---	103	80 - 120%	---	---	
1,1-Dichloroethene	20.5	---	0.400	ug/L	1	20.0	---	103	80 - 120%	---	---	
cis-1,2-Dichloroethene	18.1	---	0.400	ug/L	1	20.0	---	91	80 - 120%	---	---	
trans-1,2-Dichloroethene	19.0	---	0.400	ug/L	1	20.0	---	95	80 - 120%	---	---	
1,2-Dichloropropane	18.2	---	0.500	ug/L	1	20.0	---	91	80 - 120%	---	---	
1,3-Dichloropropane	20.2	---	1.00	ug/L	1	20.0	---	101	80 - 120%	---	---	
2,2-Dichloropropane	20.7	---	1.00	ug/L	1	20.0	---	103	80 - 120%	---	---	
1,1-Dichloropropene	19.4	---	1.00	ug/L	1	20.0	---	97	80 - 120%	---	---	
cis-1,3-Dichloropropene	20.2	---	1.00	ug/L	1	20.0	---	101	80 - 120%	---	---	
trans-1,3-Dichloropropene	22.0	---	1.00	ug/L	1	20.0	---	110	80 - 120%	---	---	
Hexachlorobutadiene	21.6	---	5.00	ug/L	1	20.0	---	108	80 - 120%	---	---	
Methylene chloride	18.4	---	10.0	ug/L	1	20.0	---	92	80 - 120%	---	---	
1,1,1,2-Tetrachloroethane	24.6	---	0.400	ug/L	1	20.0	---	<b>123</b>	<b>80 - 120%</b>	---	---	Q-56
1,1,2,2-Tetrachloroethane	22.4	---	0.500	ug/L	1	20.0	---	112	80 - 120%	---	---	
Tetrachloroethene (PCE)	22.0	---	0.400	ug/L	1	20.0	---	110	80 - 120%	---	---	
1,2,3-Trichlorobenzene	20.2	---	2.00	ug/L	1	20.0	---	101	80 - 120%	---	---	
1,2,4-Trichlorobenzene	20.2	---	2.00	ug/L	1	20.0	---	101	80 - 120%	---	---	
1,1,1-Trichloroethane	21.0	---	0.400	ug/L	1	20.0	---	105	80 - 120%	---	---	
1,1,2-Trichloroethane	21.2	---	0.500	ug/L	1	20.0	---	106	80 - 120%	---	---	
Trichloroethene (TCE)	19.6	---	0.400	ug/L	1	20.0	---	98	80 - 120%	---	---	
Trichlorofluoromethane	33.2	---	2.00	ug/L	1	20.0	---	<b>166</b>	<b>80 - 120%</b>	---	---	Q-56
1,2,3-Trichloropropane	22.1	---	1.00	ug/L	1	20.0	---	111	80 - 120%	---	---	
Vinyl chloride	22.0	---	0.400	ug/L	1	20.0	---	110	80 - 120%	---	---	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>			<i>Recovery: 96 %</i>			<i>Limits: 80-120 %</i>			<i>Dilution: 1x</i>			
<i>Toluene-d8 (Surr)</i>			<i>99 %</i>			<i>80-120 %</i>			<i>"</i>			
<i>4-Bromofluorobenzene (Surr)</i>			<i>95 %</i>			<i>80-120 %</i>			<i>"</i>			

**Duplicate (0030426-DUP1)** Prepared: 03/12/20 11:36 Analyzed: 03/12/20 18:51

**QC Source Sample: MGMS1-43 (A0C0387-01)**  
EPA 8260C

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The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver 1Q20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0387 - 03 31 20 0822
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030426 - EPA 5030B</b>						<b>Water</b>						
<b>Duplicate (0030426-DUP1)</b>			Prepared: 03/12/20 11:36 Analyzed: 03/12/20 18:51									
<b>QC Source Sample: MGMS1-43 (A0C0387-01)</b>												
Bromobenzene	ND	---	12.5	ug/L	25	---	ND	---	---	---	30%	
Bromochloromethane	ND	---	25.0	ug/L	25	---	ND	---	---	---	30%	
Bromodichloromethane	ND	---	25.0	ug/L	25	---	ND	---	---	---	30%	
Bromoform	ND	---	25.0	ug/L	25	---	ND	---	---	---	30%	
Bromomethane	ND	---	125	ug/L	25	---	ND	---	---	---	30%	
Carbon tetrachloride	ND	---	25.0	ug/L	25	---	ND	---	---	---	30%	
Chlorobenzene	ND	---	12.5	ug/L	25	---	ND	---	---	---	30%	
Chloroethane	ND	---	125	ug/L	25	---	ND	---	---	---	30%	EST
Chloroform	ND	---	25.0	ug/L	25	---	ND	---	---	---	30%	
Chloromethane	ND	---	125	ug/L	25	---	ND	---	---	---	30%	
2-Chlorotoluene	ND	---	25.0	ug/L	25	---	ND	---	---	---	30%	
4-Chlorotoluene	ND	---	25.0	ug/L	25	---	ND	---	---	---	30%	
Dibromochloromethane	ND	---	25.0	ug/L	25	---	ND	---	---	---	30%	
1,2-Dibromo-3-chloropropane	ND	---	125	ug/L	25	---	ND	---	---	---	30%	
1,2-Dibromoethane (EDB)	ND	---	12.5	ug/L	25	---	ND	---	---	---	30%	
Dibromomethane	ND	---	25.0	ug/L	25	---	ND	---	---	---	30%	
1,2-Dichlorobenzene	ND	---	12.5	ug/L	25	---	ND	---	---	---	30%	
1,3-Dichlorobenzene	ND	---	12.5	ug/L	25	---	ND	---	---	---	30%	
1,4-Dichlorobenzene	ND	---	12.5	ug/L	25	---	ND	---	---	---	30%	
Dichlorodifluoromethane	ND	---	25.0	ug/L	25	---	ND	---	---	---	30%	
1,1-Dichloroethane	157	---	10.0	ug/L	25	---	157	---	---	0.03	30%	
1,2-Dichloroethane (EDC)	ND	---	10.0	ug/L	25	---	ND	---	---	---	30%	
1,1-Dichloroethene	29.1	---	10.0	ug/L	25	---	29.7	---	---	2	30%	
cis-1,2-Dichloroethene	3180	---	10.0	ug/L	25	---	3230	---	---	2	30%	
trans-1,2-Dichloroethene	61.8	---	10.0	ug/L	25	---	60.4	---	---	2	30%	
1,2-Dichloropropane	ND	---	12.5	ug/L	25	---	ND	---	---	---	30%	
1,3-Dichloropropane	ND	---	25.0	ug/L	25	---	ND	---	---	---	30%	
2,2-Dichloropropane	ND	---	25.0	ug/L	25	---	ND	---	---	---	30%	
1,1-Dichloropropene	ND	---	25.0	ug/L	25	---	ND	---	---	---	30%	
cis-1,3-Dichloropropene	ND	---	25.0	ug/L	25	---	ND	---	---	---	30%	
trans-1,3-Dichloropropene	ND	---	25.0	ug/L	25	---	ND	---	---	---	30%	
Hexachlorobutadiene	ND	---	125	ug/L	25	---	ND	---	---	---	30%	
Methylene chloride	ND	---	250	ug/L	25	---	ND	---	---	---	30%	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver 1Q20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0387 - 03 31 20 0822
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030426 - EPA 5030B</b>												
<b>Water</b>												
<b>Duplicate (0030426-DUP1)</b>												
Prepared: 03/12/20 11:36 Analyzed: 03/12/20 18:51												
<b>QC Source Sample: MGMS1-43 (A0C0387-01)</b>												
1,1,1,2-Tetrachloroethane	ND	---	10.0	ug/L	25	---	ND	---	---	---	30%	
1,1,2,2-Tetrachloroethane	ND	---	12.5	ug/L	25	---	ND	---	---	---	30%	
Tetrachloroethene (PCE)	<b>238</b>	---	10.0	ug/L	25	---	228	---	---	4	30%	
1,2,3-Trichlorobenzene	ND	---	50.0	ug/L	25	---	ND	---	---	---	30%	
1,2,4-Trichlorobenzene	ND	---	50.0	ug/L	25	---	ND	---	---	---	30%	
1,1,1-Trichloroethane	ND	---	10.0	ug/L	25	---	ND	---	---	---	30%	
1,1,2-Trichloroethane	ND	---	12.5	ug/L	25	---	ND	---	---	---	30%	
Trichloroethene (TCE)	<b>508</b>	---	10.0	ug/L	25	---	495	---	---	3	30%	
Trichlorofluoromethane	ND	---	50.0	ug/L	25	---	ND	---	---	---	30%	
1,2,3-Trichloropropane	ND	---	25.0	ug/L	25	---	ND	---	---	---	30%	
Vinyl chloride	<b>157</b>	---	10.0	ug/L	25	---	157	---	---	0.1	30%	

Surr: 1,4-Difluorobenzene (Surr) Recovery: 100 % Limits: 80-120 % Dilution: 1x  
 Toluene-d8 (Surr) 103 % 80-120 % "  
 4-Bromofluorobenzene (Surr) 99 % 80-120 % "

**Matrix Spike (0030426-MS1)** Prepared: 03/12/20 11:36 Analyzed: 03/12/20 21:33

<b>QC Source Sample: MW-19 Dup (A0C0387-19)</b>												
<b>EPA 8260C</b>												
Bromobenzene	575	---	12.5	ug/L	25	500	ND	115	80 - 120%	---	---	
Bromochloromethane	547	---	25.0	ug/L	25	500	ND	109	78 - 123%	---	---	
Bromodichloromethane	573	---	25.0	ug/L	25	500	ND	115	79 - 125%	---	---	
Bromoform	704	---	25.0	ug/L	25	500	ND	<b>141</b>	<b>66 - 130%</b>	---	---	Q-54h
Bromomethane	816	---	125	ug/L	25	500	ND	<b>163</b>	<b>53 - 141%</b>	---	---	Q-54i
Carbon tetrachloride	653	---	25.0	ug/L	25	500	ND	131	72 - 136%	---	---	Q-54f
Chlorobenzene	555	---	12.5	ug/L	25	500	ND	111	80 - 120%	---	---	
Chloroethane	775	---	125	ug/L	25	500	ND	<b>155</b>	<b>60 - 138%</b>	---	---	Q-54g, EST
Chloroform	531	---	25.0	ug/L	25	500	ND	106	79 - 124%	---	---	
Chloromethane	495	---	125	ug/L	25	500	ND	99	50 - 139%	---	---	
2-Chlorotoluene	550	---	25.0	ug/L	25	500	ND	110	79 - 122%	---	---	
4-Chlorotoluene	505	---	25.0	ug/L	25	500	ND	101	78 - 122%	---	---	
Dibromochloromethane	630	---	25.0	ug/L	25	500	ND	126	74 - 126%	---	---	
1,2-Dibromo-3-chloropropane	517	---	125	ug/L	25	500	ND	103	62 - 128%	---	---	
1,2-Dibromoethane (EDB)	551	---	12.5	ug/L	25	500	ND	110	77 - 121%	---	---	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver 1Q20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0387 - 03 31 20 0822
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QUALITY CONTROL (QC) SAMPLE RESULTS

Halogenated Volatile Organic Compounds by EPA 8260C

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030426 - EPA 5030B</b>												
<b>Water</b>												
<b>Matrix Spike (0030426-MS1)</b>			Prepared: 03/12/20 11:36 Analyzed: 03/12/20 21:33									
<b>QC Source Sample: MW-19 Dup (A0C0387-19)</b>												
Dibromomethane	532	---	25.0	ug/L	25	500	ND	106	79 - 123%	---	---	
1,2-Dichlorobenzene	551	---	12.5	ug/L	25	500	ND	110	80 - 120%	---	---	
1,3-Dichlorobenzene	542	---	12.5	ug/L	25	500	ND	108	80 - 120%	---	---	
1,4-Dichlorobenzene	535	---	12.5	ug/L	25	500	ND	107	79 - 120%	---	---	
Dichlorodifluoromethane	667	---	25.0	ug/L	25	500	ND	133	32 - 152%	---	---	Q-54m
1,1-Dichloroethane	532	---	10.0	ug/L	25	500	35.4	99	77 - 125%	---	---	
1,2-Dichloroethane (EDC)	540	---	10.0	ug/L	25	500	ND	108	73 - 128%	---	---	
1,1-Dichloroethene	622	---	10.0	ug/L	25	500	60.4	112	71 - 131%	---	---	
cis-1,2-Dichloroethene	1930	---	10.0	ug/L	25	500	1450	96	78 - 123%	---	---	
trans-1,2-Dichloroethene	520	---	10.0	ug/L	25	500	14.8	101	75 - 124%	---	---	
1,2-Dichloropropane	480	---	12.5	ug/L	25	500	ND	96	78 - 122%	---	---	
1,3-Dichloropropane	529	---	25.0	ug/L	25	500	ND	106	80 - 120%	---	---	
2,2-Dichloropropane	490	---	25.0	ug/L	25	500	ND	98	60 - 139%	---	---	
1,1-Dichloropropene	525	---	25.0	ug/L	25	500	ND	105	79 - 125%	---	---	
cis-1,3-Dichloropropene	481	---	25.0	ug/L	25	500	ND	96	75 - 124%	---	---	
trans-1,3-Dichloropropene	561	---	25.0	ug/L	25	500	ND	112	73 - 127%	---	---	
Hexachlorobutadiene	558	---	125	ug/L	25	500	ND	112	66 - 134%	---	---	
Methylene chloride	485	---	250	ug/L	25	500	ND	97	74 - 124%	---	---	
1,1,1,2-Tetrachloroethane	641	---	10.0	ug/L	25	500	ND	<b>128</b>	<b>78 - 124%</b>	---	---	Q-54j
1,1,2,2-Tetrachloroethane	584	---	12.5	ug/L	25	500	ND	117	71 - 121%	---	---	
Tetrachloroethene (PCE)	5400	---	10.0	ug/L	25	500	4730	<b>134</b>	<b>74 - 129%</b>	---	---	Q-03
1,2,3-Trichlorobenzene	528	---	50.0	ug/L	25	500	ND	106	69 - 129%	---	---	
1,2,4-Trichlorobenzene	528	---	50.0	ug/L	25	500	ND	106	69 - 130%	---	---	
1,1,1-Trichloroethane	595	---	10.0	ug/L	25	500	29.1	113	74 - 131%	---	---	
1,1,2-Trichloroethane	550	---	12.5	ug/L	25	500	ND	110	80 - 120%	---	---	
Trichloroethene (TCE)	2560	---	10.0	ug/L	25	500	2010	111	79 - 123%	---	---	
Trichlorofluoromethane	930	---	50.0	ug/L	25	500	ND	<b>186</b>	<b>65 - 141%</b>	---	---	Q-54k
1,2,3-Trichloropropane	575	---	25.0	ug/L	25	500	ND	115	73 - 122%	---	---	
Vinyl chloride	747	---	10.0	ug/L	25	500	154	119	58 - 137%	---	---	
Surr: 1,4-Difluorobenzene (Surr)		Recovery: 99 %		Limits: 80-120 %		Dilution: 1x						
Toluene-d8 (Surr)		98 %		80-120 %		"						
4-Bromofluorobenzene (Surr)		95 %		80-120 %		"						

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver 1Q20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0387 - 03 31 20 0822
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030468 - EPA 5030B</b>						<b>Water</b>						
<b>Blank (0030468-BLK1)</b>		Prepared: 03/13/20 09:00 Analyzed: 03/13/20 11:45										
<u>EPA 8260C</u>												
Bromobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Bromochloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Bromodichloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Bromoform	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Bromomethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	
Carbon tetrachloride	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Chlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Chloroethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	EST
Chloroform	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Chloromethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	
2-Chlorotoluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
4-Chlorotoluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Dibromochloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Dibromomethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
cis-1,2-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	---	---	---	---	---	---	
Methylene chloride	ND	---	10.0	ug/L	1	---	---	---	---	---	---	

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Lisa Domenighini, Client Services Manager





<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver 1Q20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0387 - 03 31 20 0822
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030468 - EPA 5030B</b>												
<b>Water</b>												
<b>Blank (0030468-BLK1)</b>	Prepared: 03/13/20 09:00 Analyzed: 03/13/20 11:45											
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Tetrachloroethene (PCE)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Trichloroethene (TCE)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Vinyl chloride	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
Surr: 1,4-Difluorobenzene (Surr)	Recovery: 102 %		Limits: 80-120 %		Dilution: 1x							
Toluene-d8 (Surr)	102 %		80-120 %		"							
4-Bromofluorobenzene (Surr)	99 %		80-120 %		"							

<b>LCS (0030468-BS1)</b>												
Prepared: 03/13/20 09:00 Analyzed: 03/13/20 10:51												
<b>EPA 8260C</b>												
Bromobenzene	21.8	---	0.500	ug/L	1	20.0	---	109	80 - 120%	---	---	
Bromochloromethane	20.8	---	1.00	ug/L	1	20.0	---	104	80 - 120%	---	---	
Bromodichloromethane	21.4	---	1.00	ug/L	1	20.0	---	107	80 - 120%	---	---	
Bromoform	28.1	---	1.00	ug/L	1	20.0	---	<b>140</b>	<b>80 - 120%</b>	---	---	Q-56
Bromomethane	29.3	---	5.00	ug/L	1	20.0	---	<b>147</b>	<b>80 - 120%</b>	---	---	Q-56
Carbon tetrachloride	24.1	---	1.00	ug/L	1	20.0	---	120	80 - 120%	---	---	
Chlorobenzene	21.0	---	0.500	ug/L	1	20.0	---	105	80 - 120%	---	---	
Chloroethane	26.9	---	5.00	ug/L	1	20.0	---	<b>135</b>	<b>80 - 120%</b>	---	---	Q-56, EST
Chloroform	19.3	---	1.00	ug/L	1	20.0	---	97	80 - 120%	---	---	
Chloromethane	17.9	---	5.00	ug/L	1	20.0	---	90	80 - 120%	---	---	
2-Chlorotoluene	20.2	---	1.00	ug/L	1	20.0	---	101	80 - 120%	---	---	
4-Chlorotoluene	18.8	---	1.00	ug/L	1	20.0	---	94	80 - 120%	---	---	
Dibromochloromethane	24.5	---	1.00	ug/L	1	20.0	---	<b>123</b>	<b>80 - 120%</b>	---	---	Q-56
1,2-Dibromo-3-chloropropane	20.3	---	5.00	ug/L	1	20.0	---	102	80 - 120%	---	---	
1,2-Dibromoethane (EDB)	21.3	---	0.500	ug/L	1	20.0	---	107	80 - 120%	---	---	
Dibromomethane	20.3	---	1.00	ug/L	1	20.0	---	102	80 - 120%	---	---	
1,2-Dichlorobenzene	21.0	---	0.500	ug/L	1	20.0	---	105	80 - 120%	---	---	

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The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver 1Q20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0387 - 03 31 20 0822
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030468 - EPA 5030B</b>						<b>Water</b>						
<b>LCS (0030468-BS1)</b>			Prepared: 03/13/20 09:00		Analyzed: 03/13/20 10:51							
1,3-Dichlorobenzene	20.7	---	0.500	ug/L	1	20.0	---	104	80 - 120%	---	---	
1,4-Dichlorobenzene	20.6	---	0.500	ug/L	1	20.0	---	103	80 - 120%	---	---	
Dichlorodifluoromethane	23.2	---	1.00	ug/L	1	20.0	---	116	80 - 120%	---	---	
1,1-Dichloroethane	18.1	---	0.400	ug/L	1	20.0	---	91	80 - 120%	---	---	
1,2-Dichloroethane (EDC)	20.3	---	0.400	ug/L	1	20.0	---	101	80 - 120%	---	---	
1,1-Dichloroethene	19.6	---	0.400	ug/L	1	20.0	---	98	80 - 120%	---	---	
cis-1,2-Dichloroethene	17.9	---	0.400	ug/L	1	20.0	---	89	80 - 120%	---	---	
trans-1,2-Dichloroethene	18.3	---	0.400	ug/L	1	20.0	---	91	80 - 120%	---	---	
1,2-Dichloropropane	17.7	---	0.500	ug/L	1	20.0	---	89	80 - 120%	---	---	
1,3-Dichloropropane	20.2	---	1.00	ug/L	1	20.0	---	101	80 - 120%	---	---	
2,2-Dichloropropane	20.8	---	1.00	ug/L	1	20.0	---	104	80 - 120%	---	---	
1,1-Dichloropropene	18.7	---	1.00	ug/L	1	20.0	---	94	80 - 120%	---	---	
cis-1,3-Dichloropropene	20.1	---	1.00	ug/L	1	20.0	---	100	80 - 120%	---	---	
trans-1,3-Dichloropropene	22.2	---	1.00	ug/L	1	20.0	---	111	80 - 120%	---	---	
Hexachlorobutadiene	22.2	---	5.00	ug/L	1	20.0	---	111	80 - 120%	---	---	
Methylene chloride	17.7	---	10.0	ug/L	1	20.0	---	88	80 - 120%	---	---	
1,1,1,2-Tetrachloroethane	24.8	---	0.400	ug/L	1	20.0	---	<b>124</b>	<b>80 - 120%</b>	---	---	Q-56
1,1,1,2,2-Tetrachloroethane	22.8	---	0.500	ug/L	1	20.0	---	114	80 - 120%	---	---	
Tetrachloroethene (PCE)	22.7	---	0.400	ug/L	1	20.0	---	113	80 - 120%	---	---	
1,2,3-Trichlorobenzene	21.8	---	2.00	ug/L	1	20.0	---	109	80 - 120%	---	---	
1,2,4-Trichlorobenzene	21.3	---	2.00	ug/L	1	20.0	---	106	80 - 120%	---	---	
1,1,1-Trichloroethane	20.8	---	0.400	ug/L	1	20.0	---	104	80 - 120%	---	---	
1,1,2-Trichloroethane	21.3	---	0.500	ug/L	1	20.0	---	107	80 - 120%	---	---	
Trichloroethene (TCE)	19.6	---	0.400	ug/L	1	20.0	---	98	80 - 120%	---	---	
Trichlorofluoromethane	33.1	---	2.00	ug/L	1	20.0	---	<b>166</b>	<b>80 - 120%</b>	---	---	Q-56
1,2,3-Trichloropropane	22.5	---	1.00	ug/L	1	20.0	---	113	80 - 120%	---	---	
Vinyl chloride	20.9	---	0.400	ug/L	1	20.0	---	105	80 - 120%	---	---	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 97 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>100 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>94 %</i>		<i>80-120 %</i>		<i>"</i>						



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver 1Q20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0387 - 03 31 20 0822
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030529 - EPA 5030B</b>						<b>Water</b>						
<b>Blank (0030529-BLK1)</b>		Prepared: 03/16/20 08:39 Analyzed: 03/16/20 11:13										
<u>EPA 8260C</u>												
Bromobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Bromochloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Bromodichloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Bromoform	ND	---	2.00	ug/L	1	---	---	---	---	---	---	---
Bromomethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
Carbon tetrachloride	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Chlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Chloroethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
Chloroform	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Chloromethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
2-Chlorotoluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
4-Chlorotoluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Dibromochloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Dibromomethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
1,1-Dichloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
1,1-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
cis-1,2-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
1,2-Dichloropropane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
1,3-Dichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
2,2-Dichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
1,1-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Hexachlorobutadiene	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
Methylene chloride	ND	---	10.0	ug/L	1	---	---	---	---	---	---	---

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver 1Q20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0387 - 03 31 20 0822
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030529 - EPA 5030B</b>												
<b>Water</b>												
<b>Blank (0030529-BLK1)</b>	Prepared: 03/16/20 08:39 Analyzed: 03/16/20 11:13											
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Tetrachloroethene (PCE)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	---	---	---	---	---	---	---
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	---	---	---	---	---	---	---
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Trichloroethene (TCE)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
Trichlorofluoromethane	ND	---	2.00	ug/L	1	---	---	---	---	---	---	---
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Vinyl chloride	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
Surr: 1,4-Difluorobenzene (Surr)	Recovery: 100 %		Limits: 80-120 %		Dilution: 1x							
Toluene-d8 (Surr)	102 %		80-120 %		"							
4-Bromofluorobenzene (Surr)	105 %		80-120 %		"							

<b>LCS (0030529-BS1)</b>												
Prepared: 03/16/20 08:39 Analyzed: 03/16/20 10:19												
<b>EPA 8260C</b>												
Bromobenzene	19.7	---	0.500	ug/L	1	20.0	---	98	80 - 120%	---	---	
Bromochloromethane	20.3	---	1.00	ug/L	1	20.0	---	102	80 - 120%	---	---	
Bromodichloromethane	20.7	---	1.00	ug/L	1	20.0	---	104	80 - 120%	---	---	
Bromoform	19.0	---	2.00	ug/L	1	20.0	---	95	80 - 120%	---	---	
Bromomethane	18.4	---	5.00	ug/L	1	20.0	---	92	80 - 120%	---	---	
Carbon tetrachloride	17.8	---	1.00	ug/L	1	20.0	---	89	80 - 120%	---	---	
Chlorobenzene	19.8	---	0.500	ug/L	1	20.0	---	99	80 - 120%	---	---	
Chloroethane	18.8	---	5.00	ug/L	1	20.0	---	94	80 - 120%	---	---	
Chloroform	21.1	---	1.00	ug/L	1	20.0	---	106	80 - 120%	---	---	
Chloromethane	18.2	---	5.00	ug/L	1	20.0	---	91	80 - 120%	---	---	
2-Chlorotoluene	20.9	---	1.00	ug/L	1	20.0	---	104	80 - 120%	---	---	
4-Chlorotoluene	21.0	---	1.00	ug/L	1	20.0	---	105	80 - 120%	---	---	
Dibromochloromethane	17.8	---	1.00	ug/L	1	20.0	---	89	80 - 120%	---	---	
1,2-Dibromo-3-chloropropane	18.4	---	5.00	ug/L	1	20.0	---	92	80 - 120%	---	---	
1,2-Dibromoethane (EDB)	21.4	---	0.500	ug/L	1	20.0	---	107	80 - 120%	---	---	
Dibromomethane	21.0	---	1.00	ug/L	1	20.0	---	105	80 - 120%	---	---	
1,2-Dichlorobenzene	21.4	---	0.500	ug/L	1	20.0	---	107	80 - 120%	---	---	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver 1Q20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0387 - 03 31 20 0822
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030529 - EPA 5030B</b>						<b>Water</b>						
<b>LCS (0030529-BS1)</b>	Prepared: 03/16/20 08:39		Analyzed: 03/16/20 10:19									
1,3-Dichlorobenzene	20.6	---	0.500	ug/L	1	20.0	---	103	80 - 120%	---	---	
1,4-Dichlorobenzene	19.5	---	0.500	ug/L	1	20.0	---	97	80 - 120%	---	---	
Dichlorodifluoromethane	18.9	---	1.00	ug/L	1	20.0	---	94	80 - 120%	---	---	
1,1-Dichloroethane	20.0	---	0.400	ug/L	1	20.0	---	100	80 - 120%	---	---	
1,2-Dichloroethane (EDC)	20.5	---	0.400	ug/L	1	20.0	---	102	80 - 120%	---	---	
1,1-Dichloroethene	20.6	---	0.400	ug/L	1	20.0	---	103	80 - 120%	---	---	
cis-1,2-Dichloroethene	21.0	---	0.400	ug/L	1	20.0	---	105	80 - 120%	---	---	
trans-1,2-Dichloroethene	20.4	---	0.400	ug/L	1	20.0	---	102	80 - 120%	---	---	
1,2-Dichloropropane	20.6	---	0.500	ug/L	1	20.0	---	103	80 - 120%	---	---	
1,3-Dichloropropane	21.6	---	1.00	ug/L	1	20.0	---	108	80 - 120%	---	---	
2,2-Dichloropropane	25.2	---	1.00	ug/L	1	20.0	---	<b>126</b>	<b>80 - 120%</b>	---	---	Q-56
1,1-Dichloropropene	21.3	---	1.00	ug/L	1	20.0	---	107	80 - 120%	---	---	
cis-1,3-Dichloropropene	20.6	---	1.00	ug/L	1	20.0	---	103	80 - 120%	---	---	
trans-1,3-Dichloropropene	20.5	---	1.00	ug/L	1	20.0	---	102	80 - 120%	---	---	
Hexachlorobutadiene	22.8	---	5.00	ug/L	1	20.0	---	114	80 - 120%	---	---	
Methylene chloride	18.9	---	10.0	ug/L	1	20.0	---	95	80 - 120%	---	---	
1,1,1,2-Tetrachloroethane	21.9	---	0.400	ug/L	1	20.0	---	110	80 - 120%	---	---	
1,1,1,2,2-Tetrachloroethane	21.6	---	0.500	ug/L	1	20.0	---	108	80 - 120%	---	---	
Tetrachloroethene (PCE)	20.6	---	0.400	ug/L	1	20.0	---	103	80 - 120%	---	---	
1,2,3-Trichlorobenzene	23.4	---	2.00	ug/L	1	20.0	---	117	80 - 120%	---	---	
1,2,4-Trichlorobenzene	23.5	---	2.00	ug/L	1	20.0	---	118	80 - 120%	---	---	
1,1,1-Trichloroethane	20.4	---	0.400	ug/L	1	20.0	---	102	80 - 120%	---	---	
1,1,2-Trichloroethane	21.2	---	0.500	ug/L	1	20.0	---	106	80 - 120%	---	---	
Trichloroethene (TCE)	19.8	---	0.400	ug/L	1	20.0	---	99	80 - 120%	---	---	
Trichlorofluoromethane	21.9	---	2.00	ug/L	1	20.0	---	110	80 - 120%	---	---	
1,2,3-Trichloropropane	20.4	---	1.00	ug/L	1	20.0	---	102	80 - 120%	---	---	
Vinyl chloride	19.8	---	0.400	ug/L	1	20.0	---	99	80 - 120%	---	---	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 99 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>100 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>97 %</i>		<i>80-120 %</i>		<i>"</i>						



**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
 Tigard, OR 97223  
 503-718-2323  
 EPA ID: OR01039

<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver 1Q20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0387 - 03 31 20 0822
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Ammonia by Gas Diffusion and Colorimetric Detection**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030414 - Method Prep: Aq</b>						<b>Water</b>						
<b>Blank (0030414-BLK1)</b>		Prepared: 03/12/20 08:06 Analyzed: 03/12/20 14:36										
<b>SM 4500-NH3 G</b>												
Ammonia as N	ND	---	0.0200	mg/L	1	---	---	---	---	---	---	---
<b>LCS (0030414-BS1)</b>		Prepared: 03/12/20 08:06 Analyzed: 03/12/20 14:37										
<b>SM 4500-NH3 G</b>												
Ammonia as N	2.02	---	0.0200	mg/L	1	2.00	---	101	90 - 110%	---	---	---

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 503-718-2323  
 EPA ID: OR01039

<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver 1Q20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0387 - 03 31 20 0822
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Ammonia by Gas Diffusion and Colorimetric Detection**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030415 - Method Prep: Aq</b>						<b>Water</b>						
<b>Blank (0030415-BLK1)</b>		Prepared: 03/12/20 08:22 Analyzed: 03/12/20 15:28										
<b>SM 4500-NH3 G</b>												
Ammonia as N	ND	---	0.0200	mg/L	1	---	---	---	---	---	---	---
<b>LCS (0030415-BS1)</b>		Prepared: 03/12/20 08:22 Analyzed: 03/12/20 15:30										
<b>SM 4500-NH3 G</b>												
Ammonia as N	1.87	---	0.0200	mg/L	1	2.00	---	94	90 - 110%	---	---	---

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6700 S.W. Sandburg Street  
 Tigard, OR 97223  
 503-718-2323  
 EPA ID: OR01039

<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver 1Q20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0387 - 03 31 20 0822
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Ammonia by Gas Diffusion and Colorimetric Detection**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030686 - Method Prep: Aq</b>						<b>Water</b>						
<b>Blank (0030686-BLK1)</b>		Prepared: 03/19/20 09:52 Analyzed: 03/19/20 12:55										
<b>SM 4500-NH3 G</b>												
Ammonia as N	ND	---	0.0200	mg/L	1	---	---	---	---	---	---	---
<b>LCS (0030686-BS1)</b>		Prepared: 03/19/20 09:52 Analyzed: 03/19/20 12:57										
<b>SM 4500-NH3 G</b>												
Ammonia as N	2.02	---	0.0200	mg/L	1	2.00	---	101	90 - 110%	---	---	---

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<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver 1Q20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0387 - 03 31 20 0822
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Anions by Ion Chromatography**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030413 - Method Prep: Aq</b>						<b>Water</b>						
<b>Blank (0030413-BLK1)</b>		Prepared: 03/12/20 07:47 Analyzed: 03/12/20 10:54										
<u>EPA 300.0</u>												
Nitrate-Nitrogen	ND	---	0.250	mg/L	1	---	---	---	---	---	---	---
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	---	---	---	---	---	---	---
<b>LCS (0030413-BS1)</b>		Prepared: 03/12/20 07:47 Analyzed: 03/12/20 11:16										
<u>EPA 300.0</u>												
Nitrate-Nitrogen	2.05	---	0.250	mg/L	1	2.00	---	102	90 - 110%	---	---	---
Nitrite-Nitrogen	2.15	---	0.250	mg/L	1	2.00	---	107	90 - 110%	---	---	---
<b>Duplicate (0030413-DUP1)</b>		Prepared: 03/12/20 07:47 Analyzed: 03/12/20 14:01										
<u>QC Source Sample: MW-18i (A0C0387-04)</u>												
<u>EPA 300.0</u>												
Nitrate-Nitrogen	<b>0.444</b>	---	0.250	mg/L	1	---	0.445	---	---	0.1	10%	---
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	---	ND	---	---	---	10%	---
<b>Duplicate (0030413-DUP2)</b>		Prepared: 03/12/20 07:47 Analyzed: 03/12/20 16:54										
<u>QC Source Sample: MW-16 (A0C0387-08)</u>												
<u>EPA 300.0</u>												
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	---	ND	---	---	---	10%	---
<b>Duplicate (0030413-DUP3)</b>		Prepared: 03/12/20 07:47 Analyzed: 03/13/20 05:29										
<u>QC Source Sample: MW-16 (A0C0387-08RE1)</u>												
<u>EPA 300.0</u>												
Nitrate-Nitrogen	<b>10.4</b>	---	1.25	mg/L	5	---	10.5	---	---	0.4	10%	Q-16
<b>Matrix Spike (0030413-MS1)</b>		Prepared: 03/12/20 07:47 Analyzed: 03/12/20 14:23										
<u>QC Source Sample: MW-18i (A0C0387-04)</u>												
<u>EPA 300.0</u>												
Nitrate-Nitrogen	3.01	---	0.312	mg/L	1	2.50	0.445	103	80 - 120%	---	---	---
Nitrite-Nitrogen	2.68	---	0.312	mg/L	1	2.50	ND	107	80 - 120%	---	---	---
<b>Matrix Spike (0030413-MS2)</b>		Prepared: 03/12/20 07:47 Analyzed: 03/12/20 17:16										
<u>QC Source Sample: MW-16 (A0C0387-08)</u>												

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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Anions by Ion Chromatography**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030413 - Method Prep: Aq</b>						<b>Water</b>						
<b>Matrix Spike (0030413-MS2)</b>			Prepared: 03/12/20 07:47 Analyzed: 03/12/20 17:16									
<u>QC Source Sample: MW-16 (A0C0387-08)</u>												
<u>EPA 300.0</u>												
Nitrite-Nitrogen	2.69	---	0.312	mg/L	1	2.50	ND	108	80 - 120%	---	---	
<b>Matrix Spike (0030413-MS3)</b>			Prepared: 03/12/20 07:47 Analyzed: 03/13/20 05:50									
<u>QC Source Sample: MW-16 (A0C0387-08RE1)</u>												
<u>EPA 300.0</u>												
Nitrate-Nitrogen	20.5	---	1.25	mg/L	5	10.0	10.5	100	80 - 120%	---	---	Q-16



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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Total Organic Carbon (Non-Purgeable) by Persulfate Oxidation by Standard Method 5310C**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0030456 - Method Prep: Aq</b>						<b>Water</b>						
<b>Blank (0030456-BLK1)</b>		Prepared: 03/13/20 10:21 Analyzed: 03/13/20 15:59										
<b>SM 5310 C</b>												
Total Organic Carbon	ND	---	1.00	mg/L	1	---	---	---	---	---	---	---
<b>LCS (0030456-BS1)</b>		Prepared: 03/13/20 10:21 Analyzed: 03/13/20 16:33										
<b>SM 5310 C</b>												
Total Organic Carbon	10.3	---	1.00	mg/L	1	10.0	---	103	85 - 115%	---	---	---
<b>LCS (0030456-BS2)</b>		Prepared: 03/13/20 10:21 Analyzed: 03/13/20 15:29										
<b>SM 5310 C</b>												
Total Organic Carbon	ND	---	1.00	mg/L	1	0.00	---		<b>85 - 115%</b>	---	---	TOC_I



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**SAMPLE PREPARATION INFORMATION**

**Halogenated Volatile Organic Compounds by EPA 8260C**

Prep: EPA 5030B

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 0030426</u>							
A0C0387-01	Water	EPA 8260C	03/11/20 08:40	03/12/20 11:36	5mL/5mL	5mL/5mL	1.00
A0C0387-02	Water	EPA 8260C	03/11/20 09:50	03/12/20 11:36	5mL/5mL	5mL/5mL	1.00
A0C0387-03	Water	EPA 8260C	03/11/20 10:35	03/12/20 11:36	5mL/5mL	5mL/5mL	1.00
A0C0387-04	Water	EPA 8260C	03/11/20 11:15	03/12/20 11:36	5mL/5mL	5mL/5mL	1.00
A0C0387-05	Water	EPA 8260C	03/11/20 12:00	03/12/20 11:36	5mL/5mL	5mL/5mL	1.00
A0C0387-06	Water	EPA 8260C	03/11/20 13:00	03/12/20 11:36	5mL/5mL	5mL/5mL	1.00
A0C0387-07	Water	EPA 8260C	03/11/20 13:40	03/12/20 11:36	5mL/5mL	5mL/5mL	1.00
A0C0387-08	Water	EPA 8260C	03/11/20 14:20	03/12/20 11:36	5mL/5mL	5mL/5mL	1.00
A0C0387-10	Water	EPA 8260C	03/11/20 08:07	03/12/20 11:36	5mL/5mL	5mL/5mL	1.00
A0C0387-11	Water	EPA 8260C	03/11/20 08:07	03/12/20 11:36	5mL/5mL	5mL/5mL	1.00
A0C0387-12	Water	EPA 8260C	03/11/20 09:04	03/12/20 11:36	5mL/5mL	5mL/5mL	1.00
A0C0387-13	Water	EPA 8260C	03/11/20 10:02	03/12/20 11:36	5mL/5mL	5mL/5mL	1.00
A0C0387-14	Water	EPA 8260C	03/11/20 10:41	03/12/20 11:36	5mL/5mL	5mL/5mL	1.00
A0C0387-15	Water	EPA 8260C	03/11/20 11:32	03/12/20 11:36	5mL/5mL	5mL/5mL	1.00
A0C0387-16	Water	EPA 8260C	03/11/20 11:32	03/12/20 11:36	5mL/5mL	5mL/5mL	1.00
A0C0387-17	Water	EPA 8260C	03/11/20 12:34	03/12/20 11:36	5mL/5mL	5mL/5mL	1.00
A0C0387-18	Water	EPA 8260C	03/11/20 13:45	03/12/20 11:36	5mL/5mL	5mL/5mL	1.00
A0C0387-19	Water	EPA 8260C	03/11/20 13:45	03/12/20 11:36	5mL/5mL	5mL/5mL	1.00
<u>Batch: 0030468</u>							
A0C0387-17RE1	Water	EPA 8260C	03/11/20 12:34	03/12/20 11:36	5mL/5mL	5mL/5mL	1.00
<u>Batch: 0030529</u>							
A0C0387-10RE1	Water	EPA 8260C	03/11/20 08:07	03/16/20 09:18	5mL/5mL	5mL/5mL	1.00
A0C0387-11RE1	Water	EPA 8260C	03/11/20 08:07	03/16/20 09:18	5mL/5mL	5mL/5mL	1.00

**Ammonia by Gas Diffusion and Colorimetric Detection**

Prep: Method Prep: Aq

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 0030414</u>							
A0C0387-01	Water	SM 4500-NH3 G	03/11/20 08:40	03/12/20 08:06	10mL/10mL	10mL/10mL	1.00
A0C0387-02	Water	SM 4500-NH3 G	03/11/20 09:50	03/12/20 08:06	10mL/10mL	10mL/10mL	1.00
A0C0387-03	Water	SM 4500-NH3 G	03/11/20 10:35	03/12/20 08:06	10mL/10mL	10mL/10mL	1.00
A0C0387-04	Water	SM 4500-NH3 G	03/11/20 11:15	03/12/20 08:06	10mL/10mL	10mL/10mL	1.00
A0C0387-05	Water	SM 4500-NH3 G	03/11/20 12:00	03/12/20 08:06	10mL/10mL	10mL/10mL	1.00
A0C0387-06	Water	SM 4500-NH3 G	03/11/20 13:00	03/12/20 08:06	10mL/10mL	10mL/10mL	1.00

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**SAMPLE PREPARATION INFORMATION**

**Ammonia by Gas Diffusion and Colorimetric Detection**

Prep: Method Prep: Aq					Sample	Default	RL Prep
Lab Number	Matrix	Method	Sampled	Prepared	Initial/Final	Initial/Final	Factor
A0C0387-07	Water	SM 4500-NH3 G	03/11/20 13:40	03/12/20 08:06	10mL/10mL	10mL/10mL	1.00
<b>Batch: 0030415</b>							
A0C0387-08	Water	SM 4500-NH3 G	03/11/20 14:20	03/12/20 08:22	10mL/10mL	10mL/10mL	1.00
A0C0387-10	Water	SM 4500-NH3 G	03/11/20 08:07	03/12/20 08:22	10mL/10mL	10mL/10mL	1.00
A0C0387-11	Water	SM 4500-NH3 G	03/11/20 08:07	03/12/20 08:22	10mL/10mL	10mL/10mL	1.00
A0C0387-13	Water	SM 4500-NH3 G	03/11/20 10:02	03/12/20 08:22	10mL/10mL	10mL/10mL	1.00
A0C0387-14	Water	SM 4500-NH3 G	03/11/20 10:41	03/12/20 08:22	10mL/10mL	10mL/10mL	1.00
A0C0387-18	Water	SM 4500-NH3 G	03/11/20 13:45	03/12/20 08:22	10mL/10mL	10mL/10mL	1.00
A0C0387-19	Water	SM 4500-NH3 G	03/11/20 13:45	03/12/20 08:22	10mL/10mL	10mL/10mL	1.00
<b>Batch: 0030686</b>							
A0C0387-12RE2	Water	SM 4500-NH3 G	03/11/20 09:04	03/19/20 09:52	10mL/10mL	10mL/10mL	1.00
A0C0387-15RE2	Water	SM 4500-NH3 G	03/11/20 11:32	03/19/20 09:52	10mL/10mL	10mL/10mL	1.00
A0C0387-16RE2	Water	SM 4500-NH3 G	03/11/20 11:32	03/19/20 09:52	10mL/10mL	10mL/10mL	1.00
A0C0387-17RE2	Water	SM 4500-NH3 G	03/11/20 12:34	03/19/20 09:52	10mL/10mL	10mL/10mL	1.00

**Anions by Ion Chromatography**

Prep: Method Prep: Aq					Sample	Default	RL Prep
Lab Number	Matrix	Method	Sampled	Prepared	Initial/Final	Initial/Final	Factor
<b>Batch: 0030413</b>							
A0C0387-01	Water	EPA 300.0	03/11/20 08:40	03/12/20 07:47	5mL/5mL	5mL/5mL	1.00
A0C0387-01RE1	Water	EPA 300.0	03/11/20 08:40	03/12/20 07:47	5mL/5mL	5mL/5mL	1.00
A0C0387-02	Water	EPA 300.0	03/11/20 09:50	03/12/20 07:47	5mL/5mL	5mL/5mL	1.00
A0C0387-02RE2	Water	EPA 300.0	03/11/20 09:50	03/12/20 07:47	5mL/5mL	5mL/5mL	1.00
A0C0387-03RE1	Water	EPA 300.0	03/11/20 10:35	03/12/20 07:47	5mL/5mL	5mL/5mL	1.00
A0C0387-03RE2	Water	EPA 300.0	03/11/20 10:35	03/12/20 07:47	5mL/5mL	5mL/5mL	1.00
A0C0387-04	Water	EPA 300.0	03/11/20 11:15	03/12/20 07:47	5mL/5mL	5mL/5mL	1.00
A0C0387-05	Water	EPA 300.0	03/11/20 12:00	03/12/20 07:47	5mL/5mL	5mL/5mL	1.00
A0C0387-06	Water	EPA 300.0	03/11/20 13:00	03/12/20 07:47	5mL/5mL	5mL/5mL	1.00
A0C0387-07	Water	EPA 300.0	03/11/20 13:40	03/12/20 07:47	5mL/5mL	5mL/5mL	1.00
A0C0387-08	Water	EPA 300.0	03/11/20 14:20	03/12/20 07:47	5mL/5mL	5mL/5mL	1.00
A0C0387-08RE1	Water	EPA 300.0	03/11/20 14:20	03/12/20 07:47	5mL/5mL	5mL/5mL	1.00
A0C0387-10	Water	EPA 300.0	03/11/20 08:07	03/12/20 07:47	5mL/5mL	5mL/5mL	1.00
A0C0387-10RE1	Water	EPA 300.0	03/11/20 08:07	03/12/20 07:47	5mL/5mL	5mL/5mL	1.00
A0C0387-11	Water	EPA 300.0	03/11/20 08:07	03/12/20 07:47	5mL/5mL	5mL/5mL	1.00
A0C0387-11RE1	Water	EPA 300.0	03/11/20 08:07	03/12/20 07:47	5mL/5mL	5mL/5mL	1.00

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**SAMPLE PREPARATION INFORMATION**

**Anions by Ion Chromatography**

Prep: Method Prep: Aq

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
A0C0387-12RE1	Water	EPA 300.0	03/11/20 09:04	03/12/20 07:47	5mL/5mL	5mL/5mL	1.00
A0C0387-12RE2	Water	EPA 300.0	03/11/20 09:04	03/12/20 07:47	5mL/5mL	5mL/5mL	1.00
A0C0387-13	Water	EPA 300.0	03/11/20 10:02	03/12/20 07:47	5mL/5mL	5mL/5mL	1.00
A0C0387-13RE1	Water	EPA 300.0	03/11/20 10:02	03/12/20 07:47	5mL/5mL	5mL/5mL	1.00
A0C0387-14RE1	Water	EPA 300.0	03/11/20 10:41	03/12/20 07:47	5mL/5mL	5mL/5mL	1.00
A0C0387-14RE2	Water	EPA 300.0	03/11/20 10:41	03/12/20 07:47	5mL/5mL	5mL/5mL	1.00
A0C0387-15	Water	EPA 300.0	03/11/20 11:32	03/12/20 07:47	5mL/5mL	5mL/5mL	1.00
A0C0387-15RE1	Water	EPA 300.0	03/11/20 11:32	03/12/20 07:47	5mL/5mL	5mL/5mL	1.00
A0C0387-16	Water	EPA 300.0	03/11/20 11:32	03/12/20 07:47	5mL/5mL	5mL/5mL	1.00
A0C0387-16RE1	Water	EPA 300.0	03/11/20 11:32	03/12/20 07:47	5mL/5mL	5mL/5mL	1.00
A0C0387-17	Water	EPA 300.0	03/11/20 12:34	03/12/20 07:47	5mL/5mL	5mL/5mL	1.00
A0C0387-17RE1	Water	EPA 300.0	03/11/20 12:34	03/12/20 07:47	5mL/5mL	5mL/5mL	1.00
A0C0387-18	Water	EPA 300.0	03/11/20 13:45	03/12/20 07:47	5mL/5mL	5mL/5mL	1.00
A0C0387-18RE1	Water	EPA 300.0	03/11/20 13:45	03/12/20 07:47	5mL/5mL	5mL/5mL	1.00
A0C0387-19	Water	EPA 300.0	03/11/20 13:45	03/12/20 07:47	5mL/5mL	5mL/5mL	1.00
A0C0387-19RE1	Water	EPA 300.0	03/11/20 13:45	03/12/20 07:47	5mL/5mL	5mL/5mL	1.00

**Total Organic Carbon (Non-Purgeable) by Persulfate Oxidation by Standard Method 5310C**

Prep: Method Prep: Aq

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 0030456</u>							
A0C0387-01	Water	SM 5310 C	03/11/20 08:40	03/13/20 10:21	40mL/40mL	40mL/40mL	1.00
A0C0387-03	Water	SM 5310 C	03/11/20 10:35	03/13/20 10:21	40mL/40mL	40mL/40mL	1.00
A0C0387-10	Water	SM 5310 C	03/11/20 08:07	03/13/20 10:21	40mL/40mL	40mL/40mL	1.00
A0C0387-15	Water	SM 5310 C	03/11/20 11:32	03/13/20 10:21	40mL/40mL	40mL/40mL	1.00
A0C0387-17	Water	SM 5310 C	03/11/20 12:34	03/13/20 10:21	40mL/40mL	40mL/40mL	1.00
A0C0387-18	Water	SM 5310 C	03/11/20 13:45	03/13/20 10:21	40mL/40mL	40mL/40mL	1.00



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver 1Q20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0387 - 03 31 20 0822
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**QUALIFIER DEFINITIONS**

**Client Sample and Quality Control (QC) Sample Qualifier Definitions:**

**Apex Laboratories**

- EST** Result reported as an Estimated Value. Results estimated. Initial Calibration Verification Standard (ICV) failed low.
- Q-03** Spike recovery and/or RPD is outside control limits due to the high concentration of analyte present in the sample.
- Q-16** Reanalysis of an original Batch QC sample.
- Q-54f** Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260C/8270D by 1%. The results are reported as Estimated Values.
- Q-54g** Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260C/8270D by 15%. The results are reported as Estimated Values.
- Q-54h** Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260C/8270D by 16%. The results are reported as Estimated Values.
- Q-54i** Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260C/8270D by 19%. The results are reported as Estimated Values.
- Q-54j** Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260C/8270D by 3%. The results are reported as Estimated Values.
- Q-54k** Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260C/8270D by 46%. The results are reported as Estimated Values.
- Q-54m** Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260C/8270D by 7%. The results are reported as Estimated Values.
- Q-56** Daily CCV/LCS recovery for this analyte was above the +/-20% criteria listed in EPA 8260C
- R-04** Reporting levels elevated due to preparation and/or analytical dilution necessary for analysis.
- TOC\_I** Inorganic Carbon Spike Check. Results are valid if Non Detect (No Inorganic Carbon detected.)



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver 1Q20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0387 - 03 31 20 0822
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**REPORTING NOTES AND CONVENTIONS:**

**Abbreviations:**

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported.
- RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

**Detection Limits: Limit of Detection (LOD)**

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('----'), then the data has not been evaluated below the Reporting Limit.

**Reporting Limits: Limit of Quantitation (LOQ)**

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

**Reporting Conventions:**

- Basis: Results for soil samples are generally reported on a 100% dry weight basis. The Result Basis is listed following the units as "dry", "wet", or "" (blank) designation.
  - "dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.
  - "wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
  - "" Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

**QC Source:**

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) are not included in this report. Please request a Full QC report if this data is required.

**Miscellaneous Notes:**

- " --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- " \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

**Blanks:**

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 1/2 the Reporting Limit (RL).  
-For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.  
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.  
For further details, please request a copy of this document.

Apex Laboratories

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Lisa Domenighini, Client Services Manager





<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver 1Q20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0387 - 03 31 20 0822
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**REPORTING NOTES AND CONVENTIONS (Cont.):**

**Blanks (Cont.):**

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

**Preparation Notes:**

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

**Sampling and Preservation Notes:**

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

Apex Laboratories

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Lisa Domenighini, Client Services Manager



**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
**EPA ID: OR01039**

<b><u>Cascadia Associates</u></b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b><u>Shore Terminal-Vancouver</u></b> Project Number: <b>Nustar Vancouver 1Q20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0C0387 - 03 31 20 0822</b>
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**LABORATORY ACCREDITATION INFORMATION**

**TNI Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039**

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

**Apex Laboratories**

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation
<u>All reported analytes are included in Apex Laboratories' current ORELAP scope.</u>					

**Secondary Accreditations**

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

**Subcontract Laboratory Accreditations**

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

**Field Testing Parameters**

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

Lisa Domenighini, Client Services Manager

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*



**Apex Laboratories, LLC**

6700 S.W. Sandburg Street

Tigard, OR 97223

503-718-2323

EPA ID: OR01039

**Cascadia Associates**

5820 SW Kelly Ave Unit B

Portland, OR 97239

Project: **Shore Terminal-Vancouver**

Project Number: **Nustar Vancouver 1Q20**

Project Manager: **Stephanie Salisbury**

**Report ID:**

**A0C0387 - 03 31 20 0822**

COC 1 of 2

**CHAIN OF CUSTODY**

Lab # **A0C0387** PO# **1020**

Company: **Cascadia Associates** Project Mgr: **Stephanie Salisbury** Project Name: **Nustar Vancouver** Project # **1020**

Address: **5820 SW Kelly Ave Unit B** Phone: **503-426-6577** Fax: **503-718-0333** Email: **S.Salisbury@CascadiaAssociates.com**

Sampled by: **Libby W / Jim W**

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	ANALYSIS REQUEST	
						YES	NO
MW-1-43		3/11/20	1340	GW	7		
MW-8		3/5/20			5		
MW-26		10/5			7		
MW-18		11/5			5		
MW-20		12/6			5		
MW-21-40		12/20			5		
EW-1		1/3/20			5		
MW-16		1/20			5		
Trip blank							

Site Location: **OR (WA)**

Other: \_\_\_\_\_

Normal Turn Around Time (TAT) = 10 Business Days

TAT Requested (circle): **3 Day**

SPECIAL INSTRUCTIONS: **See some list as Nustar Van 4/19**  
**Extra 1/ethane/methane by RSL 175**

RECEIVED BY: **Stephanie Salisbury** Date: **3/11/20** Signature: *[Signature]*

RECEIVED BY: \_\_\_\_\_ Date: \_\_\_\_\_ Signature: \_\_\_\_\_

RECEIVED BY: \_\_\_\_\_ Date: \_\_\_\_\_ Signature: \_\_\_\_\_

RECEIVED BY: \_\_\_\_\_ Date: \_\_\_\_\_ Signature: \_\_\_\_\_

Apex Laboratories

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

*Lisa Domenighini*

Lisa Domenighini, Client Services Manager

Cascadia Associates

Project: Shore Terminal-Vancouver

5820 SW Kelly Ave Unit B  
Portland, OR 97239

Project Number: Nustar Vancouver 1Q20

Report ID:

Project Manager: Stephanie Salisbury

A0C0387 - 03 31 20 0822

**APEX LABS**  
6700 SW Sandburg St., Tigard, OR 97223 Ph: 503-718-2323

Company: Cascadia Associates Project Mgr: Stephanie Salisbury

Address: 5820 SW Kelly Ave Portland Phone: 503 555 6577 Email: stephsalbury@cascadiainc.com

Sampled by: J. Weatherford

Site Location:

**CHAIN OF CUSTODY**

Lab # A0C0387 COC # 2 of 2

Project Name: Nu Star Vancouver GPM 1Q20 Project #:

ANALYSIS REQUEST

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-CID	NWTPH-DX	NWTPH-GX	8260 BTEX	8260 RBDN VOCs	8260 Halo VOCs	8260 VOCs Full List	8270 SIM PAHs	8270 Scent-Vols Full List	8082 PCBs	8081 Pest	RCA Metals (8)	Priority Metals (13)	AL, SR, AS, BA, BE, BR, CA, CD, CH, CO, CU, FE, PB, PD, HG, MG, MN, MO, NI, K, SE, AG, NA, TL, V, ZN	TCLP Metals (8)	TOTAL DISS. TCLP	NO2/NO3	NH3	254 175	TBC	Archive		
MW-12		3/11/07	9:00	GW	7																							
MW-12 Dup			8:07		7																							
MW-14			9:04		5																							
MW-10			10:02		5																							
MW-9			10:41		5																							
MW-7			11:32		7																							
MW-7 Dup			11:32		5																							
MP-1			12:31		7																							
MW-19			1:45		7																							
MW-19 Dup			1:45		5																							

SPECIAL INSTRUCTIONS:  
\* VOCs same list as Nustar Name 4019  
Ethane/Ethane/ Methane by RSk 175  
H = hold

TAT Requested (circle): 1 Day 2 Day 3 Day 4 DAY 5 DAY Other: \_\_\_\_\_

Relinquished by: [Signature] Date: 3/11/07 Time: 3:14:00

Relinquished by: [Signature] Date: \_\_\_\_\_ Time: \_\_\_\_\_

Printed Name: Jon Weatherford Time: 16:12

Printed Name: Charles Hagan Time: 16:12

Company: Cascadia Assoc. Company: Apex

Apex Laboratories

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>Nustar Vancouver 1Q20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0C0387 - 03 31 20 0822
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**APEX LABS COOLER RECEIPT FORM**

Client: Cascadia Element WO#: A0C0387

Project/Project #: Nustar Vancouver Gwn 1Q20

**Delivery Info:**  
Date/time received: 3/11/20 @ 1612 By: CFH  
Delivered by: Apex  Client  ESS  FedEx  UPS  Swift  Senvoy  SDS  Other

**Cooler Inspection** Date/time inspected: 3/11/20 @ 1706 By: CFH  
Chain of Custody included? Yes  No  Custody seals? Yes  No   
Signed/dated by client? Yes  No   
Signed/dated by Apex? Yes  No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	<u>5.3</u>	<u>4.9</u>					
Received on ice? (Y/N)	<u>Y</u>	<u>Y</u>					
Temp. blanks? (Y/N)	<u>Y</u>	<u>Y</u>					
Ice type: (Gel/Real/Other)	<u>Real</u>	<u>Real</u>					
Condition:	<u>Good</u>	<u>Good</u>					

Cooler out of temp? (Y/N)  Possible reason why: \_\_\_\_\_  
If some coolers are in temp and some out, were green dots applied to out of temperature samples? Yes/No/NA   
Out of temperature samples form initiated? Yes/No/NA

**Samples Inspection:** Date/time inspected: 3-11-20 @ 1745 By: TAM  
All samples intact? Yes  No  Comments: \_\_\_\_\_

Bottle labels/COCs agree? Yes  No  Comments: MW-14 COC states 5<sup>+</sup> containers

COC/container discrepancies form initiated? Yes  No  NA

Containers/volumes received appropriate for analysis? Yes  No  Comments: \_\_\_\_\_

Do VOA vials have visible headspace? Yes  No  NA   
Comments 13 MW-16 have HS, 23 MW-16 have sed, MW-14 5/15 have sed

Water samples: pH checked: Yes  No  NA  pH appropriate? Yes  No  NA   
Comments: \_\_\_\_\_

**Additional information:** TB # 2264

Labeled by: (80) Witness: AKK Cooler Inspected by: TAM See Project Contact Form: (Y)

*Lisa Domenighini*

March 30, 2020

Apex Laboratories  
ATTN: Lisa Domenighini  
6700 S.W. Sandburg St.  
Tigard, OR 97223



LA Cert #04140  
EPA Methods TO3, TO14A, TO15, 25C/3C,  
RSK-175

TX Cert T104704450-14-6  
EPA Methods TO14A, TO15

UT Cert CA0133332015-3  
EPA Methods TO3, TO14A, TO15, RSK-175

### LABORATORY TEST RESULTS

Project Reference: A0C0387  
Lab Number: L031306-01/06

Enclosed are results for sample(s) received 3/13/20 by Air Technology Laboratories. Sample was received intact and chilled to 2° C. Analyses were performed according to specifications on the chain of custody provided with the sample(s).

#### Report Narrative:

- Unless otherwise noted in the report, sample analyses were performed within method performance criteria and meet all requirements of the TNI Standards.
- The enclosed results relate only to the sample(s).

ATL appreciates the opportunity to provide testing services to your company. If you have any questions regarding these results, please call me at (626) 964-4032.

Sincerely,

A handwritten signature in blue ink, appearing to read "MJohnson".

Mark Johnson  
Operations Manager  
MJohnson@AirTechLabs.com

Note: The cover letter is an integral part of this analytical report.

SUBCONTRACT ORDER

Apex Laboratories

A0C0387

WAD  
3/12/2020  
L031306-01/00  
8

SENDING LABORATORY:

Apex Laboratories  
6700 S.W. Sandburg Street  
Tigard, OR 97223  
Phone: (503) 718-2323  
Fax: (503) 336-0745  
Project Manager: Lisa Domenighini

RECEIVING LABORATORY:

Air Technology Laboratories, Inc  
18501 E. Gale Ave Suite 130  
City of Industry, CA 91748  
Phone : (626) 964-4032  
Fax: (626) 964-5832

**Sample Name: MGMS1-43** **Water** **Sampled: 03/11/20 08:40** (A0C0387-01)

Analysis	Due	Expires	Comments
<b>RSK 175 Preserved (Meth, Eth, Eth) (Sub)</b>	03/24/20 17:00	03/25/20 08:40	
<i>Containers Supplied:</i>			
(D)40 mL VOA - HCL			
(E)40 mL VOA - HCL			

**Sample Name: MW-26** **Water** **Sampled: 03/11/20 10:35** (A0C0387-03)

Analysis	Due	Expires	Comments
<b>RSK 175 Preserved (Meth, Eth, Eth) (Sub)</b>	03/24/20 17:00	03/25/20 10:35	
<i>Containers Supplied:</i>			
(D)40 mL VOA - HCL			
(E)40 mL VOA - HCL			

**Sample Name: MW-12** **Water** **Sampled: 03/11/20 08:07** (A0C0387-10)

Analysis	Due	Expires	Comments
<b>RSK 175 Preserved (Meth, Eth, Eth) (Sub)</b>	03/24/20 17:00	03/25/20 08:07	
<i>Containers Supplied:</i>			
(D)40 mL VOA - HCL			
(E)40 mL VOA - HCL			

**Sample Name: MW-7** **Water** **Sampled: 03/11/20 11:32** (A0C0387-15)

Analysis	Due	Expires	Comments
<b>RSK 175 Preserved (Meth, Eth, Eth) (Sub)</b>	03/24/20 17:00	03/25/20 11:32	
<i>Containers Supplied:</i>			
(D)40 mL VOA - HCL			
(E)40 mL VOA - HCL			

Standard CAT

*CB* 3/12/20 1400

Released By  Date  Received By  Date

UPS (Shipper)  3/13/20 1020

Released By  Date  Received By  Date

2°C

SUBCONTRACT ORDER

Apex Laboratories

A0C0387

8

L031306-01/06

Sample Name: MP-1 Water Sampled: 03/11/20 13:40 (A0C0387-17)

Analysis Due Expires Comments

RSK 175 Preserved (Meth, Eth, Eth) (Sub) 03/24/20 17:00 03/25/20 13:40

05

Containers Supplied:

(D)40 mL VOA - HCL

(E)40 mL VOA - HCL

Sample Name: MW-19 Water Sampled: 03/11/20 13:45 (A0C0387-18)

Analysis Due Expires Comments

RSK 175 Preserved (Meth, Eth, Eth) (Sub) 03/24/20 17:00 03/25/20 13:45

06

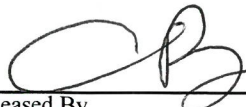
Containers Supplied:

(D)40 mL VOA - HCL

(E)40 mL VOA - HCL

Standard LAL

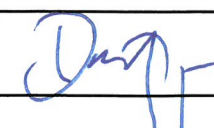
20

Released By  Date 3/12/20 1400

Received By UPS (Shipper) Date

---

Released By UPS (Shipper) Date

Received By  Date 3/13/20 1020



**Client:** Apex Laboratories  
**Attn:** Lisa Domenighini  
**Project Name:** NA  
**Project No.:** A0C0387  
**Date Received:** 03/13/20  
**Matrix:** Water  
**Reporting Units:** ug/L

**RSK175**

Lab No.:	L031306-01	L031306-02	L031306-03	L031306-04				
Client Sample I.D.:	MGMS1-43 (A0C0387-01)	MW-26 (A0C0387-03)	MW-12 (A0C0387-10)	MW-7 (A0C0387-15)				
Date/Time Sampled:	3/11/20 8:40	3/11/20 10:35	3/11/20 8:07	3/11/20 11:32				
Date/Time Analyzed:	3/24/20 9:47	3/24/20 9:58	3/24/20 10:13	3/24/20 11:07				
QC Batch No.:	200324GC8A1	200324GC8A1	200324GC8A1	200324GC8A1				
Analyst Initials:	CM	CM	CM	CM				
Dilution Factor:	1.0	1.0	1.0	1.0				
ANALYTE	Result ug/L	RL ug/L	Result ug/L	RL ug/L	Result ug/L	RL ug/L	Result ug/L	RL ug/L
Ethene	1.4	1.0	ND	1.0	ND	1.0	ND	1.0
Ethane	12	1.0	ND	1.0	6.3	1.0	1.6	1.0
Methane	670	1.0	230	1.0	8,300	1.0	3,400	1.0

ND = Not Detected (below RL)

RL = Reporting Limit

Reviewed/Approved By: \_\_\_\_\_

  
 Mark Johnson  
 Operations Manager

Date 3/30/20

The cover letter is an integral part of this analytical report



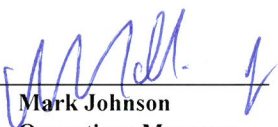
**Client:** Apex Laboratories  
**Attn:** Lisa Domenighini  
**Project Name:** NA  
**Project No.:** A0C0387  
**Date Received:** 03/13/20  
**Matrix:** Water  
**Reporting Units:** ug/L

**RSK175**

Lab No.:	L031306-05		L031306-06					
Client Sample I.D.:	MP-1 (A0C0387-17)		MW-19 (A0C0387-18)					
Date/Time Sampled:	3/11/20 13:40		3/11/20 13:45					
Date/Time Analyzed:	3/24/20 10:38		3/24/20 10:52					
QC Batch No.:	200324GC8A1		200324GC8A1					
Analyst Initials:	CM		CM					
Dilution Factor:	1.0		1.0					
ANALYTE	Result ug/L	RL ug/L	Result ug/L	RL ug/L				
Ethene	ND	1.0	7.5	1.0				
Ethane	ND	1.0	40	1.0				
Methane	250	1.0	7,200	1.0				

ND = Not Detected (below RL)  
 RL = Reporting Limit

Reviewed/Approved By: \_\_\_\_\_

  
**Mark Johnson**  
 Operations Manager

Date \_\_\_\_\_

3/30/20

The cover letter is an integral part of this analytical report



QC Batch No: 200324GC8A1

Matrix: Water

Reporting Units: ug/L

RSK 175  
LABORATORY CONTROL SAMPLE SUMMARY

Lab No.:	METHOD BLANK		LCS		LCSD						
Date/Time Analyzed:	3/24/20 8:52		3/24/20 9:05		3/24/20 9:17						
Analyst Initials:	CM		CM		CM						
Dilution Factor:	1.1		1.0		1.0		Limits				
ANALYTE	Result ug/L	RL ug/L	SPIKE AMT. ug/L	Result ug/L	% Rec.	Result ug/L	% Rec.	RPD %	Low %Rec	High %Rec	Max. RPD
Ethene	ND	1.0	1,150	1,310	115	1,310	115	0.0	70	130	30
Ethane	ND	1.0	1,200	1,420	116	1,350	110	5.4	70	130	30
Methane	ND	1.0	650	740	113	693	106	6.6	70	130	30

ND = Not Detected (below RL)

RL = Reporting Limit

Reviewed/Approved By: Mark Johnson  
Mark Johnson  
Operations Manager

Date 3/30/20

The cover letter is an integral part of this analytical report





**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
ORELAP ID: OR100062

Tuesday, June 30, 2020

Stephanie Salisbury  
Cascadia Associates  
5820 SW Kelly Ave Unit B  
Portland, OR 97239

RE: A0F0455 - Shore Terminal-Vancouver - NuStar Vancouver GWM 2Q20

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A0F0455, which was received by the laboratory on 6/16/2020 at 4:30:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [ldomenighini@apex-labs.com](mailto:ldomenighini@apex-labs.com), or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of sample receipt, unless prior arrangements have been made.

---

Cooler Receipt Information

(See Cooler Receipt Form for details)

Cooler #1                      0.6 degC

---

This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.

All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

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Lisa Domenighini, Client Services Manager



**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
ORELAP ID: OR100062

**Cascadia Associates**

5820 SW Kelly Ave Unit B  
Portland, OR 97239

Project: **Shore Terminal-Vancouver**

Project Number: **NuStar Vancouver GWM 20**

Project Manager: **Stephanie Salisbury**

**Report ID:**

**A0F0455 - 06 30 20 1418**

**ANALYTICAL REPORT FOR SAMPLES**

**SAMPLE INFORMATION**

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MGMS1-43	A0F0455-01	Water	06/16/20 08:50	06/16/20 16:30
MGMS1-60	A0F0455-02	Water	06/16/20 09:17	06/16/20 16:30
MGMS1-110	A0F0455-03	Water	06/16/20 09:39	06/16/20 16:30
MGMS2-40	A0F0455-04	Water	06/16/20 10:26	06/16/20 16:30
MGMS2-60	A0F0455-05	Water	06/16/20 10:55	06/16/20 16:30
MGMS2-110	A0F0455-06	Water	06/16/20 11:25	06/16/20 16:30
MGMS2-132	A0F0455-07	Water	06/16/20 11:55	06/16/20 16:30
MGMS3-40	A0F0455-08	Water	06/16/20 12:59	06/16/20 16:30
MGMS3-40 Dup	A0F0455-09	Water	06/16/20 12:59	06/16/20 16:30
MGMS3-60	A0F0455-10	Water	06/16/20 13:41	06/16/20 16:30
MGMS3-110	A0F0455-11	Water	06/16/20 14:14	06/16/20 16:30
MGMS3-132	A0F0455-12	Water	06/16/20 14:43	06/16/20 16:30

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5820 SW Kelly Ave Unit B  
Portland, OR 97239

Project: Shore Terminal-Vancouver

Project Number: NuStar Vancouver GWM 20

Project Manager: Stephanie Salisbury

Report ID:

A0F0455 - 06 30 20 1418

**ANALYTICAL CASE NARRATIVE**

Work Order: A0F0455

Subcontract

This report is not complete without the attached subcontract laboratory report for RSK 175 from Air Technology.

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0455 - 06 30 20 1418</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MGMS1-43 (A0F0455-01)</b>				<b>Matrix: Water</b>		<b>Batch: 0060574</b>		
Bromobenzene	ND	---	12.5	ug/L	25	06/17/20 17:05	EPA 8260D	
Bromochloromethane	ND	---	25.0	ug/L	25	06/17/20 17:05	EPA 8260D	
Bromodichloromethane	ND	---	25.0	ug/L	25	06/17/20 17:05	EPA 8260D	
Bromoform	ND	---	25.0	ug/L	25	06/17/20 17:05	EPA 8260D	
Bromomethane	ND	---	125	ug/L	25	06/17/20 17:05	EPA 8260D	
Carbon tetrachloride	ND	---	25.0	ug/L	25	06/17/20 17:05	EPA 8260D	
Chlorobenzene	ND	---	12.5	ug/L	25	06/17/20 17:05	EPA 8260D	
Chloroethane	ND	---	125	ug/L	25	06/17/20 17:05	EPA 8260D	
Chloroform	ND	---	25.0	ug/L	25	06/17/20 17:05	EPA 8260D	
Chloromethane	ND	---	125	ug/L	25	06/17/20 17:05	EPA 8260D	
2-Chlorotoluene	ND	---	25.0	ug/L	25	06/17/20 17:05	EPA 8260D	
4-Chlorotoluene	ND	---	25.0	ug/L	25	06/17/20 17:05	EPA 8260D	
Dibromochloromethane	ND	---	25.0	ug/L	25	06/17/20 17:05	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	125	ug/L	25	06/17/20 17:05	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	12.5	ug/L	25	06/17/20 17:05	EPA 8260D	
Dibromomethane	ND	---	25.0	ug/L	25	06/17/20 17:05	EPA 8260D	
1,2-Dichlorobenzene	ND	---	12.5	ug/L	25	06/17/20 17:05	EPA 8260D	
1,3-Dichlorobenzene	ND	---	12.5	ug/L	25	06/17/20 17:05	EPA 8260D	
1,4-Dichlorobenzene	ND	---	12.5	ug/L	25	06/17/20 17:05	EPA 8260D	
Dichlorodifluoromethane	ND	---	25.0	ug/L	25	06/17/20 17:05	EPA 8260D	
<b>1,1-Dichloroethane</b>	<b>114</b>	---	10.0	ug/L	25	06/17/20 17:05	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	10.0	ug/L	25	06/17/20 17:05	EPA 8260D	
<b>1,1-Dichloroethene</b>	<b>21.8</b>	---	10.0	ug/L	25	06/17/20 17:05	EPA 8260D	
<b>cis-1,2-Dichloroethene</b>	<b>2520</b>	---	10.0	ug/L	25	06/17/20 17:05	EPA 8260D	
<b>trans-1,2-Dichloroethene</b>	<b>31.5</b>	---	10.0	ug/L	25	06/17/20 17:05	EPA 8260D	
1,2-Dichloropropane	ND	---	12.5	ug/L	25	06/17/20 17:05	EPA 8260D	
1,3-Dichloropropane	ND	---	50.0	ug/L	25	06/17/20 17:05	EPA 8260D	
2,2-Dichloropropane	ND	---	25.0	ug/L	25	06/17/20 17:05	EPA 8260D	
1,1-Dichloropropene	ND	---	25.0	ug/L	25	06/17/20 17:05	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	25.0	ug/L	25	06/17/20 17:05	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	25.0	ug/L	25	06/17/20 17:05	EPA 8260D	
Hexachlorobutadiene	ND	---	125	ug/L	25	06/17/20 17:05	EPA 8260D	
Methylene chloride	ND	---	250	ug/L	25	06/17/20 17:05	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	---	10.0	ug/L	25	06/17/20 17:05	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	12.5	ug/L	25	06/17/20 17:05	EPA 8260D	
<b>Tetrachloroethene (PCE)</b>	<b>116</b>	---	10.0	ug/L	25	06/17/20 17:05	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	50.0	ug/L	25	06/17/20 17:05	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	50.0	ug/L	25	06/17/20 17:05	EPA 8260D	
1,1,1-Trichloroethane	ND	---	10.0	ug/L	25	06/17/20 17:05	EPA 8260D	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0455 - 06 30 20 1418</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MGMS1-43 (A0F0455-01)</b>			<b>Matrix: Water</b>		<b>Batch: 0060574</b>			
1,1,2-Trichloroethane	ND	---	12.5	ug/L	25	06/17/20 17:05	EPA 8260D	
<b>Trichloroethene (TCE)</b>	<b>264</b>	---	10.0	ug/L	25	06/17/20 17:05	EPA 8260D	
Trichlorofluoromethane	ND	---	50.0	ug/L	25	06/17/20 17:05	EPA 8260D	
1,2,3-Trichloropropane	ND	---	25.0	ug/L	25	06/17/20 17:05	EPA 8260D	
<b>Vinyl chloride</b>	<b>152</b>	---	10.0	ug/L	25	06/17/20 17:05	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 110 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>06/17/20 17:05</i>	<i>EPA 8260D</i>
<i>Toluene-d8 (Surr)</i>		<i>96 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/17/20 17:05</i>	<i>EPA 8260D</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>102 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/17/20 17:05</i>	<i>EPA 8260D</i>

<b>MGMS1-60 (A0F0455-02)</b>			<b>Matrix: Water</b>		<b>Batch: 0060574</b>			
Bromobenzene	ND	---	0.500	ug/L	1	06/17/20 13:55	EPA 8260D	
Bromochloromethane	ND	---	1.00	ug/L	1	06/17/20 13:55	EPA 8260D	
Bromodichloromethane	ND	---	1.00	ug/L	1	06/17/20 13:55	EPA 8260D	
Bromoform	ND	---	1.00	ug/L	1	06/17/20 13:55	EPA 8260D	
Bromomethane	ND	---	5.00	ug/L	1	06/17/20 13:55	EPA 8260D	
Carbon tetrachloride	ND	---	1.00	ug/L	1	06/17/20 13:55	EPA 8260D	
Chlorobenzene	ND	---	0.500	ug/L	1	06/17/20 13:55	EPA 8260D	
Chloroethane	ND	---	5.00	ug/L	1	06/17/20 13:55	EPA 8260D	
Chloroform	ND	---	1.00	ug/L	1	06/17/20 13:55	EPA 8260D	
Chloromethane	ND	---	5.00	ug/L	1	06/17/20 13:55	EPA 8260D	
2-Chlorotoluene	ND	---	1.00	ug/L	1	06/17/20 13:55	EPA 8260D	
4-Chlorotoluene	ND	---	1.00	ug/L	1	06/17/20 13:55	EPA 8260D	
Dibromochloromethane	ND	---	1.00	ug/L	1	06/17/20 13:55	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	06/17/20 13:55	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	06/17/20 13:55	EPA 8260D	
Dibromomethane	ND	---	1.00	ug/L	1	06/17/20 13:55	EPA 8260D	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	06/17/20 13:55	EPA 8260D	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	06/17/20 13:55	EPA 8260D	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	06/17/20 13:55	EPA 8260D	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	06/17/20 13:55	EPA 8260D	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	06/17/20 13:55	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	06/17/20 13:55	EPA 8260D	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	06/17/20 13:55	EPA 8260D	
<b>cis-1,2-Dichloroethene</b>	<b>4.23</b>	---	0.400	ug/L	1	06/17/20 13:55	EPA 8260D	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	06/17/20 13:55	EPA 8260D	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	06/17/20 13:55	EPA 8260D	
1,3-Dichloropropane	ND	---	2.00	ug/L	1	06/17/20 13:55	EPA 8260D	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	06/17/20 13:55	EPA 8260D	

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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MGMS1-60 (A0F0455-02)</b>				<b>Matrix: Water</b>		<b>Batch: 0060574</b>		
1,1-Dichloropropene	ND	---	1.00	ug/L	1	06/17/20 13:55	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/17/20 13:55	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/17/20 13:55	EPA 8260D	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	06/17/20 13:55	EPA 8260D	
Methylene chloride	ND	---	10.0	ug/L	1	06/17/20 13:55	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	06/17/20 13:55	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	06/17/20 13:55	EPA 8260D	
<b>Tetrachloroethene (PCE)</b>	<b>12.4</b>	---	0.400	ug/L	1	06/17/20 13:55	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	06/17/20 13:55	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	06/17/20 13:55	EPA 8260D	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	06/17/20 13:55	EPA 8260D	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	06/17/20 13:55	EPA 8260D	
<b>Trichloroethene (TCE)</b>	<b>6.01</b>	---	0.400	ug/L	1	06/17/20 13:55	EPA 8260D	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	06/17/20 13:55	EPA 8260D	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	06/17/20 13:55	EPA 8260D	
Vinyl chloride	ND	---	0.400	ug/L	1	06/17/20 13:55	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 117 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>06/17/20 13:55</i>	<i>EPA 8260D</i>
<i>Toluene-d8 (Surr)</i>		<i>95 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/17/20 13:55</i>	<i>EPA 8260D</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>103 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/17/20 13:55</i>	<i>EPA 8260D</i>

<b>MGMS1-110 (A0F0455-03RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0060574</b>		
Bromobenzene	ND	---	0.500	ug/L	1	06/17/20 18:28	EPA 8260D	
Bromochloromethane	ND	---	1.00	ug/L	1	06/17/20 18:28	EPA 8260D	
Bromodichloromethane	ND	---	1.00	ug/L	1	06/17/20 18:28	EPA 8260D	
Bromoform	ND	---	1.00	ug/L	1	06/17/20 18:28	EPA 8260D	
Bromomethane	ND	---	5.00	ug/L	1	06/17/20 18:28	EPA 8260D	
Carbon tetrachloride	ND	---	1.00	ug/L	1	06/17/20 18:28	EPA 8260D	
Chlorobenzene	ND	---	0.500	ug/L	1	06/17/20 18:28	EPA 8260D	
Chloroethane	ND	---	5.00	ug/L	1	06/17/20 18:28	EPA 8260D	
Chloroform	ND	---	1.00	ug/L	1	06/17/20 18:28	EPA 8260D	
Chloromethane	ND	---	5.00	ug/L	1	06/17/20 18:28	EPA 8260D	
2-Chlorotoluene	ND	---	1.00	ug/L	1	06/17/20 18:28	EPA 8260D	
4-Chlorotoluene	ND	---	1.00	ug/L	1	06/17/20 18:28	EPA 8260D	
Dibromochloromethane	ND	---	1.00	ug/L	1	06/17/20 18:28	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	06/17/20 18:28	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	06/17/20 18:28	EPA 8260D	
Dibromomethane	ND	---	1.00	ug/L	1	06/17/20 18:28	EPA 8260D	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	06/17/20 18:28	EPA 8260D	

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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MGMS1-110 (A0F0455-03RE1)</b>			<b>Matrix: Water</b>		<b>Batch: 0060574</b>			
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	06/17/20 18:28	EPA 8260D	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	06/17/20 18:28	EPA 8260D	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	06/17/20 18:28	EPA 8260D	
<b>1,1-Dichloroethane</b>	<b>4.22</b>	---	0.400	ug/L	1	06/17/20 18:28	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	06/17/20 18:28	EPA 8260D	
<b>1,1-Dichloroethene</b>	<b>0.450</b>	---	0.400	ug/L	1	06/17/20 18:28	EPA 8260D	
<b>cis-1,2-Dichloroethene</b>	<b>141</b>	---	0.400	ug/L	1	06/17/20 18:28	EPA 8260D	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	06/17/20 18:28	EPA 8260D	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	06/17/20 18:28	EPA 8260D	
1,3-Dichloropropane	ND	---	2.00	ug/L	1	06/17/20 18:28	EPA 8260D	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	06/17/20 18:28	EPA 8260D	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	06/17/20 18:28	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/17/20 18:28	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/17/20 18:28	EPA 8260D	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	06/17/20 18:28	EPA 8260D	
Methylene chloride	ND	---	10.0	ug/L	1	06/17/20 18:28	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	06/17/20 18:28	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	06/17/20 18:28	EPA 8260D	
<b>Tetrachloroethene (PCE)</b>	<b>17.6</b>	---	0.400	ug/L	1	06/17/20 18:28	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	06/17/20 18:28	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	06/17/20 18:28	EPA 8260D	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	06/17/20 18:28	EPA 8260D	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	06/17/20 18:28	EPA 8260D	
<b>Trichloroethene (TCE)</b>	<b>33.2</b>	---	0.400	ug/L	1	06/17/20 18:28	EPA 8260D	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	06/17/20 18:28	EPA 8260D	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	06/17/20 18:28	EPA 8260D	
Vinyl chloride	ND	---	0.400	ug/L	1	06/17/20 18:28	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 114 %</i>		<i>Limits: 80-120 %</i>	<i>1</i>	<i>06/17/20 18:28</i>	<i>EPA 8260D</i>	
<i>Toluene-d8 (Surr)</i>		<i>97 %</i>		<i>80-120 %</i>	<i>1</i>	<i>06/17/20 18:28</i>	<i>EPA 8260D</i>	
<i>4-Bromofluorobenzene (Surr)</i>		<i>102 %</i>		<i>80-120 %</i>	<i>1</i>	<i>06/17/20 18:28</i>	<i>EPA 8260D</i>	

<b>MGMS2-40 (A0F0455-04RE1)</b>			<b>Matrix: Water</b>		<b>Batch: 0060574</b>			
Bromobenzene	ND	---	0.500	ug/L	1	06/17/20 18:55	EPA 8260D	
Bromochloromethane	ND	---	1.00	ug/L	1	06/17/20 18:55	EPA 8260D	
Bromodichloromethane	ND	---	1.00	ug/L	1	06/17/20 18:55	EPA 8260D	
Bromoform	ND	---	1.00	ug/L	1	06/17/20 18:55	EPA 8260D	
Bromomethane	ND	---	5.00	ug/L	1	06/17/20 18:55	EPA 8260D	
Carbon tetrachloride	ND	---	1.00	ug/L	1	06/17/20 18:55	EPA 8260D	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0F0455 - 06 30 20 1418
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MGMS2-40 (A0F0455-04RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0060574</b>		
Chlorobenzene	ND	---	0.500	ug/L	1	06/17/20 18:55	EPA 8260D	
Chloroethane	ND	---	5.00	ug/L	1	06/17/20 18:55	EPA 8260D	
Chloroform	ND	---	1.00	ug/L	1	06/17/20 18:55	EPA 8260D	
Chloromethane	ND	---	5.00	ug/L	1	06/17/20 18:55	EPA 8260D	
2-Chlorotoluene	ND	---	1.00	ug/L	1	06/17/20 18:55	EPA 8260D	
4-Chlorotoluene	ND	---	1.00	ug/L	1	06/17/20 18:55	EPA 8260D	
Dibromochloromethane	ND	---	1.00	ug/L	1	06/17/20 18:55	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	06/17/20 18:55	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	06/17/20 18:55	EPA 8260D	
Dibromomethane	ND	---	1.00	ug/L	1	06/17/20 18:55	EPA 8260D	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	06/17/20 18:55	EPA 8260D	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	06/17/20 18:55	EPA 8260D	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	06/17/20 18:55	EPA 8260D	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	06/17/20 18:55	EPA 8260D	
<b>1,1-Dichloroethane</b>	<b>27.3</b>	---	0.400	ug/L	1	06/17/20 18:55	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	06/17/20 18:55	EPA 8260D	
<b>1,1-Dichloroethene</b>	<b>1.25</b>	---	0.400	ug/L	1	06/17/20 18:55	EPA 8260D	
<b>cis-1,2-Dichloroethene</b>	<b>85.0</b>	---	0.400	ug/L	1	06/17/20 18:55	EPA 8260D	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	06/17/20 18:55	EPA 8260D	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	06/17/20 18:55	EPA 8260D	
1,3-Dichloropropane	ND	---	2.00	ug/L	1	06/17/20 18:55	EPA 8260D	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	06/17/20 18:55	EPA 8260D	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	06/17/20 18:55	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/17/20 18:55	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/17/20 18:55	EPA 8260D	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	06/17/20 18:55	EPA 8260D	
Methylene chloride	ND	---	10.0	ug/L	1	06/17/20 18:55	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	06/17/20 18:55	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	06/17/20 18:55	EPA 8260D	
<b>Tetrachloroethene (PCE)</b>	<b>14.8</b>	---	0.400	ug/L	1	06/17/20 18:55	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	06/17/20 18:55	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	06/17/20 18:55	EPA 8260D	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	06/17/20 18:55	EPA 8260D	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	06/17/20 18:55	EPA 8260D	
<b>Trichloroethene (TCE)</b>	<b>9.09</b>	---	0.400	ug/L	1	06/17/20 18:55	EPA 8260D	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	06/17/20 18:55	EPA 8260D	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	06/17/20 18:55	EPA 8260D	
<b>Vinyl chloride</b>	<b>138</b>	---	0.400	ug/L	1	06/17/20 18:55	EPA 8260D	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0455 - 06 30 20 1418</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MGMS2-40 (A0F0455-04RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0060574</b>		
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 112 %</i>	<i>Limits: 80-120 %</i>	<i>1</i>		<i>06/17/20 18:55</i>	<i>EPA 8260D</i>	
<i>Toluene-d8 (Surr)</i>		<i>94 %</i>	<i>80-120 %</i>	<i>1</i>		<i>06/17/20 18:55</i>	<i>EPA 8260D</i>	
<i>4-Bromofluorobenzene (Surr)</i>		<i>102 %</i>	<i>80-120 %</i>	<i>1</i>		<i>06/17/20 18:55</i>	<i>EPA 8260D</i>	
<b>MGMS2-60 (A0F0455-05)</b>				<b>Matrix: Water</b>		<b>Batch: 0060574</b>		
Bromobenzene	ND	---	0.500	ug/L	1	06/17/20 14:22	EPA 8260D	
Bromochloromethane	ND	---	1.00	ug/L	1	06/17/20 14:22	EPA 8260D	
Bromodichloromethane	ND	---	1.00	ug/L	1	06/17/20 14:22	EPA 8260D	
Bromoform	ND	---	1.00	ug/L	1	06/17/20 14:22	EPA 8260D	
Bromomethane	ND	---	5.00	ug/L	1	06/17/20 14:22	EPA 8260D	
Carbon tetrachloride	ND	---	1.00	ug/L	1	06/17/20 14:22	EPA 8260D	
Chlorobenzene	ND	---	0.500	ug/L	1	06/17/20 14:22	EPA 8260D	
Chloroethane	ND	---	5.00	ug/L	1	06/17/20 14:22	EPA 8260D	
Chloroform	ND	---	1.00	ug/L	1	06/17/20 14:22	EPA 8260D	
Chloromethane	ND	---	5.00	ug/L	1	06/17/20 14:22	EPA 8260D	
2-Chlorotoluene	ND	---	1.00	ug/L	1	06/17/20 14:22	EPA 8260D	
4-Chlorotoluene	ND	---	1.00	ug/L	1	06/17/20 14:22	EPA 8260D	
Dibromochloromethane	ND	---	1.00	ug/L	1	06/17/20 14:22	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	06/17/20 14:22	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	06/17/20 14:22	EPA 8260D	
Dibromomethane	ND	---	1.00	ug/L	1	06/17/20 14:22	EPA 8260D	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	06/17/20 14:22	EPA 8260D	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	06/17/20 14:22	EPA 8260D	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	06/17/20 14:22	EPA 8260D	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	06/17/20 14:22	EPA 8260D	
<b>1,1-Dichloroethane</b>	<b>0.820</b>	---	0.400	ug/L	1	06/17/20 14:22	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	06/17/20 14:22	EPA 8260D	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	06/17/20 14:22	EPA 8260D	
<b>cis-1,2-Dichloroethene</b>	<b>16.5</b>	---	0.400	ug/L	1	06/17/20 14:22	EPA 8260D	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	06/17/20 14:22	EPA 8260D	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	06/17/20 14:22	EPA 8260D	
1,3-Dichloropropane	ND	---	2.00	ug/L	1	06/17/20 14:22	EPA 8260D	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	06/17/20 14:22	EPA 8260D	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	06/17/20 14:22	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/17/20 14:22	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/17/20 14:22	EPA 8260D	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	06/17/20 14:22	EPA 8260D	
Methylene chloride	ND	---	10.0	ug/L	1	06/17/20 14:22	EPA 8260D	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0455 - 06 30 20 1418</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
			<b>Matrix: Water</b>			<b>Batch: 0060574</b>		
<b>MGMS2-60 (A0F0455-05)</b>								
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	06/17/20 14:22	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	06/17/20 14:22	EPA 8260D	
<b>Tetrachloroethene (PCE)</b>	<b>23.7</b>	---	0.400	ug/L	1	06/17/20 14:22	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	06/17/20 14:22	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	06/17/20 14:22	EPA 8260D	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	06/17/20 14:22	EPA 8260D	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	06/17/20 14:22	EPA 8260D	
<b>Trichloroethene (TCE)</b>	<b>10.4</b>	---	0.400	ug/L	1	06/17/20 14:22	EPA 8260D	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	06/17/20 14:22	EPA 8260D	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	06/17/20 14:22	EPA 8260D	
<b>Vinyl chloride</b>	<b>0.850</b>	---	0.400	ug/L	1	06/17/20 14:22	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 114 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>06/17/20 14:22</i>	<i>EPA 8260D</i>
<i>Toluene-d8 (Surr)</i>		<i>96 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/17/20 14:22</i>	<i>EPA 8260D</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>103 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/17/20 14:22</i>	<i>EPA 8260D</i>

			<b>Matrix: Water</b>			<b>Batch: 0060574</b>		
<b>MGMS2-110 (A0F0455-06)</b>								
Bromobenzene	ND	---	0.500	ug/L	1	06/17/20 10:17	EPA 8260D	
Bromochloromethane	ND	---	1.00	ug/L	1	06/17/20 10:17	EPA 8260D	
Bromodichloromethane	ND	---	1.00	ug/L	1	06/17/20 10:17	EPA 8260D	
Bromoform	ND	---	1.00	ug/L	1	06/17/20 10:17	EPA 8260D	
Bromomethane	ND	---	5.00	ug/L	1	06/17/20 10:17	EPA 8260D	
Carbon tetrachloride	ND	---	1.00	ug/L	1	06/17/20 10:17	EPA 8260D	
Chlorobenzene	ND	---	0.500	ug/L	1	06/17/20 10:17	EPA 8260D	
Chloroethane	ND	---	5.00	ug/L	1	06/17/20 10:17	EPA 8260D	
Chloroform	ND	---	1.00	ug/L	1	06/17/20 10:17	EPA 8260D	
Chloromethane	ND	---	5.00	ug/L	1	06/17/20 10:17	EPA 8260D	
2-Chlorotoluene	ND	---	1.00	ug/L	1	06/17/20 10:17	EPA 8260D	
4-Chlorotoluene	ND	---	1.00	ug/L	1	06/17/20 10:17	EPA 8260D	
Dibromochloromethane	ND	---	1.00	ug/L	1	06/17/20 10:17	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	06/17/20 10:17	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	06/17/20 10:17	EPA 8260D	
Dibromomethane	ND	---	1.00	ug/L	1	06/17/20 10:17	EPA 8260D	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	06/17/20 10:17	EPA 8260D	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	06/17/20 10:17	EPA 8260D	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	06/17/20 10:17	EPA 8260D	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	06/17/20 10:17	EPA 8260D	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	06/17/20 10:17	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	06/17/20 10:17	EPA 8260D	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0455 - 06 30 20 1418</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MGMS2-110 (A0F0455-06)</b>				<b>Matrix: Water</b>		<b>Batch: 0060574</b>		
1,1-Dichloroethene	ND	---	0.400	ug/L	1	06/17/20 10:17	EPA 8260D	
<b>cis-1,2-Dichloroethene</b>	<b>2.91</b>	---	0.400	ug/L	1	06/17/20 10:17	EPA 8260D	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	06/17/20 10:17	EPA 8260D	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	06/17/20 10:17	EPA 8260D	
1,3-Dichloropropane	ND	---	2.00	ug/L	1	06/17/20 10:17	EPA 8260D	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	06/17/20 10:17	EPA 8260D	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	06/17/20 10:17	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/17/20 10:17	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/17/20 10:17	EPA 8260D	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	06/17/20 10:17	EPA 8260D	
Methylene chloride	ND	---	10.0	ug/L	1	06/17/20 10:17	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	06/17/20 10:17	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	06/17/20 10:17	EPA 8260D	
<b>Tetrachloroethene (PCE)</b>	<b>4.19</b>	---	0.400	ug/L	1	06/17/20 10:17	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	06/17/20 10:17	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	06/17/20 10:17	EPA 8260D	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	06/17/20 10:17	EPA 8260D	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	06/17/20 10:17	EPA 8260D	
<b>Trichloroethene (TCE)</b>	<b>2.50</b>	---	0.400	ug/L	1	06/17/20 10:17	EPA 8260D	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	06/17/20 10:17	EPA 8260D	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	06/17/20 10:17	EPA 8260D	
<b>Vinyl chloride</b>	<b>1.17</b>	---	0.400	ug/L	1	06/17/20 10:17	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 114 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>06/17/20 10:17</i>	<i>EPA 8260D</i>
<i>Toluene-d8 (Surr)</i>		<i>97 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/17/20 10:17</i>	<i>EPA 8260D</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>103 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/17/20 10:17</i>	<i>EPA 8260D</i>

<b>MGMS2-132 (A0F0455-07)</b>				<b>Matrix: Water</b>		<b>Batch: 0060574</b>		
Bromobenzene	ND	---	0.500	ug/L	1	06/17/20 13:00	EPA 8260D	
Bromochloromethane	ND	---	1.00	ug/L	1	06/17/20 13:00	EPA 8260D	
Bromodichloromethane	ND	---	1.00	ug/L	1	06/17/20 13:00	EPA 8260D	
Bromoform	ND	---	1.00	ug/L	1	06/17/20 13:00	EPA 8260D	
Bromomethane	ND	---	5.00	ug/L	1	06/17/20 13:00	EPA 8260D	
Carbon tetrachloride	ND	---	1.00	ug/L	1	06/17/20 13:00	EPA 8260D	
Chlorobenzene	ND	---	0.500	ug/L	1	06/17/20 13:00	EPA 8260D	
Chloroethane	ND	---	5.00	ug/L	1	06/17/20 13:00	EPA 8260D	
Chloroform	ND	---	1.00	ug/L	1	06/17/20 13:00	EPA 8260D	
Chloromethane	ND	---	5.00	ug/L	1	06/17/20 13:00	EPA 8260D	
2-Chlorotoluene	ND	---	1.00	ug/L	1	06/17/20 13:00	EPA 8260D	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0455 - 06 30 20 1418</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MGMS2-132 (A0F0455-07)</b>				<b>Matrix: Water</b>		<b>Batch: 0060574</b>		
4-Chlorotoluene	ND	---	1.00	ug/L	1	06/17/20 13:00	EPA 8260D	
Dibromochloromethane	ND	---	1.00	ug/L	1	06/17/20 13:00	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	06/17/20 13:00	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	06/17/20 13:00	EPA 8260D	
Dibromomethane	ND	---	1.00	ug/L	1	06/17/20 13:00	EPA 8260D	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	06/17/20 13:00	EPA 8260D	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	06/17/20 13:00	EPA 8260D	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	06/17/20 13:00	EPA 8260D	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	06/17/20 13:00	EPA 8260D	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	06/17/20 13:00	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	06/17/20 13:00	EPA 8260D	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	06/17/20 13:00	EPA 8260D	
<b>cis-1,2-Dichloroethene</b>	<b>4.37</b>	---	0.400	ug/L	1	06/17/20 13:00	EPA 8260D	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	06/17/20 13:00	EPA 8260D	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	06/17/20 13:00	EPA 8260D	
1,3-Dichloropropane	ND	---	2.00	ug/L	1	06/17/20 13:00	EPA 8260D	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	06/17/20 13:00	EPA 8260D	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	06/17/20 13:00	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/17/20 13:00	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/17/20 13:00	EPA 8260D	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	06/17/20 13:00	EPA 8260D	
Methylene chloride	ND	---	10.0	ug/L	1	06/17/20 13:00	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	06/17/20 13:00	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	06/17/20 13:00	EPA 8260D	
<b>Tetrachloroethene (PCE)</b>	<b>3.79</b>	---	0.400	ug/L	1	06/17/20 13:00	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	06/17/20 13:00	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	06/17/20 13:00	EPA 8260D	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	06/17/20 13:00	EPA 8260D	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	06/17/20 13:00	EPA 8260D	
<b>Trichloroethene (TCE)</b>	<b>2.50</b>	---	0.400	ug/L	1	06/17/20 13:00	EPA 8260D	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	06/17/20 13:00	EPA 8260D	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	06/17/20 13:00	EPA 8260D	
<b>Vinyl chloride</b>	<b>1.99</b>	---	0.400	ug/L	1	06/17/20 13:00	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 114 %</i>		<i>Limits: 80-120 %</i>	<i>1</i>	<i>06/17/20 13:00</i>	<i>EPA 8260D</i>	
<i>Toluene-d8 (Surr)</i>		<i>96 %</i>		<i>80-120 %</i>	<i>1</i>	<i>06/17/20 13:00</i>	<i>EPA 8260D</i>	
<i>4-Bromofluorobenzene (Surr)</i>		<i>101 %</i>		<i>80-120 %</i>	<i>1</i>	<i>06/17/20 13:00</i>	<i>EPA 8260D</i>	

<b>MGMS3-40 (A0F0455-08RE1)</b>	<b>Matrix: Water</b>	<b>Batch: 0060574</b>
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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0455 - 06 30 20 1418</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MGMS3-40 (A0F0455-08RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0060574</b>		
Bromobenzene	ND	---	0.500	ug/L	1	06/17/20 19:22	EPA 8260D	
Bromochloromethane	ND	---	1.00	ug/L	1	06/17/20 19:22	EPA 8260D	
Bromodichloromethane	ND	---	1.00	ug/L	1	06/17/20 19:22	EPA 8260D	
Bromoform	ND	---	1.00	ug/L	1	06/17/20 19:22	EPA 8260D	
Bromomethane	ND	---	5.00	ug/L	1	06/17/20 19:22	EPA 8260D	
Carbon tetrachloride	ND	---	1.00	ug/L	1	06/17/20 19:22	EPA 8260D	
Chlorobenzene	ND	---	0.500	ug/L	1	06/17/20 19:22	EPA 8260D	
Chloroethane	ND	---	5.00	ug/L	1	06/17/20 19:22	EPA 8260D	
Chloroform	ND	---	1.00	ug/L	1	06/17/20 19:22	EPA 8260D	
Chloromethane	ND	---	5.00	ug/L	1	06/17/20 19:22	EPA 8260D	
2-Chlorotoluene	ND	---	1.00	ug/L	1	06/17/20 19:22	EPA 8260D	
4-Chlorotoluene	ND	---	1.00	ug/L	1	06/17/20 19:22	EPA 8260D	
Dibromochloromethane	ND	---	1.00	ug/L	1	06/17/20 19:22	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	06/17/20 19:22	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	06/17/20 19:22	EPA 8260D	
Dibromomethane	ND	---	1.00	ug/L	1	06/17/20 19:22	EPA 8260D	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	06/17/20 19:22	EPA 8260D	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	06/17/20 19:22	EPA 8260D	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	06/17/20 19:22	EPA 8260D	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	06/17/20 19:22	EPA 8260D	
<b>1,1-Dichloroethane</b>	<b>3.54</b>	---	0.400	ug/L	1	06/17/20 19:22	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	06/17/20 19:22	EPA 8260D	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	06/17/20 19:22	EPA 8260D	
<b>cis-1,2-Dichloroethene</b>	<b>135</b>	---	0.400	ug/L	1	06/17/20 19:22	EPA 8260D	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	06/17/20 19:22	EPA 8260D	
<b>1,2-Dichloropropane</b>	<b>0.670</b>	---	0.500	ug/L	1	06/17/20 19:22	EPA 8260D	
1,3-Dichloropropane	ND	---	2.00	ug/L	1	06/17/20 19:22	EPA 8260D	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	06/17/20 19:22	EPA 8260D	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	06/17/20 19:22	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/17/20 19:22	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/17/20 19:22	EPA 8260D	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	06/17/20 19:22	EPA 8260D	
Methylene chloride	ND	---	10.0	ug/L	1	06/17/20 19:22	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	06/17/20 19:22	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	06/17/20 19:22	EPA 8260D	
<b>Tetrachloroethene (PCE)</b>	<b>0.660</b>	---	0.400	ug/L	1	06/17/20 19:22	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	06/17/20 19:22	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	06/17/20 19:22	EPA 8260D	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	06/17/20 19:22	EPA 8260D	

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Lisa Domenighini, Client Services Manager





<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0455 - 06 30 20 1418</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MGMS3-40 (A0F0455-08RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0060574</b>		
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	06/17/20 19:22	EPA 8260D	
Trichloroethene (TCE)	ND	---	0.400	ug/L	1	06/17/20 19:22	EPA 8260D	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	06/17/20 19:22	EPA 8260D	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	06/17/20 19:22	EPA 8260D	
<b>Vinyl chloride</b>	<b>129</b>	---	0.400	ug/L	1	06/17/20 19:22	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 108 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>06/17/20 19:22</i>	<i>EPA 8260D</i>
<i>Toluene-d8 (Surr)</i>		<i>96 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/17/20 19:22</i>	<i>EPA 8260D</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>101 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/17/20 19:22</i>	<i>EPA 8260D</i>

<b>MGMS3-40 Dup (A0F0455-09RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0060574</b>		
Bromobenzene	ND	---	0.500	ug/L	1	06/17/20 19:49	EPA 8260D	
Bromochloromethane	ND	---	1.00	ug/L	1	06/17/20 19:49	EPA 8260D	
Bromodichloromethane	ND	---	1.00	ug/L	1	06/17/20 19:49	EPA 8260D	
Bromoform	ND	---	1.00	ug/L	1	06/17/20 19:49	EPA 8260D	
Bromomethane	ND	---	5.00	ug/L	1	06/17/20 19:49	EPA 8260D	
Carbon tetrachloride	ND	---	1.00	ug/L	1	06/17/20 19:49	EPA 8260D	
Chlorobenzene	ND	---	0.500	ug/L	1	06/17/20 19:49	EPA 8260D	
Chloroethane	ND	---	5.00	ug/L	1	06/17/20 19:49	EPA 8260D	
Chloroform	ND	---	1.00	ug/L	1	06/17/20 19:49	EPA 8260D	
Chloromethane	ND	---	5.00	ug/L	1	06/17/20 19:49	EPA 8260D	
2-Chlorotoluene	ND	---	1.00	ug/L	1	06/17/20 19:49	EPA 8260D	
4-Chlorotoluene	ND	---	1.00	ug/L	1	06/17/20 19:49	EPA 8260D	
Dibromochloromethane	ND	---	1.00	ug/L	1	06/17/20 19:49	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	06/17/20 19:49	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	06/17/20 19:49	EPA 8260D	
Dibromomethane	ND	---	1.00	ug/L	1	06/17/20 19:49	EPA 8260D	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	06/17/20 19:49	EPA 8260D	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	06/17/20 19:49	EPA 8260D	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	06/17/20 19:49	EPA 8260D	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	06/17/20 19:49	EPA 8260D	
<b>1,1-Dichloroethane</b>	<b>3.71</b>	---	0.400	ug/L	1	06/17/20 19:49	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	06/17/20 19:49	EPA 8260D	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	06/17/20 19:49	EPA 8260D	
<b>cis-1,2-Dichloroethene</b>	<b>138</b>	---	0.400	ug/L	1	06/17/20 19:49	EPA 8260D	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	06/17/20 19:49	EPA 8260D	
<b>1,2-Dichloropropane</b>	<b>0.700</b>	---	0.500	ug/L	1	06/17/20 19:49	EPA 8260D	
1,3-Dichloropropane	ND	---	2.00	ug/L	1	06/17/20 19:49	EPA 8260D	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	06/17/20 19:49	EPA 8260D	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0455 - 06 30 20 1418</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MGMS3-40 Dup (A0F0455-09RE1)</b>			<b>Matrix: Water</b>			<b>Batch: 0060574</b>		
1,1-Dichloropropene	ND	---	1.00	ug/L	1	06/17/20 19:49	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/17/20 19:49	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/17/20 19:49	EPA 8260D	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	06/17/20 19:49	EPA 8260D	
Methylene chloride	ND	---	10.0	ug/L	1	06/17/20 19:49	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	06/17/20 19:49	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	06/17/20 19:49	EPA 8260D	
<b>Tetrachloroethene (PCE)</b>	<b>0.600</b>	---	0.400	ug/L	1	06/17/20 19:49	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	06/17/20 19:49	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	06/17/20 19:49	EPA 8260D	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	06/17/20 19:49	EPA 8260D	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	06/17/20 19:49	EPA 8260D	
Trichloroethene (TCE)	ND	---	0.400	ug/L	1	06/17/20 19:49	EPA 8260D	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	06/17/20 19:49	EPA 8260D	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	06/17/20 19:49	EPA 8260D	
<b>Vinyl chloride</b>	<b>134</b>	---	0.400	ug/L	1	06/17/20 19:49	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 108 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>06/17/20 19:49</i>	<i>EPA 8260D</i>
<i>Toluene-d8 (Surr)</i>		<i>97 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/17/20 19:49</i>	<i>EPA 8260D</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>103 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/17/20 19:49</i>	<i>EPA 8260D</i>

<b>MGMS3-60 (A0F0455-10)</b>			<b>Matrix: Water</b>			<b>Batch: 0060574</b>		
Bromobenzene	ND	---	0.500	ug/L	1	06/17/20 13:28	EPA 8260D	
Bromochloromethane	ND	---	1.00	ug/L	1	06/17/20 13:28	EPA 8260D	
Bromodichloromethane	ND	---	1.00	ug/L	1	06/17/20 13:28	EPA 8260D	
Bromoform	ND	---	1.00	ug/L	1	06/17/20 13:28	EPA 8260D	
Bromomethane	ND	---	5.00	ug/L	1	06/17/20 13:28	EPA 8260D	
Carbon tetrachloride	ND	---	1.00	ug/L	1	06/17/20 13:28	EPA 8260D	
Chlorobenzene	ND	---	0.500	ug/L	1	06/17/20 13:28	EPA 8260D	
Chloroethane	ND	---	5.00	ug/L	1	06/17/20 13:28	EPA 8260D	
Chloroform	ND	---	1.00	ug/L	1	06/17/20 13:28	EPA 8260D	
Chloromethane	ND	---	5.00	ug/L	1	06/17/20 13:28	EPA 8260D	
2-Chlorotoluene	ND	---	1.00	ug/L	1	06/17/20 13:28	EPA 8260D	
4-Chlorotoluene	ND	---	1.00	ug/L	1	06/17/20 13:28	EPA 8260D	
Dibromochloromethane	ND	---	1.00	ug/L	1	06/17/20 13:28	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	06/17/20 13:28	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	06/17/20 13:28	EPA 8260D	
Dibromomethane	ND	---	1.00	ug/L	1	06/17/20 13:28	EPA 8260D	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	06/17/20 13:28	EPA 8260D	

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<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0455 - 06 30 20 1418</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MGMS3-60 (A0F0455-10)</b>				<b>Matrix: Water</b>		<b>Batch: 0060574</b>		
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	06/17/20 13:28	EPA 8260D	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	06/17/20 13:28	EPA 8260D	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	06/17/20 13:28	EPA 8260D	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	06/17/20 13:28	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	06/17/20 13:28	EPA 8260D	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	06/17/20 13:28	EPA 8260D	
<b>cis-1,2-Dichloroethene</b>	<b>3.92</b>	---	0.400	ug/L	1	06/17/20 13:28	EPA 8260D	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	06/17/20 13:28	EPA 8260D	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	06/17/20 13:28	EPA 8260D	
1,3-Dichloropropane	ND	---	2.00	ug/L	1	06/17/20 13:28	EPA 8260D	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	06/17/20 13:28	EPA 8260D	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	06/17/20 13:28	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/17/20 13:28	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/17/20 13:28	EPA 8260D	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	06/17/20 13:28	EPA 8260D	
Methylene chloride	ND	---	10.0	ug/L	1	06/17/20 13:28	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	06/17/20 13:28	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	06/17/20 13:28	EPA 8260D	
<b>Tetrachloroethene (PCE)</b>	<b>1.17</b>	---	0.400	ug/L	1	06/17/20 13:28	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	06/17/20 13:28	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	06/17/20 13:28	EPA 8260D	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	06/17/20 13:28	EPA 8260D	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	06/17/20 13:28	EPA 8260D	
<b>Trichloroethene (TCE)</b>	<b>0.510</b>	---	0.400	ug/L	1	06/17/20 13:28	EPA 8260D	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	06/17/20 13:28	EPA 8260D	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	06/17/20 13:28	EPA 8260D	
Vinyl chloride	ND	---	0.400	ug/L	1	06/17/20 13:28	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 116 %</i>		<i>Limits: 80-120 %</i>	<i>1</i>	<i>06/17/20 13:28</i>	<i>EPA 8260D</i>	
<i>Toluene-d8 (Surr)</i>		<i>97 %</i>		<i>80-120 %</i>	<i>1</i>	<i>06/17/20 13:28</i>	<i>EPA 8260D</i>	
<i>4-Bromofluorobenzene (Surr)</i>		<i>104 %</i>		<i>80-120 %</i>	<i>1</i>	<i>06/17/20 13:28</i>	<i>EPA 8260D</i>	

<b>MGMS3-110 (A0F0455-11)</b>				<b>Matrix: Water</b>		<b>Batch: 0060574</b>		
Bromobenzene	ND	---	0.500	ug/L	1	06/17/20 11:39	EPA 8260D	
Bromochloromethane	ND	---	1.00	ug/L	1	06/17/20 11:39	EPA 8260D	
Bromodichloromethane	ND	---	1.00	ug/L	1	06/17/20 11:39	EPA 8260D	
Bromoform	ND	---	1.00	ug/L	1	06/17/20 11:39	EPA 8260D	
Bromomethane	ND	---	5.00	ug/L	1	06/17/20 11:39	EPA 8260D	
Carbon tetrachloride	ND	---	1.00	ug/L	1	06/17/20 11:39	EPA 8260D	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0455 - 06 30 20 1418</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MGMS3-110 (A0F0455-11)</b>				<b>Matrix: Water</b>		<b>Batch: 0060574</b>		
Chlorobenzene	ND	---	0.500	ug/L	1	06/17/20 11:39	EPA 8260D	
Chloroethane	ND	---	5.00	ug/L	1	06/17/20 11:39	EPA 8260D	
Chloroform	ND	---	1.00	ug/L	1	06/17/20 11:39	EPA 8260D	
Chloromethane	ND	---	5.00	ug/L	1	06/17/20 11:39	EPA 8260D	
2-Chlorotoluene	ND	---	1.00	ug/L	1	06/17/20 11:39	EPA 8260D	
4-Chlorotoluene	ND	---	1.00	ug/L	1	06/17/20 11:39	EPA 8260D	
Dibromochloromethane	ND	---	1.00	ug/L	1	06/17/20 11:39	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	06/17/20 11:39	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	06/17/20 11:39	EPA 8260D	
Dibromomethane	ND	---	1.00	ug/L	1	06/17/20 11:39	EPA 8260D	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	06/17/20 11:39	EPA 8260D	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	06/17/20 11:39	EPA 8260D	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	06/17/20 11:39	EPA 8260D	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	06/17/20 11:39	EPA 8260D	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	06/17/20 11:39	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	06/17/20 11:39	EPA 8260D	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	06/17/20 11:39	EPA 8260D	
<b>cis-1,2-Dichloroethene</b>	<b>1.00</b>	---	0.400	ug/L	1	06/17/20 11:39	EPA 8260D	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	06/17/20 11:39	EPA 8260D	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	06/17/20 11:39	EPA 8260D	
1,3-Dichloropropane	ND	---	2.00	ug/L	1	06/17/20 11:39	EPA 8260D	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	06/17/20 11:39	EPA 8260D	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	06/17/20 11:39	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/17/20 11:39	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/17/20 11:39	EPA 8260D	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	06/17/20 11:39	EPA 8260D	
Methylene chloride	ND	---	10.0	ug/L	1	06/17/20 11:39	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	06/17/20 11:39	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	06/17/20 11:39	EPA 8260D	
<b>Tetrachloroethene (PCE)</b>	<b>3.01</b>	---	0.400	ug/L	1	06/17/20 11:39	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	06/17/20 11:39	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	06/17/20 11:39	EPA 8260D	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	06/17/20 11:39	EPA 8260D	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	06/17/20 11:39	EPA 8260D	
<b>Trichloroethene (TCE)</b>	<b>1.33</b>	---	0.400	ug/L	1	06/17/20 11:39	EPA 8260D	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	06/17/20 11:39	EPA 8260D	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	06/17/20 11:39	EPA 8260D	
Vinyl chloride	ND	---	0.400	ug/L	1	06/17/20 11:39	EPA 8260D	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0455 - 06 30 20 1418</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MGMS3-110 (A0F0455-11)</b>				<b>Matrix: Water</b>		<b>Batch: 0060574</b>		
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>			Recovery: 114 %	Limits: 80-120 %	1	06/17/20 11:39	EPA 8260D	
<i>Toluene-d8 (Surr)</i>			96 %	80-120 %	1	06/17/20 11:39	EPA 8260D	
<i>4-Bromofluorobenzene (Surr)</i>			104 %	80-120 %	1	06/17/20 11:39	EPA 8260D	

<b>MGMS3-132 (A0F0455-12)</b>				<b>Matrix: Water</b>		<b>Batch: 0060574</b>		
Bromobenzene	ND	---	0.500	ug/L	1	06/17/20 12:33	EPA 8260D	
Bromochloromethane	ND	---	1.00	ug/L	1	06/17/20 12:33	EPA 8260D	
Bromodichloromethane	ND	---	1.00	ug/L	1	06/17/20 12:33	EPA 8260D	
Bromoform	ND	---	1.00	ug/L	1	06/17/20 12:33	EPA 8260D	
Bromomethane	ND	---	5.00	ug/L	1	06/17/20 12:33	EPA 8260D	
Carbon tetrachloride	ND	---	1.00	ug/L	1	06/17/20 12:33	EPA 8260D	
Chlorobenzene	ND	---	0.500	ug/L	1	06/17/20 12:33	EPA 8260D	
Chloroethane	ND	---	5.00	ug/L	1	06/17/20 12:33	EPA 8260D	
Chloroform	ND	---	1.00	ug/L	1	06/17/20 12:33	EPA 8260D	
Chloromethane	ND	---	5.00	ug/L	1	06/17/20 12:33	EPA 8260D	
2-Chlorotoluene	ND	---	1.00	ug/L	1	06/17/20 12:33	EPA 8260D	
4-Chlorotoluene	ND	---	1.00	ug/L	1	06/17/20 12:33	EPA 8260D	
Dibromochloromethane	ND	---	1.00	ug/L	1	06/17/20 12:33	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	06/17/20 12:33	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	06/17/20 12:33	EPA 8260D	
Dibromomethane	ND	---	1.00	ug/L	1	06/17/20 12:33	EPA 8260D	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	06/17/20 12:33	EPA 8260D	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	06/17/20 12:33	EPA 8260D	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	06/17/20 12:33	EPA 8260D	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	06/17/20 12:33	EPA 8260D	
<b>1,1-Dichloroethane</b>	<b>0.430</b>	---	0.400	ug/L	1	06/17/20 12:33	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	06/17/20 12:33	EPA 8260D	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	06/17/20 12:33	EPA 8260D	
<b>cis-1,2-Dichloroethene</b>	<b>4.61</b>	---	0.400	ug/L	1	06/17/20 12:33	EPA 8260D	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	06/17/20 12:33	EPA 8260D	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	06/17/20 12:33	EPA 8260D	
1,3-Dichloropropane	ND	---	2.00	ug/L	1	06/17/20 12:33	EPA 8260D	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	06/17/20 12:33	EPA 8260D	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	06/17/20 12:33	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/17/20 12:33	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/17/20 12:33	EPA 8260D	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	06/17/20 12:33	EPA 8260D	
Methylene chloride	ND	---	10.0	ug/L	1	06/17/20 12:33	EPA 8260D	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0455 - 06 30 20 1418</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MGMS3-132 (A0F0455-12)</b>				<b>Matrix: Water</b>		<b>Batch: 0060574</b>		
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	06/17/20 12:33	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	06/17/20 12:33	EPA 8260D	
<b>Tetrachloroethene (PCE)</b>	<b>9.87</b>	---	0.400	ug/L	1	06/17/20 12:33	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	06/17/20 12:33	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	06/17/20 12:33	EPA 8260D	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	06/17/20 12:33	EPA 8260D	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	06/17/20 12:33	EPA 8260D	
<b>Trichloroethene (TCE)</b>	<b>6.01</b>	---	0.400	ug/L	1	06/17/20 12:33	EPA 8260D	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	06/17/20 12:33	EPA 8260D	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	06/17/20 12:33	EPA 8260D	
Vinyl chloride	ND	---	0.400	ug/L	1	06/17/20 12:33	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 117 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>06/17/20 12:33</i>	<i>EPA 8260D</i>
<i>Toluene-d8 (Surr)</i>		<i>96 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/17/20 12:33</i>	<i>EPA 8260D</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>105 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/17/20 12:33</i>	<i>EPA 8260D</i>



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**ANALYTICAL SAMPLE RESULTS**

**Ammonia by Gas Diffusion and Colorimetric Detection**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MGMS1-43 (A0F0455-01)</b>				<b>Matrix: Water</b>		<b>Batch: 0060606</b>		
Ammonia as N	157	---	2.00	mg/L	100	06/17/20 14:53	SM 4500-NH3 G	
<b>MGMS1-60 (A0F0455-02)</b>				<b>Matrix: Water</b>		<b>Batch: 0060606</b>		
Ammonia as N	ND	---	0.0200	mg/L	1	06/17/20 14:55	SM 4500-NH3 G	
<b>MGMS1-110 (A0F0455-03)</b>				<b>Matrix: Water</b>		<b>Batch: 0060606</b>		
Ammonia as N	0.211	---	0.0200	mg/L	1	06/17/20 14:56	SM 4500-NH3 G	
<b>MGMS2-40 (A0F0455-04)</b>				<b>Matrix: Water</b>		<b>Batch: 0060606</b>		
Ammonia as N	75.8	---	0.400	mg/L	20	06/17/20 14:58	SM 4500-NH3 G	
<b>MGMS2-60 (A0F0455-05)</b>				<b>Matrix: Water</b>		<b>Batch: 0060606</b>		
Ammonia as N	0.0200	---	0.0200	mg/L	1	06/17/20 14:59	SM 4500-NH3 G	
<b>MGMS2-110 (A0F0455-06)</b>				<b>Matrix: Water</b>		<b>Batch: 0060606</b>		
Ammonia as N	ND	---	0.0200	mg/L	1	06/17/20 15:01	SM 4500-NH3 G	
<b>MGMS2-132 (A0F0455-07)</b>				<b>Matrix: Water</b>		<b>Batch: 0060606</b>		
Ammonia as N	ND	---	0.0200	mg/L	1	06/17/20 15:02	SM 4500-NH3 G	
<b>MGMS3-40 (A0F0455-08)</b>				<b>Matrix: Water</b>		<b>Batch: 0060606</b>		
Ammonia as N	0.784	---	0.0200	mg/L	1	06/17/20 15:04	SM 4500-NH3 G	
<b>MGMS3-40 Dup (A0F0455-09)</b>				<b>Matrix: Water</b>		<b>Batch: 0060606</b>		
Ammonia as N	0.789	---	0.0200	mg/L	1	06/17/20 15:05	SM 4500-NH3 G	
<b>MGMS3-60 (A0F0455-10)</b>				<b>Matrix: Water</b>		<b>Batch: 0060606</b>		
Ammonia as N	ND	---	0.0200	mg/L	1	06/17/20 15:14	SM 4500-NH3 G	
<b>MGMS3-110 (A0F0455-11)</b>				<b>Matrix: Water</b>		<b>Batch: 0060606</b>		
Ammonia as N	ND	---	0.0200	mg/L	1	06/17/20 15:16	SM 4500-NH3 G	
<b>MGMS3-132 (A0F0455-12)</b>				<b>Matrix: Water</b>		<b>Batch: 0060606</b>		
Ammonia as N	ND	---	0.0200	mg/L	1	06/17/20 15:17	SM 4500-NH3 G	

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**ANALYTICAL SAMPLE RESULTS**

**Anions by Ion Chromatography**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MGMS1-43 (A0F0455-01) Matrix: Water</b>								
Batch: 0060589								
Nitrate-Nitrogen	ND	---	0.250	mg/L	1	06/17/20 12:31	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/17/20 12:31	EPA 300.0	
<b>MGMS1-60 (A0F0455-02) Matrix: Water</b>								
Batch: 0060589								
Nitrate-Nitrogen	<b>0.375</b>	---	0.250	mg/L	1	06/17/20 12:52	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/17/20 12:52	EPA 300.0	
<b>MGMS1-110 (A0F0455-03) Matrix: Water</b>								
Batch: 0060589								
Nitrate-Nitrogen	<b>0.856</b>	---	0.250	mg/L	1	06/17/20 13:57	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/17/20 13:57	EPA 300.0	
<b>MGMS2-40 (A0F0455-04) Matrix: Water</b>								
Batch: 0060589								
Nitrate-Nitrogen	<b>6.57</b>	---	0.250	mg/L	1	06/17/20 14:19	EPA 300.0	
Nitrite-Nitrogen	<b>0.414</b>	---	0.250	mg/L	1	06/17/20 14:19	EPA 300.0	
<b>MGMS2-60 (A0F0455-05) Matrix: Water</b>								
Batch: 0060589								
Nitrate-Nitrogen	<b>0.519</b>	---	0.250	mg/L	1	06/17/20 14:40	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/17/20 14:40	EPA 300.0	
<b>MGMS2-110 (A0F0455-06) Matrix: Water</b>								
Batch: 0060589								
Nitrate-Nitrogen	<b>0.317</b>	---	0.250	mg/L	1	06/17/20 16:28	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/17/20 16:28	EPA 300.0	
<b>MGMS2-132 (A0F0455-07) Matrix: Water</b>								
Batch: 0060589								
Nitrate-Nitrogen	ND	---	0.250	mg/L	1	06/17/20 16:49	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/17/20 16:49	EPA 300.0	
<b>MGMS3-40 (A0F0455-08) Matrix: Water</b>								
Batch: 0060589								

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<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0455 - 06 30 20 1418</b>
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**ANALYTICAL SAMPLE RESULTS**

**Anions by Ion Chromatography**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MGMS3-40 (A0F0455-08)</b>				<b>Matrix: Water</b>				
Nitrate-Nitrogen	ND	---	0.250	mg/L	1	06/17/20 17:11	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/17/20 17:11	EPA 300.0	
<b>MGMS3-40 Dup (A0F0455-09)</b>				<b>Matrix: Water</b>				
Batch: 0060589								
Nitrate-Nitrogen	ND	---	0.250	mg/L	1	06/17/20 17:33	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/17/20 17:33	EPA 300.0	
<b>MGMS3-60 (A0F0455-10)</b>				<b>Matrix: Water</b>				
Batch: 0060589								
<b>Nitrate-Nitrogen</b>	<b>0.262</b>	---	0.250	mg/L	1	06/17/20 17:54	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/17/20 17:54	EPA 300.0	
<b>MGMS3-110 (A0F0455-11)</b>				<b>Matrix: Water</b>				
Batch: 0060589								
<b>Nitrate-Nitrogen</b>	<b>0.370</b>	---	0.250	mg/L	1	06/17/20 18:16	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/17/20 18:16	EPA 300.0	
<b>MGMS3-132 (A0F0455-12)</b>				<b>Matrix: Water</b>				
Batch: 0060589								
<b>Nitrate-Nitrogen</b>	<b>0.591</b>	---	0.250	mg/L	1	06/17/20 18:37	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/17/20 18:37	EPA 300.0	



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**ANALYTICAL SAMPLE RESULTS**

**Total Organic Carbon (Non-Purgeable) by Persulfate Oxidation by Standard Method 5310C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MGMS1-43 (A0F0455-01)</b>				<b>Matrix: Water</b>		<b>Batch: 0060583</b>		
Total Organic Carbon	6.56	---	1.00	mg/L	1	06/17/20 14:02	SM 5310 C	
<b>MGMS2-40 (A0F0455-04)</b>				<b>Matrix: Water</b>		<b>Batch: 0060583</b>		
Total Organic Carbon	4.13	---	1.00	mg/L	1	06/17/20 15:39	SM 5310 C	
<b>MGMS3-40 (A0F0455-08)</b>				<b>Matrix: Water</b>		<b>Batch: 0060583</b>		
Total Organic Carbon	3.08	---	1.00	mg/L	1	06/17/20 16:12	SM 5310 C	
<b>MGMS3-40 Dup (A0F0455-09)</b>				<b>Matrix: Water</b>		<b>Batch: 0060583</b>		
Total Organic Carbon	3.06	---	1.00	mg/L	1	06/17/20 16:45	SM 5310 C	

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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0060574 - EPA 5030B</b>						<b>Water</b>						
<b>Blank (0060574-BLK1)</b>		Prepared: 06/17/20 07:30 Analyzed: 06/17/20 09:50										
<b>EPA 8260D</b>												
Bromobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Bromochloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Bromodichloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Bromoform	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Bromomethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
Carbon tetrachloride	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Chlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Chloroethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
Chloroform	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Chloromethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
2-Chlorotoluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
4-Chlorotoluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Dibromochloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Dibromomethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
1,1-Dichloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
1,1-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
cis-1,2-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
1,2-Dichloropropane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
1,3-Dichloropropane	ND	---	2.00	ug/L	1	---	---	---	---	---	---	---
2,2-Dichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
1,1-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Hexachlorobutadiene	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
Methylene chloride	ND	---	10.0	ug/L	1	---	---	---	---	---	---	---

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<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0F0455 - 06 30 20 1418
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0060574 - EPA 5030B</b>												
<b>Water</b>												
<b>Blank (0060574-BLK1)</b>	Prepared: 06/17/20 07:30 Analyzed: 06/17/20 09:50											
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Tetrachloroethene (PCE)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Trichloroethene (TCE)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Vinyl chloride	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>			<i>Recovery: 113 %</i>			<i>Limits: 80-120 %</i>			<i>Dilution: 1x</i>			
<i>Toluene-d8 (Surr)</i>			<i>97 %</i>			<i>80-120 %</i>			<i>"</i>			
<i>4-Bromofluorobenzene (Surr)</i>			<i>103 %</i>			<i>80-120 %</i>			<i>"</i>			

<b>LCS (0060574-BS2)</b>												
Prepared: 06/17/20 07:30 Analyzed: 06/17/20 08:56												
<b>EPA 8260D</b>												
Bromobenzene	19.7	---	0.500	ug/L	1	20.0	---	98	80 - 120%	---	---	
Bromochloromethane	17.0	---	1.00	ug/L	1	20.0	---	85	80 - 120%	---	---	
Bromodichloromethane	21.7	---	1.00	ug/L	1	20.0	---	108	80 - 120%	---	---	
Bromoform	20.6	---	1.00	ug/L	1	20.0	---	103	80 - 120%	---	---	
Bromomethane	19.3	---	5.00	ug/L	1	20.0	---	96	80 - 120%	---	---	
Carbon tetrachloride	24.4	---	1.00	ug/L	1	20.0	---	<b>122</b>	<b>80 - 120%</b>	---	---	Q-56
Chlorobenzene	19.7	---	0.500	ug/L	1	20.0	---	99	80 - 120%	---	---	
Chloroethane	18.0	---	5.00	ug/L	1	20.0	---	90	80 - 120%	---	---	
Chloroform	20.0	---	1.00	ug/L	1	20.0	---	100	80 - 120%	---	---	
Chloromethane	18.5	---	5.00	ug/L	1	20.0	---	93	80 - 120%	---	---	
2-Chlorotoluene	19.1	---	1.00	ug/L	1	20.0	---	96	80 - 120%	---	---	
4-Chlorotoluene	18.6	---	1.00	ug/L	1	20.0	---	93	80 - 120%	---	---	
Dibromochloromethane	19.6	---	1.00	ug/L	1	20.0	---	98	80 - 120%	---	---	
1,2-Dibromo-3-chloropropane	19.9	---	5.00	ug/L	1	20.0	---	100	80 - 120%	---	---	
1,2-Dibromoethane (EDB)	20.4	---	0.500	ug/L	1	20.0	---	102	80 - 120%	---	---	
Dibromomethane	20.2	---	1.00	ug/L	1	20.0	---	101	80 - 120%	---	---	
1,2-Dichlorobenzene	21.1	---	0.500	ug/L	1	20.0	---	105	80 - 120%	---	---	

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<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0455 - 06 30 20 1418</b>
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0060574 - EPA 5030B</b>												
<b>Water</b>												
<b>LCS (0060574-BS2)</b>	Prepared: 06/17/20 07:30 Analyzed: 06/17/20 08:56											
1,3-Dichlorobenzene	21.2	---	0.500	ug/L	1	20.0	---	106	80 - 120%	---	---	
1,4-Dichlorobenzene	19.4	---	0.500	ug/L	1	20.0	---	97	80 - 120%	---	---	
Dichlorodifluoromethane	17.8	---	1.00	ug/L	1	20.0	---	89	80 - 120%	---	---	
1,1-Dichloroethane	19.2	---	0.400	ug/L	1	20.0	---	96	80 - 120%	---	---	
1,2-Dichloroethane (EDC)	20.1	---	0.400	ug/L	1	20.0	---	100	80 - 120%	---	---	
1,1-Dichloroethene	18.4	---	0.400	ug/L	1	20.0	---	92	80 - 120%	---	---	
cis-1,2-Dichloroethene	18.4	---	0.400	ug/L	1	20.0	---	92	80 - 120%	---	---	
trans-1,2-Dichloroethene	17.9	---	0.400	ug/L	1	20.0	---	89	80 - 120%	---	---	
1,2-Dichloropropane	18.2	---	0.500	ug/L	1	20.0	---	91	80 - 120%	---	---	
1,3-Dichloropropane	18.3	---	2.00	ug/L	1	20.0	---	92	80 - 120%	---	---	
2,2-Dichloropropane	30.4	---	1.00	ug/L	1	20.0	---	<b>152</b>	<b>80 - 120%</b>	---	---	Q-56
1,1-Dichloropropene	20.4	---	1.00	ug/L	1	20.0	---	102	80 - 120%	---	---	
cis-1,3-Dichloropropene	17.8	---	1.00	ug/L	1	20.0	---	89	80 - 120%	---	---	
trans-1,3-Dichloropropene	20.0	---	1.00	ug/L	1	20.0	---	100	80 - 120%	---	---	
Hexachlorobutadiene	23.9	---	5.00	ug/L	1	20.0	---	119	80 - 120%	---	---	
Methylene chloride	19.2	---	10.0	ug/L	1	20.0	---	96	80 - 120%	---	---	
1,1,1,2-Tetrachloroethane	22.2	---	0.400	ug/L	1	20.0	---	111	80 - 120%	---	---	
1,1,2,2-Tetrachloroethane	17.5	---	0.500	ug/L	1	20.0	---	88	80 - 120%	---	---	
Tetrachloroethene (PCE)	23.1	---	0.400	ug/L	1	20.0	---	116	80 - 120%	---	---	
1,2,3-Trichlorobenzene	22.9	---	2.00	ug/L	1	20.0	---	114	80 - 120%	---	---	
1,2,4-Trichlorobenzene	19.8	---	2.00	ug/L	1	20.0	---	99	80 - 120%	---	---	
1,1,1-Trichloroethane	22.3	---	0.400	ug/L	1	20.0	---	112	80 - 120%	---	---	
1,1,2-Trichloroethane	19.4	---	0.500	ug/L	1	20.0	---	97	80 - 120%	---	---	
Trichloroethene (TCE)	20.5	---	0.400	ug/L	1	20.0	---	102	80 - 120%	---	---	
Trichlorofluoromethane	20.1	---	2.00	ug/L	1	20.0	---	100	80 - 120%	---	---	
1,2,3-Trichloropropane	18.9	---	1.00	ug/L	1	20.0	---	95	80 - 120%	---	---	
Vinyl chloride	16.6	---	0.400	ug/L	1	20.0	---	83	80 - 120%	---	---	
Surr: 1,4-Difluorobenzene (Surr) Recovery: 102 % Limits: 80-120 % Dilution: 1x												
Toluene-d8 (Surr) 93 % 80-120 % "												
4-Bromofluorobenzene (Surr) 95 % 80-120 % "												

**Duplicate (0060574-DUP1)** Prepared: 06/17/20 09:50 Analyzed: 06/17/20 12:06

**QC Source Sample: MGMS3-110 (A0F0455-11)**

**EPA 8260D**

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<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0455 - 06 30 20 1418</b>
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QUALITY CONTROL (QC) SAMPLE RESULTS

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0060574 - EPA 5030B</b>												
<b>Water</b>												
<b>Duplicate (0060574-DUP1)</b>			Prepared: 06/17/20 09:50 Analyzed: 06/17/20 12:06									
<b>QC Source Sample: MGMS3-110 (A0F0455-11)</b>												
Bromobenzene	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Bromochloromethane	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromodichloromethane	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromoform	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromomethane	ND	---	5.00	ug/L	1	---	ND	---	---	---	30%	
Carbon tetrachloride	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Chlorobenzene	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Chloroethane	ND	---	5.00	ug/L	1	---	ND	---	---	---	30%	
Chloroform	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Chloromethane	ND	---	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Chlorotoluene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
4-Chlorotoluene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Dibromochloromethane	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Dibromomethane	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	---	ND	---	---	---	30%	
cis-1,2-Dichloroethene	<b>0.980</b>	---	0.400	ug/L	1	---	1.00	---	---	2	30%	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
1,3-Dichloropropane	ND	---	2.00	ug/L	1	---	ND	---	---	---	30%	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	---	ND	---	---	---	30%	
Methylene chloride	ND	---	10.0	ug/L	1	---	ND	---	---	---	30%	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0455 - 06 30 20 1418</b>
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QUALITY CONTROL (QC) SAMPLE RESULTS

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0060574 - EPA 5030B</b>												
<b>Water</b>												
<b>Duplicate (0060574-DUP1)</b>			Prepared: 06/17/20 09:50 Analyzed: 06/17/20 12:06									
<b>QC Source Sample: MGMS3-110 (A0F0455-11)</b>												
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Tetrachloroethene (PCE)	<b>2.88</b>	---	0.400	ug/L	1	---	3.01	---	---	4	30%	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	---	ND	---	---	---	30%	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Trichloroethene (TCE)	<b>1.36</b>	---	0.400	ug/L	1	---	1.33	---	---	2	30%	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	---	ND	---	---	---	30%	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Vinyl chloride	ND	---	0.400	ug/L	1	---	ND	---	---	---	30%	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>			<i>Recovery: 115 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>					
<i>Toluene-d8 (Surr)</i>			<i>97 %</i>		<i>80-120 %</i>		<i>"</i>					
<i>4-Bromofluorobenzene (Surr)</i>			<i>104 %</i>		<i>80-120 %</i>		<i>"</i>					

<b>Matrix Spike (0060574-MS1)</b>												
Prepared: 06/17/20 09:50 Analyzed: 06/17/20 10:45												
<b>QC Source Sample: MGMS2-110 (A0F0455-06)</b>												
<b>EPA 8260D</b>												
Bromobenzene	20.3	---	0.500	ug/L	1	20.0	ND	102	80 - 120%	---	---	
Bromochloromethane	18.1	---	1.00	ug/L	1	20.0	ND	91	78 - 123%	---	---	
Bromodichloromethane	23.5	---	1.00	ug/L	1	20.0	ND	117	79 - 125%	---	---	
Bromoform	22.0	---	1.00	ug/L	1	20.0	ND	110	66 - 130%	---	---	
Bromomethane	19.9	---	5.00	ug/L	1	20.0	ND	100	53 - 141%	---	---	
Carbon tetrachloride	27.5	---	1.00	ug/L	1	20.0	ND	<b>138</b>	<b>72 - 136%</b>	---	---	Q-54
Chlorobenzene	21.0	---	0.500	ug/L	1	20.0	ND	105	80 - 120%	---	---	
Chloroethane	19.5	---	5.00	ug/L	1	20.0	ND	98	60 - 138%	---	---	
Chloroform	21.9	---	1.00	ug/L	1	20.0	ND	109	79 - 124%	---	---	
Chloromethane	20.5	---	5.00	ug/L	1	20.0	ND	103	50 - 139%	---	---	
2-Chlorotoluene	20.6	---	1.00	ug/L	1	20.0	ND	103	79 - 122%	---	---	
4-Chlorotoluene	19.9	---	1.00	ug/L	1	20.0	ND	100	78 - 122%	---	---	
Dibromochloromethane	21.0	---	1.00	ug/L	1	20.0	ND	105	74 - 126%	---	---	
1,2-Dibromo-3-chloropropane	20.9	---	5.00	ug/L	1	20.0	ND	104	62 - 128%	---	---	
1,2-Dibromoethane (EDB)	21.2	---	0.500	ug/L	1	20.0	ND	106	77 - 121%	---	---	

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<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0F0455 - 06 30 20 1418
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC % REC	Limit	RPD	RPD Limit	Notes
<b>Batch 0060574 - EPA 5030B</b>												
<b>Water</b>												
<b>Matrix Spike (0060574-MS1)</b>		Prepared: 06/17/20 09:50 Analyzed: 06/17/20 10:45										
<b>QC Source Sample: MGMS2-110 (A0F0455-06)</b>												
Dibromomethane	21.8	---	1.00	ug/L	1	20.0	ND	109	79 - 123%	---	---	
1,2-Dichlorobenzene	22.2	---	0.500	ug/L	1	20.0	ND	111	80 - 120%	---	---	
1,3-Dichlorobenzene	22.2	---	0.500	ug/L	1	20.0	ND	111	80 - 120%	---	---	
1,4-Dichlorobenzene	20.3	---	0.500	ug/L	1	20.0	ND	101	79 - 120%	---	---	
Dichlorodifluoromethane	19.1	---	1.00	ug/L	1	20.0	ND	96	32 - 152%	---	---	
1,1-Dichloroethane	21.2	---	0.400	ug/L	1	20.0	0.210	105	77 - 125%	---	---	
1,2-Dichloroethane (EDC)	21.4	---	0.400	ug/L	1	20.0	ND	107	73 - 128%	---	---	
1,1-Dichloroethene	21.1	---	0.400	ug/L	1	20.0	ND	105	71 - 131%	---	---	
cis-1,2-Dichloroethene	23.7	---	0.400	ug/L	1	20.0	2.91	104	78 - 123%	---	---	
trans-1,2-Dichloroethene	19.3	---	0.400	ug/L	1	20.0	ND	97	75 - 124%	---	---	
1,2-Dichloropropane	19.6	---	0.500	ug/L	1	20.0	ND	98	78 - 122%	---	---	
1,3-Dichloropropane	19.2	---	2.00	ug/L	1	20.0	ND	96	80 - 120%	---	---	
2,2-Dichloropropane	31.6	---	1.00	ug/L	1	20.0	ND	<b>158</b>	<b>60 - 139%</b>	---	---	Q-54a
1,1-Dichloropropene	22.4	---	1.00	ug/L	1	20.0	ND	112	79 - 125%	---	---	
cis-1,3-Dichloropropene	16.4	---	1.00	ug/L	1	20.0	ND	82	75 - 124%	---	---	
trans-1,3-Dichloropropene	20.7	---	1.00	ug/L	1	20.0	ND	104	73 - 127%	---	---	
Hexachlorobutadiene	25.0	---	5.00	ug/L	1	20.0	ND	125	66 - 134%	---	---	
Methylene chloride	19.0	---	10.0	ug/L	1	20.0	ND	95	74 - 124%	---	---	
1,1,1,2-Tetrachloroethane	23.8	---	0.400	ug/L	1	20.0	ND	119	78 - 124%	---	---	
1,1,2,2-Tetrachloroethane	20.0	---	0.500	ug/L	1	20.0	ND	100	71 - 121%	---	---	
Tetrachloroethene (PCE)	28.5	---	0.400	ug/L	1	20.0	4.19	122	74 - 129%	---	---	
1,2,3-Trichlorobenzene	23.8	---	2.00	ug/L	1	20.0	ND	119	69 - 129%	---	---	
1,2,4-Trichlorobenzene	20.5	---	2.00	ug/L	1	20.0	ND	102	69 - 130%	---	---	
1,1,1-Trichloroethane	24.8	---	0.400	ug/L	1	20.0	ND	124	74 - 131%	---	---	
1,1,2-Trichloroethane	20.6	---	0.500	ug/L	1	20.0	ND	103	80 - 120%	---	---	
Trichloroethene (TCE)	23.3	---	0.400	ug/L	1	20.0	2.50	104	79 - 123%	---	---	
Trichlorofluoromethane	22.4	---	2.00	ug/L	1	20.0	ND	112	65 - 141%	---	---	
1,2,3-Trichloropropane	19.7	---	1.00	ug/L	1	20.0	ND	98	73 - 122%	---	---	
Vinyl chloride	19.1	---	0.400	ug/L	1	20.0	1.17	90	58 - 137%	---	---	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 102 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>92 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>95 %</i>		<i>80-120 %</i>		<i>"</i>						

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Lisa Domenighini, Client Services Manager





**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
 Tigard, OR 97223  
 503-718-2323  
 ORELAP ID: OR100062

<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0F0455 - 06 30 20 1418
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Ammonia by Gas Diffusion and Colorimetric Detection**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0060606 - Method Prep: Aq</b>						<b>Water</b>						
<b>Blank (0060606-BLK1)</b>		Prepared: 06/17/20 14:18 Analyzed: 06/17/20 14:35										
<b>SM 4500-NH3 G</b>												
Ammonia as N	ND	---	0.0200	mg/L	1	---	---	---	---	---	---	---
<b>LCS (0060606-BS1)</b>		Prepared: 06/17/20 14:18 Analyzed: 06/17/20 14:37										
<b>SM 4500-NH3 G</b>												
Ammonia as N	2.15	---	0.0200	mg/L	1	2.00	---	107	90 - 110%	---	---	---

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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Anions by Ion Chromatography**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0060589 - Method Prep: Aq</b>						<b>Water</b>						
<b>Blank (0060589-BLK1)</b>		Prepared: 06/17/20 10:10		Analyzed: 06/17/20 11:48								
<b>EPA 300.0</b>												
Nitrate-Nitrogen	ND	---	0.250	mg/L	1	---	---	---	---	---	---	---
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	---	---	---	---	---	---	---
<b>LCS (0060589-BS1)</b>		Prepared: 06/17/20 10:10		Analyzed: 06/17/20 12:09								
<b>EPA 300.0</b>												
Nitrate-Nitrogen	2.17	---	0.250	mg/L	1	2.00	---	109	90 - 110%	---	---	---
Nitrite-Nitrogen	2.18	---	0.250	mg/L	1	2.00	---	109	90 - 110%	---	---	---
<b>Duplicate (0060589-DUP1)</b>		Prepared: 06/17/20 10:10		Analyzed: 06/17/20 13:14								
<b>QC Source Sample: MGMS1-60 (A0F0455-02)</b>												
<b>EPA 300.0</b>												
Nitrate-Nitrogen	<b>0.379</b>	---	0.250	mg/L	1	---	0.375	---	---	1	10%	---
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	---	ND	---	---	---	10%	---
<b>Duplicate (0060589-DUP2)</b>		Prepared: 06/17/20 10:10		Analyzed: 06/17/20 15:02								
<b>QC Source Sample: MGMS2-60 (A0F0455-05)</b>												
<b>EPA 300.0</b>												
Nitrate-Nitrogen	<b>0.522</b>	---	0.250	mg/L	1	---	0.519	---	---	0.5	10%	---
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	---	ND	---	---	---	10%	---
<b>Matrix Spike (0060589-MS1)</b>		Prepared: 06/17/20 10:10		Analyzed: 06/17/20 13:35								
<b>QC Source Sample: MGMS1-60 (A0F0455-02)</b>												
<b>EPA 300.0</b>												
Nitrate-Nitrogen	3.06	---	0.312	mg/L	1	2.50	0.375	107	80 - 120%	---	---	---
Nitrite-Nitrogen	2.72	---	0.312	mg/L	1	2.50	ND	109	80 - 120%	---	---	---
<b>Matrix Spike (0060589-MS2)</b>		Prepared: 06/17/20 10:10		Analyzed: 06/17/20 16:06								
<b>QC Source Sample: MGMS2-60 (A0F0455-05)</b>												
<b>EPA 300.0</b>												
Nitrate-Nitrogen	3.18	---	0.312	mg/L	1	2.50	0.519	107	80 - 120%	---	---	---
Nitrite-Nitrogen	2.73	---	0.312	mg/L	1	2.50	ND	109	80 - 120%	---	---	---

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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Total Organic Carbon (Non-Purgeable) by Persulfate Oxidation by Standard Method 5310C**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0060583 - Method Prep: Aq</b>						<b>Water</b>						
<b>Blank (0060583-BLK1)</b>		Prepared: 06/17/20 08:11 Analyzed: 06/17/20 12:25										
<b>SM 5310 C</b>												
Total Organic Carbon	ND	---	1.00	mg/L	1	---	---	---	---	---	---	---
<b>LCS (0060583-BS1)</b>		Prepared: 06/17/20 08:11 Analyzed: 06/17/20 12:57										
<b>SM 5310 C</b>												
Total Organic Carbon	10.2	---	1.00	mg/L	1	10.0	---	102	85 - 115%	---	---	---
<b>Duplicate (0060583-DUP1)</b>		Prepared: 06/17/20 08:11 Analyzed: 06/17/20 14:34										
<b>QC Source Sample: MGMS1-43 (A0F0455-01)</b>												
<b>SM 5310 C</b>												
Total Organic Carbon	6.44	---	1.00	mg/L	1	---	6.56	---	---	2	10%	---
<b>Matrix Spike (0060583-MS1)</b>		Prepared: 06/17/20 08:11 Analyzed: 06/17/20 15:06										
<b>QC Source Sample: MGMS1-43 (A0F0455-01)</b>												
<b>SM 5310 C</b>												
Total Organic Carbon	16.2	---	1.01	mg/L	1	10.0	6.56	96	85 - 115%	---	---	---



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**SAMPLE PREPARATION INFORMATION**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Prep: EPA 5030B

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 0060574</u>							
A0F0455-01	Water	EPA 8260D	06/16/20 08:50	06/17/20 09:50	5mL/5mL	5mL/5mL	1.00
A0F0455-02	Water	EPA 8260D	06/16/20 09:17	06/17/20 09:50	5mL/5mL	5mL/5mL	1.00
A0F0455-03RE1	Water	EPA 8260D	06/16/20 09:39	06/17/20 09:50	5mL/5mL	5mL/5mL	1.00
A0F0455-04RE1	Water	EPA 8260D	06/16/20 10:26	06/17/20 09:50	5mL/5mL	5mL/5mL	1.00
A0F0455-05	Water	EPA 8260D	06/16/20 10:55	06/17/20 09:50	5mL/5mL	5mL/5mL	1.00
A0F0455-06	Water	EPA 8260D	06/16/20 11:25	06/17/20 09:50	5mL/5mL	5mL/5mL	1.00
A0F0455-07	Water	EPA 8260D	06/16/20 11:55	06/17/20 09:50	5mL/5mL	5mL/5mL	1.00
A0F0455-08RE1	Water	EPA 8260D	06/16/20 12:59	06/17/20 09:50	5mL/5mL	5mL/5mL	1.00
A0F0455-09RE1	Water	EPA 8260D	06/16/20 12:59	06/17/20 09:50	5mL/5mL	5mL/5mL	1.00
A0F0455-10	Water	EPA 8260D	06/16/20 13:41	06/17/20 09:50	5mL/5mL	5mL/5mL	1.00
A0F0455-11	Water	EPA 8260D	06/16/20 14:14	06/17/20 09:50	5mL/5mL	5mL/5mL	1.00
A0F0455-12	Water	EPA 8260D	06/16/20 14:43	06/17/20 09:50	5mL/5mL	5mL/5mL	1.00

**Ammonia by Gas Diffusion and Colorimetric Detection**

Prep: Method Prep: Aq

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 0060606</u>							
A0F0455-01	Water	SM 4500-NH3 G	06/16/20 08:50	06/17/20 14:18	10mL/10mL	10mL/10mL	1.00
A0F0455-02	Water	SM 4500-NH3 G	06/16/20 09:17	06/17/20 14:18	10mL/10mL	10mL/10mL	1.00
A0F0455-03	Water	SM 4500-NH3 G	06/16/20 09:39	06/17/20 14:18	10mL/10mL	10mL/10mL	1.00
A0F0455-04	Water	SM 4500-NH3 G	06/16/20 10:26	06/17/20 14:18	10mL/10mL	10mL/10mL	1.00
A0F0455-05	Water	SM 4500-NH3 G	06/16/20 10:55	06/17/20 14:18	10mL/10mL	10mL/10mL	1.00
A0F0455-06	Water	SM 4500-NH3 G	06/16/20 11:25	06/17/20 14:18	10mL/10mL	10mL/10mL	1.00
A0F0455-07	Water	SM 4500-NH3 G	06/16/20 11:55	06/17/20 14:18	10mL/10mL	10mL/10mL	1.00
A0F0455-08	Water	SM 4500-NH3 G	06/16/20 12:59	06/17/20 14:18	10mL/10mL	10mL/10mL	1.00
A0F0455-09	Water	SM 4500-NH3 G	06/16/20 12:59	06/17/20 14:18	10mL/10mL	10mL/10mL	1.00
A0F0455-10	Water	SM 4500-NH3 G	06/16/20 13:41	06/17/20 14:18	10mL/10mL	10mL/10mL	1.00
A0F0455-11	Water	SM 4500-NH3 G	06/16/20 14:14	06/17/20 14:18	10mL/10mL	10mL/10mL	1.00
A0F0455-12	Water	SM 4500-NH3 G	06/16/20 14:43	06/17/20 14:18	10mL/10mL	10mL/10mL	1.00

**Anions by Ion Chromatography**

Prep: Method Prep: Aq

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 0060589</u>							

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**SAMPLE PREPARATION INFORMATION**

**Anions by Ion Chromatography**

Prep: Method Prep: Aq

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
A0F0455-01	Water	EPA 300.0	06/16/20 08:50	06/17/20 10:10	5mL/5mL	5mL/5mL	1.00
A0F0455-02	Water	EPA 300.0	06/16/20 09:17	06/17/20 10:10	5mL/5mL	5mL/5mL	1.00
A0F0455-03	Water	EPA 300.0	06/16/20 09:39	06/17/20 10:10	5mL/5mL	5mL/5mL	1.00
A0F0455-04	Water	EPA 300.0	06/16/20 10:26	06/17/20 10:10	5mL/5mL	5mL/5mL	1.00
A0F0455-05	Water	EPA 300.0	06/16/20 10:55	06/17/20 10:10	5mL/5mL	5mL/5mL	1.00
A0F0455-06	Water	EPA 300.0	06/16/20 11:25	06/17/20 10:10	5mL/5mL	5mL/5mL	1.00
A0F0455-07	Water	EPA 300.0	06/16/20 11:55	06/17/20 10:10	5mL/5mL	5mL/5mL	1.00
A0F0455-08	Water	EPA 300.0	06/16/20 12:59	06/17/20 10:10	5mL/5mL	5mL/5mL	1.00
A0F0455-09	Water	EPA 300.0	06/16/20 12:59	06/17/20 10:10	5mL/5mL	5mL/5mL	1.00
A0F0455-10	Water	EPA 300.0	06/16/20 13:41	06/17/20 10:10	5mL/5mL	5mL/5mL	1.00
A0F0455-11	Water	EPA 300.0	06/16/20 14:14	06/17/20 10:10	5mL/5mL	5mL/5mL	1.00
A0F0455-12	Water	EPA 300.0	06/16/20 14:43	06/17/20 10:10	5mL/5mL	5mL/5mL	1.00

**Total Organic Carbon (Non-Purgeable) by Persulfate Oxidation by Standard Method 5310C**

Prep: Method Prep: Aq

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 0060583</b>							
A0F0455-01	Water	SM 5310 C	06/16/20 08:50	06/17/20 08:11	40mL/40mL	40mL/40mL	1.00
A0F0455-04	Water	SM 5310 C	06/16/20 10:26	06/17/20 08:11	40mL/40mL	40mL/40mL	1.00
A0F0455-08	Water	SM 5310 C	06/16/20 12:59	06/17/20 08:11	40mL/40mL	40mL/40mL	1.00
A0F0455-09	Water	SM 5310 C	06/16/20 12:59	06/17/20 08:11	40mL/40mL	40mL/40mL	1.00



**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
ORELAP ID: OR100062

<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0455 - 06 30 20 1418</b>
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**QUALIFIER DEFINITIONS**

**Client Sample and Quality Control (QC) Sample Qualifier Definitions:**

**Apex Laboratories**

- Q-54** Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +2%. The results are reported as Estimated Values.
- Q-54a** Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +32%. The results are reported as Estimated Values.
- Q-56** Daily CCV/LCS recovery for this analyte was above the +/-20% criteria listed in EPA 8260

Apex Laboratories

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0F0455 - 06 30 20 1418
--	---	--

**REPORTING NOTES AND CONVENTIONS:**

**Abbreviations:**

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported.
- RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

**Detection Limits: Limit of Detection (LOD)**

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('----'), then the data has not been evaluated below the Reporting Limit.

**Reporting Limits: Limit of Quantitation (LOQ)**

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

**Reporting Conventions:**

- Basis: Results for soil samples are generally reported on a 100% dry weight basis. The Result Basis is listed following the units as "dry", "wet", or "" (blank) designation.
  - "dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.
  - "wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
  - "" Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

**QC Source:**

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) are not included in this report. Please request a Full QC report if this data is required.

**Miscellaneous Notes:**

- " --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- " \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

**Blanks:**

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 1/2 the Reporting Limit (RL).  
-For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.  
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.  
For further details, please request a copy of this document.

Apex Laboratories

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0455 - 06 30 20 1418</b>
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**REPORTING NOTES AND CONVENTIONS (Cont.):**

**Blanks (Cont.):**

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

**Preparation Notes:**

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

**Sampling and Preservation Notes:**

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

Apex Laboratories

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Lisa Domenighini, Client Services Manager





**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
ORELAP ID: **OR100062**

<b><u>Cascadia Associates</u></b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b><u>Shore Terminal-Vancouver</u></b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0455 - 06 30 20 1418</b>
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**LABORATORY ACCREDITATION INFORMATION**

**ORELAP Certification ID: OR100062 (Primary Accreditation)**  
**EPA ID: OR01039**

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

**Apex Laboratories**

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation
<u>All reported analytes are included in Apex Laboratories' current ORELAP scope.</u>					

**Secondary Accreditations**

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

**Subcontract Laboratory Accreditations**

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

**Field Testing Parameters**

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

Lisa Domenighini, Client Services Manager

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Cascadia Associates

Project: Shore Terminal-Vancouver

5820 SW Kelly Ave Unit B  
Portland, OR 97239

Project Number: NuStar Vancouver GWM 20

Project Manager: Stephanie Salisbury

Report ID:

A0F0455 - 06 30 20 1418

**CHAIN OF CUSTODY**

Lab # A0F0455 COC # 1 of 2

Company: Cascadia Associates		Project Mgr: Stephanie Salisbury		Project Name: NuStar Vancouver GWM 20		Project #:	
Address: 5820 SW Kelly Ave, Unit B, Portland		Phone: 503-444-6777		Email: sb.salisbury@cascadialabs.com		Contract #:	
Sampled by: J. Domenighini		ANALYSIS REQUEST					
Site Location:	OR <input checked="" type="radio"/> WA <input type="radio"/> CA <input type="radio"/>						
AK ID							
SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	SPECIAL INSTRUCTIONS:	
MGM51-43	6116	8/16	9:40	GW	7	* VOCs same list as NuStar Vancouver 1020 Ethane/Ethane/Methane by RSK 175	
MGM52-60			9:12		5		
MGM51-110			9:39		5		
MGM52-40			10:26		7		
MGM52-60			10:58		5		
MGM52-110			11:25		5		
MGM52-132			11:55		5		
MGM53-40			12:59		7		
MGM53-40 Dup			12:59		7		
MGM53-60			13:41		5		
		Normal Turn Around Time (TAT) = 10 Business Days		TAT Requested (circle)			
		1 Day		2 Day		3 Day	
		4 DAY		5 DAY		Other:	
RELINQUISHED BY:		RECEIVED BY:		RECEIVED BY:		RECEIVED BY:	
Signature: <u>[Signature]</u>		Signature: <u>[Signature]</u>		Signature: <u>[Signature]</u>		Signature: _____	
Date: <u>8/16/10</u>		Date: <u>8/16/10</u>		Date: <u>8/16/10</u>		Date: _____	
Printed Name: <u>Don Domenighini</u>		Printed Name: <u>Step Sal</u>		Printed Name: <u>[Signature]</u>		Printed Name: _____	
Time: <u>16:30</u>		Time: <u>16:30</u>		Time: <u>16:30</u>		Time: _____	
Company: <u>Cascadia Assoc.</u>		Company: _____		Company: _____		Company: _____	

Apex Laboratories

*Don A. Domenighini*

Lisa Domenighini, Client Services Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
 Tigard, OR 97223  
 503-718-2323  
 ORELAP ID: OR100062

**Cascadia Associates**

5820 SW Kelly Ave Unit B  
 Portland, OR 97239

Project: **Shore Terminal-Vancouver**

Project Number: **NuStar Vancouver GWM 20**

Project Manager: **Stephanie Salisbury**

**Report ID:**

**A0F0455 - 06 30 20 1418**

**CHAIN OF CUSTODY**

Lab # **A0F0455**      COC 2 of 2

**APEX LABS**      6700 SW Sandburg St., Tigard, OR 97223      PH: 503-718-2323

Company: **Cascadia Associates**      Project Mgr: **Stephanie Salisbury**      Project Name: **NuStar Vancouver GWM 20**      Project #:

Address: **5820 S. Kelly Ave. Unit B, Portland**      Phone: **503-846-6577**      Email: **shsalisbury@cascadiaassociates.com**

Sampled by: **J. Dommenighini**

Site Location: **OR (WA) CA**      AK ID: \_\_\_\_\_

LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-DX	NWTPH-GX	8260 RTEX	8260 RBDM VOCs	8260 Halo VOCs	8260 VOCs Full List	8270 SIM PAHs	8270 Semi-Vols Full List	8082 PCBs	8081 Pest	RCPA Metals (8)	Priority Metals (13)	AL, Sb, As, Ba, Be, Cd, Ca, Cr, Cu, Fe, Pb, Hg, Mn, Ni, V, Zn, Mo, Ni, K, Sr, Ag, Na, Li, Tl	TOTAL DISS. TCLP	TCLP Metals (8)	Archive	
MGMSB-110	6/16/14	14:15	GS	5																		
MGMSB-152	6/16/14	14:15	GS	5																		

**ANALYSIS REQUEST**

**SPECIAL INSTRUCTIONS:**  
 VOCs same list as NuStar Vancouver 1020

Normal Turn Around Time (TAT) = 10 Business Days

TAT Requested (circle):      1 Day      2 Day      3 Day      4 DAY      5 DAY      Other: \_\_\_\_\_

**SAMPLES ARE HELD FOR 30 DAYS**

RELINQUISHED BY:	RECEIVED BY:
Signature: <i>[Signature]</i> Date: 6/16	Signature: <i>[Signature]</i> Date:
Printed Name: <b>Stephanie Salisbury</b> Time: 16:30	Printed Name:      Time:
Company: <b>Cascadia Associates</b>	Company: <b>Apex</b>

Apex Laboratories

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

*Lisa Domenighini*

Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0F0455 - 06 30 20 1418
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**APEX LABS COOLER RECEIPT FORM**

**Client:** Cascadia Associates Element WO#: A0F0455

**Project/Project #:** NuStar Vancouver

**Delivery Info:**  
Date/time received: 4/16/20 @ 16:30 By: JS

Delivered by: Apex  Client  ESS  FedEx  UPS  Swift  Senvoy  SDS  Other

**Cooler Inspection** Date/time inspected: 4/16/20 @ 16:30 By: JS

Chain of Custody included? Yes  No  Custody seals? Yes  No

Signed/dated by client? Yes  No

Signed/dated by Apex? Yes  No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	<u>0-6</u>						
Received on ice? (Y/N)	<u>Y</u>						
Temp. blanks? (Y/N)	<u>Y</u>						
Ice type: (Gel/Real/Other)	<u>real</u>						
Condition:	<u>good</u>						

Cooler out of temp? (Y/N) Y Possible reason why: \_\_\_\_\_

If some coolers are in temp and some out, were green dots applied to out of temperature samples? Yes/No/NA NA

Out of temperature samples form initiated? Yes/No/NA NA

**Samples Inspection:** Date/time inspected: 6-16-20 @ 17:55 By: TSM

All samples intact? Yes  No  Comments: \_\_\_\_\_

Bottle labels/COCs agree? Yes  No  Comments: TB received not listed on COC

COC/container discrepancies form initiated? Yes  No

Containers/volumes received appropriate for analysis? Yes  No  Comments: \_\_\_\_\_

Do VOA vials have visible headspace? Yes  No  NA

Comments: \_\_\_\_\_

Water samples: pH checked: Yes  No  NA  pH appropriate? Yes  No  NA

Comments: \_\_\_\_\_

**Additional information:** TB# 232A

Labeled by: TSM Witness: ACE Cooler Inspected by: TSM See Project Contact Form:

*Lisa Domenighini*

June 30, 2020

Apex Laboratories  
ATTN: Lisa Domenighini  
6700 S.W. Sandburg St.  
Tigard, OR 97223



LA Cert #04140  
EPA Methods TO3, TO14A, TO15, 25C/3C,  
RSK-175

TX Cert T104704450-14-6  
EPA Methods TO14A, TO15

UT Cert CA0133332015-3  
EPA Methods TO3, TO14A, TO15, RSK-175

### LABORATORY TEST RESULTS

Project Reference: A0F0455  
Lab Number: L061808-01/04

Enclosed are results for sample(s) received 6/18/20 by Air Technology Laboratories. Sample was received intact and chilled to 3° C. Analyses were performed according to specifications on the chain of custody provided with the sample(s).

#### Report Narrative:

- Unless otherwise noted in the report, sample analyses were performed within method performance criteria and meet all requirements of the TNI Standards.
- The enclosed results relate only to the sample(s).

ATL appreciates the opportunity to provide testing services to your company. If you have any questions regarding these results, please call me at (626) 964-4032.

Sincerely,

A handwritten signature in blue ink, appearing to read "Mark Johnson".

Mark Johnson  
Operations Manager  
MJohnson@AirTechLabs.com

Note: The cover letter is an integral part of this analytical report.

SUBCONTRACT ORDER

Apex Laboratories

06/16/20 A0F0455

LOG 1808-01/04

**SENDING LABORATORY:**

Apex Laboratories  
6700 S.W. Sandburg Street  
Tigard, OR 97223  
Phone: (503) 718-2323  
Fax: (503) 336-0745  
Project Manager: Lisa Domenighini

**RECEIVING LABORATORY:**

Air Technology Laboratories, Inc  
18501 E. Gale Ave Suite 130  
City of Industry, CA 91748  
Phone : (626) 964-4032  
Fax: (626) 964-5832

**Sample Name: MGMS1-43** **Water** **Sampled: 06/16/20 08:50** (A0F0455-01)

Analysis	Due	Expires	Comments
<b>RSK 175 Preserved (Meth, Eth, Eth) (Sub)</b>	06/29/20 17:00	06/30/20 08:50	
<i>Containers Supplied:</i>			
(D)40 mL VOA - HCL			
(E)40 mL VOA - HCL			

AKC  
6/17/20

**Sample Name: MGMS2-40** **Water** **Sampled: 06/16/20 10:26** (A0F0455-04)

Analysis	Due	Expires	Comments
<b>RSK 175 Preserved (Meth, Eth, Eth) (Sub)</b>	06/29/20 17:00	06/30/20 10:26	
<i>Containers Supplied:</i>			
(D)40 mL VOA - HCL			
(E)40 mL VOA - HCL			

**Sample Name: MGMS3-40** **Water** **Sampled: 06/16/20 12:59** (A0F0455-08)

Analysis	Due	Expires	Comments
<b>RSK 175 Preserved (Meth, Eth, Eth) (Sub)</b>	06/29/20 17:00	06/30/20 12:59	
<i>Containers Supplied:</i>			
(D)40 mL VOA - HCL			
(E)40 mL VOA - HCL			

**Sample Name: MGMS3-40 Dup** **Water** **Sampled: 06/16/20 12:59** (A0F0455-09)

Analysis	Due	Expires	Comments
<b>RSK 175 Preserved (Meth, Eth, Eth) (Sub)</b>	06/29/20 17:00	06/30/20 12:59	
<i>Containers Supplied:</i>			
(D)40 mL VOA - HCL			
(E)40 mL VOA - HCL			

Standard TAT

Released By: [Signature] Date: 6/17/20 14:55

UPS (Shipper)

Released By: UPS (Shipper)

Received By: [Signature] Date: 6/18/20 1330

Released By

Date

Received By

Date

30

**Client:** Apex Laboratories  
**Attn:** Lisa Domenighini  
**Project Name:** NA  
**Project No.:** A0F0455  
**Date Received:** 06/18/20  
**Matrix:** Water  
**Reporting Units:** ug/L

**RSK175**

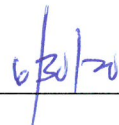
Lab No.:	L061808-01	L061808-02	L061808-03	L061808-04				
Client Sample I.D.:	MGMS1-43 (A0F0455-01)	MGMS2-40 (A0F0455-04)	MGMS3-40 (A0F0455-08)	MGMS3-40 Dup (A0F0455-09)				
Date/Time Sampled:	6/16/20 8:50	6/16/20 10:26	6/16/20 12:59	6/16/20 12:59				
Date/Time Analyzed:	6/22/20 13:25	6/22/20 13:37	6/22/20 13:49	6/22/20 14:09				
QC Batch No.:	200622GC8A1	200622GC8A1	200622GC8A1	200622GC8A1				
Analyst Initials:	CM	CM	CM	CM				
Dilution Factor:	1.0	1.0	1.0	1.0				
ANALYTE	Result ug/L	RL ug/L	Result ug/L	RL ug/L	Result ug/L	RL ug/L	Result ug/L	RL ug/L
Ethene	3.4	1.0	6.1	1.0	11	1.0	12	1.0
Ethane	25	1.0	7.8	1.0	21	1.0	25	1.0
Methane	1,900	1.0	48	1.0	3,500	1.0	4,300	1.0

ND = Not Detected (below RL)  
 RL = Reporting Limit

Reviewed/Approved By: \_\_\_\_\_

  
 Mark Johnson  
 Operations Manager

Date \_\_\_\_\_

  
 6/30/20

The cover letter is an integral part of this analytical report



QC Batch No: 200622GC8A1

Matrix: Water

Reporting Units: ug/L

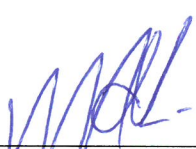
**RSK 175**  
**LABORATORY CONTROL SAMPLE SUMMARY**

Lab No.:	METHOD BLANK			LCS		LCSD					
Date/Time Analyzed:	6/22/20 9:32			6/22/20 9:43		6/22/20 9:58					
Analyst Initials:	CM			CM		CM					
Dilution Factor:	1.1			1.0		1.0			Limits		
ANALYTE	Result ug/L	RL ug/L	SPIKE AMT. ug/L	Result ug/L	% Rec.	Result ug/L	% Rec.	RPD %	Low %Rec	High %Rec	Max. RPD
Ethene	ND	1.0	1,150	1,130	110	1,000	97	12.0	70	130	30
Ethane	ND	1.0	1,200	1,220	107	1,140	100	6.5	70	130	30
Methane	ND	1.0	650	642	109	608	103	5.4	70	130	30

ND = Not Detected (below RL)

RL = Reporting Limit

Reviewed/Approved By: \_\_\_\_\_

  
Mark Johnson  
Operations Manager

Date: 6/30/20

The cover letter is an integral part of this analytical report







**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
ORELAP ID: OR100062

Thursday, July 2, 2020  
Stephanie Salisbury  
Cascadia Associates  
5820 SW Kelly Ave Unit B  
Portland, OR 97239

RE: A0F0495 - Shore Terminal-Vancouver - NuStar Vancouver GWM 2Q20

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A0F0495, which was received by the laboratory on 6/17/2020 at 3:56:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [ldomenighini@apex-labs.com](mailto:ldomenighini@apex-labs.com), or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of sample receipt, unless prior arrangements have been made.

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Cooler Receipt Information

(See Cooler Receipt Form for details)

Cooler #1	0.7 degC	Cooler #2	1.4 degC
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This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.

All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

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Apex Laboratories

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---

Lisa Domenighini, Client Services Manager



Apex Laboratories, LLC

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
ORELAP ID: OR100062

<u>Cascadia Associates</u> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <u>Shore Terminal-Vancouver</u> Project Number: NuStar Vancouver GWM 20 Project Manager: Stephanie Salisbury	<b>Report ID:</b> A0F0495 - 07 02 20 1041
--	---	--

ANALYTICAL REPORT FOR SAMPLES

**SAMPLE INFORMATION**

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-1	A0F0495-01	Water	06/17/20 08:04	06/17/20 15:56
MW-3	A0F0495-02	Water	06/17/20 08:39	06/17/20 15:56
MW-6	A0F0495-03	Water	06/17/20 09:22	06/17/20 15:56
MW-14	A0F0495-04	Water	06/17/20 12:00	06/17/20 15:56
S-2	A0F0495-05	Water	06/17/20 12:42	06/17/20 15:56
S-1	A0F0495-06	Water	06/17/20 13:24	06/17/20 15:56
MP-1	A0F0495-07	Water	06/17/20 14:10	06/17/20 15:56
MW-8	A0F0495-08	Water	06/17/20 14:20	06/17/20 15:56
EW-1	A0F0495-09	Water	06/17/20 08:00	06/17/20 15:56
MW-18i	A0F0495-10	Water	06/17/20 08:30	06/17/20 15:56
MW-20i	A0F0495-11	Water	06/17/20 09:00	06/17/20 15:56
MW-21i-40	A0F0495-12	Water	06/17/20 09:30	06/17/20 15:56
MW-2	A0F0495-13	Water	06/17/20 10:10	06/17/20 15:56
MW-23i	A0F0495-14	Water	06/17/20 13:40	06/17/20 15:56
MW-26	A0F0495-15	Water	06/17/20 12:45	06/17/20 15:56
MW-17	A0F0495-16	Water	06/17/20 11:20	06/17/20 15:56
MW-10	A0F0495-17	Water	06/17/20 10:40	06/17/20 15:56

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Lisa Domenighini, Client Services Manager



Apex Laboratories, LLC

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
ORELAP ID: OR100062

<u>Cascadia Associates</u> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <u>Shore Terminal-Vancouver</u> Project Number: NuStar Vancouver GWM 20 Project Manager: Stephanie Salisbury	<u>Report ID:</u> A0F0495 - 07 02 20 1041
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**ANALYTICAL CASE NARRATIVE**

Work Order: A0F0495

Subcontract

This report is not complete without the attached subcontract laboratory report for RSK 175 from Air Technology.

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0495 - 07 02 20 1041</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-1 (A0F0495-01)</b>				<b>Matrix: Water</b>		<b>Batch: 0060682</b>		
Bromobenzene	ND	---	0.500	ug/L	1	06/22/20 10:50	EPA 8260D	
Bromochloromethane	ND	---	1.00	ug/L	1	06/22/20 10:50	EPA 8260D	
Bromodichloromethane	ND	---	1.00	ug/L	1	06/22/20 10:50	EPA 8260D	
Bromoform	ND	---	1.00	ug/L	1	06/22/20 10:50	EPA 8260D	
Bromomethane	ND	---	5.00	ug/L	1	06/22/20 10:50	EPA 8260D	
Carbon tetrachloride	ND	---	1.00	ug/L	1	06/22/20 10:50	EPA 8260D	
Chlorobenzene	ND	---	0.500	ug/L	1	06/22/20 10:50	EPA 8260D	
Chloroethane	ND	---	5.00	ug/L	1	06/22/20 10:50	EPA 8260D	
Chloroform	ND	---	1.00	ug/L	1	06/22/20 10:50	EPA 8260D	
Chloromethane	ND	---	5.00	ug/L	1	06/22/20 10:50	EPA 8260D	
2-Chlorotoluene	ND	---	1.00	ug/L	1	06/22/20 10:50	EPA 8260D	
4-Chlorotoluene	ND	---	1.00	ug/L	1	06/22/20 10:50	EPA 8260D	
Dibromochloromethane	ND	---	1.00	ug/L	1	06/22/20 10:50	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	06/22/20 10:50	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	06/22/20 10:50	EPA 8260D	
Dibromomethane	ND	---	1.00	ug/L	1	06/22/20 10:50	EPA 8260D	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	06/22/20 10:50	EPA 8260D	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	06/22/20 10:50	EPA 8260D	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	06/22/20 10:50	EPA 8260D	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	06/22/20 10:50	EPA 8260D	
<b>1,1-Dichloroethane</b>	<b>2.95</b>	---	0.400	ug/L	1	06/22/20 10:50	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	06/22/20 10:50	EPA 8260D	
<b>1,1-Dichloroethene</b>	<b>0.420</b>	---	0.400	ug/L	1	06/22/20 10:50	EPA 8260D	
<b>cis-1,2-Dichloroethene</b>	<b>23.5</b>	---	0.400	ug/L	1	06/22/20 10:50	EPA 8260D	
<b>trans-1,2-Dichloroethene</b>	<b>0.520</b>	---	0.400	ug/L	1	06/22/20 10:50	EPA 8260D	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	06/22/20 10:50	EPA 8260D	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	06/22/20 10:50	EPA 8260D	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	06/22/20 10:50	EPA 8260D	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	06/22/20 10:50	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	2.00	ug/L	1	06/22/20 10:50	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/22/20 10:50	EPA 8260D	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	06/22/20 10:50	EPA 8260D	
Methylene chloride	ND	---	10.0	ug/L	1	06/22/20 10:50	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	06/22/20 10:50	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	06/22/20 10:50	EPA 8260D	
<b>Tetrachloroethene (PCE)</b>	<b>12.1</b>	---	0.400	ug/L	1	06/22/20 10:50	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	06/22/20 10:50	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	06/22/20 10:50	EPA 8260D	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	06/22/20 10:50	EPA 8260D	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0495 - 07 02 20 1041</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
			<b>Matrix: Water</b>			<b>Batch: 0060682</b>		
MW-1 (A0F0495-01)								
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	06/22/20 10:50	EPA 8260D	
<b>Trichloroethene (TCE)</b>	<b>7.75</b>	---	0.400	ug/L	1	06/22/20 10:50	EPA 8260D	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	06/22/20 10:50	EPA 8260D	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	06/22/20 10:50	EPA 8260D	
<b>Vinyl chloride</b>	<b>0.460</b>	---	0.400	ug/L	1	06/22/20 10:50	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 112 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>06/22/20 10:50</i>	<i>EPA 8260D</i>
<i>Toluene-d8 (Surr)</i>		<i>96 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/22/20 10:50</i>	<i>EPA 8260D</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>104 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/22/20 10:50</i>	<i>EPA 8260D</i>

			<b>Matrix: Water</b>			<b>Batch: 0060849</b>		
MW-3 (A0F0495-02RE1)								
Bromobenzene	ND	---	1.00	ug/L	2	06/25/20 16:49	EPA 8260D	
Bromochloromethane	ND	---	2.00	ug/L	2	06/25/20 16:49	EPA 8260D	
Bromodichloromethane	ND	---	2.00	ug/L	2	06/25/20 16:49	EPA 8260D	
Bromoform	ND	---	2.00	ug/L	2	06/25/20 16:49	EPA 8260D	
Bromomethane	ND	---	10.0	ug/L	2	06/25/20 16:49	EPA 8260D	
Carbon tetrachloride	ND	---	2.00	ug/L	2	06/25/20 16:49	EPA 8260D	
Chlorobenzene	ND	---	1.00	ug/L	2	06/25/20 16:49	EPA 8260D	
Chloroethane	ND	---	10.0	ug/L	2	06/25/20 16:49	EPA 8260D	
Chloroform	ND	---	2.00	ug/L	2	06/25/20 16:49	EPA 8260D	
Chloromethane	ND	---	10.0	ug/L	2	06/25/20 16:49	EPA 8260D	
2-Chlorotoluene	ND	---	2.00	ug/L	2	06/25/20 16:49	EPA 8260D	
4-Chlorotoluene	ND	---	2.00	ug/L	2	06/25/20 16:49	EPA 8260D	
Dibromochloromethane	ND	---	2.00	ug/L	2	06/25/20 16:49	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	10.0	ug/L	2	06/25/20 16:49	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	1.00	ug/L	2	06/25/20 16:49	EPA 8260D	
Dibromomethane	ND	---	2.00	ug/L	2	06/25/20 16:49	EPA 8260D	
1,2-Dichlorobenzene	ND	---	1.00	ug/L	2	06/25/20 16:49	EPA 8260D	
1,3-Dichlorobenzene	ND	---	1.00	ug/L	2	06/25/20 16:49	EPA 8260D	
1,4-Dichlorobenzene	ND	---	1.00	ug/L	2	06/25/20 16:49	EPA 8260D	
Dichlorodifluoromethane	ND	---	2.00	ug/L	2	06/25/20 16:49	EPA 8260D	
1,1-Dichloroethane	ND	---	0.800	ug/L	2	06/25/20 16:49	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	0.800	ug/L	2	06/25/20 16:49	EPA 8260D	
1,1-Dichloroethene	ND	---	0.800	ug/L	2	06/25/20 16:49	EPA 8260D	
<b>cis-1,2-Dichloroethene</b>	<b>18.6</b>	---	0.800	ug/L	2	06/25/20 16:49	EPA 8260D	
<b>trans-1,2-Dichloroethene</b>	<b>1.16</b>	---	0.800	ug/L	2	06/25/20 16:49	EPA 8260D	
1,2-Dichloropropane	ND	---	1.00	ug/L	2	06/25/20 16:49	EPA 8260D	
1,3-Dichloropropane	ND	---	2.00	ug/L	2	06/25/20 16:49	EPA 8260D	
2,2-Dichloropropane	ND	---	2.00	ug/L	2	06/25/20 16:49	EPA 8260D	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0495 - 07 02 20 1041</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-3 (A0F0495-02RE1)</b>			<b>Matrix: Water</b>		<b>Batch: 0060849</b>			
1,1-Dichloropropene	ND	---	2.00	ug/L	2	06/25/20 16:49	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	2.00	ug/L	2	06/25/20 16:49	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	2.00	ug/L	2	06/25/20 16:49	EPA 8260D	
Hexachlorobutadiene	ND	---	10.0	ug/L	2	06/25/20 16:49	EPA 8260D	
Methylene chloride	ND	---	20.0	ug/L	2	06/25/20 16:49	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	---	0.800	ug/L	2	06/25/20 16:49	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	1.00	ug/L	2	06/25/20 16:49	EPA 8260D	
<b>Tetrachloroethene (PCE)</b>	<b>115</b>	---	0.800	ug/L	2	06/25/20 16:49	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	4.00	ug/L	2	06/25/20 16:49	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	4.00	ug/L	2	06/25/20 16:49	EPA 8260D	
<b>1,1,1-Trichloroethane</b>	<b>1.38</b>	---	0.800	ug/L	2	06/25/20 16:49	EPA 8260D	
1,1,2-Trichloroethane	ND	---	1.00	ug/L	2	06/25/20 16:49	EPA 8260D	
<b>Trichloroethene (TCE)</b>	<b>22.8</b>	---	0.800	ug/L	2	06/25/20 16:49	EPA 8260D	
Trichlorofluoromethane	ND	---	4.00	ug/L	2	06/25/20 16:49	EPA 8260D	
1,2,3-Trichloropropane	ND	---	2.00	ug/L	2	06/25/20 16:49	EPA 8260D	
Vinyl chloride	ND	---	0.800	ug/L	2	06/25/20 16:49	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 106 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>06/25/20 16:49</i>	<i>EPA 8260D</i>
<i>Toluene-d8 (Surr)</i>		<i>100 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/25/20 16:49</i>	<i>EPA 8260D</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>105 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/25/20 16:49</i>	<i>EPA 8260D</i>

<b>MW-6 (A0F0495-03)</b>			<b>Matrix: Water</b>		<b>Batch: 0060682</b>			
Bromobenzene	ND	---	0.500	ug/L	1	06/22/20 12:12	EPA 8260D	
Bromochloromethane	ND	---	1.00	ug/L	1	06/22/20 12:12	EPA 8260D	
Bromodichloromethane	ND	---	1.00	ug/L	1	06/22/20 12:12	EPA 8260D	
Bromoform	ND	---	1.00	ug/L	1	06/22/20 12:12	EPA 8260D	
Bromomethane	ND	---	5.00	ug/L	1	06/22/20 12:12	EPA 8260D	
Carbon tetrachloride	ND	---	1.00	ug/L	1	06/22/20 12:12	EPA 8260D	
Chlorobenzene	ND	---	0.500	ug/L	1	06/22/20 12:12	EPA 8260D	
Chloroethane	ND	---	5.00	ug/L	1	06/22/20 12:12	EPA 8260D	
Chloroform	ND	---	1.00	ug/L	1	06/22/20 12:12	EPA 8260D	
Chloromethane	ND	---	5.00	ug/L	1	06/22/20 12:12	EPA 8260D	
2-Chlorotoluene	ND	---	1.00	ug/L	1	06/22/20 12:12	EPA 8260D	
4-Chlorotoluene	ND	---	1.00	ug/L	1	06/22/20 12:12	EPA 8260D	
Dibromochloromethane	ND	---	1.00	ug/L	1	06/22/20 12:12	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	06/22/20 12:12	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	06/22/20 12:12	EPA 8260D	
Dibromomethane	ND	---	1.00	ug/L	1	06/22/20 12:12	EPA 8260D	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	06/22/20 12:12	EPA 8260D	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0495 - 07 02 20 1041</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-6 (A0F0495-03)</b>				<b>Matrix: Water</b>		<b>Batch: 0060682</b>		
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	06/22/20 12:12	EPA 8260D	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	06/22/20 12:12	EPA 8260D	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	06/22/20 12:12	EPA 8260D	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	06/22/20 12:12	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	06/22/20 12:12	EPA 8260D	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	06/22/20 12:12	EPA 8260D	
cis-1,2-Dichloroethene	ND	---	0.400	ug/L	1	06/22/20 12:12	EPA 8260D	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	06/22/20 12:12	EPA 8260D	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	06/22/20 12:12	EPA 8260D	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	06/22/20 12:12	EPA 8260D	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	06/22/20 12:12	EPA 8260D	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	06/22/20 12:12	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	2.00	ug/L	1	06/22/20 12:12	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/22/20 12:12	EPA 8260D	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	06/22/20 12:12	EPA 8260D	
Methylene chloride	ND	---	10.0	ug/L	1	06/22/20 12:12	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	06/22/20 12:12	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	06/22/20 12:12	EPA 8260D	
Tetrachloroethene (PCE)	ND	---	0.400	ug/L	1	06/22/20 12:12	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	06/22/20 12:12	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	06/22/20 12:12	EPA 8260D	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	06/22/20 12:12	EPA 8260D	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	06/22/20 12:12	EPA 8260D	
Trichloroethene (TCE)	ND	---	0.400	ug/L	1	06/22/20 12:12	EPA 8260D	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	06/22/20 12:12	EPA 8260D	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	06/22/20 12:12	EPA 8260D	
Vinyl chloride	ND	---	0.400	ug/L	1	06/22/20 12:12	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 115 %</i>		<i>Limits: 80-120 %</i>	<i>1</i>	<i>06/22/20 12:12</i>	<i>EPA 8260D</i>	
<i>Toluene-d8 (Surr)</i>		<i>96 %</i>		<i>80-120 %</i>	<i>1</i>	<i>06/22/20 12:12</i>	<i>EPA 8260D</i>	
<i>4-Bromofluorobenzene (Surr)</i>		<i>102 %</i>		<i>80-120 %</i>	<i>1</i>	<i>06/22/20 12:12</i>	<i>EPA 8260D</i>	

<b>MW-14 (A0F0495-04RE2)</b>				<b>Matrix: Water</b>		<b>Batch: 0060883</b>		
Bromobenzene	ND	---	2.50	ug/L	5	06/26/20 22:49	EPA 8260D	
Bromochloromethane	ND	---	5.00	ug/L	5	06/26/20 22:49	EPA 8260D	
Bromodichloromethane	ND	---	5.00	ug/L	5	06/26/20 22:49	EPA 8260D	
Bromoform	ND	---	5.00	ug/L	5	06/26/20 22:49	EPA 8260D	
Bromomethane	ND	---	25.0	ug/L	5	06/26/20 22:49	EPA 8260D	
Carbon tetrachloride	ND	---	5.00	ug/L	5	06/26/20 22:49	EPA 8260D	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0495 - 07 02 20 1041</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-14 (A0F0495-04RE2)</b>				<b>Matrix: Water</b>		<b>Batch: 0060883</b>		
Chlorobenzene	ND	---	2.50	ug/L	5	06/26/20 22:49	EPA 8260D	
Chloroethane	ND	---	25.0	ug/L	5	06/26/20 22:49	EPA 8260D	
Chloroform	ND	---	5.00	ug/L	5	06/26/20 22:49	EPA 8260D	
Chloromethane	ND	---	25.0	ug/L	5	06/26/20 22:49	EPA 8260D	
2-Chlorotoluene	ND	---	5.00	ug/L	5	06/26/20 22:49	EPA 8260D	
4-Chlorotoluene	ND	---	5.00	ug/L	5	06/26/20 22:49	EPA 8260D	
Dibromochloromethane	ND	---	5.00	ug/L	5	06/26/20 22:49	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	25.0	ug/L	5	06/26/20 22:49	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	2.50	ug/L	5	06/26/20 22:49	EPA 8260D	
Dibromomethane	ND	---	5.00	ug/L	5	06/26/20 22:49	EPA 8260D	
1,2-Dichlorobenzene	ND	---	2.50	ug/L	5	06/26/20 22:49	EPA 8260D	
1,3-Dichlorobenzene	ND	---	2.50	ug/L	5	06/26/20 22:49	EPA 8260D	
1,4-Dichlorobenzene	ND	---	2.50	ug/L	5	06/26/20 22:49	EPA 8260D	
Dichlorodifluoromethane	ND	---	5.00	ug/L	5	06/26/20 22:49	EPA 8260D	
<b>1,1-Dichloroethane</b>	<b>3.50</b>	---	2.00	ug/L	5	06/26/20 22:49	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	2.00	ug/L	5	06/26/20 22:49	EPA 8260D	
1,1-Dichloroethene	ND	---	2.00	ug/L	5	06/26/20 22:49	EPA 8260D	
<b>cis-1,2-Dichloroethene</b>	<b>82.6</b>	---	2.00	ug/L	5	06/26/20 22:49	EPA 8260D	
trans-1,2-Dichloroethene	ND	---	2.00	ug/L	5	06/26/20 22:49	EPA 8260D	
1,2-Dichloropropane	ND	---	2.50	ug/L	5	06/26/20 22:49	EPA 8260D	
1,3-Dichloropropane	ND	---	5.00	ug/L	5	06/26/20 22:49	EPA 8260D	
2,2-Dichloropropane	ND	---	5.00	ug/L	5	06/26/20 22:49	EPA 8260D	
1,1-Dichloropropene	ND	---	5.00	ug/L	5	06/26/20 22:49	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	5.00	ug/L	5	06/26/20 22:49	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	5.00	ug/L	5	06/26/20 22:49	EPA 8260D	
Hexachlorobutadiene	ND	---	25.0	ug/L	5	06/26/20 22:49	EPA 8260D	
Methylene chloride	ND	---	50.0	ug/L	5	06/26/20 22:49	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	---	2.00	ug/L	5	06/26/20 22:49	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	2.50	ug/L	5	06/26/20 22:49	EPA 8260D	
<b>Tetrachloroethene (PCE)</b>	<b>62.6</b>	---	2.00	ug/L	5	06/26/20 22:49	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	10.0	ug/L	5	06/26/20 22:49	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	10.0	ug/L	5	06/26/20 22:49	EPA 8260D	
1,1,1-Trichloroethane	ND	---	2.00	ug/L	5	06/26/20 22:49	EPA 8260D	
1,1,2-Trichloroethane	ND	---	2.50	ug/L	5	06/26/20 22:49	EPA 8260D	
<b>Trichloroethene (TCE)</b>	<b>197</b>	---	2.00	ug/L	5	06/26/20 22:49	EPA 8260D	
Trichlorofluoromethane	ND	---	10.0	ug/L	5	06/26/20 22:49	EPA 8260D	
1,2,3-Trichloropropane	ND	---	5.00	ug/L	5	06/26/20 22:49	EPA 8260D	
Vinyl chloride	ND	---	2.00	ug/L	5	06/26/20 22:49	EPA 8260D	

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Lisa Domenighini, Client Services Manager





<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0495 - 07 02 20 1041</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-14 (A0F0495-04RE2)</b>			<b>Matrix: Water</b>		<b>Batch: 0060883</b>			
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 112 %</i>	<i>Limits: 80-120 %</i>	<i>1</i>		<i>06/26/20 22:49</i>	<i>EPA 8260D</i>	
<i>Toluene-d8 (Surr)</i>		<i>100 %</i>	<i>80-120 %</i>	<i>1</i>		<i>06/26/20 22:49</i>	<i>EPA 8260D</i>	
<i>4-Bromofluorobenzene (Surr)</i>		<i>103 %</i>	<i>80-120 %</i>	<i>1</i>		<i>06/26/20 22:49</i>	<i>EPA 8260D</i>	
<b>S-2 (A0F0495-05)</b>			<b>Matrix: Water</b>		<b>Batch: 0060682</b>			
Bromobenzene	ND	---	0.500	ug/L	1	06/22/20 12:39	EPA 8260D	
Bromochloromethane	ND	---	1.00	ug/L	1	06/22/20 12:39	EPA 8260D	
Bromodichloromethane	ND	---	1.00	ug/L	1	06/22/20 12:39	EPA 8260D	
Bromoform	ND	---	1.00	ug/L	1	06/22/20 12:39	EPA 8260D	
Bromomethane	ND	---	5.00	ug/L	1	06/22/20 12:39	EPA 8260D	
Carbon tetrachloride	ND	---	1.00	ug/L	1	06/22/20 12:39	EPA 8260D	
Chlorobenzene	ND	---	0.500	ug/L	1	06/22/20 12:39	EPA 8260D	
Chloroethane	ND	---	5.00	ug/L	1	06/22/20 12:39	EPA 8260D	
Chloroform	ND	---	1.00	ug/L	1	06/22/20 12:39	EPA 8260D	
Chloromethane	ND	---	5.00	ug/L	1	06/22/20 12:39	EPA 8260D	
2-Chlorotoluene	ND	---	1.00	ug/L	1	06/22/20 12:39	EPA 8260D	
4-Chlorotoluene	ND	---	1.00	ug/L	1	06/22/20 12:39	EPA 8260D	
Dibromochloromethane	ND	---	1.00	ug/L	1	06/22/20 12:39	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	06/22/20 12:39	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	06/22/20 12:39	EPA 8260D	
Dibromomethane	ND	---	1.00	ug/L	1	06/22/20 12:39	EPA 8260D	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	06/22/20 12:39	EPA 8260D	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	06/22/20 12:39	EPA 8260D	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	06/22/20 12:39	EPA 8260D	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	06/22/20 12:39	EPA 8260D	
<b>1,1-Dichloroethane</b>	<b>4.24</b>	---	0.400	ug/L	1	06/22/20 12:39	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	06/22/20 12:39	EPA 8260D	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	06/22/20 12:39	EPA 8260D	
<b>cis-1,2-Dichloroethene</b>	<b>15.5</b>	---	0.400	ug/L	1	06/22/20 12:39	EPA 8260D	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	06/22/20 12:39	EPA 8260D	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	06/22/20 12:39	EPA 8260D	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	06/22/20 12:39	EPA 8260D	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	06/22/20 12:39	EPA 8260D	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	06/22/20 12:39	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	2.00	ug/L	1	06/22/20 12:39	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/22/20 12:39	EPA 8260D	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	06/22/20 12:39	EPA 8260D	
Methylene chloride	ND	---	10.0	ug/L	1	06/22/20 12:39	EPA 8260D	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0495 - 07 02 20 1041</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>S-2 (A0F0495-05)</b>				<b>Matrix: Water</b>		<b>Batch: 0060682</b>		
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	06/22/20 12:39	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	06/22/20 12:39	EPA 8260D	
Tetrachloroethene (PCE)	ND	---	0.400	ug/L	1	06/22/20 12:39	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	06/22/20 12:39	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	06/22/20 12:39	EPA 8260D	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	06/22/20 12:39	EPA 8260D	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	06/22/20 12:39	EPA 8260D	
<b>Trichloroethene (TCE)</b>	<b>0.580</b>	---	0.400	ug/L	1	06/22/20 12:39	EPA 8260D	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	06/22/20 12:39	EPA 8260D	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	06/22/20 12:39	EPA 8260D	
Vinyl chloride	ND	---	0.400	ug/L	1	06/22/20 12:39	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 113 %</i>		<i>Limits: 80-120 %</i>	<i>1</i>	<i>06/22/20 12:39</i>	<i>EPA 8260D</i>	
<i>Toluene-d8 (Surr)</i>		<i>96 %</i>		<i>80-120 %</i>	<i>1</i>	<i>06/22/20 12:39</i>	<i>EPA 8260D</i>	
<i>4-Bromofluorobenzene (Surr)</i>		<i>103 %</i>		<i>80-120 %</i>	<i>1</i>	<i>06/22/20 12:39</i>	<i>EPA 8260D</i>	

<b>S-1 (A0F0495-06)</b>				<b>Matrix: Water</b>		<b>Batch: 0060682</b>		
Bromobenzene	ND	---	0.500	ug/L	1	06/22/20 13:06	EPA 8260D	
Bromochloromethane	ND	---	1.00	ug/L	1	06/22/20 13:06	EPA 8260D	
Bromodichloromethane	ND	---	1.00	ug/L	1	06/22/20 13:06	EPA 8260D	
Bromoform	ND	---	1.00	ug/L	1	06/22/20 13:06	EPA 8260D	
Bromomethane	ND	---	5.00	ug/L	1	06/22/20 13:06	EPA 8260D	
Carbon tetrachloride	ND	---	1.00	ug/L	1	06/22/20 13:06	EPA 8260D	
Chlorobenzene	ND	---	0.500	ug/L	1	06/22/20 13:06	EPA 8260D	
Chloroethane	ND	---	5.00	ug/L	1	06/22/20 13:06	EPA 8260D	
Chloroform	ND	---	1.00	ug/L	1	06/22/20 13:06	EPA 8260D	
Chloromethane	ND	---	5.00	ug/L	1	06/22/20 13:06	EPA 8260D	
2-Chlorotoluene	ND	---	1.00	ug/L	1	06/22/20 13:06	EPA 8260D	
4-Chlorotoluene	ND	---	1.00	ug/L	1	06/22/20 13:06	EPA 8260D	
Dibromochloromethane	ND	---	1.00	ug/L	1	06/22/20 13:06	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	06/22/20 13:06	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	06/22/20 13:06	EPA 8260D	
Dibromomethane	ND	---	1.00	ug/L	1	06/22/20 13:06	EPA 8260D	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	06/22/20 13:06	EPA 8260D	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	06/22/20 13:06	EPA 8260D	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	06/22/20 13:06	EPA 8260D	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	06/22/20 13:06	EPA 8260D	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	06/22/20 13:06	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	06/22/20 13:06	EPA 8260D	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0495 - 07 02 20 1041</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>S-1 (A0F0495-06)</b>				<b>Matrix: Water</b>		<b>Batch: 0060682</b>		
1,1-Dichloroethene	ND	---	0.400	ug/L	1	06/22/20 13:06	EPA 8260D	
cis-1,2-Dichloroethene	ND	---	0.400	ug/L	1	06/22/20 13:06	EPA 8260D	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	06/22/20 13:06	EPA 8260D	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	06/22/20 13:06	EPA 8260D	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	06/22/20 13:06	EPA 8260D	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	06/22/20 13:06	EPA 8260D	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	06/22/20 13:06	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	2.00	ug/L	1	06/22/20 13:06	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/22/20 13:06	EPA 8260D	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	06/22/20 13:06	EPA 8260D	
Methylene chloride	ND	---	10.0	ug/L	1	06/22/20 13:06	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	06/22/20 13:06	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	06/22/20 13:06	EPA 8260D	
Tetrachloroethene (PCE)	ND	---	0.400	ug/L	1	06/22/20 13:06	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	06/22/20 13:06	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	06/22/20 13:06	EPA 8260D	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	06/22/20 13:06	EPA 8260D	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	06/22/20 13:06	EPA 8260D	
<b>Trichloroethene (TCE)</b>	<b>0.440</b>	---	0.400	ug/L	1	06/22/20 13:06	EPA 8260D	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	06/22/20 13:06	EPA 8260D	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	06/22/20 13:06	EPA 8260D	
Vinyl chloride	ND	---	0.400	ug/L	1	06/22/20 13:06	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 118 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>06/22/20 13:06</i>	<i>EPA 8260D</i>
<i>Toluene-d8 (Surr)</i>		<i>96 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/22/20 13:06</i>	<i>EPA 8260D</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>103 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/22/20 13:06</i>	<i>EPA 8260D</i>

<b>MP-1 (A0F0495-07RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0060849</b>		
Bromobenzene	ND	---	5.00	ug/L	10	06/25/20 17:16	EPA 8260D	
Bromochloromethane	ND	---	10.0	ug/L	10	06/25/20 17:16	EPA 8260D	
Bromodichloromethane	ND	---	10.0	ug/L	10	06/25/20 17:16	EPA 8260D	
Bromoform	ND	---	10.0	ug/L	10	06/25/20 17:16	EPA 8260D	
Bromomethane	ND	---	50.0	ug/L	10	06/25/20 17:16	EPA 8260D	
Carbon tetrachloride	ND	---	10.0	ug/L	10	06/25/20 17:16	EPA 8260D	
Chlorobenzene	ND	---	5.00	ug/L	10	06/25/20 17:16	EPA 8260D	
Chloroethane	ND	---	50.0	ug/L	10	06/25/20 17:16	EPA 8260D	
Chloroform	ND	---	10.0	ug/L	10	06/25/20 17:16	EPA 8260D	
Chloromethane	ND	---	50.0	ug/L	10	06/25/20 17:16	EPA 8260D	
2-Chlorotoluene	ND	---	10.0	ug/L	10	06/25/20 17:16	EPA 8260D	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0495 - 07 02 20 1041</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MP-1 (A0F0495-07RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0060849</b>		
4-Chlorotoluene	ND	---	10.0	ug/L	10	06/25/20 17:16	EPA 8260D	
Dibromochloromethane	ND	---	10.0	ug/L	10	06/25/20 17:16	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	50.0	ug/L	10	06/25/20 17:16	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	5.00	ug/L	10	06/25/20 17:16	EPA 8260D	
Dibromomethane	ND	---	10.0	ug/L	10	06/25/20 17:16	EPA 8260D	
1,2-Dichlorobenzene	ND	---	5.00	ug/L	10	06/25/20 17:16	EPA 8260D	
1,3-Dichlorobenzene	ND	---	5.00	ug/L	10	06/25/20 17:16	EPA 8260D	
1,4-Dichlorobenzene	ND	---	5.00	ug/L	10	06/25/20 17:16	EPA 8260D	
Dichlorodifluoromethane	ND	---	10.0	ug/L	10	06/25/20 17:16	EPA 8260D	
1,1-Dichloroethane	ND	---	4.00	ug/L	10	06/25/20 17:16	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	4.00	ug/L	10	06/25/20 17:16	EPA 8260D	
1,1-Dichloroethene	ND	---	4.00	ug/L	10	06/25/20 17:16	EPA 8260D	
<b>cis-1,2-Dichloroethene</b>	<b>72.0</b>	---	4.00	ug/L	10	06/25/20 17:16	EPA 8260D	
trans-1,2-Dichloroethene	ND	---	4.00	ug/L	10	06/25/20 17:16	EPA 8260D	
1,2-Dichloropropane	ND	---	5.00	ug/L	10	06/25/20 17:16	EPA 8260D	
1,3-Dichloropropane	ND	---	10.0	ug/L	10	06/25/20 17:16	EPA 8260D	
2,2-Dichloropropane	ND	---	10.0	ug/L	10	06/25/20 17:16	EPA 8260D	
1,1-Dichloropropene	ND	---	10.0	ug/L	10	06/25/20 17:16	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	10.0	ug/L	10	06/25/20 17:16	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	10.0	ug/L	10	06/25/20 17:16	EPA 8260D	
Hexachlorobutadiene	ND	---	50.0	ug/L	10	06/25/20 17:16	EPA 8260D	
Methylene chloride	ND	---	100	ug/L	10	06/25/20 17:16	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	---	4.00	ug/L	10	06/25/20 17:16	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	5.00	ug/L	10	06/25/20 17:16	EPA 8260D	
<b>Tetrachloroethene (PCE)</b>	<b>427</b>	---	4.00	ug/L	10	06/25/20 17:16	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	20.0	ug/L	10	06/25/20 17:16	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	20.0	ug/L	10	06/25/20 17:16	EPA 8260D	
1,1,1-Trichloroethane	ND	---	4.00	ug/L	10	06/25/20 17:16	EPA 8260D	
1,1,2-Trichloroethane	ND	---	5.00	ug/L	10	06/25/20 17:16	EPA 8260D	
<b>Trichloroethene (TCE)</b>	<b>61.2</b>	---	4.00	ug/L	10	06/25/20 17:16	EPA 8260D	
Trichlorofluoromethane	ND	---	20.0	ug/L	10	06/25/20 17:16	EPA 8260D	
1,2,3-Trichloropropane	ND	---	10.0	ug/L	10	06/25/20 17:16	EPA 8260D	
Vinyl chloride	ND	---	4.00	ug/L	10	06/25/20 17:16	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 107 %</i>		<i>Limits: 80-120 %</i>	<i>1</i>	<i>06/25/20 17:16</i>	<i>EPA 8260D</i>	
<i>Toluene-d8 (Surr)</i>		<i>99 %</i>		<i>80-120 %</i>	<i>1</i>	<i>06/25/20 17:16</i>	<i>EPA 8260D</i>	
<i>4-Bromofluorobenzene (Surr)</i>		<i>105 %</i>		<i>80-120 %</i>	<i>1</i>	<i>06/25/20 17:16</i>	<i>EPA 8260D</i>	

**MW-8 (A0F0495-08)** **Matrix: Water** **Batch: 0060682**

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0495 - 07 02 20 1041</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-8 (A0F0495-08)</b>				<b>Matrix: Water</b>		<b>Batch: 0060682</b>		
Bromobenzene	ND	---	0.500	ug/L	1	06/22/20 13:33	EPA 8260D	
Bromochloromethane	ND	---	1.00	ug/L	1	06/22/20 13:33	EPA 8260D	
Bromodichloromethane	ND	---	1.00	ug/L	1	06/22/20 13:33	EPA 8260D	
Bromoform	ND	---	1.00	ug/L	1	06/22/20 13:33	EPA 8260D	
Bromomethane	ND	---	5.00	ug/L	1	06/22/20 13:33	EPA 8260D	
Carbon tetrachloride	ND	---	1.00	ug/L	1	06/22/20 13:33	EPA 8260D	
Chlorobenzene	ND	---	0.500	ug/L	1	06/22/20 13:33	EPA 8260D	
Chloroethane	ND	---	5.00	ug/L	1	06/22/20 13:33	EPA 8260D	
Chloroform	ND	---	1.00	ug/L	1	06/22/20 13:33	EPA 8260D	
Chloromethane	ND	---	5.00	ug/L	1	06/22/20 13:33	EPA 8260D	
2-Chlorotoluene	ND	---	1.00	ug/L	1	06/22/20 13:33	EPA 8260D	
4-Chlorotoluene	ND	---	1.00	ug/L	1	06/22/20 13:33	EPA 8260D	
Dibromochloromethane	ND	---	1.00	ug/L	1	06/22/20 13:33	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	06/22/20 13:33	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	06/22/20 13:33	EPA 8260D	
Dibromomethane	ND	---	1.00	ug/L	1	06/22/20 13:33	EPA 8260D	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	06/22/20 13:33	EPA 8260D	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	06/22/20 13:33	EPA 8260D	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	06/22/20 13:33	EPA 8260D	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	06/22/20 13:33	EPA 8260D	
<b>1,1-Dichloroethane</b>	<b>0.770</b>	---	0.400	ug/L	1	06/22/20 13:33	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	06/22/20 13:33	EPA 8260D	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	06/22/20 13:33	EPA 8260D	
<b>cis-1,2-Dichloroethene</b>	<b>12.1</b>	---	0.400	ug/L	1	06/22/20 13:33	EPA 8260D	
<b>trans-1,2-Dichloroethene</b>	<b>0.450</b>	---	0.400	ug/L	1	06/22/20 13:33	EPA 8260D	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	06/22/20 13:33	EPA 8260D	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	06/22/20 13:33	EPA 8260D	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	06/22/20 13:33	EPA 8260D	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	06/22/20 13:33	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	2.00	ug/L	1	06/22/20 13:33	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/22/20 13:33	EPA 8260D	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	06/22/20 13:33	EPA 8260D	
Methylene chloride	ND	---	10.0	ug/L	1	06/22/20 13:33	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	06/22/20 13:33	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	06/22/20 13:33	EPA 8260D	
<b>Tetrachloroethene (PCE)</b>	<b>3.51</b>	---	0.400	ug/L	1	06/22/20 13:33	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	06/22/20 13:33	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	06/22/20 13:33	EPA 8260D	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	06/22/20 13:33	EPA 8260D	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0495 - 07 02 20 1041</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
			<b>Matrix: Water</b>			<b>Batch: 0060682</b>		
<b>MW-8 (A0F0495-08)</b>								
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	06/22/20 13:33	EPA 8260D	
<b>Trichloroethene (TCE)</b>	<b>0.430</b>	---	0.400	ug/L	1	06/22/20 13:33	EPA 8260D	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	06/22/20 13:33	EPA 8260D	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	06/22/20 13:33	EPA 8260D	
Vinyl chloride	ND	---	0.400	ug/L	1	06/22/20 13:33	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 112 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>06/22/20 13:33</i>	<i>EPA 8260D</i>
<i>Toluene-d8 (Surr)</i>		<i>96 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/22/20 13:33</i>	<i>EPA 8260D</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>102 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/22/20 13:33</i>	<i>EPA 8260D</i>

			<b>Matrix: Water</b>			<b>Batch: 0060682</b>		
<b>EW-1 (A0F0495-09)</b>								
Bromobenzene	ND	---	0.500	ug/L	1	06/22/20 14:00	EPA 8260D	
Bromochloromethane	ND	---	1.00	ug/L	1	06/22/20 14:00	EPA 8260D	
Bromodichloromethane	ND	---	1.00	ug/L	1	06/22/20 14:00	EPA 8260D	
Bromoform	ND	---	1.00	ug/L	1	06/22/20 14:00	EPA 8260D	
Bromomethane	ND	---	5.00	ug/L	1	06/22/20 14:00	EPA 8260D	
Carbon tetrachloride	ND	---	1.00	ug/L	1	06/22/20 14:00	EPA 8260D	
Chlorobenzene	ND	---	0.500	ug/L	1	06/22/20 14:00	EPA 8260D	
Chloroethane	ND	---	5.00	ug/L	1	06/22/20 14:00	EPA 8260D	
<b>Chloroform</b>	<b>1.33</b>	---	1.00	ug/L	1	06/22/20 14:00	EPA 8260D	
Chloromethane	ND	---	5.00	ug/L	1	06/22/20 14:00	EPA 8260D	
2-Chlorotoluene	ND	---	1.00	ug/L	1	06/22/20 14:00	EPA 8260D	
4-Chlorotoluene	ND	---	1.00	ug/L	1	06/22/20 14:00	EPA 8260D	
Dibromochloromethane	ND	---	1.00	ug/L	1	06/22/20 14:00	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	06/22/20 14:00	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	06/22/20 14:00	EPA 8260D	
Dibromomethane	ND	---	1.00	ug/L	1	06/22/20 14:00	EPA 8260D	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	06/22/20 14:00	EPA 8260D	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	06/22/20 14:00	EPA 8260D	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	06/22/20 14:00	EPA 8260D	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	06/22/20 14:00	EPA 8260D	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	06/22/20 14:00	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	06/22/20 14:00	EPA 8260D	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	06/22/20 14:00	EPA 8260D	
<b>cis-1,2-Dichloroethene</b>	<b>1.20</b>	---	0.400	ug/L	1	06/22/20 14:00	EPA 8260D	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	06/22/20 14:00	EPA 8260D	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	06/22/20 14:00	EPA 8260D	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	06/22/20 14:00	EPA 8260D	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	06/22/20 14:00	EPA 8260D	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0F0495 - 07 02 20 1041
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>EW-1 (A0F0495-09)</b>			<b>Matrix: Water</b>			<b>Batch: 0060682</b>		
1,1-Dichloropropene	ND	---	1.00	ug/L	1	06/22/20 14:00	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	2.00	ug/L	1	06/22/20 14:00	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/22/20 14:00	EPA 8260D	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	06/22/20 14:00	EPA 8260D	
Methylene chloride	ND	---	10.0	ug/L	1	06/22/20 14:00	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	06/22/20 14:00	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	06/22/20 14:00	EPA 8260D	
<b>Tetrachloroethene (PCE)</b>	<b>29.9</b>	---	0.400	ug/L	1	06/22/20 14:00	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	06/22/20 14:00	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	06/22/20 14:00	EPA 8260D	
<b>1,1,1-Trichloroethane</b>	<b>0.900</b>	---	0.400	ug/L	1	06/22/20 14:00	EPA 8260D	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	06/22/20 14:00	EPA 8260D	
<b>Trichloroethene (TCE)</b>	<b>6.78</b>	---	0.400	ug/L	1	06/22/20 14:00	EPA 8260D	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	06/22/20 14:00	EPA 8260D	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	06/22/20 14:00	EPA 8260D	
Vinyl chloride	ND	---	0.400	ug/L	1	06/22/20 14:00	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 118 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>06/22/20 14:00</i>	<i>EPA 8260D</i>
<i>Toluene-d8 (Surr)</i>		<i>94 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/22/20 14:00</i>	<i>EPA 8260D</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>104 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/22/20 14:00</i>	<i>EPA 8260D</i>

<b>MW-18i (A0F0495-10)</b>			<b>Matrix: Water</b>			<b>Batch: 0060682</b>		
Bromobenzene	ND	---	0.500	ug/L	1	06/22/20 14:27	EPA 8260D	
Bromochloromethane	ND	---	1.00	ug/L	1	06/22/20 14:27	EPA 8260D	
Bromodichloromethane	ND	---	1.00	ug/L	1	06/22/20 14:27	EPA 8260D	
Bromoform	ND	---	1.00	ug/L	1	06/22/20 14:27	EPA 8260D	
Bromomethane	ND	---	5.00	ug/L	1	06/22/20 14:27	EPA 8260D	
Carbon tetrachloride	ND	---	1.00	ug/L	1	06/22/20 14:27	EPA 8260D	
Chlorobenzene	ND	---	0.500	ug/L	1	06/22/20 14:27	EPA 8260D	
Chloroethane	ND	---	5.00	ug/L	1	06/22/20 14:27	EPA 8260D	
Chloroform	ND	---	1.00	ug/L	1	06/22/20 14:27	EPA 8260D	
Chloromethane	ND	---	5.00	ug/L	1	06/22/20 14:27	EPA 8260D	
2-Chlorotoluene	ND	---	1.00	ug/L	1	06/22/20 14:27	EPA 8260D	
4-Chlorotoluene	ND	---	1.00	ug/L	1	06/22/20 14:27	EPA 8260D	
Dibromochloromethane	ND	---	1.00	ug/L	1	06/22/20 14:27	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	06/22/20 14:27	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	06/22/20 14:27	EPA 8260D	
Dibromomethane	ND	---	1.00	ug/L	1	06/22/20 14:27	EPA 8260D	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	06/22/20 14:27	EPA 8260D	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0495 - 07 02 20 1041</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-18i (A0F0495-10)</b>				<b>Matrix: Water</b>		<b>Batch: 0060682</b>		
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	06/22/20 14:27	EPA 8260D	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	06/22/20 14:27	EPA 8260D	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	06/22/20 14:27	EPA 8260D	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	06/22/20 14:27	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	06/22/20 14:27	EPA 8260D	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	06/22/20 14:27	EPA 8260D	
<b>cis-1,2-Dichloroethene</b>	<b>0.940</b>	---	0.400	ug/L	1	06/22/20 14:27	EPA 8260D	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	06/22/20 14:27	EPA 8260D	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	06/22/20 14:27	EPA 8260D	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	06/22/20 14:27	EPA 8260D	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	06/22/20 14:27	EPA 8260D	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	06/22/20 14:27	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	2.00	ug/L	1	06/22/20 14:27	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/22/20 14:27	EPA 8260D	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	06/22/20 14:27	EPA 8260D	
Methylene chloride	ND	---	10.0	ug/L	1	06/22/20 14:27	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	06/22/20 14:27	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	06/22/20 14:27	EPA 8260D	
<b>Tetrachloroethene (PCE)</b>	<b>0.880</b>	---	0.400	ug/L	1	06/22/20 14:27	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	06/22/20 14:27	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	06/22/20 14:27	EPA 8260D	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	06/22/20 14:27	EPA 8260D	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	06/22/20 14:27	EPA 8260D	
<b>Trichloroethene (TCE)</b>	<b>0.400</b>	---	0.400	ug/L	1	06/22/20 14:27	EPA 8260D	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	06/22/20 14:27	EPA 8260D	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	06/22/20 14:27	EPA 8260D	
Vinyl chloride	ND	---	0.400	ug/L	1	06/22/20 14:27	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 117 %</i>		<i>Limits: 80-120 %</i>	<i>1</i>	<i>06/22/20 14:27</i>	<i>EPA 8260D</i>	
<i>Toluene-d8 (Surr)</i>		<i>95 %</i>		<i>80-120 %</i>	<i>1</i>	<i>06/22/20 14:27</i>	<i>EPA 8260D</i>	
<i>4-Bromofluorobenzene (Surr)</i>		<i>103 %</i>		<i>80-120 %</i>	<i>1</i>	<i>06/22/20 14:27</i>	<i>EPA 8260D</i>	

<b>MW-20i (A0F0495-11)</b>				<b>Matrix: Water</b>		<b>Batch: 0060682</b>		
Bromobenzene	ND	---	0.500	ug/L	1	06/22/20 14:54	EPA 8260D	
Bromochloromethane	ND	---	1.00	ug/L	1	06/22/20 14:54	EPA 8260D	
Bromodichloromethane	ND	---	1.00	ug/L	1	06/22/20 14:54	EPA 8260D	
Bromoform	ND	---	1.00	ug/L	1	06/22/20 14:54	EPA 8260D	
Bromomethane	ND	---	5.00	ug/L	1	06/22/20 14:54	EPA 8260D	
Carbon tetrachloride	ND	---	1.00	ug/L	1	06/22/20 14:54	EPA 8260D	

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Lisa Domenighini, Client Services Manager





<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0495 - 07 02 20 1041</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-20i (A0F0495-11)</b>				<b>Matrix: Water</b>		<b>Batch: 0060682</b>		
Chlorobenzene	ND	---	0.500	ug/L	1	06/22/20 14:54	EPA 8260D	
Chloroethane	ND	---	5.00	ug/L	1	06/22/20 14:54	EPA 8260D	
Chloroform	ND	---	1.00	ug/L	1	06/22/20 14:54	EPA 8260D	
Chloromethane	ND	---	5.00	ug/L	1	06/22/20 14:54	EPA 8260D	
2-Chlorotoluene	ND	---	1.00	ug/L	1	06/22/20 14:54	EPA 8260D	
4-Chlorotoluene	ND	---	1.00	ug/L	1	06/22/20 14:54	EPA 8260D	
Dibromochloromethane	ND	---	1.00	ug/L	1	06/22/20 14:54	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	06/22/20 14:54	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	06/22/20 14:54	EPA 8260D	
Dibromomethane	ND	---	1.00	ug/L	1	06/22/20 14:54	EPA 8260D	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	06/22/20 14:54	EPA 8260D	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	06/22/20 14:54	EPA 8260D	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	06/22/20 14:54	EPA 8260D	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	06/22/20 14:54	EPA 8260D	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	06/22/20 14:54	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	06/22/20 14:54	EPA 8260D	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	06/22/20 14:54	EPA 8260D	
<b>cis-1,2-Dichloroethene</b>	<b>1.93</b>	---	0.400	ug/L	1	06/22/20 14:54	EPA 8260D	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	06/22/20 14:54	EPA 8260D	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	06/22/20 14:54	EPA 8260D	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	06/22/20 14:54	EPA 8260D	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	06/22/20 14:54	EPA 8260D	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	06/22/20 14:54	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	2.00	ug/L	1	06/22/20 14:54	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/22/20 14:54	EPA 8260D	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	06/22/20 14:54	EPA 8260D	
Methylene chloride	ND	---	10.0	ug/L	1	06/22/20 14:54	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	06/22/20 14:54	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	06/22/20 14:54	EPA 8260D	
<b>Tetrachloroethene (PCE)</b>	<b>0.410</b>	---	0.400	ug/L	1	06/22/20 14:54	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	06/22/20 14:54	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	06/22/20 14:54	EPA 8260D	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	06/22/20 14:54	EPA 8260D	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	06/22/20 14:54	EPA 8260D	
Trichloroethene (TCE)	ND	---	0.400	ug/L	1	06/22/20 14:54	EPA 8260D	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	06/22/20 14:54	EPA 8260D	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	06/22/20 14:54	EPA 8260D	
Vinyl chloride	ND	---	0.400	ug/L	1	06/22/20 14:54	EPA 8260D	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0495 - 07 02 20 1041</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-20i (A0F0495-11)</b>				<b>Matrix: Water</b>		<b>Batch: 0060682</b>		
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>			Recovery: 118 %	Limits: 80-120 %	1	06/22/20 14:54	EPA 8260D	
<i>Toluene-d8 (Surr)</i>			96 %	80-120 %	1	06/22/20 14:54	EPA 8260D	
<i>4-Bromofluorobenzene (Surr)</i>			103 %	80-120 %	1	06/22/20 14:54	EPA 8260D	

<b>MW-21i-40 (A0F0495-12)</b>				<b>Matrix: Water</b>		<b>Batch: 0060682</b>		
Bromobenzene	ND	---	0.500	ug/L	1	06/22/20 18:25	EPA 8260D	
Bromochloromethane	ND	---	1.00	ug/L	1	06/22/20 18:25	EPA 8260D	
Bromodichloromethane	ND	---	1.00	ug/L	1	06/22/20 18:25	EPA 8260D	
Bromoform	ND	---	1.00	ug/L	1	06/22/20 18:25	EPA 8260D	
Bromomethane	ND	---	5.00	ug/L	1	06/22/20 18:25	EPA 8260D	
Carbon tetrachloride	ND	---	1.00	ug/L	1	06/22/20 18:25	EPA 8260D	
Chlorobenzene	ND	---	0.500	ug/L	1	06/22/20 18:25	EPA 8260D	
Chloroethane	ND	---	5.00	ug/L	1	06/22/20 18:25	EPA 8260D	
Chloroform	ND	---	1.00	ug/L	1	06/22/20 18:25	EPA 8260D	
Chloromethane	ND	---	5.00	ug/L	1	06/22/20 18:25	EPA 8260D	
2-Chlorotoluene	ND	---	1.00	ug/L	1	06/22/20 18:25	EPA 8260D	
4-Chlorotoluene	ND	---	1.00	ug/L	1	06/22/20 18:25	EPA 8260D	
Dibromochloromethane	ND	---	1.00	ug/L	1	06/22/20 18:25	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	06/22/20 18:25	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	06/22/20 18:25	EPA 8260D	
Dibromomethane	ND	---	1.00	ug/L	1	06/22/20 18:25	EPA 8260D	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	06/22/20 18:25	EPA 8260D	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	06/22/20 18:25	EPA 8260D	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	06/22/20 18:25	EPA 8260D	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	06/22/20 18:25	EPA 8260D	
<b>1,1-Dichloroethane</b>	<b>1.95</b>	---	0.400	ug/L	1	06/22/20 18:25	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	06/22/20 18:25	EPA 8260D	
<b>1,1-Dichloroethene</b>	<b>0.540</b>	---	0.400	ug/L	1	06/22/20 18:25	EPA 8260D	
<b>cis-1,2-Dichloroethene</b>	<b>45.9</b>	---	0.400	ug/L	1	06/22/20 18:25	EPA 8260D	
<b>trans-1,2-Dichloroethene</b>	<b>0.400</b>	---	0.400	ug/L	1	06/22/20 18:25	EPA 8260D	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	06/22/20 18:25	EPA 8260D	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	06/22/20 18:25	EPA 8260D	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	06/22/20 18:25	EPA 8260D	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	06/22/20 18:25	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	2.00	ug/L	1	06/22/20 18:25	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/22/20 18:25	EPA 8260D	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	06/22/20 18:25	EPA 8260D	
Methylene chloride	ND	---	10.0	ug/L	1	06/22/20 18:25	EPA 8260D	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0495 - 07 02 20 1041</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-21i-40 (A0F0495-12)</b>				<b>Matrix: Water</b>		<b>Batch: 0060682</b>		
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	06/22/20 18:25	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	06/22/20 18:25	EPA 8260D	
<b>Tetrachloroethene (PCE)</b>	<b>31.1</b>	---	0.400	ug/L	1	06/22/20 18:25	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	06/22/20 18:25	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	06/22/20 18:25	EPA 8260D	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	06/22/20 18:25	EPA 8260D	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	06/22/20 18:25	EPA 8260D	
<b>Trichloroethene (TCE)</b>	<b>14.6</b>	---	0.400	ug/L	1	06/22/20 18:25	EPA 8260D	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	06/22/20 18:25	EPA 8260D	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	06/22/20 18:25	EPA 8260D	
Vinyl chloride	ND	---	0.400	ug/L	1	06/22/20 18:25	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 114 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>06/22/20 18:25</i>	<i>EPA 8260D</i>
<i>Toluene-d8 (Surr)</i>		<i>95 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/22/20 18:25</i>	<i>EPA 8260D</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>103 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/22/20 18:25</i>	<i>EPA 8260D</i>

<b>MW-2 (A0F0495-13)</b>				<b>Matrix: Water</b>		<b>Batch: 0060682</b>		
Bromobenzene	ND	---	0.500	ug/L	1	06/22/20 15:22	EPA 8260D	
Bromochloromethane	ND	---	1.00	ug/L	1	06/22/20 15:22	EPA 8260D	
Bromodichloromethane	ND	---	1.00	ug/L	1	06/22/20 15:22	EPA 8260D	
Bromoform	ND	---	1.00	ug/L	1	06/22/20 15:22	EPA 8260D	
Bromomethane	ND	---	5.00	ug/L	1	06/22/20 15:22	EPA 8260D	
Carbon tetrachloride	ND	---	1.00	ug/L	1	06/22/20 15:22	EPA 8260D	
Chlorobenzene	ND	---	0.500	ug/L	1	06/22/20 15:22	EPA 8260D	
Chloroethane	ND	---	5.00	ug/L	1	06/22/20 15:22	EPA 8260D	
Chloroform	ND	---	1.00	ug/L	1	06/22/20 15:22	EPA 8260D	
Chloromethane	ND	---	5.00	ug/L	1	06/22/20 15:22	EPA 8260D	
2-Chlorotoluene	ND	---	1.00	ug/L	1	06/22/20 15:22	EPA 8260D	
4-Chlorotoluene	ND	---	1.00	ug/L	1	06/22/20 15:22	EPA 8260D	
Dibromochloromethane	ND	---	1.00	ug/L	1	06/22/20 15:22	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	06/22/20 15:22	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	06/22/20 15:22	EPA 8260D	
Dibromomethane	ND	---	1.00	ug/L	1	06/22/20 15:22	EPA 8260D	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	06/22/20 15:22	EPA 8260D	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	06/22/20 15:22	EPA 8260D	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	06/22/20 15:22	EPA 8260D	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	06/22/20 15:22	EPA 8260D	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	06/22/20 15:22	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	06/22/20 15:22	EPA 8260D	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0495 - 07 02 20 1041</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
			<b>Matrix: Water</b>			<b>Batch: 0060682</b>		
<b>MW-2 (A0F0495-13)</b>								
1,1-Dichloroethene	ND	---	0.400	ug/L	1	06/22/20 15:22	EPA 8260D	
cis-1,2-Dichloroethene	ND	---	0.400	ug/L	1	06/22/20 15:22	EPA 8260D	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	06/22/20 15:22	EPA 8260D	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	06/22/20 15:22	EPA 8260D	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	06/22/20 15:22	EPA 8260D	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	06/22/20 15:22	EPA 8260D	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	06/22/20 15:22	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	2.00	ug/L	1	06/22/20 15:22	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/22/20 15:22	EPA 8260D	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	06/22/20 15:22	EPA 8260D	
Methylene chloride	ND	---	10.0	ug/L	1	06/22/20 15:22	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	06/22/20 15:22	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	06/22/20 15:22	EPA 8260D	
Tetrachloroethene (PCE)	ND	---	0.400	ug/L	1	06/22/20 15:22	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	06/22/20 15:22	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	06/22/20 15:22	EPA 8260D	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	06/22/20 15:22	EPA 8260D	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	06/22/20 15:22	EPA 8260D	
Trichloroethene (TCE)	ND	---	0.400	ug/L	1	06/22/20 15:22	EPA 8260D	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	06/22/20 15:22	EPA 8260D	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	06/22/20 15:22	EPA 8260D	
Vinyl chloride	ND	---	0.400	ug/L	1	06/22/20 15:22	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>			<i>Recovery: 118 %</i>	<i>Limits: 80-120 %</i>	<i>1</i>	<i>06/22/20 15:22</i>	<i>EPA 8260D</i>	
<i>Toluene-d8 (Surr)</i>			<i>94 %</i>	<i>80-120 %</i>	<i>1</i>	<i>06/22/20 15:22</i>	<i>EPA 8260D</i>	
<i>4-Bromofluorobenzene (Surr)</i>			<i>103 %</i>	<i>80-120 %</i>	<i>1</i>	<i>06/22/20 15:22</i>	<i>EPA 8260D</i>	

			<b>Matrix: Water</b>			<b>Batch: 0060682</b>		
<b>MW-23i (A0F0495-14)</b>								
Bromobenzene	ND	---	0.500	ug/L	1	06/22/20 15:49	EPA 8260D	
Bromochloromethane	ND	---	1.00	ug/L	1	06/22/20 15:49	EPA 8260D	
Bromodichloromethane	ND	---	1.00	ug/L	1	06/22/20 15:49	EPA 8260D	
Bromoform	ND	---	1.00	ug/L	1	06/22/20 15:49	EPA 8260D	
Bromomethane	ND	---	5.00	ug/L	1	06/22/20 15:49	EPA 8260D	
Carbon tetrachloride	ND	---	1.00	ug/L	1	06/22/20 15:49	EPA 8260D	
Chlorobenzene	ND	---	0.500	ug/L	1	06/22/20 15:49	EPA 8260D	
Chloroethane	ND	---	5.00	ug/L	1	06/22/20 15:49	EPA 8260D	
Chloroform	ND	---	1.00	ug/L	1	06/22/20 15:49	EPA 8260D	
Chloromethane	ND	---	5.00	ug/L	1	06/22/20 15:49	EPA 8260D	
2-Chlorotoluene	ND	---	1.00	ug/L	1	06/22/20 15:49	EPA 8260D	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0495 - 07 02 20 1041</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-23i (A0F0495-14)</b>				<b>Matrix: Water</b>		<b>Batch: 0060682</b>		
4-Chlorotoluene	ND	---	1.00	ug/L	1	06/22/20 15:49	EPA 8260D	
Dibromochloromethane	ND	---	1.00	ug/L	1	06/22/20 15:49	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	06/22/20 15:49	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	06/22/20 15:49	EPA 8260D	
Dibromomethane	ND	---	1.00	ug/L	1	06/22/20 15:49	EPA 8260D	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	06/22/20 15:49	EPA 8260D	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	06/22/20 15:49	EPA 8260D	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	06/22/20 15:49	EPA 8260D	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	06/22/20 15:49	EPA 8260D	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	06/22/20 15:49	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	06/22/20 15:49	EPA 8260D	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	06/22/20 15:49	EPA 8260D	
cis-1,2-Dichloroethene	ND	---	0.400	ug/L	1	06/22/20 15:49	EPA 8260D	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	06/22/20 15:49	EPA 8260D	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	06/22/20 15:49	EPA 8260D	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	06/22/20 15:49	EPA 8260D	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	06/22/20 15:49	EPA 8260D	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	06/22/20 15:49	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	2.00	ug/L	1	06/22/20 15:49	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/22/20 15:49	EPA 8260D	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	06/22/20 15:49	EPA 8260D	
Methylene chloride	ND	---	10.0	ug/L	1	06/22/20 15:49	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	06/22/20 15:49	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	06/22/20 15:49	EPA 8260D	
Tetrachloroethene (PCE)	ND	---	0.400	ug/L	1	06/22/20 15:49	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	06/22/20 15:49	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	06/22/20 15:49	EPA 8260D	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	06/22/20 15:49	EPA 8260D	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	06/22/20 15:49	EPA 8260D	
Trichloroethene (TCE)	ND	---	0.400	ug/L	1	06/22/20 15:49	EPA 8260D	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	06/22/20 15:49	EPA 8260D	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	06/22/20 15:49	EPA 8260D	
Vinyl chloride	ND	---	0.400	ug/L	1	06/22/20 15:49	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 116 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>06/22/20 15:49</i>	<i>EPA 8260D</i>
<i>Toluene-d8 (Surr)</i>		<i>96 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/22/20 15:49</i>	<i>EPA 8260D</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>103 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/22/20 15:49</i>	<i>EPA 8260D</i>

<b>MW-26 (A0F0495-15RE1)</b>	<b>Matrix: Water</b>	<b>Batch: 0060849</b>
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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0495 - 07 02 20 1041</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-26 (A0F0495-15RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0060849</b>		
Bromobenzene	ND	---	1.00	ug/L	2	06/25/20 17:43	EPA 8260D	
Bromochloromethane	ND	---	2.00	ug/L	2	06/25/20 17:43	EPA 8260D	
Bromodichloromethane	ND	---	2.00	ug/L	2	06/25/20 17:43	EPA 8260D	
Bromoform	ND	---	2.00	ug/L	2	06/25/20 17:43	EPA 8260D	
Bromomethane	ND	---	10.0	ug/L	2	06/25/20 17:43	EPA 8260D	
Carbon tetrachloride	ND	---	2.00	ug/L	2	06/25/20 17:43	EPA 8260D	
Chlorobenzene	ND	---	1.00	ug/L	2	06/25/20 17:43	EPA 8260D	
Chloroethane	ND	---	10.0	ug/L	2	06/25/20 17:43	EPA 8260D	
Chloroform	ND	---	2.00	ug/L	2	06/25/20 17:43	EPA 8260D	
Chloromethane	ND	---	10.0	ug/L	2	06/25/20 17:43	EPA 8260D	
2-Chlorotoluene	ND	---	2.00	ug/L	2	06/25/20 17:43	EPA 8260D	
4-Chlorotoluene	ND	---	2.00	ug/L	2	06/25/20 17:43	EPA 8260D	
Dibromochloromethane	ND	---	2.00	ug/L	2	06/25/20 17:43	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	10.0	ug/L	2	06/25/20 17:43	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	1.00	ug/L	2	06/25/20 17:43	EPA 8260D	
Dibromomethane	ND	---	2.00	ug/L	2	06/25/20 17:43	EPA 8260D	
1,2-Dichlorobenzene	ND	---	1.00	ug/L	2	06/25/20 17:43	EPA 8260D	
1,3-Dichlorobenzene	ND	---	1.00	ug/L	2	06/25/20 17:43	EPA 8260D	
1,4-Dichlorobenzene	ND	---	1.00	ug/L	2	06/25/20 17:43	EPA 8260D	
Dichlorodifluoromethane	ND	---	2.00	ug/L	2	06/25/20 17:43	EPA 8260D	
<b>1,1-Dichloroethane</b>	<b>5.16</b>	---	0.800	ug/L	2	06/25/20 17:43	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	0.800	ug/L	2	06/25/20 17:43	EPA 8260D	
<b>1,1-Dichloroethene</b>	<b>1.38</b>	---	0.800	ug/L	2	06/25/20 17:43	EPA 8260D	
<b>cis-1,2-Dichloroethene</b>	<b>64.2</b>	---	0.800	ug/L	2	06/25/20 17:43	EPA 8260D	
<b>trans-1,2-Dichloroethene</b>	<b>1.90</b>	---	0.800	ug/L	2	06/25/20 17:43	EPA 8260D	
1,2-Dichloropropane	ND	---	1.00	ug/L	2	06/25/20 17:43	EPA 8260D	
1,3-Dichloropropane	ND	---	2.00	ug/L	2	06/25/20 17:43	EPA 8260D	
2,2-Dichloropropane	ND	---	2.00	ug/L	2	06/25/20 17:43	EPA 8260D	
1,1-Dichloropropene	ND	---	2.00	ug/L	2	06/25/20 17:43	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	2.00	ug/L	2	06/25/20 17:43	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	2.00	ug/L	2	06/25/20 17:43	EPA 8260D	
Hexachlorobutadiene	ND	---	10.0	ug/L	2	06/25/20 17:43	EPA 8260D	
Methylene chloride	ND	---	20.0	ug/L	2	06/25/20 17:43	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	---	0.800	ug/L	2	06/25/20 17:43	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	1.00	ug/L	2	06/25/20 17:43	EPA 8260D	
<b>Tetrachloroethene (PCE)</b>	<b>143</b>	---	0.800	ug/L	2	06/25/20 17:43	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	4.00	ug/L	2	06/25/20 17:43	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	4.00	ug/L	2	06/25/20 17:43	EPA 8260D	
<b>1,1,1-Trichloroethane</b>	<b>2.20</b>	---	0.800	ug/L	2	06/25/20 17:43	EPA 8260D	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0495 - 07 02 20 1041</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-26 (A0F0495-15RE1)</b>			<b>Matrix: Water</b>		<b>Batch: 0060849</b>			
1,1,2-Trichloroethane	ND	---	1.00	ug/L	2	06/25/20 17:43	EPA 8260D	
<b>Trichloroethene (TCE)</b>	<b>299</b>	---	0.800	ug/L	2	06/25/20 17:43	EPA 8260D	
Trichlorofluoromethane	ND	---	4.00	ug/L	2	06/25/20 17:43	EPA 8260D	
1,2,3-Trichloropropane	ND	---	2.00	ug/L	2	06/25/20 17:43	EPA 8260D	
Vinyl chloride	ND	---	0.800	ug/L	2	06/25/20 17:43	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 113 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>06/25/20 17:43</i>	<i>EPA 8260D</i>
<i>Toluene-d8 (Surr)</i>		<i>100 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/25/20 17:43</i>	<i>EPA 8260D</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>104 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/25/20 17:43</i>	<i>EPA 8260D</i>

<b>MW-17 (A0F0495-16)</b>			<b>Matrix: Water</b>		<b>Batch: 0060682</b>			
Bromobenzene	ND	---	0.500	ug/L	1	06/22/20 16:16	EPA 8260D	
Bromochloromethane	ND	---	1.00	ug/L	1	06/22/20 16:16	EPA 8260D	
Bromodichloromethane	ND	---	1.00	ug/L	1	06/22/20 16:16	EPA 8260D	
Bromoform	ND	---	1.00	ug/L	1	06/22/20 16:16	EPA 8260D	
Bromomethane	ND	---	5.00	ug/L	1	06/22/20 16:16	EPA 8260D	
Carbon tetrachloride	ND	---	1.00	ug/L	1	06/22/20 16:16	EPA 8260D	
Chlorobenzene	ND	---	0.500	ug/L	1	06/22/20 16:16	EPA 8260D	
Chloroethane	ND	---	5.00	ug/L	1	06/22/20 16:16	EPA 8260D	
Chloroform	ND	---	1.00	ug/L	1	06/22/20 16:16	EPA 8260D	
Chloromethane	ND	---	5.00	ug/L	1	06/22/20 16:16	EPA 8260D	
2-Chlorotoluene	ND	---	1.00	ug/L	1	06/22/20 16:16	EPA 8260D	
4-Chlorotoluene	ND	---	1.00	ug/L	1	06/22/20 16:16	EPA 8260D	
Dibromochloromethane	ND	---	1.00	ug/L	1	06/22/20 16:16	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	06/22/20 16:16	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	06/22/20 16:16	EPA 8260D	
Dibromomethane	ND	---	1.00	ug/L	1	06/22/20 16:16	EPA 8260D	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	06/22/20 16:16	EPA 8260D	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	06/22/20 16:16	EPA 8260D	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	06/22/20 16:16	EPA 8260D	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	06/22/20 16:16	EPA 8260D	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	06/22/20 16:16	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	06/22/20 16:16	EPA 8260D	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	06/22/20 16:16	EPA 8260D	
<b>cis-1,2-Dichloroethene</b>	<b>5.11</b>	---	0.400	ug/L	1	06/22/20 16:16	EPA 8260D	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	06/22/20 16:16	EPA 8260D	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	06/22/20 16:16	EPA 8260D	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	06/22/20 16:16	EPA 8260D	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	06/22/20 16:16	EPA 8260D	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0F0495 - 07 02 20 1041
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
				<b>Matrix: Water</b>		<b>Batch: 0060682</b>		
1,1-Dichloropropene	ND	---	1.00	ug/L	1	06/22/20 16:16	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	2.00	ug/L	1	06/22/20 16:16	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/22/20 16:16	EPA 8260D	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	06/22/20 16:16	EPA 8260D	
Methylene chloride	ND	---	10.0	ug/L	1	06/22/20 16:16	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	06/22/20 16:16	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	06/22/20 16:16	EPA 8260D	
<b>Tetrachloroethene (PCE)</b>	<b>4.06</b>	---	0.400	ug/L	1	06/22/20 16:16	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	06/22/20 16:16	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	06/22/20 16:16	EPA 8260D	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	06/22/20 16:16	EPA 8260D	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	06/22/20 16:16	EPA 8260D	
<b>Trichloroethene (TCE)</b>	<b>7.40</b>	---	0.400	ug/L	1	06/22/20 16:16	EPA 8260D	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	06/22/20 16:16	EPA 8260D	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	06/22/20 16:16	EPA 8260D	
Vinyl chloride	ND	---	0.400	ug/L	1	06/22/20 16:16	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 118 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>06/22/20 16:16</i>	<i>EPA 8260D</i>
<i>Toluene-d8 (Surr)</i>		<i>96 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/22/20 16:16</i>	<i>EPA 8260D</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>103 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/22/20 16:16</i>	<i>EPA 8260D</i>

				<b>Matrix: Water</b>		<b>Batch: 0060682</b>		
Bromobenzene	ND	---	0.500	ug/L	1	06/22/20 16:43	EPA 8260D	
Bromochloromethane	ND	---	1.00	ug/L	1	06/22/20 16:43	EPA 8260D	
Bromodichloromethane	ND	---	1.00	ug/L	1	06/22/20 16:43	EPA 8260D	
Bromoform	ND	---	1.00	ug/L	1	06/22/20 16:43	EPA 8260D	
Bromomethane	ND	---	5.00	ug/L	1	06/22/20 16:43	EPA 8260D	
Carbon tetrachloride	ND	---	1.00	ug/L	1	06/22/20 16:43	EPA 8260D	
Chlorobenzene	ND	---	0.500	ug/L	1	06/22/20 16:43	EPA 8260D	
Chloroethane	ND	---	5.00	ug/L	1	06/22/20 16:43	EPA 8260D	
Chloroform	ND	---	1.00	ug/L	1	06/22/20 16:43	EPA 8260D	
Chloromethane	ND	---	5.00	ug/L	1	06/22/20 16:43	EPA 8260D	
2-Chlorotoluene	ND	---	1.00	ug/L	1	06/22/20 16:43	EPA 8260D	
4-Chlorotoluene	ND	---	1.00	ug/L	1	06/22/20 16:43	EPA 8260D	
Dibromochloromethane	ND	---	1.00	ug/L	1	06/22/20 16:43	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	06/22/20 16:43	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	06/22/20 16:43	EPA 8260D	
Dibromomethane	ND	---	1.00	ug/L	1	06/22/20 16:43	EPA 8260D	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	06/22/20 16:43	EPA 8260D	

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Lisa Domenighini, Client Services Manager





<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0495 - 07 02 20 1041</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-10 (A0F0495-17)</b>				<b>Matrix: Water</b>		<b>Batch: 0060682</b>		
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	06/22/20 16:43	EPA 8260D	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	06/22/20 16:43	EPA 8260D	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	06/22/20 16:43	EPA 8260D	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	06/22/20 16:43	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	06/22/20 16:43	EPA 8260D	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	06/22/20 16:43	EPA 8260D	
cis-1,2-Dichloroethene	ND	---	0.400	ug/L	1	06/22/20 16:43	EPA 8260D	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	06/22/20 16:43	EPA 8260D	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	06/22/20 16:43	EPA 8260D	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	06/22/20 16:43	EPA 8260D	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	06/22/20 16:43	EPA 8260D	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	06/22/20 16:43	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	2.00	ug/L	1	06/22/20 16:43	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/22/20 16:43	EPA 8260D	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	06/22/20 16:43	EPA 8260D	
Methylene chloride	ND	---	10.0	ug/L	1	06/22/20 16:43	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	06/22/20 16:43	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	06/22/20 16:43	EPA 8260D	
<b>Tetrachloroethene (PCE)</b>	<b>9.74</b>	---	0.400	ug/L	1	06/22/20 16:43	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	06/22/20 16:43	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	06/22/20 16:43	EPA 8260D	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	06/22/20 16:43	EPA 8260D	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	06/22/20 16:43	EPA 8260D	
<b>Trichloroethene (TCE)</b>	<b>5.00</b>	---	0.400	ug/L	1	06/22/20 16:43	EPA 8260D	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	06/22/20 16:43	EPA 8260D	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	06/22/20 16:43	EPA 8260D	
Vinyl chloride	ND	---	0.400	ug/L	1	06/22/20 16:43	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 119 %</i>		<i>Limits: 80-120 %</i>	<i>1</i>	<i>06/22/20 16:43</i>	<i>EPA 8260D</i>	
<i>Toluene-d8 (Surr)</i>		<i>94 %</i>		<i>80-120 %</i>	<i>1</i>	<i>06/22/20 16:43</i>	<i>EPA 8260D</i>	
<i>4-Bromofluorobenzene (Surr)</i>		<i>104 %</i>		<i>80-120 %</i>	<i>1</i>	<i>06/22/20 16:43</i>	<i>EPA 8260D</i>	



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**ANALYTICAL SAMPLE RESULTS**

**Ammonia by Gas Diffusion and Colorimetric Detection**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-1 (A0F0495-01RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0060617</b>		
Ammonia as N	38.0	---	0.200	mg/L	10	06/19/20 13:44	SM 4500-NH3 G	
<b>MW-3 (A0F0495-02)</b>				<b>Matrix: Water</b>		<b>Batch: 0060617</b>		
Ammonia as N	ND	---	0.0200	mg/L	1	06/19/20 12:48	SM 4500-NH3 G	
<b>MW-6 (A0F0495-03RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0060617</b>		
Ammonia as N	1.87	---	0.0400	mg/L	2	06/19/20 13:46	SM 4500-NH3 G	
<b>MW-14 (A0F0495-04RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0060617</b>		
Ammonia as N	23.9	---	0.200	mg/L	10	06/19/20 13:47	SM 4500-NH3 G	
<b>S-2 (A0F0495-05RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0060617</b>		
Ammonia as N	6.34	---	0.0400	mg/L	2	06/19/20 13:49	SM 4500-NH3 G	
<b>S-1 (A0F0495-06RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0060617</b>		
Ammonia as N	ND	---	0.0200	mg/L	1	06/19/20 13:50	SM 4500-NH3 G	
<b>MP-1 (A0F0495-07RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0060617</b>		
Ammonia as N	5.81	---	0.0400	mg/L	2	06/19/20 13:52	SM 4500-NH3 G	
<b>MW-8 (A0F0495-08RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0060617</b>		
Ammonia as N	ND	---	0.0200	mg/L	1	06/19/20 13:53	SM 4500-NH3 G	
<b>EW-1 (A0F0495-09RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0060617</b>		
Ammonia as N	ND	---	0.0200	mg/L	1	06/19/20 13:55	SM 4500-NH3 G	
<b>MW-18i (A0F0495-10RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0060617</b>		
Ammonia as N	ND	---	0.0200	mg/L	1	06/19/20 13:56	SM 4500-NH3 G	
<b>MW-20i (A0F0495-11RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0060617</b>		
Ammonia as N	ND	---	0.0200	mg/L	1	06/19/20 13:58	SM 4500-NH3 G	
<b>MW-21i-40 (A0F0495-12)</b>				<b>Matrix: Water</b>		<b>Batch: 0060617</b>		
Ammonia as N	ND	---	0.0200	mg/L	1	06/19/20 13:21	SM 4500-NH3 G	
<b>MW-2 (A0F0495-13RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0060617</b>		

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**ANALYTICAL SAMPLE RESULTS**

**Ammonia by Gas Diffusion and Colorimetric Detection**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-2 (A0F0495-13RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0060617</b>		
Ammonia as N	10.9	---	0.0800	mg/L	4	06/19/20 14:07	SM 4500-NH3 G	
<b>MW-23i (A0F0495-14)</b>				<b>Matrix: Water</b>		<b>Batch: 0060617</b>		
Ammonia as N	ND	---	0.0200	mg/L	1	06/19/20 13:24	SM 4500-NH3 G	
<b>MW-26 (A0F0495-15)</b>				<b>Matrix: Water</b>		<b>Batch: 0060617</b>		
Ammonia as N	42.9	---	0.200	mg/L	10	06/19/20 13:26	SM 4500-NH3 G	
<b>MW-17 (A0F0495-16)</b>				<b>Matrix: Water</b>		<b>Batch: 0060617</b>		
Ammonia as N	ND	---	0.0200	mg/L	1	06/19/20 13:27	SM 4500-NH3 G	
<b>MW-10 (A0F0495-17)</b>				<b>Matrix: Water</b>		<b>Batch: 0060617</b>		
Ammonia as N	13.2	---	0.200	mg/L	10	06/19/20 13:29	SM 4500-NH3 G	

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**ANALYTICAL SAMPLE RESULTS**

**Anions by Ion Chromatography**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-1 (A0F0495-01) Matrix: Water</b>								
Batch: 0060630								
Nitrate-Nitrogen	7.45	---	0.250	mg/L	1	06/18/20 12:44	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/18/20 12:44	EPA 300.0	
<b>MW-3 (A0F0495-02) Matrix: Water</b>								
Batch: 0060630								
Nitrate-Nitrogen	7.92	---	0.250	mg/L	1	06/18/20 13:49	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/18/20 13:49	EPA 300.0	
<b>MW-6 (A0F0495-03) Matrix: Water</b>								
Batch: 0060630								
Nitrate-Nitrogen	ND	---	0.250	mg/L	1	06/18/20 14:11	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/18/20 14:11	EPA 300.0	
<b>MW-14 (A0F0495-04) Matrix: Water</b>								
Batch: 0060630								
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/18/20 14:32	EPA 300.0	
<b>MW-14 (A0F0495-04RE2) Matrix: Water</b>								
Batch: 0060630								
Nitrate-Nitrogen	118	---	5.00	mg/L	20	06/20/20 16:35	EPA 300.0	<b>H-01</b>
<b>S-2 (A0F0495-05) Matrix: Water</b>								
Batch: 0060630								
Nitrate-Nitrogen	ND	---	0.250	mg/L	1	06/18/20 14:54	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/18/20 14:54	EPA 300.0	
<b>S-1 (A0F0495-06) Matrix: Water</b>								
Batch: 0060630								
Nitrate-Nitrogen	1.13	---	0.250	mg/L	1	06/18/20 15:15	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/18/20 15:15	EPA 300.0	
<b>MP-1 (A0F0495-07) Matrix: Water</b>								
Batch: 0060630								
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/18/20 17:03	EPA 300.0	

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**ANALYTICAL SAMPLE RESULTS**

**Anions by Ion Chromatography**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MP-1 (A0F0495-07RE3)</b>				<b>Matrix: Water</b>				
Batch: 0060630								
Nitrate-Nitrogen	161	---	12.5	mg/L	50	06/20/20 12:59	EPA 300.0	H-01
<b>MW-8 (A0F0495-08)</b>				<b>Matrix: Water</b>				
Batch: 0060630								
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/18/20 17:25	EPA 300.0	
<b>MW-8 (A0F0495-08RE1)</b>				<b>Matrix: Water</b>				
Batch: 0060630								
Nitrate-Nitrogen	108	---	5.00	mg/L	20	06/19/20 14:44	EPA 300.0	H-01
<b>EW-1 (A0F0495-09)</b>				<b>Matrix: Water</b>				
Batch: 0060630								
Nitrate-Nitrogen	4.24	---	0.250	mg/L	1	06/18/20 17:46	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/18/20 17:46	EPA 300.0	
<b>MW-18i (A0F0495-10)</b>				<b>Matrix: Water</b>				
Batch: 0060630								
Nitrate-Nitrogen	0.420	---	0.250	mg/L	1	06/18/20 18:08	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/18/20 18:08	EPA 300.0	
<b>MW-20i (A0F0495-11)</b>				<b>Matrix: Water</b>				
Batch: 0060630								
Nitrate-Nitrogen	0.585	---	0.250	mg/L	1	06/18/20 18:29	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/18/20 18:29	EPA 300.0	
<b>MW-21i-40 (A0F0495-12)</b>				<b>Matrix: Water</b>				
Batch: 0060630								
Nitrate-Nitrogen	2.11	---	0.250	mg/L	1	06/18/20 18:51	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/18/20 18:51	EPA 300.0	
<b>MW-2 (A0F0495-13)</b>				<b>Matrix: Water</b>				
Batch: 0060630								
Nitrate-Nitrogen	ND	---	0.250	mg/L	1	06/18/20 19:13	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/18/20 19:13	EPA 300.0	

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**ANALYTICAL SAMPLE RESULTS**

**Anions by Ion Chromatography**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-23i (A0F0495-14)</b>				<b>Matrix: Water</b>				
Batch: 0060630								
Nitrate-Nitrogen	0.372	---	0.250	mg/L	1	06/18/20 19:34	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/18/20 19:34	EPA 300.0	
<b>MW-26 (A0F0495-15RE1)</b>				<b>Matrix: Water</b>				
Batch: 0060630								
Nitrate-Nitrogen	573	---	50.0	mg/L	200	06/20/20 16:56	EPA 300.0	H-01
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/19/20 15:06	EPA 300.0	H-01
<b>MW-17 (A0F0495-16)</b>				<b>Matrix: Water</b>				
Batch: 0060630								
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/18/20 21:00	EPA 300.0	
<b>MW-17 (A0F0495-16RE1)</b>				<b>Matrix: Water</b>				
Batch: 0060630								
Nitrate-Nitrogen	10.6	---	0.500	mg/L	2	06/20/20 15:30	EPA 300.0	H-01
<b>MW-10 (A0F0495-17RE1)</b>				<b>Matrix: Water</b>				
Batch: 0060630								
Nitrate-Nitrogen	489	---	50.0	mg/L	200	06/20/20 17:18	EPA 300.0	H-01
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/19/20 15:27	EPA 300.0	H-01

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 Tigard, OR 97223  
 503-718-2323  
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**ANALYTICAL SAMPLE RESULTS**

**Total Organic Carbon (Non-Purgeable) by Persulfate Oxidation by Standard Method 5310C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-14 (A0F0495-04)</b>				<b>Matrix: Water</b>		<b>Batch: 0060732</b>		
<b>Total Organic Carbon</b>	<b>4.22</b>	---	1.00	mg/L	1	06/23/20 14:47	SM 5310 C	
<b>MP-1 (A0F0495-07)</b>				<b>Matrix: Water</b>		<b>Batch: 0060732</b>		
<b>Total Organic Carbon</b>	<b>5.91</b>	---	1.00	mg/L	1	06/23/20 15:21	SM 5310 C	

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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0060682 - EPA 5030B</b>						<b>Water</b>						
<b>Blank (0060682-BLK1)</b>		Prepared: 06/22/20 07:30			Analyzed: 06/22/20 09:29							
<b>EPA 8260D</b>												
Bromobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Bromochloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Bromodichloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Bromoform	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Bromomethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
Carbon tetrachloride	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Chlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Chloroethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
Chloroform	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Chloromethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
2-Chlorotoluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
4-Chlorotoluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Dibromochloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Dibromomethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
1,1-Dichloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
1,1-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
cis-1,2-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
1,2-Dichloropropane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
1,3-Dichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
2,2-Dichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
1,1-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
cis-1,3-Dichloropropene	ND	---	2.00	ug/L	1	---	---	---	---	---	---	---
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Hexachlorobutadiene	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
Methylene chloride	ND	---	10.0	ug/L	1	---	---	---	---	---	---	---

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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0060682 - EPA 5030B</b>												
<b>Water</b>												
<b>Blank (0060682-BLK1)</b>	Prepared: 06/22/20 07:30 Analyzed: 06/22/20 09:29											
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Tetrachloroethene (PCE)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Trichloroethene (TCE)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Vinyl chloride	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 115 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>97 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>104 %</i>		<i>80-120 %</i>		<i>"</i>						

<b>LCS (0060682-BS1)</b>												
Prepared: 06/22/20 07:30 Analyzed: 06/22/20 08:08												
<b>EPA 8260D</b>												
Bromobenzene	19.6	---	0.500	ug/L	1	20.0	---	98	80 - 120%	---	---	
Bromochloromethane	17.1	---	1.00	ug/L	1	20.0	---	86	80 - 120%	---	---	
Bromodichloromethane	22.1	---	1.00	ug/L	1	20.0	---	111	80 - 120%	---	---	
Bromoform	21.5	---	1.00	ug/L	1	20.0	---	108	80 - 120%	---	---	
Bromomethane	20.4	---	5.00	ug/L	1	20.0	---	102	80 - 120%	---	---	
Carbon tetrachloride	25.3	---	1.00	ug/L	1	20.0	---	<b>126</b>	<b>80 - 120%</b>	---	---	Q-56
Chlorobenzene	20.0	---	0.500	ug/L	1	20.0	---	100	80 - 120%	---	---	
Chloroethane	18.8	---	5.00	ug/L	1	20.0	---	94	80 - 120%	---	---	
Chloroform	20.3	---	1.00	ug/L	1	20.0	---	102	80 - 120%	---	---	
Chloromethane	18.6	---	5.00	ug/L	1	20.0	---	93	80 - 120%	---	---	
2-Chlorotoluene	18.9	---	1.00	ug/L	1	20.0	---	95	80 - 120%	---	---	
4-Chlorotoluene	18.5	---	1.00	ug/L	1	20.0	---	93	80 - 120%	---	---	
Dibromochloromethane	19.8	---	1.00	ug/L	1	20.0	---	99	80 - 120%	---	---	
1,2-Dibromo-3-chloropropane	20.2	---	5.00	ug/L	1	20.0	---	101	80 - 120%	---	---	
1,2-Dibromoethane (EDB)	20.4	---	0.500	ug/L	1	20.0	---	102	80 - 120%	---	---	
Dibromomethane	20.6	---	1.00	ug/L	1	20.0	---	103	80 - 120%	---	---	
1,2-Dichlorobenzene	21.5	---	0.500	ug/L	1	20.0	---	108	80 - 120%	---	---	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0F0495 - 07 02 20 1041
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0060682 - EPA 5030B</b>												
						<b>Water</b>						
<b>LCS (0060682-BS1)</b>	Prepared: 06/22/20 07:30 Analyzed: 06/22/20 08:08											
1,3-Dichlorobenzene	21.3	---	0.500	ug/L	1	20.0	---	106	80 - 120%	---	---	
1,4-Dichlorobenzene	19.5	---	0.500	ug/L	1	20.0	---	98	80 - 120%	---	---	
Dichlorodifluoromethane	19.2	---	1.00	ug/L	1	20.0	---	96	80 - 120%	---	---	
1,1-Dichloroethane	18.9	---	0.400	ug/L	1	20.0	---	95	80 - 120%	---	---	
1,2-Dichloroethane (EDC)	20.0	---	0.400	ug/L	1	20.0	---	100	80 - 120%	---	---	
1,1-Dichloroethene	17.8	---	0.400	ug/L	1	20.0	---	89	80 - 120%	---	---	
cis-1,2-Dichloroethene	18.3	---	0.400	ug/L	1	20.0	---	91	80 - 120%	---	---	
trans-1,2-Dichloroethene	17.5	---	0.400	ug/L	1	20.0	---	88	80 - 120%	---	---	
1,2-Dichloropropane	17.9	---	0.500	ug/L	1	20.0	---	89	80 - 120%	---	---	
1,3-Dichloropropane	18.0	---	1.00	ug/L	1	20.0	---	90	80 - 120%	---	---	
2,2-Dichloropropane	30.5	---	1.00	ug/L	1	20.0	---	<b>153</b>	<b>80 - 120%</b>	---	---	Q-56
1,1-Dichloropropene	20.1	---	1.00	ug/L	1	20.0	---	100	80 - 120%	---	---	
cis-1,3-Dichloropropene	17.2	---	2.00	ug/L	1	20.0	---	86	80 - 120%	---	---	
trans-1,3-Dichloropropene	19.7	---	1.00	ug/L	1	20.0	---	98	80 - 120%	---	---	
Hexachlorobutadiene	24.5	---	5.00	ug/L	1	20.0	---	<b>122</b>	<b>80 - 120%</b>	---	---	Q-56
Methylene chloride	18.4	---	10.0	ug/L	1	20.0	---	92	80 - 120%	---	---	
1,1,1,2-Tetrachloroethane	22.6	---	0.400	ug/L	1	20.0	---	113	80 - 120%	---	---	
1,1,2,2-Tetrachloroethane	16.5	---	0.500	ug/L	1	20.0	---	82	80 - 120%	---	---	
Tetrachloroethene (PCE)	23.2	---	0.400	ug/L	1	20.0	---	116	80 - 120%	---	---	
1,2,3-Trichlorobenzene	22.7	---	2.00	ug/L	1	20.0	---	114	80 - 120%	---	---	
1,2,4-Trichlorobenzene	19.8	---	2.00	ug/L	1	20.0	---	99	80 - 120%	---	---	
1,1,1-Trichloroethane	22.4	---	0.400	ug/L	1	20.0	---	112	80 - 120%	---	---	
1,1,2-Trichloroethane	19.4	---	0.500	ug/L	1	20.0	---	97	80 - 120%	---	---	
Trichloroethene (TCE)	21.4	---	0.400	ug/L	1	20.0	---	107	80 - 120%	---	---	
Trichlorofluoromethane	21.1	---	2.00	ug/L	1	20.0	---	106	80 - 120%	---	---	
1,2,3-Trichloropropane	18.4	---	1.00	ug/L	1	20.0	---	92	80 - 120%	---	---	
Vinyl chloride	16.6	---	0.400	ug/L	1	20.0	---	83	80 - 120%	---	---	
Surr: 1,4-Difluorobenzene (Surr) Recovery: 102 % Limits: 80-120 % Dilution: 1x												
Toluene-d8 (Surr) 92 % 80-120 % "												
4-Bromofluorobenzene (Surr) 96 % 80-120 % "												

**Duplicate (0060682-DUP1)** Prepared: 06/22/20 10:00 Analyzed: 06/22/20 17:57

**QC Source Sample: MW-10 (A0F0495-17)**  
**EPA 8260D**

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0F0495 - 07 02 20 1041
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0060682 - EPA 5030B</b>												
<b>Water</b>												
<b>Duplicate (0060682-DUP1)</b>		Prepared: 06/22/20 10:00 Analyzed: 06/22/20 17:57										
<b>QC Source Sample: MW-10 (A0F0495-17)</b>												
Bromobenzene	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Bromochloromethane	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromodichloromethane	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromoform	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromomethane	ND	---	5.00	ug/L	1	---	ND	---	---	---	30%	
Carbon tetrachloride	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Chlorobenzene	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Chloroethane	ND	---	5.00	ug/L	1	---	ND	---	---	---	30%	
Chloroform	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Chloromethane	ND	---	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Chlorotoluene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
4-Chlorotoluene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Dibromochloromethane	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Dibromomethane	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	---	ND	---	---	---	30%	
cis-1,2-Dichloroethene	ND	---	0.400	ug/L	1	---	ND	---	---	---	30%	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
cis-1,3-Dichloropropene	ND	---	2.00	ug/L	1	---	ND	---	---	---	30%	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	---	ND	---	---	---	30%	
Methylene chloride	ND	---	10.0	ug/L	1	---	ND	---	---	---	30%	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0495 - 07 02 20 1041</b>
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0060682 - EPA 5030B</b>												
<b>Water</b>												
<b>Duplicate (0060682-DUP1)</b>												
			Prepared: 06/22/20 10:00			Analyzed: 06/22/20 17:57						
<b>QC Source Sample: MW-10 (A0F0495-17)</b>												
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Tetrachloroethene (PCE)	<b>9.27</b>	---	0.400	ug/L	1	---	9.74	---	---	5	30%	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	---	ND	---	---	---	30%	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Trichloroethene (TCE)	<b>4.71</b>	---	0.400	ug/L	1	---	5.00	---	---	6	30%	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	---	ND	---	---	---	30%	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Vinyl chloride	ND	---	0.400	ug/L	1	---	ND	---	---	---	30%	

Surr: 1,4-Difluorobenzene (Surr) Recovery: 119 % Limits: 80-120 % Dilution: 1x  
 Toluene-d8 (Surr) 95 % 80-120 % "  
 4-Bromofluorobenzene (Surr) 106 % 80-120 % "

**Matrix Spike (0060682-MS1)** Prepared: 06/22/20 10:00 Analyzed: 06/22/20 11:18

<b>QC Source Sample: MW-1 (A0F0495-01)</b>												
<b>EPA 8260D</b>												
Bromobenzene	21.6	---	0.500	ug/L	1	20.0	ND	108	80 - 120%	---	---	
Bromochloromethane	18.4	---	1.00	ug/L	1	20.0	ND	92	78 - 123%	---	---	
Bromodichloromethane	24.4	---	1.00	ug/L	1	20.0	ND	122	79 - 125%	---	---	
Bromoform	23.7	---	1.00	ug/L	1	20.0	ND	118	66 - 130%	---	---	
Bromomethane	21.9	---	5.00	ug/L	1	20.0	ND	110	53 - 141%	---	---	
Carbon tetrachloride	28.6	---	1.00	ug/L	1	20.0	ND	<b>143</b>	<b>72 - 136%</b>	---	---	Q-54c
Chlorobenzene	22.0	---	0.500	ug/L	1	20.0	ND	110	80 - 120%	---	---	
Chloroethane	20.7	---	5.00	ug/L	1	20.0	ND	104	60 - 138%	---	---	
Chloroform	22.6	---	1.00	ug/L	1	20.0	ND	113	79 - 124%	---	---	
Chloromethane	20.6	---	5.00	ug/L	1	20.0	ND	103	50 - 139%	---	---	
2-Chlorotoluene	21.0	---	1.00	ug/L	1	20.0	ND	105	79 - 122%	---	---	
4-Chlorotoluene	20.4	---	1.00	ug/L	1	20.0	ND	102	78 - 122%	---	---	
Dibromochloromethane	21.5	---	1.00	ug/L	1	20.0	ND	107	74 - 126%	---	---	
1,2-Dibromo-3-chloropropane	22.4	---	5.00	ug/L	1	20.0	ND	112	62 - 128%	---	---	
1,2-Dibromoethane (EDB)	21.6	---	0.500	ug/L	1	20.0	ND	108	77 - 121%	---	---	

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<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0495 - 07 02 20 1041</b>
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QUALITY CONTROL (QC) SAMPLE RESULTS

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0060682 - EPA 5030B</b>												
<b>Water</b>												
<b>Matrix Spike (0060682-MS1)</b>		Prepared: 06/22/20 10:00 Analyzed: 06/22/20 11:18										
<b>QC Source Sample: MW-1 (A0F0495-01)</b>												
Dibromomethane	22.5	---	1.00	ug/L	1	20.0	ND	112	79 - 123%	---	---	
1,2-Dichlorobenzene	23.6	---	0.500	ug/L	1	20.0	ND	118	80 - 120%	---	---	
1,3-Dichlorobenzene	23.7	---	0.500	ug/L	1	20.0	ND	119	80 - 120%	---	---	
1,4-Dichlorobenzene	21.5	---	0.500	ug/L	1	20.0	ND	108	79 - 120%	---	---	
Dichlorodifluoromethane	21.5	---	1.00	ug/L	1	20.0	ND	107	32 - 152%	---	---	
1,1-Dichloroethane	23.7	---	0.400	ug/L	1	20.0	2.95	104	77 - 125%	---	---	
1,2-Dichloroethane (EDC)	22.0	---	0.400	ug/L	1	20.0	ND	110	73 - 128%	---	---	
1,1-Dichloroethene	20.3	---	0.400	ug/L	1	20.0	0.420	99	71 - 131%	---	---	
cis-1,2-Dichloroethene	47.4	---	0.400	ug/L	1	20.0	23.5	120	78 - 123%	---	---	
trans-1,2-Dichloroethene	19.8	---	0.400	ug/L	1	20.0	0.520	96	75 - 124%	---	---	
1,2-Dichloropropane	19.7	---	0.500	ug/L	1	20.0	ND	98	78 - 122%	---	---	
1,3-Dichloropropane	19.4	---	1.00	ug/L	1	20.0	ND	97	80 - 120%	---	---	
2,2-Dichloropropane	33.1	---	1.00	ug/L	1	20.0	ND	<b>166</b>	<b>60 - 139%</b>	---	---	Q-54b
1,1-Dichloropropene	22.8	---	1.00	ug/L	1	20.0	ND	114	79 - 125%	---	---	
cis-1,3-Dichloropropene	16.0	---	2.00	ug/L	1	20.0	ND	80	75 - 124%	---	---	
trans-1,3-Dichloropropene	21.0	---	1.00	ug/L	1	20.0	ND	105	73 - 127%	---	---	
Hexachlorobutadiene	27.4	---	5.00	ug/L	1	20.0	ND	<b>137</b>	<b>66 - 134%</b>	---	---	Q-54a
Methylene chloride	19.8	---	10.0	ug/L	1	20.0	ND	99	74 - 124%	---	---	
1,1,1,2-Tetrachloroethane	25.0	---	0.400	ug/L	1	20.0	ND	<b>125</b>	<b>78 - 124%</b>	---	---	Q-01
1,1,2,2-Tetrachloroethane	20.5	---	0.500	ug/L	1	20.0	ND	102	71 - 121%	---	---	
Tetrachloroethene (PCE)	37.5	---	0.400	ug/L	1	20.0	12.1	127	74 - 129%	---	---	
1,2,3-Trichlorobenzene	25.1	---	2.00	ug/L	1	20.0	ND	126	69 - 129%	---	---	
1,2,4-Trichlorobenzene	22.0	---	2.00	ug/L	1	20.0	ND	110	69 - 130%	---	---	
1,1,1-Trichloroethane	25.2	---	0.400	ug/L	1	20.0	ND	126	74 - 131%	---	---	
1,1,2-Trichloroethane	21.1	---	0.500	ug/L	1	20.0	ND	106	80 - 120%	---	---	
Trichloroethene (TCE)	30.1	---	0.400	ug/L	1	20.0	7.75	112	79 - 123%	---	---	
Trichlorofluoromethane	23.5	---	2.00	ug/L	1	20.0	ND	118	65 - 141%	---	---	
1,2,3-Trichloropropane	20.2	---	1.00	ug/L	1	20.0	ND	101	73 - 122%	---	---	
Vinyl chloride	19.0	---	0.400	ug/L	1	20.0	0.460	92	58 - 137%	---	---	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 103 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>90 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>96 %</i>		<i>80-120 %</i>		<i>"</i>						

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0F0495 - 07 02 20 1041
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0060849 - EPA 5030B</b>						<b>Water</b>						
<b>Blank (0060849-BLK1)</b>		Prepared: 06/25/20 14:58 Analyzed: 06/25/20 16:22										
<b>EPA 8260D</b>												
Bromobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Bromochloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Bromodichloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Bromoform	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Bromomethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
Carbon tetrachloride	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Chlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Chloroethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
Chloroform	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Chloromethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
2-Chlorotoluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
4-Chlorotoluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Dibromochloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Dibromomethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
1,1-Dichloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
1,1-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
cis-1,2-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
1,2-Dichloropropane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
1,3-Dichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
2,2-Dichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
1,1-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Hexachlorobutadiene	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
Methylene chloride	ND	---	10.0	ug/L	1	---	---	---	---	---	---	---

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0F0495 - 07 02 20 1041
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0060849 - EPA 5030B</b>												
<b>Water</b>												
<b>Blank (0060849-BLK1)</b>	Prepared: 06/25/20 14:58 Analyzed: 06/25/20 16:22											
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Tetrachloroethene (PCE)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	---	---	---	---	---	---	---
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	---	---	---	---	---	---	---
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Trichloroethene (TCE)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
Trichlorofluoromethane	ND	---	2.00	ug/L	1	---	---	---	---	---	---	---
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Vinyl chloride	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
<i>Surr: 1,4-Difluorobenzene (Surr)</i>			<i>Recovery: 105 %</i>			<i>Limits: 80-120 %</i>			<i>Dilution: 1x</i>			
<i>Toluene-d8 (Surr)</i>			<i>101 %</i>			<i>80-120 %</i>			<i>"</i>			
<i>4-Bromofluorobenzene (Surr)</i>			<i>105 %</i>			<i>80-120 %</i>			<i>"</i>			

<b>LCS (0060849-BS1)</b>												
Prepared: 06/25/20 14:58 Analyzed: 06/25/20 15:28												
<b>EPA 8260D</b>												
Bromobenzene	18.4	---	0.500	ug/L	1	20.0	---	92	80 - 120%	---	---	---
Bromochloromethane	17.5	---	1.00	ug/L	1	20.0	---	87	80 - 120%	---	---	---
Bromodichloromethane	18.2	---	1.00	ug/L	1	20.0	---	91	80 - 120%	---	---	---
Bromoform	19.4	---	1.00	ug/L	1	20.0	---	97	80 - 120%	---	---	---
Bromomethane	19.9	---	5.00	ug/L	1	20.0	---	99	80 - 120%	---	---	---
Carbon tetrachloride	18.9	---	1.00	ug/L	1	20.0	---	95	80 - 120%	---	---	---
Chlorobenzene	18.4	---	0.500	ug/L	1	20.0	---	92	80 - 120%	---	---	---
Chloroethane	17.7	---	5.00	ug/L	1	20.0	---	88	80 - 120%	---	---	---
Chloroform	18.1	---	1.00	ug/L	1	20.0	---	90	80 - 120%	---	---	---
Chloromethane	16.3	---	5.00	ug/L	1	20.0	---	82	80 - 120%	---	---	---
2-Chlorotoluene	20.4	---	1.00	ug/L	1	20.0	---	102	80 - 120%	---	---	---
4-Chlorotoluene	20.8	---	1.00	ug/L	1	20.0	---	104	80 - 120%	---	---	---
Dibromochloromethane	19.6	---	1.00	ug/L	1	20.0	---	98	80 - 120%	---	---	---
1,2-Dibromo-3-chloropropane	20.3	---	5.00	ug/L	1	20.0	---	102	80 - 120%	---	---	---
1,2-Dibromoethane (EDB)	20.0	---	0.500	ug/L	1	20.0	---	100	80 - 120%	---	---	---
Dibromomethane	18.4	---	1.00	ug/L	1	20.0	---	92	80 - 120%	---	---	---
1,2-Dichlorobenzene	19.9	---	0.500	ug/L	1	20.0	---	100	80 - 120%	---	---	---

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0F0495 - 07 02 20 1041
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0060849 - EPA 5030B</b>												
<b>Water</b>												
<b>LCS (0060849-BS1)</b>	Prepared: 06/25/20 14:58 Analyzed: 06/25/20 15:28											
1,3-Dichlorobenzene	20.3	---	0.500	ug/L	1	20.0	---	101	80 - 120%	---	---	
1,4-Dichlorobenzene	18.7	---	0.500	ug/L	1	20.0	---	94	80 - 120%	---	---	
Dichlorodifluoromethane	17.8	---	1.00	ug/L	1	20.0	---	89	80 - 120%	---	---	
1,1-Dichloroethane	18.7	---	0.400	ug/L	1	20.0	---	93	80 - 120%	---	---	
1,2-Dichloroethane (EDC)	17.8	---	0.400	ug/L	1	20.0	---	89	80 - 120%	---	---	
1,1-Dichloroethene	18.8	---	0.400	ug/L	1	20.0	---	94	80 - 120%	---	---	
cis-1,2-Dichloroethene	19.8	---	0.400	ug/L	1	20.0	---	99	80 - 120%	---	---	
trans-1,2-Dichloroethene	18.7	---	0.400	ug/L	1	20.0	---	94	80 - 120%	---	---	
1,2-Dichloropropane	18.5	---	0.500	ug/L	1	20.0	---	93	80 - 120%	---	---	
1,3-Dichloropropane	19.9	---	1.00	ug/L	1	20.0	---	100	80 - 120%	---	---	
2,2-Dichloropropane	22.2	---	1.00	ug/L	1	20.0	---	111	80 - 120%	---	---	
1,1-Dichloropropene	21.4	---	1.00	ug/L	1	20.0	---	107	80 - 120%	---	---	
cis-1,3-Dichloropropene	19.0	---	1.00	ug/L	1	20.0	---	95	80 - 120%	---	---	
trans-1,3-Dichloropropene	19.2	---	1.00	ug/L	1	20.0	---	96	80 - 120%	---	---	
Hexachlorobutadiene	21.6	---	5.00	ug/L	1	20.0	---	108	80 - 120%	---	---	
Methylene chloride	20.0	---	10.0	ug/L	1	20.0	---	100	80 - 120%	---	---	
1,1,1,2-Tetrachloroethane	19.4	---	0.400	ug/L	1	20.0	---	97	80 - 120%	---	---	
1,1,2,2-Tetrachloroethane	17.9	---	0.500	ug/L	1	20.0	---	89	80 - 120%	---	---	
Tetrachloroethene (PCE)	19.0	---	0.400	ug/L	1	20.0	---	95	80 - 120%	---	---	
1,2,3-Trichlorobenzene	21.0	---	2.00	ug/L	1	20.0	---	105	80 - 120%	---	---	
1,2,4-Trichlorobenzene	22.1	---	2.00	ug/L	1	20.0	---	110	80 - 120%	---	---	
1,1,1-Trichloroethane	19.1	---	0.400	ug/L	1	20.0	---	96	80 - 120%	---	---	
1,1,2-Trichloroethane	18.9	---	0.500	ug/L	1	20.0	---	94	80 - 120%	---	---	
Trichloroethene (TCE)	19.0	---	0.400	ug/L	1	20.0	---	95	80 - 120%	---	---	
Trichlorofluoromethane	18.2	---	2.00	ug/L	1	20.0	---	91	80 - 120%	---	---	
1,2,3-Trichloropropane	18.5	---	1.00	ug/L	1	20.0	---	92	80 - 120%	---	---	
Vinyl chloride	17.9	---	0.400	ug/L	1	20.0	---	89	80 - 120%	---	---	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>			<i>Recovery: 97 %</i>			<i>Limits: 80-120 %</i>			<i>Dilution: 1x</i>			
<i>Toluene-d8 (Surr)</i>			<i>99 %</i>			<i>80-120 %</i>			<i>"</i>			
<i>4-Bromofluorobenzene (Surr)</i>			<i>99 %</i>			<i>80-120 %</i>			<i>"</i>			





<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0F0495 - 07 02 20 1041
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0060883 - EPA 5030B</b>						<b>Water</b>						
<b>Blank (0060883-BLK1)</b>		Prepared: 06/26/20 13:38		Analyzed: 06/26/20 14:59								
<b>EPA 8260D</b>												
Bromobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Bromochloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Bromodichloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Bromoform	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Bromomethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
Carbon tetrachloride	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Chlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Chloroethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
Chloroform	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Chloromethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
2-Chlorotoluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
4-Chlorotoluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Dibromochloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Dibromomethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
1,1-Dichloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
1,1-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
cis-1,2-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
1,2-Dichloropropane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
1,3-Dichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
2,2-Dichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
1,1-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Hexachlorobutadiene	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
Methylene chloride	ND	---	10.0	ug/L	1	---	---	---	---	---	---	---

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<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0F0495 - 07 02 20 1041
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QUALITY CONTROL (QC) SAMPLE RESULTS

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0060883 - EPA 5030B</b>												
<b>Water</b>												
<b>Blank (0060883-BLK1)</b>	Prepared: 06/26/20 13:38 Analyzed: 06/26/20 14:59											
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Tetrachloroethene (PCE)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	---	---	---	---	---	---	---
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	---	---	---	---	---	---	---
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Trichloroethene (TCE)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
Trichlorofluoromethane	ND	---	2.00	ug/L	1	---	---	---	---	---	---	---
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Vinyl chloride	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
Surr: 1,4-Difluorobenzene (Surr)	Recovery: 108 %		Limits: 80-120 %		Dilution: 1x							
Toluene-d8 (Surr)	100 %		80-120 %		"							
4-Bromofluorobenzene (Surr)	105 %		80-120 %		"							

<b>LCS (0060883-BS1)</b>	Prepared: 06/26/20 13:38 Analyzed: 06/26/20 14:05											
<b>EPA 8260D</b>												
Bromobenzene	19.2	---	0.500	ug/L	1	20.0	---	96	80 - 120%	---	---	---
Bromochloromethane	18.6	---	1.00	ug/L	1	20.0	---	93	80 - 120%	---	---	---
Bromodichloromethane	19.6	---	1.00	ug/L	1	20.0	---	98	80 - 120%	---	---	---
Bromoform	21.4	---	1.00	ug/L	1	20.0	---	107	80 - 120%	---	---	---
Bromomethane	19.5	---	5.00	ug/L	1	20.0	---	98	80 - 120%	---	---	---
Carbon tetrachloride	20.1	---	1.00	ug/L	1	20.0	---	100	80 - 120%	---	---	---
Chlorobenzene	19.4	---	0.500	ug/L	1	20.0	---	97	80 - 120%	---	---	---
Chloroethane	21.4	---	5.00	ug/L	1	20.0	---	107	80 - 120%	---	---	---
Chloroform	19.3	---	1.00	ug/L	1	20.0	---	97	80 - 120%	---	---	---
Chloromethane	16.6	---	5.00	ug/L	1	20.0	---	83	80 - 120%	---	---	---
2-Chlorotoluene	21.3	---	1.00	ug/L	1	20.0	---	106	80 - 120%	---	---	---
4-Chlorotoluene	21.8	---	1.00	ug/L	1	20.0	---	109	80 - 120%	---	---	---
Dibromochloromethane	20.7	---	1.00	ug/L	1	20.0	---	104	80 - 120%	---	---	---
1,2-Dibromo-3-chloropropane	21.7	---	5.00	ug/L	1	20.0	---	109	80 - 120%	---	---	---
1,2-Dibromoethane (EDB)	20.6	---	0.500	ug/L	1	20.0	---	103	80 - 120%	---	---	---
Dibromomethane	19.1	---	1.00	ug/L	1	20.0	---	96	80 - 120%	---	---	---
1,2-Dichlorobenzene	20.5	---	0.500	ug/L	1	20.0	---	103	80 - 120%	---	---	---

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<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0495 - 07 02 20 1041</b>
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0060883 - EPA 5030B</b>												
<b>Water</b>												
<b>LCS (0060883-BS1)</b>	Prepared: 06/26/20 13:38 Analyzed: 06/26/20 14:05											
1,3-Dichlorobenzene	21.0	---	0.500	ug/L	1	20.0	---	105	80 - 120%	---	---	
1,4-Dichlorobenzene	19.5	---	0.500	ug/L	1	20.0	---	97	80 - 120%	---	---	
Dichlorodifluoromethane	18.6	---	1.00	ug/L	1	20.0	---	93	80 - 120%	---	---	
1,1-Dichloroethane	19.8	---	0.400	ug/L	1	20.0	---	99	80 - 120%	---	---	
1,2-Dichloroethane (EDC)	19.4	---	0.400	ug/L	1	20.0	---	97	80 - 120%	---	---	
1,1-Dichloroethene	19.0	---	0.400	ug/L	1	20.0	---	95	80 - 120%	---	---	
cis-1,2-Dichloroethene	20.1	---	0.400	ug/L	1	20.0	---	101	80 - 120%	---	---	
trans-1,2-Dichloroethene	18.9	---	0.400	ug/L	1	20.0	---	94	80 - 120%	---	---	
1,2-Dichloropropane	18.8	---	0.500	ug/L	1	20.0	---	94	80 - 120%	---	---	
1,3-Dichloropropane	20.4	---	1.00	ug/L	1	20.0	---	102	80 - 120%	---	---	
2,2-Dichloropropane	24.1	---	1.00	ug/L	1	20.0	---	<b>121</b>	<b>80 - 120%</b>	---	---	Q-56
1,1-Dichloropropene	22.0	---	1.00	ug/L	1	20.0	---	110	80 - 120%	---	---	
cis-1,3-Dichloropropene	19.8	---	1.00	ug/L	1	20.0	---	99	80 - 120%	---	---	
trans-1,3-Dichloropropene	20.4	---	1.00	ug/L	1	20.0	---	102	80 - 120%	---	---	
Hexachlorobutadiene	21.3	---	5.00	ug/L	1	20.0	---	107	80 - 120%	---	---	
Methylene chloride	20.6	---	10.0	ug/L	1	20.0	---	103	80 - 120%	---	---	
1,1,1,2-Tetrachloroethane	21.3	---	0.400	ug/L	1	20.0	---	106	80 - 120%	---	---	
1,1,2,2-Tetrachloroethane	19.3	---	0.500	ug/L	1	20.0	---	97	80 - 120%	---	---	
Tetrachloroethene (PCE)	19.7	---	0.400	ug/L	1	20.0	---	99	80 - 120%	---	---	
1,2,3-Trichlorobenzene	21.5	---	2.00	ug/L	1	20.0	---	108	80 - 120%	---	---	
1,2,4-Trichlorobenzene	21.3	---	2.00	ug/L	1	20.0	---	107	80 - 120%	---	---	
1,1,1-Trichloroethane	20.6	---	0.400	ug/L	1	20.0	---	103	80 - 120%	---	---	
1,1,2-Trichloroethane	19.8	---	0.500	ug/L	1	20.0	---	99	80 - 120%	---	---	
Trichloroethene (TCE)	18.7	---	0.400	ug/L	1	20.0	---	94	80 - 120%	---	---	
Trichlorofluoromethane	19.6	---	2.00	ug/L	1	20.0	---	98	80 - 120%	---	---	
1,2,3-Trichloropropane	19.7	---	1.00	ug/L	1	20.0	---	99	80 - 120%	---	---	
Vinyl chloride	18.0	---	0.400	ug/L	1	20.0	---	90	80 - 120%	---	---	
<b>Surr: 1,4-Difluorobenzene (Surr) Recovery: 95 % Limits: 80-120 % Dilution: 1x</b>												
<b>Toluene-d8 (Surr) 98 % 80-120 % "</b>												
<b>4-Bromofluorobenzene (Surr) 96 % 80-120 % "</b>												



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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Ammonia by Gas Diffusion and Colorimetric Detection**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0060617 - Method Prep: Aq</b>						<b>Water</b>						
<b>Blank (0060617-BLK1)</b>		Prepared: 06/18/20 07:49 Analyzed: 06/19/20 12:42										
<b>SM 4500-NH3 G</b>												
Ammonia as N	ND	---	0.0200	mg/L	1	---	---	---	---	---	---	
<b>LCS (0060617-BS1)</b>		Prepared: 06/18/20 07:49 Analyzed: 06/19/20 12:44										
<b>SM 4500-NH3 G</b>												
Ammonia as N	2.08	---	0.0200	mg/L	1	2.00	---	104	90 - 110%	---	---	
<b>Matrix Spike (0060617-MS1)</b>		Prepared: 06/18/20 07:49 Analyzed: 06/19/20 12:50										
<b>QC Source Sample: MW-3 (A0F0495-02)</b>												
<b>SM 4500-NH3 G</b>												
Ammonia as N	2.61	---	0.0250	mg/L	1	2.50	ND	104	90 - 110%	---	---	
<b>Matrix Spike Dup (0060617-MSD1)</b>		Prepared: 06/18/20 07:49 Analyzed: 06/19/20 12:51										
<b>QC Source Sample: MW-3 (A0F0495-02)</b>												
<b>SM 4500-NH3 G</b>												
Ammonia as N	2.64	---	0.0250	mg/L	1	2.50	ND	106	90 - 110%	1	10%	



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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Anions by Ion Chromatography**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0060630 - Method Prep: Aq</b>						<b>Water</b>						
<b>Blank (0060630-BLK1)</b>			Prepared: 06/18/20 11:08		Analyzed: 06/18/20 12:01							
<b>EPA 300.0</b>												
Nitrate-Nitrogen	ND	---	0.250	mg/L	1	---	---	---	---	---	---	---
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	---	---	---	---	---	---	---
<b>LCS (0060630-BS1)</b>			Prepared: 06/18/20 11:08		Analyzed: 06/18/20 12:23							
<b>EPA 300.0</b>												
Nitrate-Nitrogen	2.15	---	0.250	mg/L	1	2.00	---	108	90 - 110%	---	---	---
Nitrite-Nitrogen	2.17	---	0.250	mg/L	1	2.00	---	108	90 - 110%	---	---	---
<b>Duplicate (0060630-DUP1)</b>			Prepared: 06/18/20 11:08		Analyzed: 06/18/20 13:06							
<b>QC Source Sample: MW-1 (A0F0495-01)</b>												
<b>EPA 300.0</b>												
Nitrate-Nitrogen	7.46	---	0.250	mg/L	1	---	7.45	---	---	0.2	10%	---
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	---	ND	---	---	---	10%	---
<b>Duplicate (0060630-DUP2)</b>			Prepared: 06/18/20 11:08		Analyzed: 06/18/20 16:20							
<b>QC Source Sample: S-1 (A0F0495-06)</b>												
<b>EPA 300.0</b>												
Nitrate-Nitrogen	1.13	---	0.250	mg/L	1	---	1.13	---	---	0.3	10%	---
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	---	ND	---	---	---	10%	---
<b>Matrix Spike (0060630-MS1)</b>			Prepared: 06/18/20 11:08		Analyzed: 06/18/20 13:27							
<b>QC Source Sample: MW-1 (A0F0495-01)</b>												
<b>EPA 300.0</b>												
Nitrate-Nitrogen	10.1	---	0.312	mg/L	1	2.50	7.45	107	80 - 120%	---	---	---
Nitrite-Nitrogen	2.70	---	0.312	mg/L	1	2.50	ND	108	80 - 120%	---	---	---
<b>Matrix Spike (0060630-MS2)</b>			Prepared: 06/18/20 11:08		Analyzed: 06/18/20 16:42							
<b>QC Source Sample: S-1 (A0F0495-06)</b>												
<b>EPA 300.0</b>												
Nitrate-Nitrogen	3.84	---	0.312	mg/L	1	2.50	1.13	108	80 - 120%	---	---	M-02
Nitrite-Nitrogen	2.76	---	0.312	mg/L	1	2.50	ND	110	80 - 120%	---	---	---

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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Total Organic Carbon (Non-Purgeable) by Persulfate Oxidation by Standard Method 5310C**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0060732 - Method Prep: Aq</b>						<b>Water</b>						
<b>Blank (0060732-BLK1)</b>		Prepared: 06/23/20 09:48 Analyzed: 06/23/20 13:42										
<b>SM 5310 C</b>												
Total Organic Carbon	ND	---	1.00	mg/L	1	---	---	---	---	---	---	---
<b>LCS (0060732-BS1)</b>		Prepared: 06/23/20 09:48 Analyzed: 06/23/20 14:14										
<b>SM 5310 C</b>												
Total Organic Carbon	10.5	---	1.00	mg/L	1	10.0	---	105	85 - 115%	---	---	---
<b>LCS (0060732-BS2)</b>		Prepared: 06/23/20 09:48 Analyzed: 06/23/20 13:02										
<b>SM 5310 C</b>												
Total Organic Carbon	ND	---	1.00	mg/L	1	0.00	---		<b>85 - 115%</b>	---	---	TOC_I
<b>Duplicate (0060732-DUP1)</b>		Prepared: 06/23/20 09:48 Analyzed: 06/23/20 15:54										
<b>QC Source Sample: MP-1 (A0F0495-07)</b>												
<b>SM 5310 C</b>												
Total Organic Carbon	<b>5.93</b>	---	1.00	mg/L	1	---	5.91	---	---	0.4	10%	---
<b>Matrix Spike (0060732-MS1)</b>		Prepared: 06/23/20 09:48 Analyzed: 06/23/20 16:25										
<b>QC Source Sample: MP-1 (A0F0495-07)</b>												
<b>SM 5310 C</b>												
Total Organic Carbon	16.5	---	1.01	mg/L	1	10.0	5.91	106	85 - 115%	---	---	---



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**SAMPLE PREPARATION INFORMATION**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Prep: EPA 5030B

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 0060682</u>							
A0F0495-01	Water	EPA 8260D	06/17/20 08:04	06/22/20 10:00	5mL/5mL	5mL/5mL	1.00
A0F0495-03	Water	EPA 8260D	06/17/20 09:22	06/22/20 10:00	5mL/5mL	5mL/5mL	1.00
A0F0495-05	Water	EPA 8260D	06/17/20 12:42	06/22/20 10:00	5mL/5mL	5mL/5mL	1.00
A0F0495-06	Water	EPA 8260D	06/17/20 13:24	06/22/20 10:00	5mL/5mL	5mL/5mL	1.00
A0F0495-08	Water	EPA 8260D	06/17/20 14:20	06/22/20 10:00	5mL/5mL	5mL/5mL	1.00
A0F0495-09	Water	EPA 8260D	06/17/20 08:00	06/22/20 10:00	5mL/5mL	5mL/5mL	1.00
A0F0495-10	Water	EPA 8260D	06/17/20 08:30	06/22/20 10:00	5mL/5mL	5mL/5mL	1.00
A0F0495-11	Water	EPA 8260D	06/17/20 09:00	06/22/20 10:00	5mL/5mL	5mL/5mL	1.00
A0F0495-12	Water	EPA 8260D	06/17/20 09:30	06/22/20 10:00	5mL/5mL	5mL/5mL	1.00
A0F0495-13	Water	EPA 8260D	06/17/20 10:10	06/22/20 10:00	5mL/5mL	5mL/5mL	1.00
A0F0495-14	Water	EPA 8260D	06/17/20 13:40	06/22/20 10:00	5mL/5mL	5mL/5mL	1.00
A0F0495-16	Water	EPA 8260D	06/17/20 11:20	06/22/20 10:00	5mL/5mL	5mL/5mL	1.00
A0F0495-17	Water	EPA 8260D	06/17/20 10:40	06/22/20 10:00	5mL/5mL	5mL/5mL	1.00
<u>Batch: 0060849</u>							
A0F0495-02RE1	Water	EPA 8260D	06/17/20 08:39	06/25/20 14:58	5mL/5mL	5mL/5mL	1.00
A0F0495-07RE1	Water	EPA 8260D	06/17/20 14:10	06/25/20 14:58	5mL/5mL	5mL/5mL	1.00
A0F0495-15RE1	Water	EPA 8260D	06/17/20 12:45	06/25/20 14:58	5mL/5mL	5mL/5mL	1.00
<u>Batch: 0060883</u>							
A0F0495-04RE2	Water	EPA 8260D	06/17/20 12:00	06/26/20 13:38	5mL/5mL	5mL/5mL	1.00

**Ammonia by Gas Diffusion and Colorimetric Detection**

Prep: Method Prep: Aq

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 0060617</u>							
A0F0495-01RE1	Water	SM 4500-NH3 G	06/17/20 08:04	06/18/20 07:49	10mL/10mL	10mL/10mL	1.00
A0F0495-02	Water	SM 4500-NH3 G	06/17/20 08:39	06/18/20 07:49	10mL/10mL	10mL/10mL	1.00
A0F0495-03RE1	Water	SM 4500-NH3 G	06/17/20 09:22	06/18/20 07:49	10mL/10mL	10mL/10mL	1.00
A0F0495-04RE1	Water	SM 4500-NH3 G	06/17/20 12:00	06/18/20 07:49	10mL/10mL	10mL/10mL	1.00
A0F0495-05RE1	Water	SM 4500-NH3 G	06/17/20 12:42	06/18/20 07:49	10mL/10mL	10mL/10mL	1.00
A0F0495-06RE1	Water	SM 4500-NH3 G	06/17/20 13:24	06/18/20 07:49	10mL/10mL	10mL/10mL	1.00
A0F0495-07RE1	Water	SM 4500-NH3 G	06/17/20 14:10	06/18/20 07:49	10mL/10mL	10mL/10mL	1.00
A0F0495-08RE1	Water	SM 4500-NH3 G	06/17/20 14:20	06/18/20 07:49	10mL/10mL	10mL/10mL	1.00
A0F0495-09RE1	Water	SM 4500-NH3 G	06/17/20 08:00	06/18/20 07:49	10mL/10mL	10mL/10mL	1.00
A0F0495-10RE1	Water	SM 4500-NH3 G	06/17/20 08:30	06/18/20 07:49	10mL/10mL	10mL/10mL	1.00

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**SAMPLE PREPARATION INFORMATION**

**Ammonia by Gas Diffusion and Colorimetric Detection**

<u>Prep: Method Prep: Aq</u>					Sample	Default	RL Prep
Lab Number	Matrix	Method	Sampled	Prepared	Initial/Final	Initial/Final	Factor
A0F0495-11RE1	Water	SM 4500-NH3 G	06/17/20 09:00	06/18/20 07:49	10mL/10mL	10mL/10mL	1.00
A0F0495-12	Water	SM 4500-NH3 G	06/17/20 09:30	06/18/20 07:49	10mL/10mL	10mL/10mL	1.00
A0F0495-13RE1	Water	SM 4500-NH3 G	06/17/20 10:10	06/18/20 07:49	10mL/10mL	10mL/10mL	1.00
A0F0495-14	Water	SM 4500-NH3 G	06/17/20 13:40	06/18/20 07:49	10mL/10mL	10mL/10mL	1.00
A0F0495-15	Water	SM 4500-NH3 G	06/17/20 12:45	06/18/20 07:49	10mL/10mL	10mL/10mL	1.00
A0F0495-16	Water	SM 4500-NH3 G	06/17/20 11:20	06/18/20 07:49	10mL/10mL	10mL/10mL	1.00
A0F0495-17	Water	SM 4500-NH3 G	06/17/20 10:40	06/18/20 07:49	10mL/10mL	10mL/10mL	1.00

**Anions by Ion Chromatography**

<u>Prep: Method Prep: Aq</u>					Sample	Default	RL Prep
Lab Number	Matrix	Method	Sampled	Prepared	Initial/Final	Initial/Final	Factor
<u>Batch: 0060630</u>							
A0F0495-01	Water	EPA 300.0	06/17/20 08:04	06/18/20 11:08	5mL/5mL	5mL/5mL	1.00
A0F0495-02	Water	EPA 300.0	06/17/20 08:39	06/18/20 11:08	5mL/5mL	5mL/5mL	1.00
A0F0495-03	Water	EPA 300.0	06/17/20 09:22	06/18/20 11:08	5mL/5mL	5mL/5mL	1.00
A0F0495-04	Water	EPA 300.0	06/17/20 12:00	06/18/20 11:08	5mL/5mL	5mL/5mL	1.00
A0F0495-04RE2	Water	EPA 300.0	06/17/20 12:00	06/18/20 11:08	5mL/5mL	5mL/5mL	1.00
A0F0495-05	Water	EPA 300.0	06/17/20 12:42	06/18/20 11:08	5mL/5mL	5mL/5mL	1.00
A0F0495-06	Water	EPA 300.0	06/17/20 13:24	06/18/20 11:08	5mL/5mL	5mL/5mL	1.00
A0F0495-07	Water	EPA 300.0	06/17/20 14:10	06/18/20 11:08	5mL/5mL	5mL/5mL	1.00
A0F0495-07RE3	Water	EPA 300.0	06/17/20 14:10	06/18/20 11:08	5mL/5mL	5mL/5mL	1.00
A0F0495-08	Water	EPA 300.0	06/17/20 14:20	06/18/20 11:08	5mL/5mL	5mL/5mL	1.00
A0F0495-08RE1	Water	EPA 300.0	06/17/20 14:20	06/18/20 11:08	5mL/5mL	5mL/5mL	1.00
A0F0495-09	Water	EPA 300.0	06/17/20 08:00	06/18/20 11:08	5mL/5mL	5mL/5mL	1.00
A0F0495-10	Water	EPA 300.0	06/17/20 08:30	06/18/20 11:08	5mL/5mL	5mL/5mL	1.00
A0F0495-11	Water	EPA 300.0	06/17/20 09:00	06/18/20 11:08	5mL/5mL	5mL/5mL	1.00
A0F0495-12	Water	EPA 300.0	06/17/20 09:30	06/18/20 11:08	5mL/5mL	5mL/5mL	1.00
A0F0495-13	Water	EPA 300.0	06/17/20 10:10	06/18/20 11:08	5mL/5mL	5mL/5mL	1.00
A0F0495-14	Water	EPA 300.0	06/17/20 13:40	06/18/20 11:08	5mL/5mL	5mL/5mL	1.00
A0F0495-15RE1	Water	EPA 300.0	06/17/20 12:45	06/18/20 11:08	5mL/5mL	5mL/5mL	1.00
A0F0495-16	Water	EPA 300.0	06/17/20 11:20	06/18/20 11:08	5mL/5mL	5mL/5mL	1.00
A0F0495-16RE1	Water	EPA 300.0	06/17/20 11:20	06/18/20 11:08	5mL/5mL	5mL/5mL	1.00
A0F0495-17RE1	Water	EPA 300.0	06/17/20 10:40	06/18/20 11:08	5mL/5mL	5mL/5mL	1.00

**Total Organic Carbon (Non-Purgeable) by Persulfate Oxidation by Standard Method 5310C**

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Lisa Domenighini, Client Services Manager





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6700 S.W. Sandburg Street  
 Tigard, OR 97223  
 503-718-2323  
 ORELAP ID: OR100062

<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0495 - 07 02 20 1041</b>
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**SAMPLE PREPARATION INFORMATION**

**Total Organic Carbon (Non-Purgeable) by Persulfate Oxidation by Standard Method 5310C**

<u>Prep: Method Prep: Aq</u>					Sample	Default	RL Prep
Lab Number	Matrix	Method	Sampled	Prepared	Initial/Final	Initial/Final	Factor
<u>Batch: 0060732</u>							
A0F0495-04	Water	SM 5310 C	06/17/20 12:00	06/23/20 09:48	40mL/40mL	40mL/40mL	1.00
A0F0495-07	Water	SM 5310 C	06/17/20 14:10	06/23/20 09:48	40mL/40mL	40mL/40mL	1.00

Apex Laboratories

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0495 - 07 02 20 1041</b>
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**QUALIFIER DEFINITIONS**

**Client Sample and Quality Control (QC) Sample Qualifier Definitions:**

**Apex Laboratories**

- H-01** This sample was analyzed outside the recommended holding time.
- M-02** Due to matrix interference, this analyte cannot be accurately quantified. The reported result is estimated.
- Q-01** Spike recovery and/or RPD is outside acceptance limits.
- Q-54a** Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +2%. The results are reported as Estimated Values.
- Q-54b** Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +33%. The results are reported as Estimated Values.
- Q-54c** Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +6%. The results are reported as Estimated Values.
- Q-56** Daily CCV/LCS recovery for this analyte was above the +/-20% criteria listed in EPA 8260
- TOC\_I** Inorganic Carbon Spike Check. Results are valid if Non Detect (No Inorganic Carbon detected.)

Apex Laboratories

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0F0495 - 07 02 20 1041
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**REPORTING NOTES AND CONVENTIONS:**

**Abbreviations:**

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported.
- RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

**Detection Limits: Limit of Detection (LOD)**

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('----'), then the data has not been evaluated below the Reporting Limit.

**Reporting Limits: Limit of Quantitation (LOQ)**

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

**Reporting Conventions:**

- Basis: Results for soil samples are generally reported on a 100% dry weight basis. The Result Basis is listed following the units as "dry", "wet", or "" (blank) designation.
  - "dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.
  - "wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
  - "" Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

**QC Source:**

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) are not included in this report. Please request a Full QC report if this data is required.

**Miscellaneous Notes:**

- " --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- " \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

**Blanks:**

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 1/2 the Reporting Limit (RL).  
-For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.  
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.  
For further details, please request a copy of this document.

Apex Laboratories

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0495 - 07 02 20 1041</b>
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**REPORTING NOTES AND CONVENTIONS (Cont.):**

**Blanks (Cont.):**

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

**Preparation Notes:**

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

**Sampling and Preservation Notes:**

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

Apex Laboratories

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0F0495 - 07 02 20 1041
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**LABORATORY ACCREDITATION INFORMATION**

**ORELAP Certification ID: OR100062 (Primary Accreditation)**  
**EPA ID: OR01039**

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

**Apex Laboratories**

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation
<u>All reported analytes are included in Apex Laboratories' current ORELAP scope.</u>					

**Secondary Accreditations**

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

**Subcontract Laboratory Accreditations**

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

**Field Testing Parameters**

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.



Apex Laboratories, LLC

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
ORELAP ID: OR100062

Cascadia Associates

Project: Shore Terminal-Vancouver

5820 SW Kelly Ave Unit B

Project Number: NuStar Vancouver GWM 20

Portland, OR 97239

Project Manager: Stephanie Salisbury

Report ID:

A0F0495 - 07 02 20 1041

**CHAIN OF CUSTODY**

Lab # AO F0495 COC # of 2

**APEX LABS**  
6700 SW Sandburg St., Tigard, OR 97223 Ph: 503-718-2323

Company: Cascadia Associates Project Mgr: Stephanie Salisbury Project Name: GWM NuStar Vancouver 2008

Address: 5820 S Kelly Ave Unit B Portland Phone: 503-904-6577 Email: ssalisbury@cascadiainst.com

Sampled by: Jon Weethorpe / L. Weethorpe

Site Location: OR (WA) CA

LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-DX	NWTPH-GX	8260 BTEX	8260 RBDM VOCs	8260 Halo VOCs	8260 VOCs Full List *	8270 SIM PAHs	8270 Semi-Vols Full List	8082 PCBs	8081 Pest	RCCA Metals (8)	Priority Metals (13)	AL, SB, AS, BA, BE, CA, CB, CC, CU, FE, PB, HG, NI, MN, MO, NI, K, SE, AG, NA, TL, Y, ZN	TOTAL DISS. TGP	TCLP Metals (8)	NDS/MS	MS/MS	RSK 175	TOC	Archive	
MW-1	6/17/02	8:00 AM	GW	5							✓										✓					
MW-5		8:30		5																	✓					
MW-6		9:22		5																	✓					
MW-14		12:00		7																	✓					
S-2		12:42		5																	✓					
S-1		13:24		5																	✓					
MP-1		14:10		7																	✓					
MW-8		14:20		5																	✓					
EW-1		18:00		5																	✓					
MW-18j		8:30		5																	✓					

SPECIAL INSTRUCTIONS:  
\* VOCs same list as NuStar Vancouver 1020  
Ethane/Ethane/Methane by RSK 175

TAT Requested (circle): 1 Day 2 Day 3 Day 4 DAY 5 DAY Other: \_\_\_\_\_

SAMPLES ARE HELD FOR 30 DAYS

RELINQUISHED BY: Signature: <u>[Signature]</u> Date: <u>6/17/02</u>	RECEIVED BY: Signature: _____ Date: _____
Printed Name: <u>Jon Weethorpe</u> Time: <u>15:56</u>	Printed Name: _____ Time: _____
Company: <u>Cascadia Assoc.</u>	Company: _____

Apex Laboratories

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

*Lisa Domenighini*

Lisa Domenighini, Client Services Manager



Cascadia Associates

5820 SW Kelly Ave Unit B  
Portland, OR 97239

Project: Shore Terminal-Vancouver

Project Number: NuStar Vancouver GWM 20

Project Manager: Stephanie Salisbury

Report ID:

A0F0495 - 07 02 20 1041

**CHAIN OF CUSTODY**

APEX LABS  
6700 SW Sandburg St., Tigard, OR 97223 Ph: 503-718-2323

Lab # A0F0495 COC 2 of 2

Company: Cascadia Associates Project Mgr: Stephanie Salisbury Project Name: NuStar Vancouver GWM 20 Project #:  
Address: 5820 SW Kelly Ave Unit B, Portland Phone: 503-406-6577 Email: Stephanie.Salisbury@cascadiassociates.com

Sampled by: L. Weatherford

Site Location: OR WA WA

LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-DX	NWTPH-GX	8260 BTEX	8260 RBDM VOCs	8260 Halb VOCs	8260 VOCs Full List	8270 SIM PAHs	8270 Semi-Volat Full List	8082 PCBs	8081 Pest	RCRA Metals (8)	Priority Metals (13)	AL, Sb, As, Ba, Be, Bi, Cd, Ca, Cr, Co, Cu, Fe, Pb, Hg, Mn, Mo, Ni, K, Se, Ag, Na, Tl, V, Zn	TOTAL DISS. TCLP	TCLP Metals (8)	NH3	RSK 175	TOC	Archive	
MW-20i	6/17/00	900	60	5							✓														
MW-21i-40	9:50			5																					
MW-2	10:10			5																					
MW-23i	13:10			5																					
MW-24	12:45			5																					
MW-17	11:20			5																					
MW-10	10:40			5																					
MW-8	14:10			5																					

SPECIAL INSTRUCTIONS:  
\* VOCs same list as NuStar Vancouver 1020

Normal Turn Around Time (TAT) = 10 Business Days

TAT Requested (circle): 1 Day 2 Day 3 Day 4 DAY 5 DAY Other: \_\_\_\_\_

SAMPLES ARE HELD FOR 30 DAYS

RELINQUISHED BY: Signature: <u>[Signature]</u> Printed Name: <u>Don Weatherford</u> Company: <u>Cascadia Associates</u>	RECEIVED BY: Signature: <u>[Signature]</u> Printed Name: <u>Charles Hoffman</u> Company: <u>Apex Lab</u>
Date: <u>6/17/00</u> Time: <u>1558</u>	Date: <u>6/17/00</u> Time: _____

Apex Laboratories

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*Lisa Domenighini*

Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>NuStar Vancouver GWM 20</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0F0495 - 07 02 20 1041
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**APEX LABS COOLER RECEIPT FORM**

**Client:** Cascadia Assoc. **Element WO#:** A0 F0495

**Project/Project #:** GWM NuStar Vancouver 2020

**Delivery Info:**  
Date/time received: 6/17/20 @ 1554 By: CFH  
Delivered by: Apex  Client  ESS  FedEx  UPS  Swift  Senvoy  SDS  Other

**Cooler Inspection** Date/time inspected: 6/17/20 @ 1810 By: AKK

Chain of Custody included? Yes  No  Custody seals? Yes  No

Signed/dated by client? Yes  No

Signed/dated by Apex? Yes  No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	<u>0.7</u>	<u>1.4</u>					
Received on ice? (Y/N)	<u>Y</u>	<u>Y</u>					
Temp. blanks? (Y/N)	<u>Y</u>	<u>Y</u>					
Ice type: (Gel/Real/Other)	<u>Real</u>	<u>Real</u>					
Condition:	<u>Good</u>	<u>Good</u>					

Cooler out of temp? (Y/N) Possible reason why: \_\_\_\_\_  
If some coolers are in temp and some out, were green dots applied to out of temperature samples? Yes/No/NA NA  
Out of temperature samples form initiated? Yes/No/NA NA

**Samples Inspection:** Date/time inspected: 6/17/20 @ 1842 By: AKK

All samples intact? Yes  No  Comments: \_\_\_\_\_

Bottle labels/COCs agree? Yes  No  Comments: MW-8 listed twice on COC, but only 1 set provided. 2 Trip Blanks (#2324) provided, not on COC.

COC/container discrepancies form initiated? Yes  No

Containers/volumes received appropriate for analysis? Yes  No  Comments: \_\_\_\_\_

Do VOA vials have visible headspace? Yes  No  NA

Comments MW-3 + <sup>and MW-10</sup> S-2 for 3 has sed.

Water samples: pH checked: Yes  No  NA  pH appropriate? Yes  No  NA

Comments: \_\_\_\_\_

**Additional information:**  
\_\_\_\_\_  
\_\_\_\_\_

Labeled by: AKK Witness: JAM Cooler Inspected by: AKK See Project Contact Form:



July 2, 2020

Apex Laboratories  
ATTN: Lisa Domenighini  
6700 S.W. Sandburg St.  
Tigard, OR 97223



LA Cert #04140  
EPA Methods TO3, TO14A, TO15, 25C/3C,  
RSK-175

TX Cert T104704450-14-6  
EPA Methods TO14A, TO15

UT Cert CA0133332015-3  
EPA Methods TO3, TO14A, TO15, RSK-175

### LABORATORY TEST RESULTS

Project Reference: A0F0495  
Lab Number: L061904-01/02

Enclosed are results for sample(s) received 6/19/20 by Air Technology Laboratories. Sample was received intact and chilled to 8° C. Analyses were performed according to specifications on the chain of custody provided with the sample(s).

#### Report Narrative:

- Unless otherwise noted in the report, sample analyses were performed within method performance criteria and meet all requirements of the TNI Standards.
- The enclosed results relate only to the sample(s).

ATL appreciates the opportunity to provide testing services to your company. If you have any questions regarding these results, please call me at (626) 964-4032.

Sincerely,

A handwritten signature in blue ink, appearing to read "Mark Johnson".

Mark Johnson  
Operations Manager  
MJohnson@AirTechLabs.com

Note: The cover letter is an integral part of this analytical report.

SUBCONTRACT ORDER

Apex Laboratories

A0F0495

CB 6/17/20

WDG/984-01/02

SENDING LABORATORY:

Apex Laboratories  
6700 S.W. Sandburg Street  
Tigard, OR 97223  
Phone: (503) 718-2323  
Fax: (503) 336-0745  
Project Manager: Lisa Domenighini

RECEIVING LABORATORY:

Air Technology Laboratories, Inc  
18501 E. Gale Ave Suite 130  
City of Industry, CA 91748  
Phone : (626) 964-4032  
Fax: (626) 964-5832

**Sample Name: MW-14** **Water** **Sampled: 06/17/20 12:00** (A0F0495-04)

Analysis	Due	Expires	Comments
<b>RSK 175 Preserved (Meth, Eth, Eth) (Sub)</b>	06/30/20 17:00	07/01/20 12:00	
<i>Containers Supplied:</i>			
(D)40 mL VOA - HCL			AKK
(E)40 mL VOA - HCL			6/18/20

01

**Sample Name: MP-1** **Water** **Sampled: 06/17/20 14:10** (A0F0495-07)

Analysis	Due	Expires	Comments
<b>RSK 175 Preserved (Meth, Eth, Eth) (Sub)</b>	06/30/20 17:00	07/01/20 14:10	
<i>Containers Supplied:</i>			
(D)40 mL VOA - HCL			
(E)40 mL VOA - HCL			

02

Standard TAT

8°C

Released By WALD Date 6/18/20 15:10 Received By [Signature] Date 6/19/20 12:15

Released By UPS (Shipper) Date \_\_\_\_\_ Received By \_\_\_\_\_ Date \_\_\_\_\_

UPS (Shipper)

UPS (Shipper)

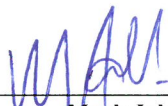
**Client:** Apex Laboratories  
**Attn:** Lisa Domenighini  
**Project Name:** NA  
**Project No.:** A0F0495  
**Date Received:** 06/19/20  
**Matrix:** Water  
**Reporting Units:** ug/L

**RSK175**

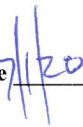
Lab No.:	L061904-01	L061904-02						
Client Sample I.D.:	MW-14 (A0F0495-04)	MP-1 (A0F0495-07)						
Date/Time Sampled:	6/17/20 12:00	6/17/20 14:10						
Date/Time Analyzed:	6/25/20 12:50	6/25/20 13:15						
QC Batch No.:	200625GC8A1	200625GC8A1						
Analyst Initials:	CM	CM						
Dilution Factor:	1.0	1.0						
ANALYTE	Result ug/L	RL ug/L	Result ug/L	RL ug/L				
Ethene	ND	1.0	ND	1.0				
Ethane	ND	1.0	3.2	1.0				
Methane	3.5	1.0	1,800	1.0				

ND = Not Detected (below RL)  
 RL = Reporting Limit

Reviewed/Approved By: \_\_\_\_\_

  
**Mark Johnson**  
 Operations Manager

Date: \_\_\_\_\_

  
 7/20

The cover letter is an integral part of this analytical report



QC Batch No: 200625GC8A1

Matrix: Water

Reporting Units: ug/L

**RSK 175**  
**LABORATORY CONTROL SAMPLE SUMMARY**

Lab No.:	METHOD BLANK			LCS		LCSD					
Date/Time Analyzed:	6/25/20 9:55			6/25/20 10:07		6/25/20 10:32					
Analyst Initials:	CM			CM		CM					
Dilution Factor:	1.1			1.0		1.0					
								Limits			
ANALYTE	Result ug/L	RL ug/L	SPIKE AMT. ug/L	Result ug/L	% Rec.	Result ug/L	% Rec.	RPD %	Low %Rec	High %Rec	Max. RPD
Ethene	ND	1.0	1,150	941	91	1,020	99	7.8	70	130	30
Ethane	ND	1.0	1,200	1,070	97	1,140	103	6.2	70	130	30
Methane	ND	1.0	650	577	98	606	103	4.8	70	130	30

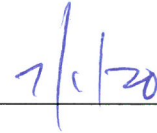
ND = Not Detected (below RL)

RL = Reporting Limit

Reviewed/Approved By: \_\_\_\_\_

  
Mark Johnson  
Operations Manager

Date \_\_\_\_\_



The cover letter is an integral part of this analytical report





**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
ORELAP ID: OR100062

Thursday, July 9, 2020  
Stephanie Salisbury  
Cascadia Associates  
5820 SW Kelly Ave Unit B  
Portland, OR 97239

RE: A0F0534 - Shore Terminal-Vancouver - 2Q20 GWM Nustar VAN

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A0F0534, which was received by the laboratory on 6/18/2020 at 4:00:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [ldomenighini@apex-labs.com](mailto:ldomenighini@apex-labs.com), or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of sample receipt, unless prior arrangements have been made.

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Cooler Receipt Information

(See Cooler Receipt Form for details)

Cooler#1	4.3 degC	Cooler#2	3.9 degC
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This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.

All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

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Apex Laboratories

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Lisa Domenighini, Client Services Manager



**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
 Tigard, OR 97223  
 503-718-2323  
 ORELAP ID: OR100062

<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>2Q20 GWM Nustar VAN</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0F0534 - 07 09 20 1314
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**ANALYTICAL REPORT FOR SAMPLES**

**SAMPLE INFORMATION**

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-24i	A0F0534-01	Water	06/18/20 08:00	06/18/20 16:00
MW-24d	A0F0534-02	Water	06/18/20 08:45	06/18/20 16:00
MW-25i	A0F0534-03	Water	06/18/20 09:30	06/18/20 16:00
MW-16	A0F0534-04	Water	06/18/20 10:05	06/18/20 16:00
MW-5	A0F0534-05	Water	06/18/20 11:00	06/18/20 16:00
MW-19i	A0F0534-06	Water	06/18/20 12:10	06/18/20 16:00
MW-15	A0F0534-07	Water	06/18/20 12:50	06/18/20 16:00
MW-22i	A0F0534-08	Water	06/18/20 08:19	06/18/20 16:00
MW-12	A0F0534-09	Water	06/18/20 09:14	06/18/20 16:00
MW-12 Dup	A0F0534-10	Water	06/18/20 09:14	06/18/20 16:00
MW-13	A0F0534-11	Water	06/18/20 10:08	06/18/20 16:00
MW-19	A0F0534-12	Water	06/18/20 10:55	06/18/20 16:00
MW-19 Dup	A0F0534-13	Water	06/18/20 10:55	06/18/20 16:00
MW-7	A0F0534-14	Water	06/18/20 12:01	06/18/20 16:00
MW-7 Dup	A0F0534-15	Water	06/18/20 12:01	06/18/20 16:00
MW-9	A0F0534-16	Water	06/18/20 12:55	06/18/20 16:00
MW-21i-105	A0F0534-17	Water	06/18/20 13:44	06/18/20 16:00

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Lisa Domenighini, Client Services Manager



Apex Laboratories, LLC

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
ORELAP ID: OR100062

<u>Cascadia Associates</u> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <u>Shore Terminal-Vancouver</u> Project Number: 2Q20 GWM Nustar VAN Project Manager: Stephanie Salisbury	<u>Report ID:</u> A0F0534 - 07 09 20 1314
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**ANALYTICAL CASE NARRATIVE**

Work Order: A0F0534

Subcontract

This report is not complete without the attached subcontract laboratory report for RSK 175 from Air Technology.

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>2Q20 GWM Nustar VAN</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0534 - 07 09 20 1314</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-24i (A0F0534-01)</b>				<b>Matrix: Water</b>		<b>Batch: 0060849</b>		
Bromobenzene	ND	---	0.500	ug/L	1	06/26/20 00:30	EPA 8260D	
Bromochloromethane	ND	---	1.00	ug/L	1	06/26/20 00:30	EPA 8260D	
Bromodichloromethane	ND	---	1.00	ug/L	1	06/26/20 00:30	EPA 8260D	
Bromoform	ND	---	1.00	ug/L	1	06/26/20 00:30	EPA 8260D	
Bromomethane	ND	---	5.00	ug/L	1	06/26/20 00:30	EPA 8260D	
Carbon tetrachloride	ND	---	1.00	ug/L	1	06/26/20 00:30	EPA 8260D	
Chlorobenzene	ND	---	0.500	ug/L	1	06/26/20 00:30	EPA 8260D	
Chloroethane	ND	---	5.00	ug/L	1	06/26/20 00:30	EPA 8260D	
Chloroform	ND	---	1.00	ug/L	1	06/26/20 00:30	EPA 8260D	
Chloromethane	ND	---	5.00	ug/L	1	06/26/20 00:30	EPA 8260D	
2-Chlorotoluene	ND	---	1.00	ug/L	1	06/26/20 00:30	EPA 8260D	
4-Chlorotoluene	ND	---	1.00	ug/L	1	06/26/20 00:30	EPA 8260D	
Dibromochloromethane	ND	---	1.00	ug/L	1	06/26/20 00:30	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	06/26/20 00:30	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	06/26/20 00:30	EPA 8260D	
Dibromomethane	ND	---	1.00	ug/L	1	06/26/20 00:30	EPA 8260D	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	06/26/20 00:30	EPA 8260D	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	06/26/20 00:30	EPA 8260D	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	06/26/20 00:30	EPA 8260D	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	06/26/20 00:30	EPA 8260D	
<b>1,1-Dichloroethane</b>	<b>0.610</b>	---	0.400	ug/L	1	06/26/20 00:30	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	06/26/20 00:30	EPA 8260D	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	06/26/20 00:30	EPA 8260D	
<b>cis-1,2-Dichloroethene</b>	<b>2.91</b>	---	0.400	ug/L	1	06/26/20 00:30	EPA 8260D	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	06/26/20 00:30	EPA 8260D	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	06/26/20 00:30	EPA 8260D	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	06/26/20 00:30	EPA 8260D	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	06/26/20 00:30	EPA 8260D	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	06/26/20 00:30	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/26/20 00:30	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/26/20 00:30	EPA 8260D	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	06/26/20 00:30	EPA 8260D	
Methylene chloride	ND	---	10.0	ug/L	1	06/26/20 00:30	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	06/26/20 00:30	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	06/26/20 00:30	EPA 8260D	
<b>Tetrachloroethene (PCE)</b>	<b>6.24</b>	---	0.400	ug/L	1	06/26/20 00:30	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	06/26/20 00:30	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	06/26/20 00:30	EPA 8260D	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	06/26/20 00:30	EPA 8260D	

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Lisa Domenighini, Client Services Manager





<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>2Q20 GWM Nustar VAN</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0534 - 07 09 20 1314</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
			<b>Matrix: Water</b>			<b>Batch: 0060849</b>		
<b>MW-24i (A0F0534-01)</b>								
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	06/26/20 00:30	EPA 8260D	
<b>Trichloroethene (TCE)</b>	<b>2.84</b>	---	0.400	ug/L	1	06/26/20 00:30	EPA 8260D	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	06/26/20 00:30	EPA 8260D	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	06/26/20 00:30	EPA 8260D	
Vinyl chloride	ND	---	0.400	ug/L	1	06/26/20 00:30	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 108 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>06/26/20 00:30</i>	<i>EPA 8260D</i>
<i>Toluene-d8 (Surr)</i>		<i>100 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/26/20 00:30</i>	<i>EPA 8260D</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>103 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/26/20 00:30</i>	<i>EPA 8260D</i>

			<b>Matrix: Water</b>			<b>Batch: 0060849</b>		
<b>MW-24d (A0F0534-02)</b>								
Bromobenzene	ND	---	0.500	ug/L	1	06/25/20 19:32	EPA 8260D	
Bromochloromethane	ND	---	1.00	ug/L	1	06/25/20 19:32	EPA 8260D	
Bromodichloromethane	ND	---	1.00	ug/L	1	06/25/20 19:32	EPA 8260D	
Bromoform	ND	---	1.00	ug/L	1	06/25/20 19:32	EPA 8260D	
Bromomethane	ND	---	5.00	ug/L	1	06/25/20 19:32	EPA 8260D	
Carbon tetrachloride	ND	---	1.00	ug/L	1	06/25/20 19:32	EPA 8260D	
Chlorobenzene	ND	---	0.500	ug/L	1	06/25/20 19:32	EPA 8260D	
Chloroethane	ND	---	5.00	ug/L	1	06/25/20 19:32	EPA 8260D	
Chloroform	ND	---	1.00	ug/L	1	06/25/20 19:32	EPA 8260D	
Chloromethane	ND	---	5.00	ug/L	1	06/25/20 19:32	EPA 8260D	
2-Chlorotoluene	ND	---	1.00	ug/L	1	06/25/20 19:32	EPA 8260D	
4-Chlorotoluene	ND	---	1.00	ug/L	1	06/25/20 19:32	EPA 8260D	
Dibromochloromethane	ND	---	1.00	ug/L	1	06/25/20 19:32	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	06/25/20 19:32	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	06/25/20 19:32	EPA 8260D	
Dibromomethane	ND	---	1.00	ug/L	1	06/25/20 19:32	EPA 8260D	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	06/25/20 19:32	EPA 8260D	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	06/25/20 19:32	EPA 8260D	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	06/25/20 19:32	EPA 8260D	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	06/25/20 19:32	EPA 8260D	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	06/25/20 19:32	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	06/25/20 19:32	EPA 8260D	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	06/25/20 19:32	EPA 8260D	
cis-1,2-Dichloroethene	ND	---	0.400	ug/L	1	06/25/20 19:32	EPA 8260D	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	06/25/20 19:32	EPA 8260D	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	06/25/20 19:32	EPA 8260D	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	06/25/20 19:32	EPA 8260D	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	06/25/20 19:32	EPA 8260D	

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<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>2Q20 GWM Nustar VAN</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0534 - 07 09 20 1314</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-24d (A0F0534-02)</b>				<b>Matrix: Water</b>		<b>Batch: 0060849</b>		
1,1-Dichloropropene	ND	---	1.00	ug/L	1	06/25/20 19:32	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/25/20 19:32	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/25/20 19:32	EPA 8260D	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	06/25/20 19:32	EPA 8260D	
Methylene chloride	ND	---	10.0	ug/L	1	06/25/20 19:32	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	06/25/20 19:32	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	06/25/20 19:32	EPA 8260D	
Tetrachloroethene (PCE)	ND	---	0.400	ug/L	1	06/25/20 19:32	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	06/25/20 19:32	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	06/25/20 19:32	EPA 8260D	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	06/25/20 19:32	EPA 8260D	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	06/25/20 19:32	EPA 8260D	
Trichloroethene (TCE)	ND	---	0.400	ug/L	1	06/25/20 19:32	EPA 8260D	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	06/25/20 19:32	EPA 8260D	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	06/25/20 19:32	EPA 8260D	
Vinyl chloride	ND	---	0.400	ug/L	1	06/25/20 19:32	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 110 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>06/25/20 19:32</i>	<i>EPA 8260D</i>
<i>Toluene-d8 (Surr)</i>		<i>100 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/25/20 19:32</i>	<i>EPA 8260D</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>103 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/25/20 19:32</i>	<i>EPA 8260D</i>

<b>MW-25i (A0F0534-03)</b>				<b>Matrix: Water</b>		<b>Batch: 0060849</b>		
Bromobenzene	ND	---	0.500	ug/L	1	06/25/20 20:53	EPA 8260D	
Bromochloromethane	ND	---	1.00	ug/L	1	06/25/20 20:53	EPA 8260D	
Bromodichloromethane	ND	---	1.00	ug/L	1	06/25/20 20:53	EPA 8260D	
Bromoform	ND	---	1.00	ug/L	1	06/25/20 20:53	EPA 8260D	
Bromomethane	ND	---	5.00	ug/L	1	06/25/20 20:53	EPA 8260D	
Carbon tetrachloride	ND	---	1.00	ug/L	1	06/25/20 20:53	EPA 8260D	
Chlorobenzene	ND	---	0.500	ug/L	1	06/25/20 20:53	EPA 8260D	
Chloroethane	ND	---	5.00	ug/L	1	06/25/20 20:53	EPA 8260D	
Chloroform	ND	---	1.00	ug/L	1	06/25/20 20:53	EPA 8260D	
Chloromethane	ND	---	5.00	ug/L	1	06/25/20 20:53	EPA 8260D	
2-Chlorotoluene	ND	---	1.00	ug/L	1	06/25/20 20:53	EPA 8260D	
4-Chlorotoluene	ND	---	1.00	ug/L	1	06/25/20 20:53	EPA 8260D	
Dibromochloromethane	ND	---	1.00	ug/L	1	06/25/20 20:53	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	06/25/20 20:53	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	06/25/20 20:53	EPA 8260D	
Dibromomethane	ND	---	1.00	ug/L	1	06/25/20 20:53	EPA 8260D	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	06/25/20 20:53	EPA 8260D	

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<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>2Q20 GWM Nustar VAN</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0534 - 07 09 20 1314</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-25i (A0F0534-03)</b>				<b>Matrix: Water</b>		<b>Batch: 0060849</b>		
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	06/25/20 20:53	EPA 8260D	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	06/25/20 20:53	EPA 8260D	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	06/25/20 20:53	EPA 8260D	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	06/25/20 20:53	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	06/25/20 20:53	EPA 8260D	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	06/25/20 20:53	EPA 8260D	
<b>cis-1,2-Dichloroethene</b>	<b>0.440</b>	---	0.400	ug/L	1	06/25/20 20:53	EPA 8260D	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	06/25/20 20:53	EPA 8260D	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	06/25/20 20:53	EPA 8260D	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	06/25/20 20:53	EPA 8260D	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	06/25/20 20:53	EPA 8260D	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	06/25/20 20:53	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/25/20 20:53	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/25/20 20:53	EPA 8260D	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	06/25/20 20:53	EPA 8260D	
Methylene chloride	ND	---	10.0	ug/L	1	06/25/20 20:53	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	06/25/20 20:53	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	06/25/20 20:53	EPA 8260D	
Tetrachloroethene (PCE)	ND	---	0.400	ug/L	1	06/25/20 20:53	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	06/25/20 20:53	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	06/25/20 20:53	EPA 8260D	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	06/25/20 20:53	EPA 8260D	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	06/25/20 20:53	EPA 8260D	
Trichloroethene (TCE)	ND	---	0.400	ug/L	1	06/25/20 20:53	EPA 8260D	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	06/25/20 20:53	EPA 8260D	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	06/25/20 20:53	EPA 8260D	
Vinyl chloride	ND	---	0.400	ug/L	1	06/25/20 20:53	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 110 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>06/25/20 20:53</i>	<i>EPA 8260D</i>
<i>Toluene-d8 (Surr)</i>		<i>101 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/25/20 20:53</i>	<i>EPA 8260D</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>103 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/25/20 20:53</i>	<i>EPA 8260D</i>

<b>MW-16 (A0F0534-04)</b>				<b>Matrix: Water</b>		<b>Batch: 0060849</b>		
Bromobenzene	ND	---	0.500	ug/L	1	06/26/20 03:11	EPA 8260D	
Bromochloromethane	ND	---	1.00	ug/L	1	06/26/20 03:11	EPA 8260D	
Bromodichloromethane	ND	---	1.00	ug/L	1	06/26/20 03:11	EPA 8260D	
Bromoform	ND	---	1.00	ug/L	1	06/26/20 03:11	EPA 8260D	
Bromomethane	ND	---	5.00	ug/L	1	06/26/20 03:11	EPA 8260D	
Carbon tetrachloride	ND	---	1.00	ug/L	1	06/26/20 03:11	EPA 8260D	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>2Q20 GWM Nustar VAN</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0534 - 07 09 20 1314</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-16 (A0F0534-04)</b>				<b>Matrix: Water</b>		<b>Batch: 0060849</b>		
Chlorobenzene	ND	---	0.500	ug/L	1	06/26/20 03:11	EPA 8260D	
Chloroethane	ND	---	5.00	ug/L	1	06/26/20 03:11	EPA 8260D	
Chloroform	ND	---	1.00	ug/L	1	06/26/20 03:11	EPA 8260D	
Chloromethane	ND	---	5.00	ug/L	1	06/26/20 03:11	EPA 8260D	
2-Chlorotoluene	ND	---	1.00	ug/L	1	06/26/20 03:11	EPA 8260D	
4-Chlorotoluene	ND	---	1.00	ug/L	1	06/26/20 03:11	EPA 8260D	
Dibromochloromethane	ND	---	1.00	ug/L	1	06/26/20 03:11	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	06/26/20 03:11	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	06/26/20 03:11	EPA 8260D	
Dibromomethane	ND	---	1.00	ug/L	1	06/26/20 03:11	EPA 8260D	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	06/26/20 03:11	EPA 8260D	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	06/26/20 03:11	EPA 8260D	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	06/26/20 03:11	EPA 8260D	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	06/26/20 03:11	EPA 8260D	
<b>1,1-Dichloroethane</b>	<b>1.07</b>	---	0.400	ug/L	1	06/26/20 03:11	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	06/26/20 03:11	EPA 8260D	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	06/26/20 03:11	EPA 8260D	
<b>cis-1,2-Dichloroethene</b>	<b>23.8</b>	---	0.400	ug/L	1	06/26/20 03:11	EPA 8260D	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	06/26/20 03:11	EPA 8260D	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	06/26/20 03:11	EPA 8260D	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	06/26/20 03:11	EPA 8260D	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	06/26/20 03:11	EPA 8260D	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	06/26/20 03:11	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/26/20 03:11	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/26/20 03:11	EPA 8260D	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	06/26/20 03:11	EPA 8260D	
Methylene chloride	ND	---	10.0	ug/L	1	06/26/20 03:11	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	06/26/20 03:11	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	06/26/20 03:11	EPA 8260D	
<b>Tetrachloroethene (PCE)</b>	<b>27.3</b>	---	0.400	ug/L	1	06/26/20 03:11	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	06/26/20 03:11	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	06/26/20 03:11	EPA 8260D	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	06/26/20 03:11	EPA 8260D	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	06/26/20 03:11	EPA 8260D	
<b>Trichloroethene (TCE)</b>	<b>5.89</b>	---	0.400	ug/L	1	06/26/20 03:11	EPA 8260D	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	06/26/20 03:11	EPA 8260D	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	06/26/20 03:11	EPA 8260D	
<b>Vinyl chloride</b>	<b>0.420</b>	---	0.400	ug/L	1	06/26/20 03:11	EPA 8260D	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>2Q20 GWM Nustar VAN</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0534 - 07 09 20 1314</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-16 (A0F0534-04)</b>				<b>Matrix: Water</b>		<b>Batch: 0060849</b>		
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 106 %</i>	<i>Limits: 80-120 %</i>	<i>1</i>		<i>06/26/20 03:11</i>	<i>EPA 8260D</i>	
<i>Toluene-d8 (Surr)</i>		<i>100 %</i>	<i>80-120 %</i>	<i>1</i>		<i>06/26/20 03:11</i>	<i>EPA 8260D</i>	
<i>4-Bromofluorobenzene (Surr)</i>		<i>103 %</i>	<i>80-120 %</i>	<i>1</i>		<i>06/26/20 03:11</i>	<i>EPA 8260D</i>	

<b>MW-5 (A0F0534-05)</b>				<b>Matrix: Water</b>		<b>Batch: 0060849</b>		
Bromobenzene	ND	---	0.500	ug/L	1	06/25/20 21:20	EPA 8260D	
Bromochloromethane	ND	---	1.00	ug/L	1	06/25/20 21:20	EPA 8260D	
Bromodichloromethane	ND	---	1.00	ug/L	1	06/25/20 21:20	EPA 8260D	
Bromoform	ND	---	1.00	ug/L	1	06/25/20 21:20	EPA 8260D	
Bromomethane	ND	---	5.00	ug/L	1	06/25/20 21:20	EPA 8260D	
Carbon tetrachloride	ND	---	1.00	ug/L	1	06/25/20 21:20	EPA 8260D	
Chlorobenzene	ND	---	0.500	ug/L	1	06/25/20 21:20	EPA 8260D	
Chloroethane	ND	---	5.00	ug/L	1	06/25/20 21:20	EPA 8260D	
Chloroform	ND	---	1.00	ug/L	1	06/25/20 21:20	EPA 8260D	
Chloromethane	ND	---	5.00	ug/L	1	06/25/20 21:20	EPA 8260D	
2-Chlorotoluene	ND	---	1.00	ug/L	1	06/25/20 21:20	EPA 8260D	
4-Chlorotoluene	ND	---	1.00	ug/L	1	06/25/20 21:20	EPA 8260D	
Dibromochloromethane	ND	---	1.00	ug/L	1	06/25/20 21:20	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	06/25/20 21:20	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	06/25/20 21:20	EPA 8260D	
Dibromomethane	ND	---	1.00	ug/L	1	06/25/20 21:20	EPA 8260D	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	06/25/20 21:20	EPA 8260D	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	06/25/20 21:20	EPA 8260D	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	06/25/20 21:20	EPA 8260D	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	06/25/20 21:20	EPA 8260D	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	06/25/20 21:20	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	06/25/20 21:20	EPA 8260D	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	06/25/20 21:20	EPA 8260D	
<b>cis-1,2-Dichloroethene</b>	<b>10.4</b>	---	0.400	ug/L	1	06/25/20 21:20	EPA 8260D	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	06/25/20 21:20	EPA 8260D	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	06/25/20 21:20	EPA 8260D	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	06/25/20 21:20	EPA 8260D	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	06/25/20 21:20	EPA 8260D	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	06/25/20 21:20	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/25/20 21:20	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/25/20 21:20	EPA 8260D	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	06/25/20 21:20	EPA 8260D	
Methylene chloride	ND	---	10.0	ug/L	1	06/25/20 21:20	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	06/25/20 21:20	EPA 8260D	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>2Q20 GWM Nustar VAN</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0534 - 07 09 20 1314</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-5 (A0F0534-05)</b>				<b>Matrix: Water</b>		<b>Batch: 0060849</b>		
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	06/25/20 21:20	EPA 8260D	
<b>Tetrachloroethene (PCE)</b>	<b>17.3</b>	---	0.400	ug/L	1	06/25/20 21:20	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	06/25/20 21:20	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	06/25/20 21:20	EPA 8260D	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	06/25/20 21:20	EPA 8260D	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	06/25/20 21:20	EPA 8260D	
<b>Trichloroethene (TCE)</b>	<b>18.3</b>	---	0.400	ug/L	1	06/25/20 21:20	EPA 8260D	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	06/25/20 21:20	EPA 8260D	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	06/25/20 21:20	EPA 8260D	
<b>Vinyl chloride</b>	<b>0.410</b>	---	0.400	ug/L	1	06/25/20 21:20	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 110 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>06/25/20 21:20</i>	<i>EPA 8260D</i>
<i>Toluene-d8 (Surr)</i>		<i>100 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/25/20 21:20</i>	<i>EPA 8260D</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>103 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/25/20 21:20</i>	<i>EPA 8260D</i>

<b>MW-19i (A0F0534-06)</b>				<b>Matrix: Water</b>		<b>Batch: 0060849</b>		
Bromobenzene	ND	---	0.500	ug/L	1	06/25/20 21:47	EPA 8260D	
Bromochloromethane	ND	---	1.00	ug/L	1	06/25/20 21:47	EPA 8260D	
Bromodichloromethane	ND	---	1.00	ug/L	1	06/25/20 21:47	EPA 8260D	
Bromoform	ND	---	1.00	ug/L	1	06/25/20 21:47	EPA 8260D	
Bromomethane	ND	---	5.00	ug/L	1	06/25/20 21:47	EPA 8260D	
Carbon tetrachloride	ND	---	1.00	ug/L	1	06/25/20 21:47	EPA 8260D	
Chlorobenzene	ND	---	0.500	ug/L	1	06/25/20 21:47	EPA 8260D	
Chloroethane	ND	---	5.00	ug/L	1	06/25/20 21:47	EPA 8260D	
Chloroform	ND	---	1.00	ug/L	1	06/25/20 21:47	EPA 8260D	
Chloromethane	ND	---	5.00	ug/L	1	06/25/20 21:47	EPA 8260D	
2-Chlorotoluene	ND	---	1.00	ug/L	1	06/25/20 21:47	EPA 8260D	
4-Chlorotoluene	ND	---	1.00	ug/L	1	06/25/20 21:47	EPA 8260D	
Dibromochloromethane	ND	---	1.00	ug/L	1	06/25/20 21:47	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	06/25/20 21:47	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	06/25/20 21:47	EPA 8260D	
Dibromomethane	ND	---	1.00	ug/L	1	06/25/20 21:47	EPA 8260D	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	06/25/20 21:47	EPA 8260D	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	06/25/20 21:47	EPA 8260D	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	06/25/20 21:47	EPA 8260D	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	06/25/20 21:47	EPA 8260D	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	06/25/20 21:47	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	06/25/20 21:47	EPA 8260D	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	06/25/20 21:47	EPA 8260D	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>2Q20 GWM Nustar VAN</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0534 - 07 09 20 1314</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-19i (A0F0534-06)</b>				<b>Matrix: Water</b>		<b>Batch: 0060849</b>		
cis-1,2-Dichloroethene	ND	---	0.400	ug/L	1	06/25/20 21:47	EPA 8260D	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	06/25/20 21:47	EPA 8260D	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	06/25/20 21:47	EPA 8260D	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	06/25/20 21:47	EPA 8260D	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	06/25/20 21:47	EPA 8260D	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	06/25/20 21:47	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/25/20 21:47	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/25/20 21:47	EPA 8260D	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	06/25/20 21:47	EPA 8260D	
Methylene chloride	ND	---	10.0	ug/L	1	06/25/20 21:47	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	06/25/20 21:47	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	06/25/20 21:47	EPA 8260D	
Tetrachloroethene (PCE)	ND	---	0.400	ug/L	1	06/25/20 21:47	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	06/25/20 21:47	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	06/25/20 21:47	EPA 8260D	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	06/25/20 21:47	EPA 8260D	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	06/25/20 21:47	EPA 8260D	
Trichloroethene (TCE)	ND	---	0.400	ug/L	1	06/25/20 21:47	EPA 8260D	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	06/25/20 21:47	EPA 8260D	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	06/25/20 21:47	EPA 8260D	
Vinyl chloride	ND	---	0.400	ug/L	1	06/25/20 21:47	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 110 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>06/25/20 21:47</i>	<i>EPA 8260D</i>
<i>Toluene-d8 (Surr)</i>		<i>101 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/25/20 21:47</i>	<i>EPA 8260D</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>103 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/25/20 21:47</i>	<i>EPA 8260D</i>

<b>MW-15 (A0F0534-07)</b>				<b>Matrix: Water</b>		<b>Batch: 0060849</b>		
Bromobenzene	ND	---	0.500	ug/L	1	06/25/20 22:14	EPA 8260D	
Bromochloromethane	ND	---	1.00	ug/L	1	06/25/20 22:14	EPA 8260D	
Bromodichloromethane	ND	---	1.00	ug/L	1	06/25/20 22:14	EPA 8260D	
Bromoform	ND	---	1.00	ug/L	1	06/25/20 22:14	EPA 8260D	
Bromomethane	ND	---	5.00	ug/L	1	06/25/20 22:14	EPA 8260D	
Carbon tetrachloride	ND	---	1.00	ug/L	1	06/25/20 22:14	EPA 8260D	
Chlorobenzene	ND	---	0.500	ug/L	1	06/25/20 22:14	EPA 8260D	
Chloroethane	ND	---	5.00	ug/L	1	06/25/20 22:14	EPA 8260D	
Chloroform	ND	---	1.00	ug/L	1	06/25/20 22:14	EPA 8260D	
Chloromethane	ND	---	5.00	ug/L	1	06/25/20 22:14	EPA 8260D	
2-Chlorotoluene	ND	---	1.00	ug/L	1	06/25/20 22:14	EPA 8260D	
4-Chlorotoluene	ND	---	1.00	ug/L	1	06/25/20 22:14	EPA 8260D	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>2Q20 GWM Nustar VAN</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0534 - 07 09 20 1314</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-15 (A0F0534-07)</b>				<b>Matrix: Water</b>		<b>Batch: 0060849</b>		
Dibromochloromethane	ND	---	1.00	ug/L	1	06/25/20 22:14	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	06/25/20 22:14	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	06/25/20 22:14	EPA 8260D	
Dibromomethane	ND	---	1.00	ug/L	1	06/25/20 22:14	EPA 8260D	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	06/25/20 22:14	EPA 8260D	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	06/25/20 22:14	EPA 8260D	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	06/25/20 22:14	EPA 8260D	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	06/25/20 22:14	EPA 8260D	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	06/25/20 22:14	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	06/25/20 22:14	EPA 8260D	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	06/25/20 22:14	EPA 8260D	
cis-1,2-Dichloroethene	ND	---	0.400	ug/L	1	06/25/20 22:14	EPA 8260D	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	06/25/20 22:14	EPA 8260D	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	06/25/20 22:14	EPA 8260D	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	06/25/20 22:14	EPA 8260D	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	06/25/20 22:14	EPA 8260D	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	06/25/20 22:14	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/25/20 22:14	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/25/20 22:14	EPA 8260D	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	06/25/20 22:14	EPA 8260D	
Methylene chloride	ND	---	10.0	ug/L	1	06/25/20 22:14	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	06/25/20 22:14	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	06/25/20 22:14	EPA 8260D	
<b>Tetrachloroethene (PCE)</b>	<b>0.540</b>	---	0.400	ug/L	1	06/25/20 22:14	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	06/25/20 22:14	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	06/25/20 22:14	EPA 8260D	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	06/25/20 22:14	EPA 8260D	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	06/25/20 22:14	EPA 8260D	
Trichloroethene (TCE)	ND	---	0.400	ug/L	1	06/25/20 22:14	EPA 8260D	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	06/25/20 22:14	EPA 8260D	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	06/25/20 22:14	EPA 8260D	
Vinyl chloride	ND	---	0.400	ug/L	1	06/25/20 22:14	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 109 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>06/25/20 22:14</i>	<i>EPA 8260D</i>
<i>Toluene-d8 (Surr)</i>		<i>101 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/25/20 22:14</i>	<i>EPA 8260D</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>102 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/25/20 22:14</i>	<i>EPA 8260D</i>

<b>MW-22i (A0F0534-08)</b>				<b>Matrix: Water</b>		<b>Batch: 0060849</b>		
Bromobenzene	ND	---	0.500	ug/L	1	06/25/20 23:08	EPA 8260D	

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Lisa Domenighini, Client Services Manager





<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>2Q20 GWM Nustar VAN</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0534 - 07 09 20 1314</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-22i (A0F0534-08)</b>				<b>Matrix: Water</b>		<b>Batch: 0060849</b>		
Bromochloromethane	ND	---	1.00	ug/L	1	06/25/20 23:08	EPA 8260D	
Bromodichloromethane	ND	---	1.00	ug/L	1	06/25/20 23:08	EPA 8260D	
Bromoform	ND	---	1.00	ug/L	1	06/25/20 23:08	EPA 8260D	
Bromomethane	ND	---	5.00	ug/L	1	06/25/20 23:08	EPA 8260D	
Carbon tetrachloride	ND	---	1.00	ug/L	1	06/25/20 23:08	EPA 8260D	
Chlorobenzene	ND	---	0.500	ug/L	1	06/25/20 23:08	EPA 8260D	
Chloroethane	ND	---	5.00	ug/L	1	06/25/20 23:08	EPA 8260D	
Chloroform	ND	---	1.00	ug/L	1	06/25/20 23:08	EPA 8260D	
Chloromethane	ND	---	5.00	ug/L	1	06/25/20 23:08	EPA 8260D	
2-Chlorotoluene	ND	---	1.00	ug/L	1	06/25/20 23:08	EPA 8260D	
4-Chlorotoluene	ND	---	1.00	ug/L	1	06/25/20 23:08	EPA 8260D	
Dibromochloromethane	ND	---	1.00	ug/L	1	06/25/20 23:08	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	06/25/20 23:08	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	06/25/20 23:08	EPA 8260D	
Dibromomethane	ND	---	1.00	ug/L	1	06/25/20 23:08	EPA 8260D	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	06/25/20 23:08	EPA 8260D	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	06/25/20 23:08	EPA 8260D	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	06/25/20 23:08	EPA 8260D	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	06/25/20 23:08	EPA 8260D	
<b>1,1-Dichloroethane</b>	<b>0.580</b>	---	0.400	ug/L	1	06/25/20 23:08	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	06/25/20 23:08	EPA 8260D	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	06/25/20 23:08	EPA 8260D	
<b>cis-1,2-Dichloroethene</b>	<b>13.6</b>	---	0.400	ug/L	1	06/25/20 23:08	EPA 8260D	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	06/25/20 23:08	EPA 8260D	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	06/25/20 23:08	EPA 8260D	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	06/25/20 23:08	EPA 8260D	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	06/25/20 23:08	EPA 8260D	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	06/25/20 23:08	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/25/20 23:08	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/25/20 23:08	EPA 8260D	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	06/25/20 23:08	EPA 8260D	
Methylene chloride	ND	---	10.0	ug/L	1	06/25/20 23:08	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	06/25/20 23:08	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	06/25/20 23:08	EPA 8260D	
<b>Tetrachloroethene (PCE)</b>	<b>3.17</b>	---	0.400	ug/L	1	06/25/20 23:08	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	06/25/20 23:08	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	06/25/20 23:08	EPA 8260D	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	06/25/20 23:08	EPA 8260D	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	06/25/20 23:08	EPA 8260D	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>2Q20 GWM Nustar VAN</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0534 - 07 09 20 1314</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-22i (A0F0534-08)</b>				<b>Matrix: Water</b>		<b>Batch: 0060849</b>		
Trichloroethene (TCE)	7.62	---	0.400	ug/L	1	06/25/20 23:08	EPA 8260D	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	06/25/20 23:08	EPA 8260D	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	06/25/20 23:08	EPA 8260D	
Vinyl chloride	ND	---	0.400	ug/L	1	06/25/20 23:08	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 107 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>06/25/20 23:08</i>	<i>EPA 8260D</i>
<i>Toluene-d8 (Surr)</i>		<i>101 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/25/20 23:08</i>	<i>EPA 8260D</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>103 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/25/20 23:08</i>	<i>EPA 8260D</i>

<b>MW-12 (A0F0534-09)</b>				<b>Matrix: Water</b>		<b>Batch: 0060849</b>		
Bromobenzene	ND	---	0.500	ug/L	1	06/25/20 23:36	EPA 8260D	
Bromochloromethane	ND	---	1.00	ug/L	1	06/25/20 23:36	EPA 8260D	
Bromodichloromethane	ND	---	1.00	ug/L	1	06/25/20 23:36	EPA 8260D	
Bromoform	ND	---	1.00	ug/L	1	06/25/20 23:36	EPA 8260D	
Bromomethane	ND	---	5.00	ug/L	1	06/25/20 23:36	EPA 8260D	
Carbon tetrachloride	ND	---	1.00	ug/L	1	06/25/20 23:36	EPA 8260D	
Chlorobenzene	ND	---	0.500	ug/L	1	06/25/20 23:36	EPA 8260D	
Chloroethane	ND	---	5.00	ug/L	1	06/25/20 23:36	EPA 8260D	
Chloroform	ND	---	1.00	ug/L	1	06/25/20 23:36	EPA 8260D	
Chloromethane	ND	---	5.00	ug/L	1	06/25/20 23:36	EPA 8260D	
2-Chlorotoluene	ND	---	1.00	ug/L	1	06/25/20 23:36	EPA 8260D	
4-Chlorotoluene	ND	---	1.00	ug/L	1	06/25/20 23:36	EPA 8260D	
Dibromochloromethane	ND	---	1.00	ug/L	1	06/25/20 23:36	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	06/25/20 23:36	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	06/25/20 23:36	EPA 8260D	
Dibromomethane	ND	---	1.00	ug/L	1	06/25/20 23:36	EPA 8260D	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	06/25/20 23:36	EPA 8260D	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	06/25/20 23:36	EPA 8260D	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	06/25/20 23:36	EPA 8260D	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	06/25/20 23:36	EPA 8260D	
<b>1,1-Dichloroethane</b>	<b>1.25</b>	---	0.400	ug/L	1	06/25/20 23:36	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	06/25/20 23:36	EPA 8260D	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	06/25/20 23:36	EPA 8260D	
<b>cis-1,2-Dichloroethene</b>	<b>14.2</b>	---	0.400	ug/L	1	06/25/20 23:36	EPA 8260D	
<b>trans-1,2-Dichloroethene</b>	<b>0.410</b>	---	0.400	ug/L	1	06/25/20 23:36	EPA 8260D	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	06/25/20 23:36	EPA 8260D	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	06/25/20 23:36	EPA 8260D	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	06/25/20 23:36	EPA 8260D	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	06/25/20 23:36	EPA 8260D	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>2Q20 GWM Nustar VAN</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0534 - 07 09 20 1314</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-12 (A0F0534-09)</b>				<b>Matrix: Water</b>		<b>Batch: 0060849</b>		
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/25/20 23:36	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/25/20 23:36	EPA 8260D	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	06/25/20 23:36	EPA 8260D	
Methylene chloride	ND	---	10.0	ug/L	1	06/25/20 23:36	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	06/25/20 23:36	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	06/25/20 23:36	EPA 8260D	
<b>Tetrachloroethene (PCE)</b>	<b>2.49</b>	---	0.400	ug/L	1	06/25/20 23:36	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	06/25/20 23:36	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	06/25/20 23:36	EPA 8260D	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	06/25/20 23:36	EPA 8260D	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	06/25/20 23:36	EPA 8260D	
<b>Trichloroethene (TCE)</b>	<b>2.60</b>	---	0.400	ug/L	1	06/25/20 23:36	EPA 8260D	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	06/25/20 23:36	EPA 8260D	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	06/25/20 23:36	EPA 8260D	
<b>Vinyl chloride</b>	<b>1.10</b>	---	0.400	ug/L	1	06/25/20 23:36	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 106 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>06/25/20 23:36</i>	<i>EPA 8260D</i>
<i>Toluene-d8 (Surr)</i>		<i>100 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/25/20 23:36</i>	<i>EPA 8260D</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>103 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/25/20 23:36</i>	<i>EPA 8260D</i>

<b>MW-12 Dup (A0F0534-10)</b>				<b>Matrix: Water</b>		<b>Batch: 0060849</b>		
Bromobenzene	ND	---	0.500	ug/L	1	06/26/20 00:02	EPA 8260D	
Bromochloromethane	ND	---	1.00	ug/L	1	06/26/20 00:02	EPA 8260D	
Bromodichloromethane	ND	---	1.00	ug/L	1	06/26/20 00:02	EPA 8260D	
Bromoform	ND	---	1.00	ug/L	1	06/26/20 00:02	EPA 8260D	
Bromomethane	ND	---	5.00	ug/L	1	06/26/20 00:02	EPA 8260D	
Carbon tetrachloride	ND	---	1.00	ug/L	1	06/26/20 00:02	EPA 8260D	
Chlorobenzene	ND	---	0.500	ug/L	1	06/26/20 00:02	EPA 8260D	
Chloroethane	ND	---	5.00	ug/L	1	06/26/20 00:02	EPA 8260D	
Chloroform	ND	---	1.00	ug/L	1	06/26/20 00:02	EPA 8260D	
Chloromethane	ND	---	5.00	ug/L	1	06/26/20 00:02	EPA 8260D	
2-Chlorotoluene	ND	---	1.00	ug/L	1	06/26/20 00:02	EPA 8260D	
4-Chlorotoluene	ND	---	1.00	ug/L	1	06/26/20 00:02	EPA 8260D	
Dibromochloromethane	ND	---	1.00	ug/L	1	06/26/20 00:02	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	06/26/20 00:02	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	06/26/20 00:02	EPA 8260D	
Dibromomethane	ND	---	1.00	ug/L	1	06/26/20 00:02	EPA 8260D	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	06/26/20 00:02	EPA 8260D	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	06/26/20 00:02	EPA 8260D	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>2Q20 GWM Nustar VAN</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0534 - 07 09 20 1314</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-12 Dup (A0F0534-10)</b>				<b>Matrix: Water</b>		<b>Batch: 0060849</b>		
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	06/26/20 00:02	EPA 8260D	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	06/26/20 00:02	EPA 8260D	
<b>1,1-Dichloroethane</b>	<b>1.30</b>	---	0.400	ug/L	1	06/26/20 00:02	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	06/26/20 00:02	EPA 8260D	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	06/26/20 00:02	EPA 8260D	
<b>cis-1,2-Dichloroethene</b>	<b>14.1</b>	---	0.400	ug/L	1	06/26/20 00:02	EPA 8260D	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	06/26/20 00:02	EPA 8260D	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	06/26/20 00:02	EPA 8260D	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	06/26/20 00:02	EPA 8260D	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	06/26/20 00:02	EPA 8260D	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	06/26/20 00:02	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/26/20 00:02	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/26/20 00:02	EPA 8260D	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	06/26/20 00:02	EPA 8260D	
Methylene chloride	ND	---	10.0	ug/L	1	06/26/20 00:02	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	06/26/20 00:02	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	06/26/20 00:02	EPA 8260D	
<b>Tetrachloroethene (PCE)</b>	<b>2.59</b>	---	0.400	ug/L	1	06/26/20 00:02	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	06/26/20 00:02	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	06/26/20 00:02	EPA 8260D	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	06/26/20 00:02	EPA 8260D	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	06/26/20 00:02	EPA 8260D	
<b>Trichloroethene (TCE)</b>	<b>2.68</b>	---	0.400	ug/L	1	06/26/20 00:02	EPA 8260D	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	06/26/20 00:02	EPA 8260D	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	06/26/20 00:02	EPA 8260D	
<b>Vinyl chloride</b>	<b>1.04</b>	---	0.400	ug/L	1	06/26/20 00:02	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 105 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>06/26/20 00:02</i>	<i>EPA 8260D</i>
<i>Toluene-d8 (Surr)</i>		<i>101 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/26/20 00:02</i>	<i>EPA 8260D</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>102 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/26/20 00:02</i>	<i>EPA 8260D</i>

<b>MW-13 (A0F0534-11RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0060883</b>		
Bromobenzene	ND	---	0.500	ug/L	1	06/26/20 16:52	EPA 8260D	
Bromochloromethane	ND	---	1.00	ug/L	1	06/26/20 16:52	EPA 8260D	
Bromodichloromethane	ND	---	1.00	ug/L	1	06/26/20 16:52	EPA 8260D	
Bromoform	ND	---	1.00	ug/L	1	06/26/20 16:52	EPA 8260D	
Bromomethane	ND	---	5.00	ug/L	1	06/26/20 16:52	EPA 8260D	
Carbon tetrachloride	ND	---	1.00	ug/L	1	06/26/20 16:52	EPA 8260D	
Chlorobenzene	ND	---	0.500	ug/L	1	06/26/20 16:52	EPA 8260D	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>2Q20 GWM Nustar VAN</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0534 - 07 09 20 1314</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-13 (A0F0534-11RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0060883</b>		
Chloroethane	ND	---	5.00	ug/L	1	06/26/20 16:52	EPA 8260D	
Chloroform	ND	---	1.00	ug/L	1	06/26/20 16:52	EPA 8260D	
Chloromethane	ND	---	5.00	ug/L	1	06/26/20 16:52	EPA 8260D	
2-Chlorotoluene	ND	---	1.00	ug/L	1	06/26/20 16:52	EPA 8260D	
4-Chlorotoluene	ND	---	1.00	ug/L	1	06/26/20 16:52	EPA 8260D	
Dibromochloromethane	ND	---	1.00	ug/L	1	06/26/20 16:52	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	06/26/20 16:52	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	06/26/20 16:52	EPA 8260D	
Dibromomethane	ND	---	1.00	ug/L	1	06/26/20 16:52	EPA 8260D	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	06/26/20 16:52	EPA 8260D	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	06/26/20 16:52	EPA 8260D	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	06/26/20 16:52	EPA 8260D	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	06/26/20 16:52	EPA 8260D	
<b>1,1-Dichloroethane</b>	<b>0.610</b>	---	0.400	ug/L	1	06/26/20 16:52	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	06/26/20 16:52	EPA 8260D	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	06/26/20 16:52	EPA 8260D	
<b>cis-1,2-Dichloroethene</b>	<b>1.15</b>	---	0.400	ug/L	1	06/26/20 16:52	EPA 8260D	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	06/26/20 16:52	EPA 8260D	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	06/26/20 16:52	EPA 8260D	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	06/26/20 16:52	EPA 8260D	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	06/26/20 16:52	EPA 8260D	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	06/26/20 16:52	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/26/20 16:52	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/26/20 16:52	EPA 8260D	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	06/26/20 16:52	EPA 8260D	
Methylene chloride	ND	---	10.0	ug/L	1	06/26/20 16:52	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	06/26/20 16:52	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	06/26/20 16:52	EPA 8260D	
Tetrachloroethene (PCE)	ND	---	0.400	ug/L	1	06/26/20 16:52	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	06/26/20 16:52	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	06/26/20 16:52	EPA 8260D	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	06/26/20 16:52	EPA 8260D	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	06/26/20 16:52	EPA 8260D	
<b>Trichloroethene (TCE)</b>	<b>1.12</b>	---	0.400	ug/L	1	06/26/20 16:52	EPA 8260D	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	06/26/20 16:52	EPA 8260D	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	06/26/20 16:52	EPA 8260D	
<b>Vinyl chloride</b>	<b>5.28</b>	---	0.400	ug/L	1	06/26/20 16:52	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 109 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>06/26/20 16:52</i>	<i>EPA 8260D</i>

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>2Q20 GWM Nustar VAN</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0534 - 07 09 20 1314</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-13 (A0F0534-11RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0060883</b>		
<i>Surrogate: Toluene-d8 (Surr)</i>			Recovery: 99 %	Limits: 80-120 %	1	06/26/20 16:52	EPA 8260D	
<i>4-Bromofluorobenzene (Surr)</i>			103 %	80-120 %	1	06/26/20 16:52	EPA 8260D	

<b>MW-19 (A0F0534-12RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0060898</b>		
Bromobenzene	ND	---	5.00	ug/L	10	06/28/20 14:27	EPA 8260D	
Bromochloromethane	ND	---	10.0	ug/L	10	06/28/20 14:27	EPA 8260D	
Bromodichloromethane	ND	---	10.0	ug/L	10	06/28/20 14:27	EPA 8260D	
Bromoform	ND	---	10.0	ug/L	10	06/28/20 14:27	EPA 8260D	
Bromomethane	ND	---	50.0	ug/L	10	06/28/20 14:27	EPA 8260D	
Carbon tetrachloride	ND	---	10.0	ug/L	10	06/28/20 14:27	EPA 8260D	
Chlorobenzene	ND	---	5.00	ug/L	10	06/28/20 14:27	EPA 8260D	
Chloroethane	ND	---	50.0	ug/L	10	06/28/20 14:27	EPA 8260D	
Chloroform	ND	---	10.0	ug/L	10	06/28/20 14:27	EPA 8260D	
Chloromethane	ND	---	50.0	ug/L	10	06/28/20 14:27	EPA 8260D	
2-Chlorotoluene	ND	---	10.0	ug/L	10	06/28/20 14:27	EPA 8260D	
4-Chlorotoluene	ND	---	10.0	ug/L	10	06/28/20 14:27	EPA 8260D	
Dibromochloromethane	ND	---	10.0	ug/L	10	06/28/20 14:27	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	50.0	ug/L	10	06/28/20 14:27	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	5.00	ug/L	10	06/28/20 14:27	EPA 8260D	
Dibromomethane	ND	---	10.0	ug/L	10	06/28/20 14:27	EPA 8260D	
1,2-Dichlorobenzene	ND	---	5.00	ug/L	10	06/28/20 14:27	EPA 8260D	
1,3-Dichlorobenzene	ND	---	5.00	ug/L	10	06/28/20 14:27	EPA 8260D	
1,4-Dichlorobenzene	ND	---	5.00	ug/L	10	06/28/20 14:27	EPA 8260D	
Dichlorodifluoromethane	ND	---	10.0	ug/L	10	06/28/20 14:27	EPA 8260D	
<b>1,1-Dichloroethane</b>	<b>25.7</b>	---	4.00	ug/L	10	06/28/20 14:27	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	4.00	ug/L	10	06/28/20 14:27	EPA 8260D	
<b>1,1-Dichloroethene</b>	<b>21.1</b>	---	4.00	ug/L	10	06/28/20 14:27	EPA 8260D	
<b>cis-1,2-Dichloroethene</b>	<b>1060</b>	---	4.00	ug/L	10	06/28/20 14:27	EPA 8260D	
<b>trans-1,2-Dichloroethene</b>	<b>5.60</b>	---	4.00	ug/L	10	06/28/20 14:27	EPA 8260D	
1,2-Dichloropropane	ND	---	5.00	ug/L	10	06/28/20 14:27	EPA 8260D	
1,3-Dichloropropane	ND	---	10.0	ug/L	10	06/28/20 14:27	EPA 8260D	
2,2-Dichloropropane	ND	---	10.0	ug/L	10	06/28/20 14:27	EPA 8260D	
1,1-Dichloropropene	ND	---	10.0	ug/L	10	06/28/20 14:27	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	10.0	ug/L	10	06/28/20 14:27	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	10.0	ug/L	10	06/28/20 14:27	EPA 8260D	
Hexachlorobutadiene	ND	---	50.0	ug/L	10	06/28/20 14:27	EPA 8260D	
Methylene chloride	ND	---	100	ug/L	10	06/28/20 14:27	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	---	4.00	ug/L	10	06/28/20 14:27	EPA 8260D	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>2Q20 GWM Nustar VAN</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0534 - 07 09 20 1314</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-19 (A0F0534-12RE1)</b>			<b>Matrix: Water</b>			<b>Batch: 0060898</b>		
1,1,2,2-Tetrachloroethane	ND	---	5.00	ug/L	10	06/28/20 14:27	EPA 8260D	
<b>Tetrachloroethene (PCE)</b>	<b>1000</b>	---	4.00	ug/L	10	06/28/20 14:27	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	20.0	ug/L	10	06/28/20 14:27	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	20.0	ug/L	10	06/28/20 14:27	EPA 8260D	
<b>1,1,1-Trichloroethane</b>	<b>9.40</b>	---	4.00	ug/L	10	06/28/20 14:27	EPA 8260D	
1,1,2-Trichloroethane	ND	---	5.00	ug/L	10	06/28/20 14:27	EPA 8260D	
<b>Trichloroethene (TCE)</b>	<b>580</b>	---	4.00	ug/L	10	06/28/20 14:27	EPA 8260D	
Trichlorofluoromethane	ND	---	20.0	ug/L	10	06/28/20 14:27	EPA 8260D	
1,2,3-Trichloropropane	ND	---	10.0	ug/L	10	06/28/20 14:27	EPA 8260D	
<b>Vinyl chloride</b>	<b>96.3</b>	---	4.00	ug/L	10	06/28/20 14:27	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 110 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>06/28/20 14:27</i>	<i>EPA 8260D</i>
<i>Toluene-d8 (Surr)</i>		<i>99 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/28/20 14:27</i>	<i>EPA 8260D</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>107 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/28/20 14:27</i>	<i>EPA 8260D</i>

<b>MW-19 Dup (A0F0534-13)</b>			<b>Matrix: Water</b>			<b>Batch: 0060883</b>		
Bromobenzene	ND	---	25.0	ug/L	50	06/26/20 17:48	EPA 8260D	
Bromochloromethane	ND	---	50.0	ug/L	50	06/26/20 17:48	EPA 8260D	
Bromodichloromethane	ND	---	50.0	ug/L	50	06/26/20 17:48	EPA 8260D	
Bromoform	ND	---	50.0	ug/L	50	06/26/20 17:48	EPA 8260D	
Bromomethane	ND	---	250	ug/L	50	06/26/20 17:48	EPA 8260D	
Carbon tetrachloride	ND	---	50.0	ug/L	50	06/26/20 17:48	EPA 8260D	
Chlorobenzene	ND	---	25.0	ug/L	50	06/26/20 17:48	EPA 8260D	
Chloroethane	ND	---	250	ug/L	50	06/26/20 17:48	EPA 8260D	
Chloroform	ND	---	50.0	ug/L	50	06/26/20 17:48	EPA 8260D	
Chloromethane	ND	---	250	ug/L	50	06/26/20 17:48	EPA 8260D	
2-Chlorotoluene	ND	---	50.0	ug/L	50	06/26/20 17:48	EPA 8260D	
4-Chlorotoluene	ND	---	50.0	ug/L	50	06/26/20 17:48	EPA 8260D	
Dibromochloromethane	ND	---	50.0	ug/L	50	06/26/20 17:48	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	250	ug/L	50	06/26/20 17:48	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	25.0	ug/L	50	06/26/20 17:48	EPA 8260D	
Dibromomethane	ND	---	50.0	ug/L	50	06/26/20 17:48	EPA 8260D	
1,2-Dichlorobenzene	ND	---	25.0	ug/L	50	06/26/20 17:48	EPA 8260D	
1,3-Dichlorobenzene	ND	---	25.0	ug/L	50	06/26/20 17:48	EPA 8260D	
1,4-Dichlorobenzene	ND	---	25.0	ug/L	50	06/26/20 17:48	EPA 8260D	
Dichlorodifluoromethane	ND	---	50.0	ug/L	50	06/26/20 17:48	EPA 8260D	
<b>1,1-Dichloroethane</b>	<b>32.5</b>	---	20.0	ug/L	50	06/26/20 17:48	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	20.0	ug/L	50	06/26/20 17:48	EPA 8260D	
<b>1,1-Dichloroethene</b>	<b>27.5</b>	---	20.0	ug/L	50	06/26/20 17:48	EPA 8260D	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>2Q20 GWM Nustar VAN</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0534 - 07 09 20 1314</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-19 Dup (A0F0534-13)</b>				<b>Matrix: Water</b>		<b>Batch: 0060883</b>		
cis-1,2-Dichloroethene	956	---	20.0	ug/L	50	06/26/20 17:48	EPA 8260D	
trans-1,2-Dichloroethene	ND	---	20.0	ug/L	50	06/26/20 17:48	EPA 8260D	
1,2-Dichloropropane	ND	---	25.0	ug/L	50	06/26/20 17:48	EPA 8260D	
1,3-Dichloropropane	ND	---	50.0	ug/L	50	06/26/20 17:48	EPA 8260D	
2,2-Dichloropropane	ND	---	50.0	ug/L	50	06/26/20 17:48	EPA 8260D	
1,1-Dichloropropene	ND	---	50.0	ug/L	50	06/26/20 17:48	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	50.0	ug/L	50	06/26/20 17:48	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	50.0	ug/L	50	06/26/20 17:48	EPA 8260D	
Hexachlorobutadiene	ND	---	250	ug/L	50	06/26/20 17:48	EPA 8260D	
Methylene chloride	ND	---	500	ug/L	50	06/26/20 17:48	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	---	20.0	ug/L	50	06/26/20 17:48	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	25.0	ug/L	50	06/26/20 17:48	EPA 8260D	
<b>Tetrachloroethene (PCE)</b>	<b>1080</b>	---	20.0	ug/L	50	06/26/20 17:48	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	100	ug/L	50	06/26/20 17:48	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	100	ug/L	50	06/26/20 17:48	EPA 8260D	
1,1,1-Trichloroethane	ND	---	20.0	ug/L	50	06/26/20 17:48	EPA 8260D	
1,1,2-Trichloroethane	ND	---	25.0	ug/L	50	06/26/20 17:48	EPA 8260D	
<b>Trichloroethene (TCE)</b>	<b>697</b>	---	20.0	ug/L	50	06/26/20 17:48	EPA 8260D	
Trichlorofluoromethane	ND	---	100	ug/L	50	06/26/20 17:48	EPA 8260D	
1,2,3-Trichloropropane	ND	---	50.0	ug/L	50	06/26/20 17:48	EPA 8260D	
<b>Vinyl chloride</b>	<b>95.0</b>	---	20.0	ug/L	50	06/26/20 17:48	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 108 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>06/26/20 17:48</i>	<i>EPA 8260D</i>
<i>Toluene-d8 (Surr)</i>		<i>100 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/26/20 17:48</i>	<i>EPA 8260D</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>103 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/26/20 17:48</i>	<i>EPA 8260D</i>

<b>MW-7 (A0F0534-14)</b>				<b>Matrix: Water</b>		<b>Batch: 0060849</b>		
Bromobenzene	ND	---	0.500	ug/L	1	06/26/20 01:23	EPA 8260D	
Bromochloromethane	ND	---	1.00	ug/L	1	06/26/20 01:23	EPA 8260D	
Bromodichloromethane	ND	---	1.00	ug/L	1	06/26/20 01:23	EPA 8260D	
Bromoform	ND	---	1.00	ug/L	1	06/26/20 01:23	EPA 8260D	
Bromomethane	ND	---	5.00	ug/L	1	06/26/20 01:23	EPA 8260D	
Carbon tetrachloride	ND	---	1.00	ug/L	1	06/26/20 01:23	EPA 8260D	
Chlorobenzene	ND	---	0.500	ug/L	1	06/26/20 01:23	EPA 8260D	
Chloroethane	ND	---	5.00	ug/L	1	06/26/20 01:23	EPA 8260D	
Chloroform	ND	---	1.00	ug/L	1	06/26/20 01:23	EPA 8260D	
Chloromethane	ND	---	5.00	ug/L	1	06/26/20 01:23	EPA 8260D	
2-Chlorotoluene	ND	---	1.00	ug/L	1	06/26/20 01:23	EPA 8260D	
4-Chlorotoluene	ND	---	1.00	ug/L	1	06/26/20 01:23	EPA 8260D	

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Lisa Domenighini, Client Services Manager





<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>2Q20 GWM Nustar VAN</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0534 - 07 09 20 1314</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-7 (A0F0534-14)</b>				<b>Matrix: Water</b>		<b>Batch: 0060849</b>		
Dibromochloromethane	ND	---	1.00	ug/L	1	06/26/20 01:23	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	06/26/20 01:23	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	06/26/20 01:23	EPA 8260D	
Dibromomethane	ND	---	1.00	ug/L	1	06/26/20 01:23	EPA 8260D	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	06/26/20 01:23	EPA 8260D	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	06/26/20 01:23	EPA 8260D	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	06/26/20 01:23	EPA 8260D	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	06/26/20 01:23	EPA 8260D	
<b>1,1-Dichloroethane</b>	<b>0.780</b>	---	0.400	ug/L	1	06/26/20 01:23	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	06/26/20 01:23	EPA 8260D	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	06/26/20 01:23	EPA 8260D	
<b>cis-1,2-Dichloroethene</b>	<b>10.2</b>	---	0.400	ug/L	1	06/26/20 01:23	EPA 8260D	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	06/26/20 01:23	EPA 8260D	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	06/26/20 01:23	EPA 8260D	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	06/26/20 01:23	EPA 8260D	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	06/26/20 01:23	EPA 8260D	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	06/26/20 01:23	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/26/20 01:23	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/26/20 01:23	EPA 8260D	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	06/26/20 01:23	EPA 8260D	
Methylene chloride	ND	---	10.0	ug/L	1	06/26/20 01:23	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	06/26/20 01:23	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	06/26/20 01:23	EPA 8260D	
<b>Tetrachloroethene (PCE)</b>	<b>43.0</b>	---	0.400	ug/L	1	06/26/20 01:23	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	06/26/20 01:23	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	06/26/20 01:23	EPA 8260D	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	06/26/20 01:23	EPA 8260D	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	06/26/20 01:23	EPA 8260D	
<b>Trichloroethene (TCE)</b>	<b>10.0</b>	---	0.400	ug/L	1	06/26/20 01:23	EPA 8260D	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	06/26/20 01:23	EPA 8260D	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	06/26/20 01:23	EPA 8260D	
Vinyl chloride	ND	---	0.400	ug/L	1	06/26/20 01:23	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 108 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>06/26/20 01:23</i>	<i>EPA 8260D</i>
<i>Toluene-d8 (Surr)</i>		<i>99 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/26/20 01:23</i>	<i>EPA 8260D</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>103 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/26/20 01:23</i>	<i>EPA 8260D</i>

<b>MW-7 Dup (A0F0534-15)</b>				<b>Matrix: Water</b>		<b>Batch: 0060849</b>		
Bromobenzene	ND	---	0.500	ug/L	1	06/26/20 01:50	EPA 8260D	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>2Q20 GWM Nustar VAN</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0534 - 07 09 20 1314</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-7 Dup (A0F0534-15)</b>				<b>Matrix: Water</b>		<b>Batch: 0060849</b>		
Bromochloromethane	ND	---	1.00	ug/L	1	06/26/20 01:50	EPA 8260D	
Bromodichloromethane	ND	---	1.00	ug/L	1	06/26/20 01:50	EPA 8260D	
Bromoform	ND	---	1.00	ug/L	1	06/26/20 01:50	EPA 8260D	
Bromomethane	ND	---	5.00	ug/L	1	06/26/20 01:50	EPA 8260D	
Carbon tetrachloride	ND	---	1.00	ug/L	1	06/26/20 01:50	EPA 8260D	
Chlorobenzene	ND	---	0.500	ug/L	1	06/26/20 01:50	EPA 8260D	
Chloroethane	ND	---	5.00	ug/L	1	06/26/20 01:50	EPA 8260D	
Chloroform	ND	---	1.00	ug/L	1	06/26/20 01:50	EPA 8260D	
Chloromethane	ND	---	5.00	ug/L	1	06/26/20 01:50	EPA 8260D	
2-Chlorotoluene	ND	---	1.00	ug/L	1	06/26/20 01:50	EPA 8260D	
4-Chlorotoluene	ND	---	1.00	ug/L	1	06/26/20 01:50	EPA 8260D	
Dibromochloromethane	ND	---	1.00	ug/L	1	06/26/20 01:50	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	06/26/20 01:50	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	06/26/20 01:50	EPA 8260D	
Dibromomethane	ND	---	1.00	ug/L	1	06/26/20 01:50	EPA 8260D	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	06/26/20 01:50	EPA 8260D	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	06/26/20 01:50	EPA 8260D	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	06/26/20 01:50	EPA 8260D	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	06/26/20 01:50	EPA 8260D	
<b>1,1-Dichloroethane</b>	<b>0.850</b>	---	0.400	ug/L	1	06/26/20 01:50	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	06/26/20 01:50	EPA 8260D	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	06/26/20 01:50	EPA 8260D	
<b>cis-1,2-Dichloroethene</b>	<b>11.1</b>	---	0.400	ug/L	1	06/26/20 01:50	EPA 8260D	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	06/26/20 01:50	EPA 8260D	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	06/26/20 01:50	EPA 8260D	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	06/26/20 01:50	EPA 8260D	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	06/26/20 01:50	EPA 8260D	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	06/26/20 01:50	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/26/20 01:50	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/26/20 01:50	EPA 8260D	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	06/26/20 01:50	EPA 8260D	
Methylene chloride	ND	---	10.0	ug/L	1	06/26/20 01:50	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	06/26/20 01:50	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	06/26/20 01:50	EPA 8260D	
<b>Tetrachloroethene (PCE)</b>	<b>40.8</b>	---	0.400	ug/L	1	06/26/20 01:50	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	06/26/20 01:50	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	06/26/20 01:50	EPA 8260D	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	06/26/20 01:50	EPA 8260D	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	06/26/20 01:50	EPA 8260D	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>2Q20 GWM Nustar VAN</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0534 - 07 09 20 1314</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-7 Dup (A0F0534-15)</b>			<b>Matrix: Water</b>		<b>Batch: 0060849</b>			
Trichloroethene (TCE)	10.1	---	0.400	ug/L	1	06/26/20 01:50	EPA 8260D	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	06/26/20 01:50	EPA 8260D	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	06/26/20 01:50	EPA 8260D	
Vinyl chloride	ND	---	0.400	ug/L	1	06/26/20 01:50	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 107 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>06/26/20 01:50</i>	<i>EPA 8260D</i>
<i>Toluene-d8 (Surr)</i>		<i>100 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/26/20 01:50</i>	<i>EPA 8260D</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>104 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/26/20 01:50</i>	<i>EPA 8260D</i>

<b>MW-9 (A0F0534-16)</b>			<b>Matrix: Water</b>		<b>Batch: 0060849</b>			
Bromobenzene	ND	---	0.500	ug/L	1	06/26/20 02:17	EPA 8260D	
Bromochloromethane	ND	---	1.00	ug/L	1	06/26/20 02:17	EPA 8260D	
Bromodichloromethane	ND	---	1.00	ug/L	1	06/26/20 02:17	EPA 8260D	
Bromoform	ND	---	1.00	ug/L	1	06/26/20 02:17	EPA 8260D	
Bromomethane	ND	---	5.00	ug/L	1	06/26/20 02:17	EPA 8260D	
Carbon tetrachloride	ND	---	1.00	ug/L	1	06/26/20 02:17	EPA 8260D	
Chlorobenzene	ND	---	0.500	ug/L	1	06/26/20 02:17	EPA 8260D	
Chloroethane	ND	---	5.00	ug/L	1	06/26/20 02:17	EPA 8260D	
Chloroform	ND	---	1.00	ug/L	1	06/26/20 02:17	EPA 8260D	
Chloromethane	ND	---	5.00	ug/L	1	06/26/20 02:17	EPA 8260D	
2-Chlorotoluene	ND	---	1.00	ug/L	1	06/26/20 02:17	EPA 8260D	
4-Chlorotoluene	ND	---	1.00	ug/L	1	06/26/20 02:17	EPA 8260D	
Dibromochloromethane	ND	---	1.00	ug/L	1	06/26/20 02:17	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	06/26/20 02:17	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	06/26/20 02:17	EPA 8260D	
Dibromomethane	ND	---	1.00	ug/L	1	06/26/20 02:17	EPA 8260D	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	06/26/20 02:17	EPA 8260D	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	06/26/20 02:17	EPA 8260D	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	06/26/20 02:17	EPA 8260D	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	06/26/20 02:17	EPA 8260D	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	06/26/20 02:17	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	06/26/20 02:17	EPA 8260D	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	06/26/20 02:17	EPA 8260D	
<b>cis-1,2-Dichloroethene</b>	<b>5.27</b>	---	0.400	ug/L	1	06/26/20 02:17	EPA 8260D	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	06/26/20 02:17	EPA 8260D	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	06/26/20 02:17	EPA 8260D	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	06/26/20 02:17	EPA 8260D	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	06/26/20 02:17	EPA 8260D	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	06/26/20 02:17	EPA 8260D	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>2Q20 GWM Nustar VAN</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0534 - 07 09 20 1314</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
			<b>Matrix: Water</b>			<b>Batch: 0060849</b>		
<b>MW-9 (A0F0534-16)</b>								
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/26/20 02:17	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/26/20 02:17	EPA 8260D	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	06/26/20 02:17	EPA 8260D	
Methylene chloride	ND	---	10.0	ug/L	1	06/26/20 02:17	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	06/26/20 02:17	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	06/26/20 02:17	EPA 8260D	
<b>Tetrachloroethene (PCE)</b>	<b>109</b>	---	0.400	ug/L	1	06/26/20 02:17	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	06/26/20 02:17	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	06/26/20 02:17	EPA 8260D	
<b>1,1,1-Trichloroethane</b>	<b>1.44</b>	---	0.400	ug/L	1	06/26/20 02:17	EPA 8260D	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	06/26/20 02:17	EPA 8260D	
<b>Trichloroethene (TCE)</b>	<b>45.9</b>	---	0.400	ug/L	1	06/26/20 02:17	EPA 8260D	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	06/26/20 02:17	EPA 8260D	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	06/26/20 02:17	EPA 8260D	
Vinyl chloride	ND	---	0.400	ug/L	1	06/26/20 02:17	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 117 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>06/26/20 02:17</i>	<i>EPA 8260D</i>
<i>Toluene-d8 (Surr)</i>		<i>98 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/26/20 02:17</i>	<i>EPA 8260D</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>103 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/26/20 02:17</i>	<i>EPA 8260D</i>

			<b>Matrix: Water</b>			<b>Batch: 0060849</b>		
<b>MW-21i-105 (A0F0534-17)</b>								
Bromobenzene	ND	---	0.500	ug/L	1	06/26/20 00:56	EPA 8260D	
Bromochloromethane	ND	---	1.00	ug/L	1	06/26/20 00:56	EPA 8260D	
Bromodichloromethane	ND	---	1.00	ug/L	1	06/26/20 00:56	EPA 8260D	
Bromoform	ND	---	1.00	ug/L	1	06/26/20 00:56	EPA 8260D	
Bromomethane	ND	---	5.00	ug/L	1	06/26/20 00:56	EPA 8260D	
Carbon tetrachloride	ND	---	1.00	ug/L	1	06/26/20 00:56	EPA 8260D	
Chlorobenzene	ND	---	0.500	ug/L	1	06/26/20 00:56	EPA 8260D	
Chloroethane	ND	---	5.00	ug/L	1	06/26/20 00:56	EPA 8260D	
Chloroform	ND	---	1.00	ug/L	1	06/26/20 00:56	EPA 8260D	
Chloromethane	ND	---	5.00	ug/L	1	06/26/20 00:56	EPA 8260D	
2-Chlorotoluene	ND	---	1.00	ug/L	1	06/26/20 00:56	EPA 8260D	
4-Chlorotoluene	ND	---	1.00	ug/L	1	06/26/20 00:56	EPA 8260D	
Dibromochloromethane	ND	---	1.00	ug/L	1	06/26/20 00:56	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	06/26/20 00:56	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	06/26/20 00:56	EPA 8260D	
Dibromomethane	ND	---	1.00	ug/L	1	06/26/20 00:56	EPA 8260D	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	06/26/20 00:56	EPA 8260D	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	06/26/20 00:56	EPA 8260D	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>2Q20 GWM Nustar VAN</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0534 - 07 09 20 1314</b>
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**ANALYTICAL SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-21i-105 (A0F0534-17)</b>				<b>Matrix: Water</b>		<b>Batch: 0060849</b>		
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	06/26/20 00:56	EPA 8260D	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	06/26/20 00:56	EPA 8260D	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	06/26/20 00:56	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	06/26/20 00:56	EPA 8260D	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	06/26/20 00:56	EPA 8260D	
<b>cis-1,2-Dichloroethene</b>	<b>1.59</b>	---	0.400	ug/L	1	06/26/20 00:56	EPA 8260D	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	06/26/20 00:56	EPA 8260D	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	06/26/20 00:56	EPA 8260D	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	06/26/20 00:56	EPA 8260D	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	06/26/20 00:56	EPA 8260D	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	06/26/20 00:56	EPA 8260D	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/26/20 00:56	EPA 8260D	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	06/26/20 00:56	EPA 8260D	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	06/26/20 00:56	EPA 8260D	
Methylene chloride	ND	---	10.0	ug/L	1	06/26/20 00:56	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	06/26/20 00:56	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	06/26/20 00:56	EPA 8260D	
<b>Tetrachloroethene (PCE)</b>	<b>3.08</b>	---	0.400	ug/L	1	06/26/20 00:56	EPA 8260D	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	06/26/20 00:56	EPA 8260D	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	06/26/20 00:56	EPA 8260D	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	06/26/20 00:56	EPA 8260D	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	06/26/20 00:56	EPA 8260D	
<b>Trichloroethene (TCE)</b>	<b>1.49</b>	---	0.400	ug/L	1	06/26/20 00:56	EPA 8260D	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	06/26/20 00:56	EPA 8260D	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	06/26/20 00:56	EPA 8260D	
Vinyl chloride	ND	---	0.400	ug/L	1	06/26/20 00:56	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 107 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>06/26/20 00:56</i>	<i>EPA 8260D</i>
<i>Toluene-d8 (Surr)</i>		<i>101 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/26/20 00:56</i>	<i>EPA 8260D</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>102 %</i>		<i>80-120 %</i>		<i>1</i>	<i>06/26/20 00:56</i>	<i>EPA 8260D</i>



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**ANALYTICAL SAMPLE RESULTS**

**Ammonia by Gas Diffusion and Colorimetric Detection**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-24i (A0F0534-01)</b>				<b>Matrix: Water</b>		<b>Batch: 0060687</b>		
Ammonia as N	ND	---	0.0200	mg/L	1	06/23/20 16:36	SM 4500-NH3 G	
<b>MW-24d (A0F0534-02)</b>				<b>Matrix: Water</b>		<b>Batch: 0060687</b>		
Ammonia as N	<b>0.211</b>	---	0.0200	mg/L	1	06/23/20 16:37	SM 4500-NH3 G	
<b>MW-25i (A0F0534-03)</b>				<b>Matrix: Water</b>		<b>Batch: 0060687</b>		
Ammonia as N	ND	---	0.0200	mg/L	1	06/23/20 16:39	SM 4500-NH3 G	
<b>MW-16 (A0F0534-04)</b>				<b>Matrix: Water</b>		<b>Batch: 0060687</b>		
Ammonia as N	ND	---	0.0200	mg/L	1	06/23/20 16:40	SM 4500-NH3 G	
<b>MW-5 (A0F0534-05)</b>				<b>Matrix: Water</b>		<b>Batch: 0060687</b>		
Ammonia as N	<b>0.114</b>	---	0.0200	mg/L	1	06/23/20 16:49	SM 4500-NH3 G	
<b>MW-19i (A0F0534-06)</b>				<b>Matrix: Water</b>		<b>Batch: 0060687</b>		
Ammonia as N	<b>0.191</b>	---	0.0200	mg/L	1	06/23/20 16:51	SM 4500-NH3 G	
<b>MW-15 (A0F0534-07)</b>				<b>Matrix: Water</b>		<b>Batch: 0060687</b>		
Ammonia as N	ND	---	0.0200	mg/L	1	06/23/20 16:53	SM 4500-NH3 G	
<b>MW-22i (A0F0534-08)</b>				<b>Matrix: Water</b>		<b>Batch: 0060687</b>		
Ammonia as N	<b>0.331</b>	---	0.0200	mg/L	1	06/23/20 16:54	SM 4500-NH3 G	
<b>MW-12 (A0F0534-09)</b>				<b>Matrix: Water</b>		<b>Batch: 0060687</b>		
Ammonia as N	<b>12.2</b>	---	0.200	mg/L	10	06/23/20 16:56	SM 4500-NH3 G	
<b>MW-12 Dup (A0F0534-10)</b>				<b>Matrix: Water</b>		<b>Batch: 0060687</b>		
Ammonia as N	<b>12.3</b>	---	0.200	mg/L	10	06/23/20 16:57	SM 4500-NH3 G	
<b>MW-13 (A0F0534-11)</b>				<b>Matrix: Water</b>		<b>Batch: 0060687</b>		
Ammonia as N	<b>18.1</b>	---	0.200	mg/L	10	06/23/20 16:59	SM 4500-NH3 G	
<b>MW-19 (A0F0534-12RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0060687</b>		
Ammonia as N	<b>88.0</b>	---	1.00	mg/L	50	06/23/20 17:29	SM 4500-NH3 G	
<b>MW-19 Dup (A0F0534-13RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0060687</b>		

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**ANALYTICAL SAMPLE RESULTS**

**Ammonia by Gas Diffusion and Colorimetric Detection**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-19 Dup (A0F0534-13RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0060687</b>		
Ammonia as N	90.4	---	1.00	mg/L	50	06/23/20 17:30	SM 4500-NH3 G	
<b>MW-7 (A0F0534-14)</b>				<b>Matrix: Water</b>		<b>Batch: 0060687</b>		
Ammonia as N	5.21	---	0.0400	mg/L	2	06/23/20 17:11	SM 4500-NH3 G	
<b>MW-7 Dup (A0F0534-15)</b>				<b>Matrix: Water</b>		<b>Batch: 0060687</b>		
Ammonia as N	6.33	---	0.0400	mg/L	2	06/23/20 17:12	SM 4500-NH3 G	
<b>MW-9 (A0F0534-16)</b>				<b>Matrix: Water</b>		<b>Batch: 0060687</b>		
Ammonia as N	ND	---	0.0200	mg/L	1	06/23/20 17:14	SM 4500-NH3 G	
<b>MW-21i-105 (A0F0534-17RE1)</b>				<b>Matrix: Water</b>		<b>Batch: 0060687</b>		
Ammonia as N	44.6	---	0.200	mg/L	10	06/23/20 17:32	SM 4500-NH3 G	

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**ANALYTICAL SAMPLE RESULTS**

**Anions by Ion Chromatography**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-24i (A0F0534-01)</b>				<b>Matrix: Water</b>				
Batch: 0060660								
Nitrate-Nitrogen	2.70	---	0.250	mg/L	1	06/19/20 16:32	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/19/20 16:32	EPA 300.0	
<b>MW-24d (A0F0534-02)</b>				<b>Matrix: Water</b>				
Batch: 0060660								
Nitrate-Nitrogen	ND	---	0.250	mg/L	1	06/19/20 18:42	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/19/20 18:42	EPA 300.0	
<b>MW-25i (A0F0534-03)</b>				<b>Matrix: Water</b>				
Batch: 0060660								
Nitrate-Nitrogen	0.357	---	0.250	mg/L	1	06/19/20 19:03	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/19/20 19:03	EPA 300.0	
<b>MW-16 (A0F0534-04)</b>				<b>Matrix: Water</b>				
Batch: 0060660								
Nitrate-Nitrogen	2.44	---	0.250	mg/L	1	06/19/20 20:08	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/19/20 20:08	EPA 300.0	
<b>MW-5 (A0F0534-05)</b>				<b>Matrix: Water</b>				
Batch: 0060660								
Nitrate-Nitrogen	ND	---	0.250	mg/L	1	06/19/20 20:30	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/19/20 20:30	EPA 300.0	
<b>MW-19i (A0F0534-06)</b>				<b>Matrix: Water</b>				
Batch: 0060660								
Nitrate-Nitrogen	ND	---	0.250	mg/L	1	06/19/20 20:51	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/19/20 20:51	EPA 300.0	
<b>MW-15 (A0F0534-07)</b>				<b>Matrix: Water</b>				
Batch: 0060660								
Nitrate-Nitrogen	1.34	---	0.250	mg/L	1	06/19/20 21:13	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/19/20 21:13	EPA 300.0	
<b>MW-22i (A0F0534-08)</b>				<b>Matrix: Water</b>				
Batch: 0060660								

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**ANALYTICAL SAMPLE RESULTS**

**Anions by Ion Chromatography**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-22i (A0F0534-08)</b>				<b>Matrix: Water</b>				
Nitrate-Nitrogen	ND	---	0.250	mg/L	1	06/19/20 21:34	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/19/20 21:34	EPA 300.0	
<b>MW-12 (A0F0534-09)</b>				<b>Matrix: Water</b>				
Batch: 0060660								
Nitrate-Nitrogen	<b>1.66</b>	---	0.250	mg/L	1	06/19/20 21:56	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/19/20 21:56	EPA 300.0	
<b>MW-12 Dup (A0F0534-10)</b>				<b>Matrix: Water</b>				
Batch: 0060660								
Nitrate-Nitrogen	<b>1.61</b>	---	0.250	mg/L	1	06/19/20 23:01	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/19/20 23:01	EPA 300.0	
<b>MW-13 (A0F0534-11)</b>				<b>Matrix: Water</b>				
Batch: 0060660								
Nitrate-Nitrogen	ND	---	0.250	mg/L	1	06/19/20 23:22	EPA 300.0	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/19/20 23:22	EPA 300.0	
<b>MW-19 (A0F0534-12)</b>				<b>Matrix: Water</b>				
Batch: 0060660								
Nitrate-Nitrogen	<b>30.8</b>	---	5.00	mg/L	20	06/19/20 23:44	EPA 300.0	
<b>MW-19 (A0F0534-12RE1)</b>				<b>Matrix: Water</b>				
Batch: 0060660								
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/20/20 00:05	EPA 300.0	
<b>MW-19 Dup (A0F0534-13)</b>				<b>Matrix: Water</b>				
Batch: 0060660								
Nitrate-Nitrogen	<b>27.2</b>	---	5.00	mg/L	20	06/20/20 00:27	EPA 300.0	
<b>MW-19 Dup (A0F0534-13RE1)</b>				<b>Matrix: Water</b>				
Batch: 0060660								
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/20/20 00:48	EPA 300.0	
<b>MW-7 (A0F0534-14)</b>				<b>Matrix: Water</b>				
Batch: 0060660								

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**ANALYTICAL SAMPLE RESULTS**

**Anions by Ion Chromatography**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-7 (A0F0534-14)</b>				<b>Matrix: Water</b>				
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/20/20 01:10	EPA 300.0	
<b>MW-7 (A0F0534-14RE1)</b>				<b>Matrix: Water</b>				
Batch: 0060660								
Nitrate-Nitrogen	27.6	---	5.00	mg/L	20	06/20/20 13:21	EPA 300.0	H-01
<b>MW-7 Dup (A0F0534-15)</b>				<b>Matrix: Water</b>				
Batch: 0060660								
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/20/20 01:31	EPA 300.0	
<b>MW-7 Dup (A0F0534-15RE1)</b>				<b>Matrix: Water</b>				
Batch: 0060660								
Nitrate-Nitrogen	27.6	---	5.00	mg/L	20	06/20/20 13:42	EPA 300.0	H-01
<b>MW-9 (A0F0534-16)</b>				<b>Matrix: Water</b>				
Batch: 0060660								
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	06/20/20 01:53	EPA 300.0	
<b>MW-9 (A0F0534-16RE1)</b>				<b>Matrix: Water</b>				
Batch: 0060660								
Nitrate-Nitrogen	128	---	12.5	mg/L	50	06/20/20 14:04	EPA 300.0	H-01
<b>MW-21i-105 (A0F0534-17)</b>				<b>Matrix: Water</b>				
Batch: 0060660								
Nitrite-Nitrogen	12.1	---	5.00	mg/L	20	06/20/20 02:15	EPA 300.0	
<b>MW-21i-105 (A0F0534-17RE1)</b>				<b>Matrix: Water</b>				
Batch: 0060660								
Nitrate-Nitrogen	4.18	---	0.250	mg/L	1	06/20/20 03:19	EPA 300.0	

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**ANALYTICAL SAMPLE RESULTS**

**Total Organic Carbon (Non-Purgeable) by Persulfate Oxidation by Standard Method 5310C**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>MW-24i (A0F0534-01)</b>				<b>Matrix: Water</b>		<b>Batch: 0060732</b>		
Total Organic Carbon	ND	---	1.00	mg/L	1	06/23/20 17:29	SM 5310 C	
<b>MW-12 (A0F0534-09)</b>				<b>Matrix: Water</b>		<b>Batch: 0060732</b>		
Total Organic Carbon	10.5	---	1.00	mg/L	1	06/23/20 18:03	SM 5310 C	
<b>MW-13 (A0F0534-11)</b>				<b>Matrix: Water</b>		<b>Batch: 0060732</b>		
Total Organic Carbon	21.9	---	1.00	mg/L	1	06/23/20 19:47	SM 5310 C	
<b>MW-19 (A0F0534-12)</b>				<b>Matrix: Water</b>		<b>Batch: 0060732</b>		
Total Organic Carbon	40.1	---	2.00	mg/L	2	06/23/20 20:21	SM 5310 C	
<b>MW-7 (A0F0534-14)</b>				<b>Matrix: Water</b>		<b>Batch: 0060732</b>		
Total Organic Carbon	5.10	---	1.00	mg/L	1	06/23/20 20:55	SM 5310 C	

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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0060849 - EPA 5030B</b>						<b>Water</b>						
<b>Blank (0060849-BLK1)</b>		Prepared: 06/25/20 14:58 Analyzed: 06/25/20 16:22										
<b>EPA 8260D</b>												
Bromobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Bromochloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Bromodichloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Bromoform	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Bromomethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
Carbon tetrachloride	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Chlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Chloroethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
Chloroform	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Chloromethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
2-Chlorotoluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
4-Chlorotoluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Dibromochloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Dibromomethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
1,1-Dichloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
1,1-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
cis-1,2-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
1,2-Dichloropropane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
1,3-Dichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
2,2-Dichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
1,1-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Hexachlorobutadiene	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
Methylene chloride	ND	---	10.0	ug/L	1	---	---	---	---	---	---	---

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>2Q20 GWM Nustar VAN</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0F0534 - 07 09 20 1314
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0060849 - EPA 5030B</b>						<b>Water</b>						
<b>Blank (0060849-BLK1)</b>		Prepared: 06/25/20 14:58		Analyzed: 06/25/20 16:22								
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Tetrachloroethene (PCE)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Trichloroethene (TCE)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Vinyl chloride	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 105 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>101 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>105 %</i>		<i>80-120 %</i>		<i>"</i>						

<b>LCS (0060849-BS1)</b>		Prepared: 06/25/20 14:58		Analyzed: 06/25/20 15:28								
<b>EPA 8260D</b>												
Bromobenzene	18.4	---	0.500	ug/L	1	20.0	---	92	80 - 120%	---	---	
Bromochloromethane	17.5	---	1.00	ug/L	1	20.0	---	87	80 - 120%	---	---	
Bromodichloromethane	18.2	---	1.00	ug/L	1	20.0	---	91	80 - 120%	---	---	
Bromoform	19.4	---	1.00	ug/L	1	20.0	---	97	80 - 120%	---	---	
Bromomethane	19.9	---	5.00	ug/L	1	20.0	---	99	80 - 120%	---	---	
Carbon tetrachloride	18.9	---	1.00	ug/L	1	20.0	---	95	80 - 120%	---	---	
Chlorobenzene	18.4	---	0.500	ug/L	1	20.0	---	92	80 - 120%	---	---	
Chloroethane	17.7	---	5.00	ug/L	1	20.0	---	88	80 - 120%	---	---	
Chloroform	18.1	---	1.00	ug/L	1	20.0	---	90	80 - 120%	---	---	
Chloromethane	16.3	---	5.00	ug/L	1	20.0	---	82	80 - 120%	---	---	
2-Chlorotoluene	20.4	---	1.00	ug/L	1	20.0	---	102	80 - 120%	---	---	
4-Chlorotoluene	20.8	---	1.00	ug/L	1	20.0	---	104	80 - 120%	---	---	
Dibromochloromethane	19.6	---	1.00	ug/L	1	20.0	---	98	80 - 120%	---	---	
1,2-Dibromo-3-chloropropane	20.3	---	5.00	ug/L	1	20.0	---	102	80 - 120%	---	---	
1,2-Dibromoethane (EDB)	20.0	---	0.500	ug/L	1	20.0	---	100	80 - 120%	---	---	
Dibromomethane	18.4	---	1.00	ug/L	1	20.0	---	92	80 - 120%	---	---	
1,2-Dichlorobenzene	19.9	---	0.500	ug/L	1	20.0	---	100	80 - 120%	---	---	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>2Q20 GWM Nustar VAN</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0534 - 07 09 20 1314</b>
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0060849 - EPA 5030B</b>												
<b>Water</b>												
<b>LCS (0060849-BS1)</b>	Prepared: 06/25/20 14:58 Analyzed: 06/25/20 15:28											
1,3-Dichlorobenzene	20.3	---	0.500	ug/L	1	20.0	---	101	80 - 120%	---	---	
1,4-Dichlorobenzene	18.7	---	0.500	ug/L	1	20.0	---	94	80 - 120%	---	---	
Dichlorodifluoromethane	17.8	---	1.00	ug/L	1	20.0	---	89	80 - 120%	---	---	
1,1-Dichloroethane	18.7	---	0.400	ug/L	1	20.0	---	93	80 - 120%	---	---	
1,2-Dichloroethane (EDC)	17.8	---	0.400	ug/L	1	20.0	---	89	80 - 120%	---	---	
1,1-Dichloroethene	18.8	---	0.400	ug/L	1	20.0	---	94	80 - 120%	---	---	
cis-1,2-Dichloroethene	19.8	---	0.400	ug/L	1	20.0	---	99	80 - 120%	---	---	
trans-1,2-Dichloroethene	18.7	---	0.400	ug/L	1	20.0	---	94	80 - 120%	---	---	
1,2-Dichloropropane	18.5	---	0.500	ug/L	1	20.0	---	93	80 - 120%	---	---	
1,3-Dichloropropane	19.9	---	1.00	ug/L	1	20.0	---	100	80 - 120%	---	---	
2,2-Dichloropropane	22.2	---	1.00	ug/L	1	20.0	---	111	80 - 120%	---	---	
1,1-Dichloropropene	21.4	---	1.00	ug/L	1	20.0	---	107	80 - 120%	---	---	
cis-1,3-Dichloropropene	19.0	---	1.00	ug/L	1	20.0	---	95	80 - 120%	---	---	
trans-1,3-Dichloropropene	19.2	---	1.00	ug/L	1	20.0	---	96	80 - 120%	---	---	
Hexachlorobutadiene	21.6	---	5.00	ug/L	1	20.0	---	108	80 - 120%	---	---	
Methylene chloride	20.0	---	10.0	ug/L	1	20.0	---	100	80 - 120%	---	---	
1,1,1,2-Tetrachloroethane	19.4	---	0.400	ug/L	1	20.0	---	97	80 - 120%	---	---	
1,1,2,2-Tetrachloroethane	17.9	---	0.500	ug/L	1	20.0	---	89	80 - 120%	---	---	
Tetrachloroethene (PCE)	19.0	---	0.400	ug/L	1	20.0	---	95	80 - 120%	---	---	
1,2,3-Trichlorobenzene	21.0	---	2.00	ug/L	1	20.0	---	105	80 - 120%	---	---	
1,2,4-Trichlorobenzene	22.1	---	2.00	ug/L	1	20.0	---	110	80 - 120%	---	---	
1,1,1-Trichloroethane	19.1	---	0.400	ug/L	1	20.0	---	96	80 - 120%	---	---	
1,1,2-Trichloroethane	18.9	---	0.500	ug/L	1	20.0	---	94	80 - 120%	---	---	
Trichloroethene (TCE)	19.0	---	0.400	ug/L	1	20.0	---	95	80 - 120%	---	---	
Trichlorofluoromethane	18.2	---	2.00	ug/L	1	20.0	---	91	80 - 120%	---	---	
1,2,3-Trichloropropane	18.5	---	1.00	ug/L	1	20.0	---	92	80 - 120%	---	---	
Vinyl chloride	17.9	---	0.400	ug/L	1	20.0	---	89	80 - 120%	---	---	
Surr: 1,4-Difluorobenzene (Surr)	Recovery: 97 %		Limits: 80-120 %		Dilution: 1x							
Toluene-d8 (Surr)	99 %		80-120 %		"							
4-Bromofluorobenzene (Surr)	99 %		80-120 %		"							

**Duplicate (0060849-DUP1)** Prepared: 06/25/20 14:58 Analyzed: 06/25/20 22:41

**QC Source Sample: MW-15 (A0F0534-07)**

**EPA 8260D**

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>2Q20 GWM Nustar VAN</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0F0534 - 07 09 20 1314
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0060849 - EPA 5030B</b>												
<b>Water</b>												
<b>Duplicate (0060849-DUP1)</b>			Prepared: 06/25/20 14:58 Analyzed: 06/25/20 22:41									
<b>QC Source Sample: MW-15 (A0F0534-07)</b>												
Bromobenzene	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Bromochloromethane	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromodichloromethane	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromoform	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromomethane	ND	---	5.00	ug/L	1	---	ND	---	---	---	30%	
Carbon tetrachloride	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Chlorobenzene	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Chloroethane	ND	---	5.00	ug/L	1	---	ND	---	---	---	30%	
Chloroform	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Chloromethane	ND	---	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Chlorotoluene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
4-Chlorotoluene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Dibromochloromethane	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Dibromomethane	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	---	ND	---	---	---	30%	
cis-1,2-Dichloroethene	ND	---	0.400	ug/L	1	---	ND	---	---	---	30%	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	---	ND	---	---	---	30%	
Methylene chloride	ND	---	10.0	ug/L	1	---	ND	---	---	---	30%	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>2Q20 GWM Nustar VAN</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0534 - 07 09 20 1314</b>
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QUALITY CONTROL (QC) SAMPLE RESULTS

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0060849 - EPA 5030B</b>												
<b>Water</b>												
<b>Duplicate (0060849-DUP1)</b>			Prepared: 06/25/20 14:58 Analyzed: 06/25/20 22:41									
<b>QC Source Sample: MW-15 (A0F0534-07)</b>												
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Tetrachloroethene (PCE)	<b>0.500</b>	---	0.400	ug/L	1	---	0.540	---	---	8	30%	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	---	ND	---	---	---	30%	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Trichloroethene (TCE)	ND	---	0.400	ug/L	1	---	ND	---	---	---	30%	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	---	ND	---	---	---	30%	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Vinyl chloride	ND	---	0.400	ug/L	1	---	ND	---	---	---	30%	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>			<i>Recovery: 109 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>					
<i>Toluene-d8 (Surr)</i>			<i>101 %</i>		<i>80-120 %</i>		<i>"</i>					
<i>4-Bromofluorobenzene (Surr)</i>			<i>103 %</i>		<i>80-120 %</i>		<i>"</i>					

<b>Matrix Spike (0060849-MS1)</b>												
Prepared: 06/25/20 14:58 Analyzed: 06/25/20 19:59												
<b>QC Source Sample: MW-24d (A0F0534-02)</b>												
<b>EPA 8260D</b>												
Bromobenzene	19.1	---	0.500	ug/L	1	20.0	ND	96	80 - 120%	---	---	
Bromochloromethane	18.6	---	1.00	ug/L	1	20.0	ND	93	78 - 123%	---	---	
Bromodichloromethane	19.7	---	1.00	ug/L	1	20.0	ND	98	79 - 125%	---	---	
Bromoform	21.0	---	1.00	ug/L	1	20.0	ND	105	66 - 130%	---	---	
Bromomethane	20.6	---	5.00	ug/L	1	20.0	ND	103	53 - 141%	---	---	
Carbon tetrachloride	20.8	---	1.00	ug/L	1	20.0	ND	104	72 - 136%	---	---	
Chlorobenzene	19.6	---	0.500	ug/L	1	20.0	ND	98	80 - 120%	---	---	
Chloroethane	20.8	---	5.00	ug/L	1	20.0	ND	104	60 - 138%	---	---	
Chloroform	19.3	---	1.00	ug/L	1	20.0	ND	96	79 - 124%	---	---	
Chloromethane	18.0	---	5.00	ug/L	1	20.0	ND	90	50 - 139%	---	---	
2-Chlorotoluene	21.5	---	1.00	ug/L	1	20.0	ND	108	79 - 122%	---	---	
4-Chlorotoluene	22.1	---	1.00	ug/L	1	20.0	ND	111	78 - 122%	---	---	
Dibromochloromethane	21.1	---	1.00	ug/L	1	20.0	ND	106	74 - 126%	---	---	
1,2-Dibromo-3-chloropropane	21.4	---	5.00	ug/L	1	20.0	ND	107	62 - 128%	---	---	
1,2-Dibromoethane (EDB)	20.7	---	0.500	ug/L	1	20.0	ND	104	77 - 121%	---	---	

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Lisa Domenighini, Client Services Manager





<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>2Q20 GWM Nustar VAN</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0534 - 07 09 20 1314</b>
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0060849 - EPA 5030B</b>												
<b>Water</b>												
<b>Matrix Spike (0060849-MS1)</b>			Prepared: 06/25/20 14:58 Analyzed: 06/25/20 19:59									
<b>QC Source Sample: MW-24d (A0F0534-02)</b>												
Dibromomethane	19.2	---	1.00	ug/L	1	20.0	ND	96	79 - 123%	---	---	
1,2-Dichlorobenzene	20.9	---	0.500	ug/L	1	20.0	ND	105	80 - 120%	---	---	
1,3-Dichlorobenzene	21.2	---	0.500	ug/L	1	20.0	ND	106	80 - 120%	---	---	
1,4-Dichlorobenzene	19.9	---	0.500	ug/L	1	20.0	ND	99	79 - 120%	---	---	
Dichlorodifluoromethane	17.7	---	1.00	ug/L	1	20.0	ND	89	32 - 152%	---	---	
1,1-Dichloroethane	19.7	---	0.400	ug/L	1	20.0	ND	98	77 - 125%	---	---	
1,2-Dichloroethane (EDC)	19.1	---	0.400	ug/L	1	20.0	ND	96	73 - 128%	---	---	
1,1-Dichloroethene	19.0	---	0.400	ug/L	1	20.0	ND	95	71 - 131%	---	---	
cis-1,2-Dichloroethene	20.4	---	0.400	ug/L	1	20.0	ND	102	78 - 123%	---	---	
trans-1,2-Dichloroethene	19.1	---	0.400	ug/L	1	20.0	ND	96	75 - 124%	---	---	
1,2-Dichloropropane	19.1	---	0.500	ug/L	1	20.0	ND	96	78 - 122%	---	---	
1,3-Dichloropropane	20.4	---	1.00	ug/L	1	20.0	ND	102	80 - 120%	---	---	
2,2-Dichloropropane	20.9	---	1.00	ug/L	1	20.0	ND	104	60 - 139%	---	---	
1,1-Dichloropropene	22.4	---	1.00	ug/L	1	20.0	ND	112	79 - 125%	---	---	
cis-1,3-Dichloropropene	16.2	---	1.00	ug/L	1	20.0	ND	81	75 - 124%	---	---	
trans-1,3-Dichloropropene	19.8	---	1.00	ug/L	1	20.0	ND	99	73 - 127%	---	---	
Hexachlorobutadiene	22.4	---	5.00	ug/L	1	20.0	ND	112	66 - 134%	---	---	
Methylene chloride	19.3	---	10.0	ug/L	1	20.0	ND	97	74 - 124%	---	---	
1,1,1,2-Tetrachloroethane	21.3	---	0.400	ug/L	1	20.0	ND	106	78 - 124%	---	---	
1,1,2,2-Tetrachloroethane	20.0	---	0.500	ug/L	1	20.0	ND	100	71 - 121%	---	---	
Tetrachloroethene (PCE)	20.0	---	0.400	ug/L	1	20.0	ND	100	74 - 129%	---	---	
1,2,3-Trichlorobenzene	22.9	---	2.00	ug/L	1	20.0	ND	115	69 - 129%	---	---	
1,2,4-Trichlorobenzene	23.2	---	2.00	ug/L	1	20.0	ND	116	69 - 130%	---	---	
1,1,1-Trichloroethane	20.4	---	0.400	ug/L	1	20.0	ND	102	74 - 131%	---	---	
1,1,2-Trichloroethane	19.6	---	0.500	ug/L	1	20.0	ND	98	80 - 120%	---	---	
Trichloroethene (TCE)	18.8	---	0.400	ug/L	1	20.0	ND	94	79 - 123%	---	---	
Trichlorofluoromethane	20.2	---	2.00	ug/L	1	20.0	ND	101	65 - 141%	---	---	
1,2,3-Trichloropropane	19.7	---	1.00	ug/L	1	20.0	ND	99	73 - 122%	---	---	
Vinyl chloride	19.3	---	0.400	ug/L	1	20.0	ND	96	58 - 137%	---	---	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>			<i>Recovery: 96 %</i>	<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>			<i>96 %</i>	<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>			<i>96 %</i>	<i>80-120 %</i>		<i>"</i>						

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>2Q20 GWM Nustar VAN</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0F0534 - 07 09 20 1314
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0060883 - EPA 5030B</b>						<b>Water</b>						
<b>Blank (0060883-BLK1)</b>		Prepared: 06/26/20 13:38			Analyzed: 06/26/20 14:59							
<b>EPA 8260D</b>												
Bromobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Bromochloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Bromodichloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Bromoform	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Bromomethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
Carbon tetrachloride	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Chlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Chloroethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
Chloroform	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Chloromethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
2-Chlorotoluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
4-Chlorotoluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Dibromochloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Dibromomethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
1,1-Dichloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
1,1-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
cis-1,2-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
1,2-Dichloropropane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
1,3-Dichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
2,2-Dichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
1,1-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Hexachlorobutadiene	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
Methylene chloride	ND	---	10.0	ug/L	1	---	---	---	---	---	---	---

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>2Q20 GWM Nustar VAN</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0F0534 - 07 09 20 1314
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0060883 - EPA 5030B</b>						<b>Water</b>						
<b>Blank (0060883-BLK1)</b>		Prepared: 06/26/20 13:38		Analyzed: 06/26/20 14:59								
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Tetrachloroethene (PCE)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Trichloroethene (TCE)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Vinyl chloride	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 108 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>100 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>105 %</i>		<i>80-120 %</i>		<i>"</i>						

<b>LCS (0060883-BS1)</b>		Prepared: 06/26/20 13:38		Analyzed: 06/26/20 14:05								
<b>EPA 8260D</b>												
Bromobenzene	19.2	---	0.500	ug/L	1	20.0	---	96	80 - 120%	---	---	
Bromochloromethane	18.6	---	1.00	ug/L	1	20.0	---	93	80 - 120%	---	---	
Bromodichloromethane	19.6	---	1.00	ug/L	1	20.0	---	98	80 - 120%	---	---	
Bromoform	21.4	---	1.00	ug/L	1	20.0	---	107	80 - 120%	---	---	
Bromomethane	19.5	---	5.00	ug/L	1	20.0	---	98	80 - 120%	---	---	
Carbon tetrachloride	20.1	---	1.00	ug/L	1	20.0	---	100	80 - 120%	---	---	
Chlorobenzene	19.4	---	0.500	ug/L	1	20.0	---	97	80 - 120%	---	---	
Chloroethane	21.4	---	5.00	ug/L	1	20.0	---	107	80 - 120%	---	---	
Chloroform	19.3	---	1.00	ug/L	1	20.0	---	97	80 - 120%	---	---	
Chloromethane	16.6	---	5.00	ug/L	1	20.0	---	83	80 - 120%	---	---	
2-Chlorotoluene	21.3	---	1.00	ug/L	1	20.0	---	106	80 - 120%	---	---	
4-Chlorotoluene	21.8	---	1.00	ug/L	1	20.0	---	109	80 - 120%	---	---	
Dibromochloromethane	20.7	---	1.00	ug/L	1	20.0	---	104	80 - 120%	---	---	
1,2-Dibromo-3-chloropropane	21.7	---	5.00	ug/L	1	20.0	---	109	80 - 120%	---	---	
1,2-Dibromoethane (EDB)	20.6	---	0.500	ug/L	1	20.0	---	103	80 - 120%	---	---	
Dibromomethane	19.1	---	1.00	ug/L	1	20.0	---	96	80 - 120%	---	---	
1,2-Dichlorobenzene	20.5	---	0.500	ug/L	1	20.0	---	103	80 - 120%	---	---	

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>2Q20 GWM Nustar VAN</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0534 - 07 09 20 1314</b>
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0060883 - EPA 5030B</b>						<b>Water</b>						
<b>LCS (0060883-BS1)</b>	Prepared: 06/26/20 13:38		Analyzed: 06/26/20 14:05									
1,3-Dichlorobenzene	21.0	---	0.500	ug/L	1	20.0	---	105	80 - 120%	---	---	
1,4-Dichlorobenzene	19.5	---	0.500	ug/L	1	20.0	---	97	80 - 120%	---	---	
Dichlorodifluoromethane	18.6	---	1.00	ug/L	1	20.0	---	93	80 - 120%	---	---	
1,1-Dichloroethane	19.8	---	0.400	ug/L	1	20.0	---	99	80 - 120%	---	---	
1,2-Dichloroethane (EDC)	19.4	---	0.400	ug/L	1	20.0	---	97	80 - 120%	---	---	
1,1-Dichloroethene	19.0	---	0.400	ug/L	1	20.0	---	95	80 - 120%	---	---	
cis-1,2-Dichloroethene	20.1	---	0.400	ug/L	1	20.0	---	101	80 - 120%	---	---	
trans-1,2-Dichloroethene	18.9	---	0.400	ug/L	1	20.0	---	94	80 - 120%	---	---	
1,2-Dichloropropane	18.8	---	0.500	ug/L	1	20.0	---	94	80 - 120%	---	---	
1,3-Dichloropropane	20.4	---	1.00	ug/L	1	20.0	---	102	80 - 120%	---	---	
2,2-Dichloropropane	24.1	---	1.00	ug/L	1	20.0	---	<b>121</b>	<b>80 - 120%</b>	---	---	Q-56
1,1-Dichloropropene	22.0	---	1.00	ug/L	1	20.0	---	110	80 - 120%	---	---	
cis-1,3-Dichloropropene	19.8	---	1.00	ug/L	1	20.0	---	99	80 - 120%	---	---	
trans-1,3-Dichloropropene	20.4	---	1.00	ug/L	1	20.0	---	102	80 - 120%	---	---	
Hexachlorobutadiene	21.3	---	5.00	ug/L	1	20.0	---	107	80 - 120%	---	---	
Methylene chloride	20.6	---	10.0	ug/L	1	20.0	---	103	80 - 120%	---	---	
1,1,1,2-Tetrachloroethane	21.3	---	0.400	ug/L	1	20.0	---	106	80 - 120%	---	---	
1,1,2,2-Tetrachloroethane	19.3	---	0.500	ug/L	1	20.0	---	97	80 - 120%	---	---	
Tetrachloroethene (PCE)	19.7	---	0.400	ug/L	1	20.0	---	99	80 - 120%	---	---	
1,2,3-Trichlorobenzene	21.5	---	2.00	ug/L	1	20.0	---	108	80 - 120%	---	---	
1,2,4-Trichlorobenzene	21.3	---	2.00	ug/L	1	20.0	---	107	80 - 120%	---	---	
1,1,1-Trichloroethane	20.6	---	0.400	ug/L	1	20.0	---	103	80 - 120%	---	---	
1,1,2-Trichloroethane	19.8	---	0.500	ug/L	1	20.0	---	99	80 - 120%	---	---	
Trichloroethene (TCE)	18.7	---	0.400	ug/L	1	20.0	---	94	80 - 120%	---	---	
Trichlorofluoromethane	19.6	---	2.00	ug/L	1	20.0	---	98	80 - 120%	---	---	
1,2,3-Trichloropropane	19.7	---	1.00	ug/L	1	20.0	---	99	80 - 120%	---	---	
Vinyl chloride	18.0	---	0.400	ug/L	1	20.0	---	90	80 - 120%	---	---	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 95 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>98 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>96 %</i>		<i>80-120 %</i>		<i>"</i>						



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>2Q20 GWM Nustar VAN</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0F0534 - 07 09 20 1314
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0060898 - EPA 5030B</b>						<b>Water</b>						
<b>Blank (0060898-BLK1)</b>		Prepared: 06/28/20 10:29 Analyzed: 06/28/20 12:39										
<b>EPA 8260D</b>												
Bromobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Bromochloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Bromodichloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Bromoform	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Bromomethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
Carbon tetrachloride	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Chlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Chloroethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
Chloroform	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Chloromethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
2-Chlorotoluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
4-Chlorotoluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Dibromochloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Dibromomethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
1,1-Dichloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
1,1-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
cis-1,2-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
1,2-Dichloropropane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
1,3-Dichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
2,2-Dichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
1,1-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Hexachlorobutadiene	ND	---	5.00	ug/L	1	---	---	---	---	---	---	---
Methylene chloride	ND	---	10.0	ug/L	1	---	---	---	---	---	---	---

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>2Q20 GWM Nustar VAN</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0F0534 - 07 09 20 1314
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0060898 - EPA 5030B</b>												
<b>Water</b>												
<b>Blank (0060898-BLK1)</b>	Prepared: 06/28/20 10:29 Analyzed: 06/28/20 12:39											
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Tetrachloroethene (PCE)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	---	---	---	---	---	---	---
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	---	---	---	---	---	---	---
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	---
Trichloroethene (TCE)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
Trichlorofluoromethane	ND	---	2.00	ug/L	1	---	---	---	---	---	---	---
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	---
Vinyl chloride	ND	---	0.400	ug/L	1	---	---	---	---	---	---	---
Surr: 1,4-Difluorobenzene (Surr)	Recovery: 108 %		Limits: 80-120 %		Dilution: 1x							
Toluene-d8 (Surr)	101 %		80-120 %		"							
4-Bromofluorobenzene (Surr)	105 %		80-120 %		"							

<b>LCS (0060898-BS1)</b>	Prepared: 06/28/20 10:29 Analyzed: 06/28/20 11:45											
<b>EPA 8260D</b>												
Bromobenzene	18.9	---	0.500	ug/L	1	20.0	---	94	80 - 120%	---	---	
Bromochloromethane	17.8	---	1.00	ug/L	1	20.0	---	89	80 - 120%	---	---	
Bromodichloromethane	18.9	---	1.00	ug/L	1	20.0	---	94	80 - 120%	---	---	
Bromoform	20.6	---	1.00	ug/L	1	20.0	---	103	80 - 120%	---	---	
Bromomethane	19.1	---	5.00	ug/L	1	20.0	---	95	80 - 120%	---	---	
Carbon tetrachloride	19.3	---	1.00	ug/L	1	20.0	---	96	80 - 120%	---	---	
Chlorobenzene	18.5	---	0.500	ug/L	1	20.0	---	92	80 - 120%	---	---	
Chloroethane	20.4	---	5.00	ug/L	1	20.0	---	102	80 - 120%	---	---	
Chloroform	18.4	---	1.00	ug/L	1	20.0	---	92	80 - 120%	---	---	
Chloromethane	16.2	---	5.00	ug/L	1	20.0	---	81	80 - 120%	---	---	
2-Chlorotoluene	20.2	---	1.00	ug/L	1	20.0	---	101	80 - 120%	---	---	
4-Chlorotoluene	20.6	---	1.00	ug/L	1	20.0	---	103	80 - 120%	---	---	
Dibromochloromethane	20.4	---	1.00	ug/L	1	20.0	---	102	80 - 120%	---	---	
1,2-Dibromo-3-chloropropane	20.5	---	5.00	ug/L	1	20.0	---	102	80 - 120%	---	---	
1,2-Dibromoethane (EDB)	19.9	---	0.500	ug/L	1	20.0	---	100	80 - 120%	---	---	
Dibromomethane	18.7	---	1.00	ug/L	1	20.0	---	94	80 - 120%	---	---	
1,2-Dichlorobenzene	19.8	---	0.500	ug/L	1	20.0	---	99	80 - 120%	---	---	

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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0060898 - EPA 5030B</b>												
						<b>Water</b>						
<b>LCS (0060898-BS1)</b>	Prepared: 06/28/20 10:29					Analyzed: 06/28/20 11:45						
1,3-Dichlorobenzene	20.2	---	0.500	ug/L	1	20.0	---	101	80 - 120%	---	---	
1,4-Dichlorobenzene	18.7	---	0.500	ug/L	1	20.0	---	93	80 - 120%	---	---	
Dichlorodifluoromethane	17.6	---	1.00	ug/L	1	20.0	---	88	80 - 120%	---	---	
1,1-Dichloroethane	18.6	---	0.400	ug/L	1	20.0	---	93	80 - 120%	---	---	
1,2-Dichloroethane (EDC)	18.8	---	0.400	ug/L	1	20.0	---	94	80 - 120%	---	---	
1,1-Dichloroethene	17.6	---	0.400	ug/L	1	20.0	---	88	80 - 120%	---	---	
cis-1,2-Dichloroethene	18.8	---	0.400	ug/L	1	20.0	---	94	80 - 120%	---	---	
trans-1,2-Dichloroethene	17.8	---	0.400	ug/L	1	20.0	---	89	80 - 120%	---	---	
1,2-Dichloropropane	17.8	---	0.500	ug/L	1	20.0	---	89	80 - 120%	---	---	
1,3-Dichloropropane	19.8	---	1.00	ug/L	1	20.0	---	99	80 - 120%	---	---	
2,2-Dichloropropane	22.1	---	1.00	ug/L	1	20.0	---	111	80 - 120%	---	---	
1,1-Dichloropropene	20.5	---	1.00	ug/L	1	20.0	---	103	80 - 120%	---	---	
cis-1,3-Dichloropropene	19.1	---	1.00	ug/L	1	20.0	---	96	80 - 120%	---	---	
trans-1,3-Dichloropropene	19.8	---	1.00	ug/L	1	20.0	---	99	80 - 120%	---	---	
Hexachlorobutadiene	20.3	---	5.00	ug/L	1	20.0	---	101	80 - 120%	---	---	
Methylene chloride	19.6	---	10.0	ug/L	1	20.0	---	98	80 - 120%	---	---	
1,1,1,2-Tetrachloroethane	20.5	---	0.400	ug/L	1	20.0	---	103	80 - 120%	---	---	
1,1,2,2-Tetrachloroethane	18.1	---	0.500	ug/L	1	20.0	---	90	80 - 120%	---	---	
Tetrachloroethene (PCE)	18.8	---	0.400	ug/L	1	20.0	---	94	80 - 120%	---	---	
1,2,3-Trichlorobenzene	20.5	---	2.00	ug/L	1	20.0	---	102	80 - 120%	---	---	
1,2,4-Trichlorobenzene	20.3	---	2.00	ug/L	1	20.0	---	101	80 - 120%	---	---	
1,1,1-Trichloroethane	19.6	---	0.400	ug/L	1	20.0	---	98	80 - 120%	---	---	
1,1,2-Trichloroethane	19.0	---	0.500	ug/L	1	20.0	---	95	80 - 120%	---	---	
Trichloroethene (TCE)	18.4	---	0.400	ug/L	1	20.0	---	92	80 - 120%	---	---	
Trichlorofluoromethane	19.2	---	2.00	ug/L	1	20.0	---	96	80 - 120%	---	---	
1,2,3-Trichloropropane	19.9	---	1.00	ug/L	1	20.0	---	99	80 - 120%	---	---	
Vinyl chloride	16.8	---	0.400	ug/L	1	20.0	---	84	80 - 120%	---	---	
<b>Surr: 1,4-Difluorobenzene (Surr)</b>												
		Recovery: 95 %		Limits: 80-120 %		Dilution: 1x						
<b>Toluene-d8 (Surr)</b>												
		99 %		80-120 %		"						
<b>4-Bromofluorobenzene (Surr)</b>												
		99 %		80-120 %		"						



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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Ammonia by Gas Diffusion and Colorimetric Detection**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0060687 - Method Prep: Aq</b>						<b>Water</b>						
<b>Blank (0060687-BLK1)</b>		Prepared: 06/22/20 08:31 Analyzed: 06/23/20 16:25										
<b>SM 4500-NH3 G</b>												
Ammonia as N	ND	---	0.0200	mg/L	1	---	---	---	---	---	---	---
<b>LCS (0060687-BS1)</b>		Prepared: 06/22/20 08:31 Analyzed: 06/23/20 16:27										
<b>SM 4500-NH3 G</b>												
Ammonia as N	2.02	---	0.0200	mg/L	1	2.00	---	101	90 - 110%	---	---	---

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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Anions by Ion Chromatography**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0060660 - Method Prep: Aq</b>						<b>Water</b>						
<b>Blank (0060660-BLK2)</b>			Prepared: 06/19/20 10:43			Analyzed: 06/19/20 16:54						
<b>EPA 300.0</b>												
Nitrate-Nitrogen	ND	---	0.250	mg/L	1	---	---	---	---	---	---	Q-16
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	---	---	---	---	---	---	Q-16
<b>LCS (0060660-BS1)</b>			Prepared: 06/19/20 10:43			Analyzed: 06/19/20 16:11						
<b>EPA 300.0</b>												
Nitrate-Nitrogen	2.19	---	0.250	mg/L	1	2.00	---	110	90 - 110%	---	---	
Nitrite-Nitrogen	2.20	---	0.250	mg/L	1	2.00	---	110	90 - 110%	---	---	Q-41
<b>Duplicate (0060660-DUP1)</b>			Prepared: 06/19/20 10:43			Analyzed: 06/19/20 17:15						
<b>QC Source Sample: MW-24i (A0F0534-01)</b>												
<b>EPA 300.0</b>												
Nitrate-Nitrogen	<b>2.70</b>	---	0.250	mg/L	1	---	2.70	---	---	0.1	10%	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	---	ND	---	---	---	10%	
<b>Duplicate (0060660-DUP2)</b>			Prepared: 06/19/20 10:43			Analyzed: 06/19/20 19:25						
<b>QC Source Sample: MW-25i (A0F0534-03)</b>												
<b>EPA 300.0</b>												
Nitrate-Nitrogen	<b>0.365</b>	---	0.250	mg/L	1	---	0.357	---	---	2	10%	
Nitrite-Nitrogen	ND	---	0.250	mg/L	1	---	ND	---	---	---	10%	
<b>Matrix Spike (0060660-MS1)</b>			Prepared: 06/19/20 10:43			Analyzed: 06/19/20 17:37						
<b>QC Source Sample: MW-24i (A0F0534-01)</b>												
<b>EPA 300.0</b>												
Nitrate-Nitrogen	5.44	---	0.312	mg/L	1	2.50	2.70	110	80 - 120%	---	---	
Nitrite-Nitrogen	2.76	---	0.312	mg/L	1	2.50	ND	111	80 - 120%	---	---	Q-41
<b>Matrix Spike (0060660-MS2)</b>			Prepared: 06/19/20 10:43			Analyzed: 06/19/20 19:46						
<b>QC Source Sample: MW-25i (A0F0534-03)</b>												
<b>EPA 300.0</b>												
Nitrate-Nitrogen	3.10	---	0.312	mg/L	1	2.50	0.357	110	80 - 120%	---	---	
Nitrite-Nitrogen	2.77	---	0.312	mg/L	1	2.50	ND	111	80 - 120%	---	---	Q-41

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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Total Organic Carbon (Non-Purgeable) by Persulfate Oxidation by Standard Method 5310C**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0060732 - Method Prep: Aq</b>						<b>Water</b>						
<b>Blank (0060732-BLK1)</b>		Prepared: 06/23/20 09:48 Analyzed: 06/23/20 13:42										
<b>SM 5310 C</b>												
Total Organic Carbon	ND	---	1.00	mg/L	1	---	---	---	---	---	---	---
<b>LCS (0060732-BS1)</b>		Prepared: 06/23/20 09:48 Analyzed: 06/23/20 14:14										
<b>SM 5310 C</b>												
Total Organic Carbon	10.5	---	1.00	mg/L	1	10.0	---	105	85 - 115%	---	---	---
<b>LCS (0060732-BS2)</b>		Prepared: 06/23/20 09:48 Analyzed: 06/23/20 13:02										
<b>SM 5310 C</b>												
Total Organic Carbon	ND	---	1.00	mg/L	1	0.00	---		<b>85 - 115%</b>	---	---	TOC_I



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**SAMPLE PREPARATION INFORMATION**

**Halogenated Volatile Organic Compounds by EPA 8260D**

Prep: EPA 5030B

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 0060849</u>							
A0F0534-01	Water	EPA 8260D	06/18/20 08:00	06/25/20 14:58	5mL/5mL	5mL/5mL	1.00
A0F0534-02	Water	EPA 8260D	06/18/20 08:45	06/25/20 14:58	5mL/5mL	5mL/5mL	1.00
A0F0534-03	Water	EPA 8260D	06/18/20 09:30	06/25/20 14:58	5mL/5mL	5mL/5mL	1.00
A0F0534-04	Water	EPA 8260D	06/18/20 10:05	06/25/20 14:58	5mL/5mL	5mL/5mL	1.00
A0F0534-05	Water	EPA 8260D	06/18/20 11:00	06/25/20 14:58	5mL/5mL	5mL/5mL	1.00
A0F0534-06	Water	EPA 8260D	06/18/20 12:10	06/25/20 14:58	5mL/5mL	5mL/5mL	1.00
A0F0534-07	Water	EPA 8260D	06/18/20 12:50	06/25/20 14:58	5mL/5mL	5mL/5mL	1.00
A0F0534-08	Water	EPA 8260D	06/18/20 08:19	06/25/20 14:58	5mL/5mL	5mL/5mL	1.00
A0F0534-09	Water	EPA 8260D	06/18/20 09:14	06/25/20 14:58	5mL/5mL	5mL/5mL	1.00
A0F0534-10	Water	EPA 8260D	06/18/20 09:14	06/25/20 14:58	5mL/5mL	5mL/5mL	1.00
A0F0534-14	Water	EPA 8260D	06/18/20 12:01	06/25/20 14:58	5mL/5mL	5mL/5mL	1.00
A0F0534-15	Water	EPA 8260D	06/18/20 12:01	06/25/20 14:58	5mL/5mL	5mL/5mL	1.00
A0F0534-16	Water	EPA 8260D	06/18/20 12:55	06/25/20 14:58	5mL/5mL	5mL/5mL	1.00
A0F0534-17	Water	EPA 8260D	06/18/20 13:44	06/25/20 14:58	5mL/5mL	5mL/5mL	1.00
<u>Batch: 0060883</u>							
A0F0534-11RE1	Water	EPA 8260D	06/18/20 10:08	06/26/20 13:38	5mL/5mL	5mL/5mL	1.00
A0F0534-13	Water	EPA 8260D	06/18/20 10:55	06/26/20 13:38	5mL/5mL	5mL/5mL	1.00
<u>Batch: 0060898</u>							
A0F0534-12RE1	Water	EPA 8260D	06/18/20 10:55	06/28/20 11:31	5mL/5mL	5mL/5mL	1.00

**Ammonia by Gas Diffusion and Colorimetric Detection**

Prep: Method Prep: Aq

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 0060687</u>							
A0F0534-01	Water	SM 4500-NH3 G	06/18/20 08:00	06/22/20 08:31	10mL/10mL	10mL/10mL	1.00
A0F0534-02	Water	SM 4500-NH3 G	06/18/20 08:45	06/22/20 08:31	10mL/10mL	10mL/10mL	1.00
A0F0534-03	Water	SM 4500-NH3 G	06/18/20 09:30	06/22/20 08:31	10mL/10mL	10mL/10mL	1.00
A0F0534-04	Water	SM 4500-NH3 G	06/18/20 10:05	06/22/20 08:31	10mL/10mL	10mL/10mL	1.00
A0F0534-05	Water	SM 4500-NH3 G	06/18/20 11:00	06/22/20 08:31	10mL/10mL	10mL/10mL	1.00
A0F0534-06	Water	SM 4500-NH3 G	06/18/20 12:10	06/22/20 08:31	10mL/10mL	10mL/10mL	1.00
A0F0534-07	Water	SM 4500-NH3 G	06/18/20 12:50	06/22/20 08:31	10mL/10mL	10mL/10mL	1.00
A0F0534-08	Water	SM 4500-NH3 G	06/18/20 08:19	06/22/20 08:31	10mL/10mL	10mL/10mL	1.00
A0F0534-09	Water	SM 4500-NH3 G	06/18/20 09:14	06/22/20 08:31	10mL/10mL	10mL/10mL	1.00
A0F0534-10	Water	SM 4500-NH3 G	06/18/20 09:14	06/22/20 08:31	10mL/10mL	10mL/10mL	1.00

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**SAMPLE PREPARATION INFORMATION**

**Ammonia by Gas Diffusion and Colorimetric Detection**

<u>Prep: Method Prep: Aq</u>					Sample	Default	RL Prep
Lab Number	Matrix	Method	Sampled	Prepared	Initial/Final	Initial/Final	Factor
A0F0534-11	Water	SM 4500-NH3 G	06/18/20 10:08	06/22/20 08:31	10mL/10mL	10mL/10mL	1.00
A0F0534-12RE1	Water	SM 4500-NH3 G	06/18/20 10:55	06/22/20 08:31	10mL/10mL	10mL/10mL	1.00
A0F0534-13RE1	Water	SM 4500-NH3 G	06/18/20 10:55	06/22/20 08:31	10mL/10mL	10mL/10mL	1.00
A0F0534-14	Water	SM 4500-NH3 G	06/18/20 12:01	06/22/20 08:31	10mL/10mL	10mL/10mL	1.00
A0F0534-15	Water	SM 4500-NH3 G	06/18/20 12:01	06/22/20 08:31	10mL/10mL	10mL/10mL	1.00
A0F0534-16	Water	SM 4500-NH3 G	06/18/20 12:55	06/22/20 08:31	10mL/10mL	10mL/10mL	1.00
A0F0534-17RE1	Water	SM 4500-NH3 G	06/18/20 13:44	06/22/20 08:31	10mL/10mL	10mL/10mL	1.00

**Anions by Ion Chromatography**

<u>Prep: Method Prep: Aq</u>					Sample	Default	RL Prep
Lab Number	Matrix	Method	Sampled	Prepared	Initial/Final	Initial/Final	Factor
<u>Batch: 0060660</u>							
A0F0534-01	Water	EPA 300.0	06/18/20 08:00	06/19/20 10:43	5mL/5mL	5mL/5mL	1.00
A0F0534-02	Water	EPA 300.0	06/18/20 08:45	06/19/20 10:43	5mL/5mL	5mL/5mL	1.00
A0F0534-03	Water	EPA 300.0	06/18/20 09:30	06/19/20 10:43	5mL/5mL	5mL/5mL	1.00
A0F0534-04	Water	EPA 300.0	06/18/20 10:05	06/19/20 10:43	5mL/5mL	5mL/5mL	1.00
A0F0534-05	Water	EPA 300.0	06/18/20 11:00	06/19/20 10:43	5mL/5mL	5mL/5mL	1.00
A0F0534-06	Water	EPA 300.0	06/18/20 12:10	06/19/20 10:43	5mL/5mL	5mL/5mL	1.00
A0F0534-07	Water	EPA 300.0	06/18/20 12:50	06/19/20 10:43	5mL/5mL	5mL/5mL	1.00
A0F0534-08	Water	EPA 300.0	06/18/20 08:19	06/19/20 10:43	5mL/5mL	5mL/5mL	1.00
A0F0534-09	Water	EPA 300.0	06/18/20 09:14	06/19/20 10:43	5mL/5mL	5mL/5mL	1.00
A0F0534-10	Water	EPA 300.0	06/18/20 09:14	06/19/20 10:43	5mL/5mL	5mL/5mL	1.00
A0F0534-11	Water	EPA 300.0	06/18/20 10:08	06/19/20 10:43	5mL/5mL	5mL/5mL	1.00
A0F0534-12	Water	EPA 300.0	06/18/20 10:55	06/19/20 10:43	5mL/5mL	5mL/5mL	1.00
A0F0534-12RE1	Water	EPA 300.0	06/18/20 10:55	06/19/20 10:43	5mL/5mL	5mL/5mL	1.00
A0F0534-13	Water	EPA 300.0	06/18/20 10:55	06/19/20 10:43	5mL/5mL	5mL/5mL	1.00
A0F0534-13RE1	Water	EPA 300.0	06/18/20 10:55	06/19/20 10:43	5mL/5mL	5mL/5mL	1.00
A0F0534-14	Water	EPA 300.0	06/18/20 12:01	06/19/20 10:43	5mL/5mL	5mL/5mL	1.00
A0F0534-14RE1	Water	EPA 300.0	06/18/20 12:01	06/19/20 10:43	5mL/5mL	5mL/5mL	1.00
A0F0534-15	Water	EPA 300.0	06/18/20 12:01	06/19/20 10:43	5mL/5mL	5mL/5mL	1.00
A0F0534-15RE1	Water	EPA 300.0	06/18/20 12:01	06/19/20 10:43	5mL/5mL	5mL/5mL	1.00
A0F0534-16	Water	EPA 300.0	06/18/20 12:55	06/19/20 10:43	5mL/5mL	5mL/5mL	1.00
A0F0534-16RE1	Water	EPA 300.0	06/18/20 12:55	06/19/20 10:43	5mL/5mL	5mL/5mL	1.00
A0F0534-17	Water	EPA 300.0	06/18/20 13:44	06/19/20 10:43	5mL/5mL	5mL/5mL	1.00
A0F0534-17RE1	Water	EPA 300.0	06/18/20 13:44	06/19/20 10:43	5mL/5mL	5mL/5mL	1.00

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**SAMPLE PREPARATION INFORMATION**

**Total Organic Carbon (Non-Purgeable) by Persulfate Oxidation by Standard Method 5310C**

<u>Prep: Method Prep: Aq</u>					Sample	Default	RL Prep
Lab Number	Matrix	Method	Sampled	Prepared	Initial/Final	Initial/Final	Factor
<u>Batch: 0060732</u>							
A0F0534-01	Water	SM 5310 C	06/18/20 08:00	06/23/20 09:48	40mL/40mL	40mL/40mL	1.00
A0F0534-09	Water	SM 5310 C	06/18/20 09:14	06/23/20 09:48	40mL/40mL	40mL/40mL	1.00
A0F0534-11	Water	SM 5310 C	06/18/20 10:08	06/23/20 09:48	40mL/40mL	40mL/40mL	1.00
A0F0534-12	Water	SM 5310 C	06/18/20 10:55	06/23/20 09:48	40mL/40mL	40mL/40mL	1.00
A0F0534-14	Water	SM 5310 C	06/18/20 12:01	06/23/20 09:48	40mL/40mL	40mL/40mL	1.00

Apex Laboratories

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Lisa Domenighini, Client Services Manager



**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
ORELAP ID: OR100062

**Cascadia Associates**

5820 SW Kelly Ave Unit B  
Portland, OR 97239

Project: **Shore Terminal-Vancouver**

Project Number: **2Q20 GWM Nustar VAN**

Project Manager: **Stephanie Salisbury**

**Report ID:**

**A0F0534 - 07 09 20 1314**

**QUALIFIER DEFINITIONS**

**Client Sample and Quality Control (QC) Sample Qualifier Definitions:**

**Apex Laboratories**

- H-01** This sample was analyzed outside the recommended holding time.
- Q-16** Reanalysis of an original Batch QC sample.
- Q-41** Estimated Results. Recovery of Continuing Calibration Verification sample above upper control limit for this analyte. Results are likely biased high.
- Q-56** Daily CCV/LCS recovery for this analyte was above the +/-20% criteria listed in EPA 8260
- TOC\_I** Inorganic Carbon Spike Check. Results are valid if Non Detect (No Inorganic Carbon detected.)

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Apex Laboratories

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Lisa Domenighini, Client Services Manager



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>2Q20 GWM Nustar VAN</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0534 - 07 09 20 1314</b>
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**REPORTING NOTES AND CONVENTIONS:**

**Abbreviations:**

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported.
- RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

**Detection Limits: Limit of Detection (LOD)**

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('----'), then the data has not been evaluated below the Reporting Limit.

**Reporting Limits: Limit of Quantitation (LOQ)**

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

**Reporting Conventions:**

- Basis: Results for soil samples are generally reported on a 100% dry weight basis. The Result Basis is listed following the units as "dry", "wet", or "" (blank) designation.
  - "dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.
  - "wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
  - "" Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

**QC Source:**

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) are not included in this report. Please request a Full QC report if this data is required.

**Miscellaneous Notes:**

- " --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- " \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

**Blanks:**

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 1/2 the Reporting Limit (RL).  
-For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.  
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.  
For further details, please request a copy of this document.



<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>2Q20 GWM Nustar VAN</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0534 - 07 09 20 1314</b>
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**REPORTING NOTES AND CONVENTIONS (Cont.):**

**Blanks (Cont.):**

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

**Preparation Notes:**

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

**Sampling and Preservation Notes:**

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

Apex Laboratories

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Lisa Domenighini, Client Services Manager





**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
ORELAP ID: **OR100062**

<b><u>Cascadia Associates</u></b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b><u>Shore Terminal-Vancouver</u></b> Project Number: <b>2Q20 GWM Nustar VAN</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> <b>A0F0534 - 07 09 20 1314</b>
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**LABORATORY ACCREDITATION INFORMATION**

**ORELAP Certification ID: OR100062 (Primary Accreditation)**  
**EPA ID: OR01039**

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

**Apex Laboratories**

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation
<u>All reported analytes are included in Apex Laboratories' current ORELAP scope.</u>					

**Secondary Accreditations**

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

**Subcontract Laboratory Accreditations**

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

**Field Testing Parameters**

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

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Lisa Domenighini, Client Services Manager



Cascadia Associates  
5820 SW Kelly Ave Unit B  
Portland, OR 97239

Project: Shore Terminal-Vancouver  
Project Number: 2Q20 GWM Nustar VAN  
Project Manager: Stephanie Salisbury

Report ID:  
A0F0534 - 07 09 20 1314

**APEX LABS**  
6700 SW Sandburg St., Tigard, OR 97223 Ph: 503-718-2323

**CHAIN OF CUSTODY**

Lab # A0F0534 coc 1 of 2

Company: Cascadia Project Mgr: Stephanie S Project Name: 2Q20 GWM Nustar VAN

Address: 5820 S Kelly Ave Portland, OR 97239 Phone: 503-506-6577 Email: Stephanie.Salisbury@CascadiaAssociates.com

Sampled by: Stephanie S

Site Location: OR (WA) CA

LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-DX	NWTPH-GX	8260 BTEX	8260 RBDM VOCs	8260 Halo VOCs	8260 VOCs Full List	8270 SIM PAHs	8270 Semi-Vols Full List	8082 PCBs	8081 Pest	RCRA Metals (8)	Priority Metals (13)	Al, Sb, As, Ba, Be, Cd, Cr, Cu, Fe, Pb, Hg, Mn, Ni, Mo, Ni, K, Se, Sr, Zn, Ti, V, Zn	TOTAL DISS. TCLP	TCLP Metals (8)	FSC-175*	ToC	AMMONG	Nitrates-Nitrite	Archive	
MW-24i	6/18	800	GW	7							X										X	X				
MW-24d		845		5																						
MW-25i		930		5																						
MW-16		1008		5																						
MW-5		1100		5																						
MW-19i		1210		5																						
MW-15		1250		5																						
MW-22i		819		5																						
MW-12		914		7																						
MW-12Dup		914		5																						

SPECIAL INSTRUCTIONS:  
None/ethane/methane on RSK 175  
Use Same Vol list as 1028 GWM

TAT Requested (circle):  
1 Day 2 Day 3 Day 4 DAY 5 DAY Other:

RELEASING BY: [Signature] Date: 6/18 Time: 10:00  
Signature: [Signature] Date: 6/18/20 Time: 10:00  
Printed Name: Stephanie Salisbury  
Company: Cascadia Assoc.

RECEIVED BY: [Signature] Date: 6/18/20 Time: 10:00  
Signature: [Signature] Date: 6/18/20 Time: 10:00  
Printed Name: Stephanie Salisbury  
Company: Cascadia Assoc.

Apex Laboratories

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

*Lisa Domenighini*

Lisa Domenighini, Client Services Manager





<b>Cascadia Associates</b> 5820 SW Kelly Ave Unit B Portland, OR 97239	Project: <b>Shore Terminal-Vancouver</b> Project Number: <b>2Q20 GWM Nustar VAN</b> Project Manager: <b>Stephanie Salisbury</b>	<b>Report ID:</b> A0F0534 - 07 09 20 1314
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**APEX LABS COOLER RECEIPT FORM**

**Client:** Cascadia **Element WO#:** A0F0534

**Project/Project #:** 2Q20 GWM Nustar Van

**Delivery Info:**  
Date/time received: 6/18/20 @ 1600 By: JS  
Delivered by: Apex  Client  ESS  FedEx  UPS  Swift  Senvoy  SDS  Other

**Cooler Inspection** Date/time inspected: 6/18/20 @ 1600 By: JS  
Chain of Custody included? Yes  No  Custody seals? Yes  No   
Signed/dated by client? Yes  No   
Signed/dated by Apex? Yes  No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	<u>4.3</u>	<u>3.9</u>					
Received on ice? (Y/N)	<u>y</u>	<u>y</u>					
Temp. blanks? (Y/N)	<u>y</u>	<u>y</u>					
Ice type: (Gel/Real/Other)	<u>Real</u>	<u>Real</u>					
Condition:	<u>good</u>	<u>good</u>					

Cooler out of temp? (Y/N)  Possible reason why: \_\_\_\_\_  
If some coolers are in temp and some out, were green dots applied to out of temperature samples? Yes/No/NA   
Out of temperature samples form initiated? Yes/No/NA

**Samples Inspection:** Date/time inspected: 6-18-20 @ 16:30 By: TAM  
All samples intact? Yes  No  Comments: \_\_\_\_\_

Bottle labels/COCs agree? Yes  No  Comments: no T on 2/5 MW-12 + V-003 TAM 6-18-20

COC/container discrepancies form initiated? Yes  No   
Containers/volumes received appropriate for analysis? Yes  No  Comments: \_\_\_\_\_

Do VOA vials have visible headspace? Yes  No  NA   
Comments 3/5 MW-19 have HS, 1/3 MW-19 dup have HS

Water samples: pH checked: Yes  No  NA  pH appropriate? Yes  No  NA   
Comments: \_\_\_\_\_

**Additional information:** TB # 2329

Labeled by: TAM Witness: [Signature] Cooler Inspected by: TAM See Project Contact Form: Y

*Lisa Domenighini*

July 9, 2020

Apex Laboratories  
ATTN: Lisa Domenighini  
6700 S.W. Sandburg St.  
Tigard, OR 97223



LA Cert #04140  
EPA Methods TO3, TO14A, TO15, 25C/3C,  
RSK-175

TX Cert T104704450-14-6  
EPA Methods TO14A, TO15

UT Cert CA0133332015-3  
EPA Methods TO3, TO14A, TO15, RSK-175

LABORATORY TEST RESULTS

Project Reference: A0F0534  
Lab Number: L062303-01/05

Enclosed are results for sample(s) received 6/23/20 by Air Technology Laboratories. Sample was received intact and chilled to 6° C. Analyses were performed according to specifications on the chain of custody provided with the sample(s).

Report Narrative:

- Unless otherwise noted in the report, sample analyses were performed within method performance criteria and meet all requirements of the TNI Standards.
- The enclosed results relate only to the sample(s).

ATL appreciates the opportunity to provide testing services to your company. If you have any questions regarding these results, please call me at (626) 964-4032.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Mark Johnson'.

Mark Johnson  
Operations Manager  
MJohnson@AirTechLabs.com

Note: The cover letter is an integral part of this analytical report.

SUBCONTRACT ORDER

Apex Laboratories

A0F0534

LO62303-01/09

06/18/20

SENDING LABORATORY:

Apex Laboratories  
6700 S.W. Sandburg Street  
Tigard, OR 97223  
Phone: (503) 718-2323  
Fax: (503) 336-0745  
Project Manager: Lisa Domenighini

RECEIVING LABORATORY:

Air Technology Laboratories, Inc  
18501 E. Gale Ave Suite 130  
City of Industry, CA 91748  
Phone : (626) 964-4032  
Fax: (626) 964-5832

**Sample Name: MW-24i** **Water** **Sampled: 06/18/20 08:00** (A0F0534-01)

Analysis	Due	Expires	Comments
<b>RSK 175 Preserved (Meth, Eth, Eth) (Sub)</b>	07/01/20 17:00	07/02/20 08:00	
<i>Containers Supplied:</i>			
(D)40 mL VOA - HCL			
(E)40 mL VOA - HCL			ack @ rdw

**Sample Name: MW-12** **Water** **Sampled: 06/18/20 09:14** (A0F0534-09)

Analysis	Due	Expires	Comments
<b>RSK 175 Preserved (Meth, Eth, Eth) (Sub)</b>	07/01/20 17:00	07/02/20 09:14	
<i>Containers Supplied:</i>			
(D)40 mL VOA - HCL			
(E)40 mL VOA - HCL			

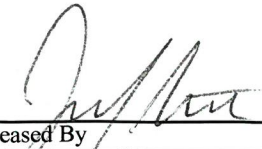
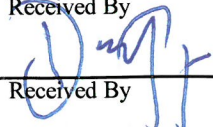
**Sample Name: MW-13** **Water** **Sampled: 06/18/20 10:08** (A0F0534-11)

Analysis	Due	Expires	Comments
<b>RSK 175 Preserved (Meth, Eth, Eth) (Sub)</b>	07/01/20 17:00	07/02/20 10:08	
<i>Containers Supplied:</i>			
(D)40 mL VOA - HCL			
(E)40 mL VOA - HCL			

**Sample Name: MW-19** **Water** **Sampled: 06/18/20 10:55** (A0F0534-12)

Analysis	Due	Expires	Comments
<b>RSK 175 Preserved (Meth, Eth, Eth) (Sub)</b>	07/01/20 17:00	07/02/20 10:55	3/5 voas have HS
<i>Containers Supplied:</i>			
(D)40 mL VOA - HCL			
(E)40 mL VOA - HCL			

Standard TAT

Released By  Date 6/22/20 UPS (Shipper) Received By  Date 6/23/20 1245

Released By UPS (Shipper) Date \_\_\_\_\_ Received By \_\_\_\_\_ Date \_\_\_\_\_

60°C

SUBCONTRACT ORDER

Apex Laboratories

A0F0534

LO 62303-01/05

6/18/20

Sample Name: MW-7

Water

Sampled: 06/18/20 12:01

(A0F0534-14)

Analysis	Due	Expires	Comments
RSK 175 Preserved (Meth, Eth, Eth) (Sub)	07/01/20 17:00	07/02/20 12:01	
Containers Supplied:			
(D)40 mL VOA - HCL			
(E)40 mL VOA - HCL			

05

STANDARD TAT

Released By: [Signature] Date: 6/22/20 Received By: [Signature] Date: 6/23/20  
 Released By: UPS (Shipper) Date: \_\_\_\_\_ Received By: [Signature] Date: 12/15

6°C

**Client:** Apex Laboratories  
**Attn:** Lisa Domenighini  
**Project Name:** NA  
**Project No.:** A0F0534  
**Date Received:** 06/23/20  
**Matrix:** Water  
**Reporting Units:** ug/L

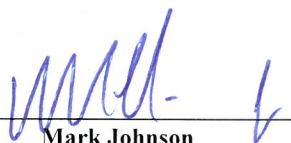
**RSK175**

Lab No.:	L062303-01	L062303-02	L062303-03	L062303-04				
Client Sample I.D.:	MW-24i (A0F0534-01)	MW-12 (A0F0534-09)	MW-13 (A0F0534-11)	MW-19 (A0F0534-12)				
Date/Time Sampled:	6/18/20 8:00	6/18/20 9:14	6/18/20 10:08	6/18/20 10:55				
Date/Time Analyzed:	6/30/20 10:10	6/30/20 10:24	6/30/20 10:43	6/30/20 11:01				
QC Batch No.:	200630GC8A1	200630GC8A1	200630GC8A1	200630GC8A1				
Analyst Initials:	CM	CM	CM	CM				
Dilution Factor:	1.0	1.0	1.0	1.0				
ANALYTE	Result ug/L	RL ug/L	Result ug/L	RL ug/L	Result ug/L	RL ug/L	Result ug/L	RL ug/L
Ethene	ND	1.0	ND	1.0	ND	1.0	5.0	1.0
Ethane	ND	1.0	12	1.0	19	1.0	22	1.0
Methane	ND	1.0	10,000	1.0	9,600	1.0	4,300	1.0

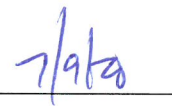
ND = Not Detected (below RL)

RL = Reporting Limit

Reviewed/Approved By: \_\_\_\_\_

  
 Mark Johnson  
 Operations Manager

Date \_\_\_\_\_

  
 7/9/20

The cover letter is an integral part of this analytical report



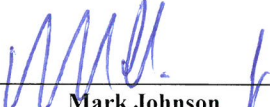


**Client:** Apex Laboratories  
**Attn:** Lisa Domenighini  
**Project Name:** NA  
**Project No.:** A0F0534  
**Date Received:** 06/23/20  
**Matrix:** Water  
**Reporting Units:** ug/L

**RSK175**

<b>Lab No.:</b>	<b>L062303-05</b>						
<b>Client Sample I.D.:</b>	<b>MW-7 (A0F0534-14)</b>						
<b>Date/Time Sampled:</b>	<b>6/18/20 12:01</b>						
<b>Date/Time Analyzed:</b>	<b>6/30/20 11:19</b>						
<b>QC Batch No.:</b>	<b>200630GC8A1</b>						
<b>Analyst Initials:</b>	<b>CM</b>						
<b>Dilution Factor:</b>	<b>1.0</b>						
<b>ANALYTE</b>	<b>Result ug/L</b>	<b>RL ug/L</b>					
Ethene	ND	1.0					
Ethane	1.3	1.0					
Methane	4,200	1.0					

ND = Not Detected (below RL)  
 RL = Reporting Limit

Reviewed/Approved By:   
**Mark Johnson**  
**Operations Manager**

Date 7/9/20

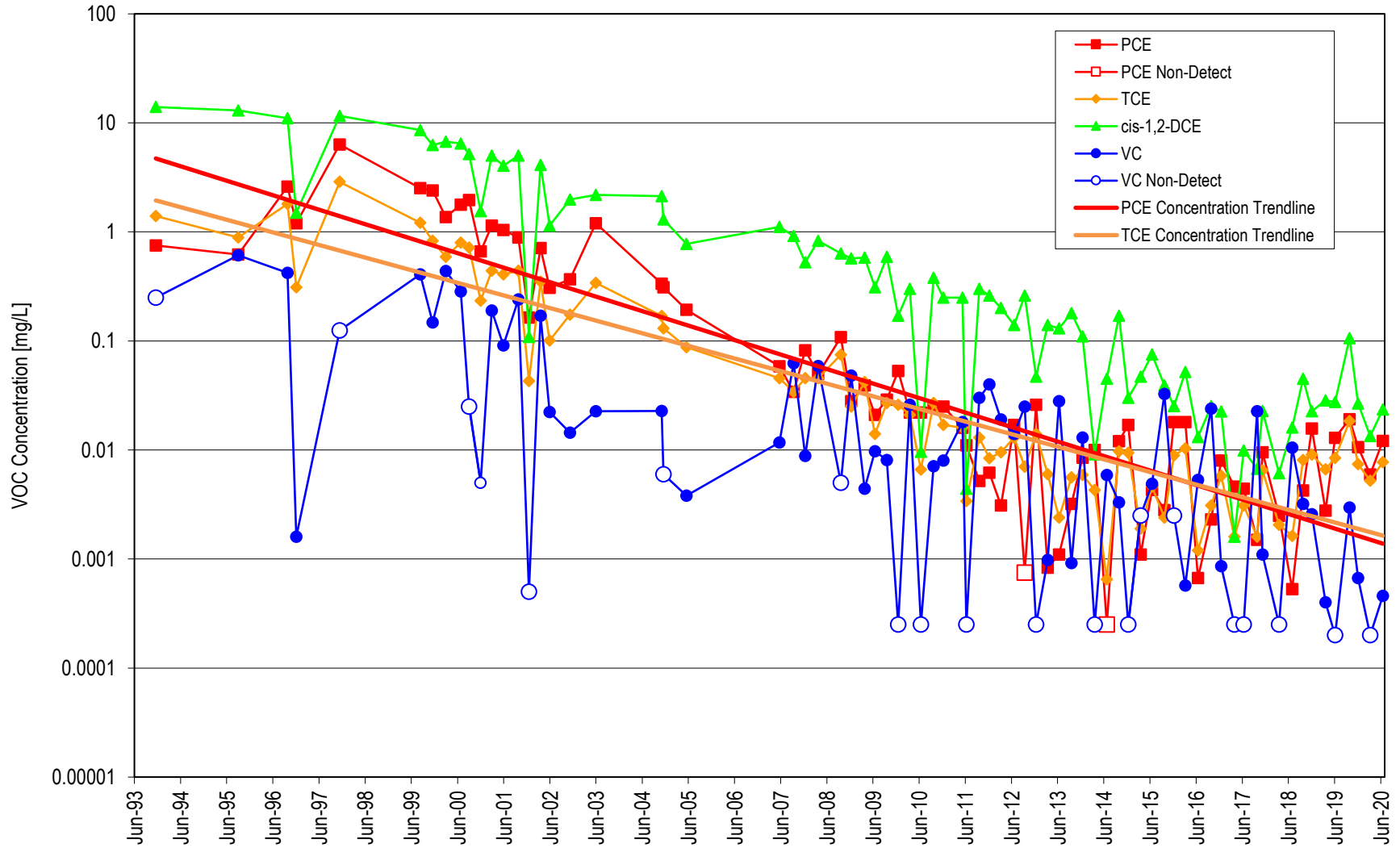
The cover letter is an integral part of this analytical report





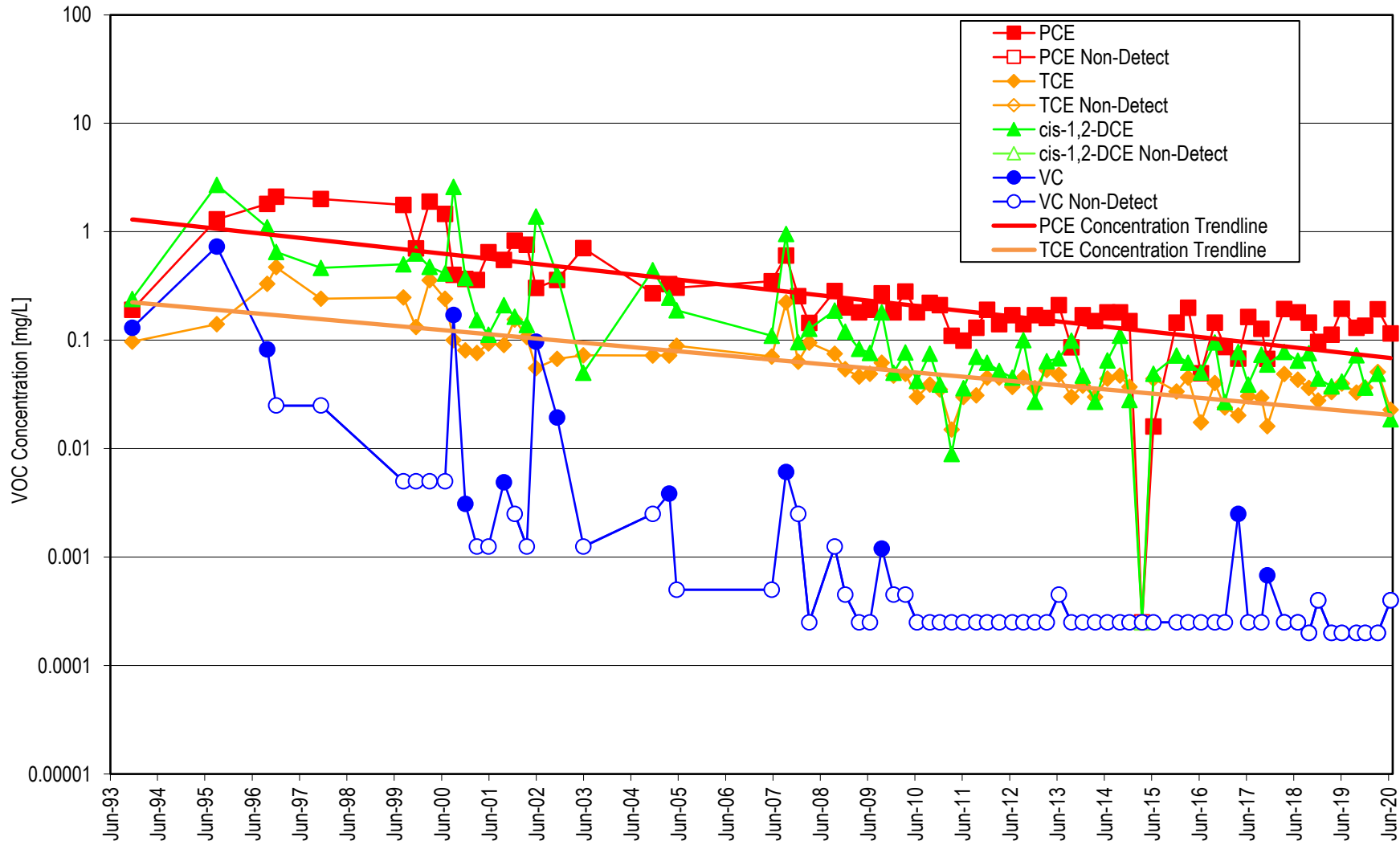
**APPENDIX D**  
**VOC CONCENTRATION TREND PLOTS**

### VOC Concentrations in MW-1



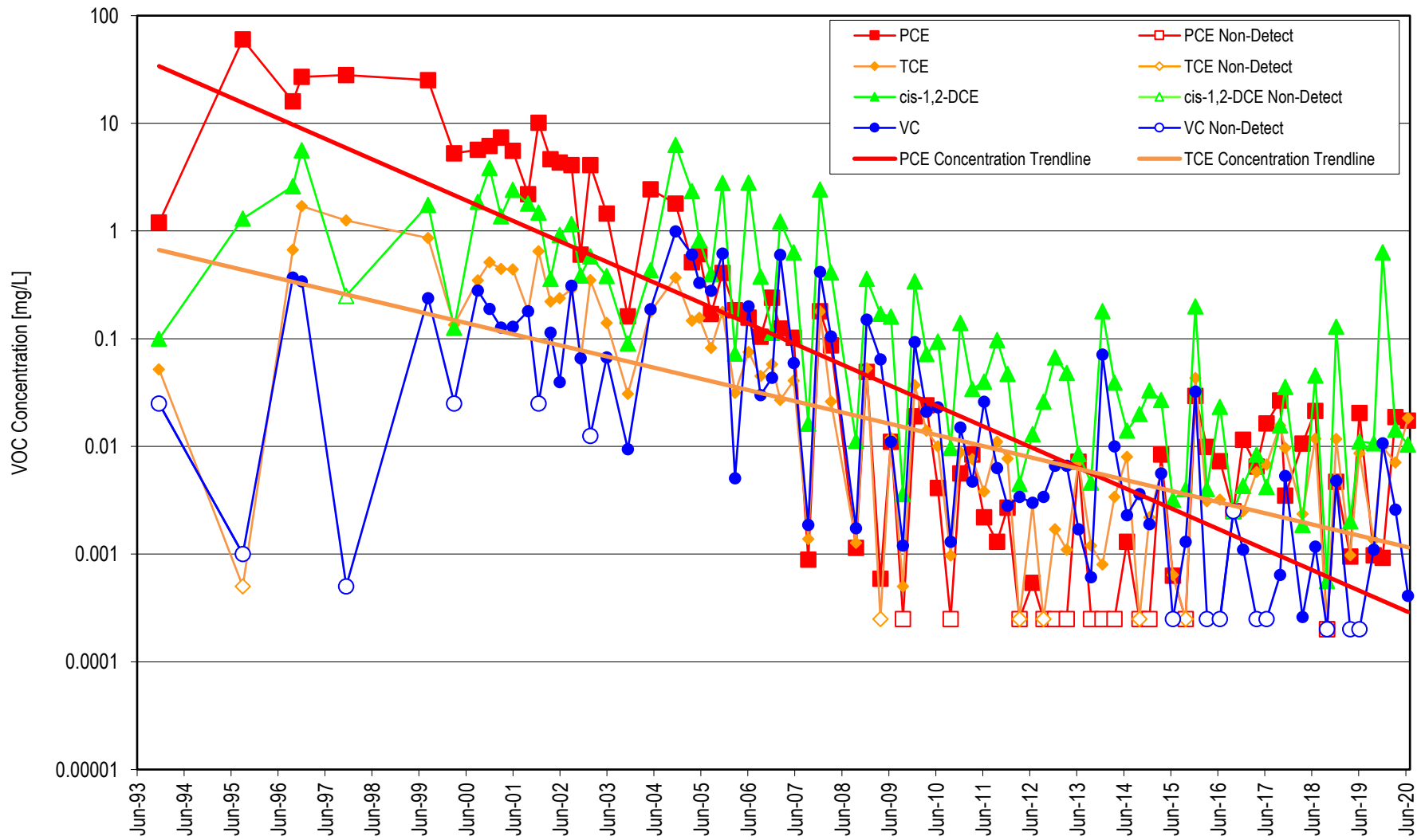
**Note:** Not detected values plotted at 1/2 the reporting limit.

### VOC Concentrations in MW-3



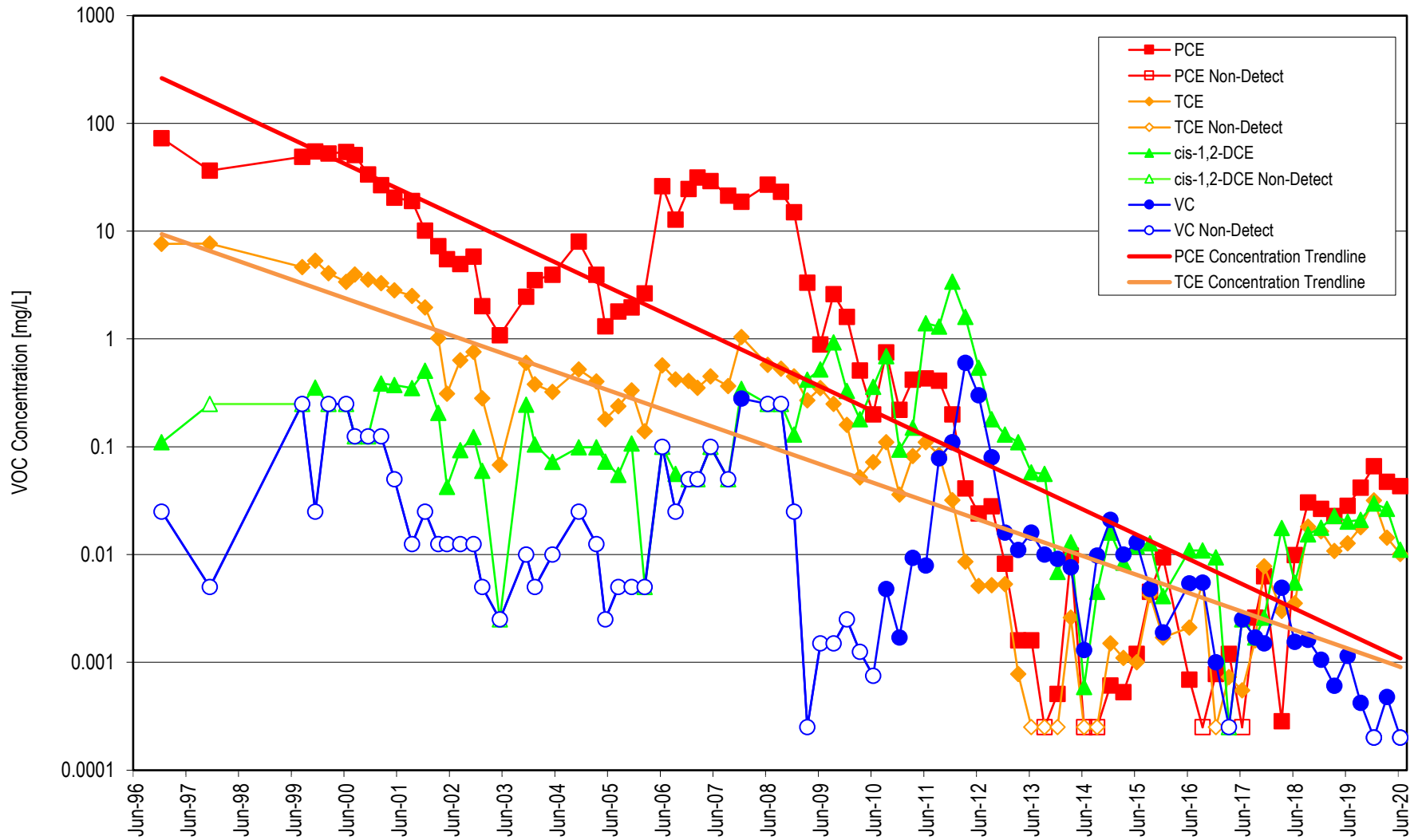
**Note:** Not detected values plotted at 1/2 the reporting limit.

### VOC Concentrations in MW-5



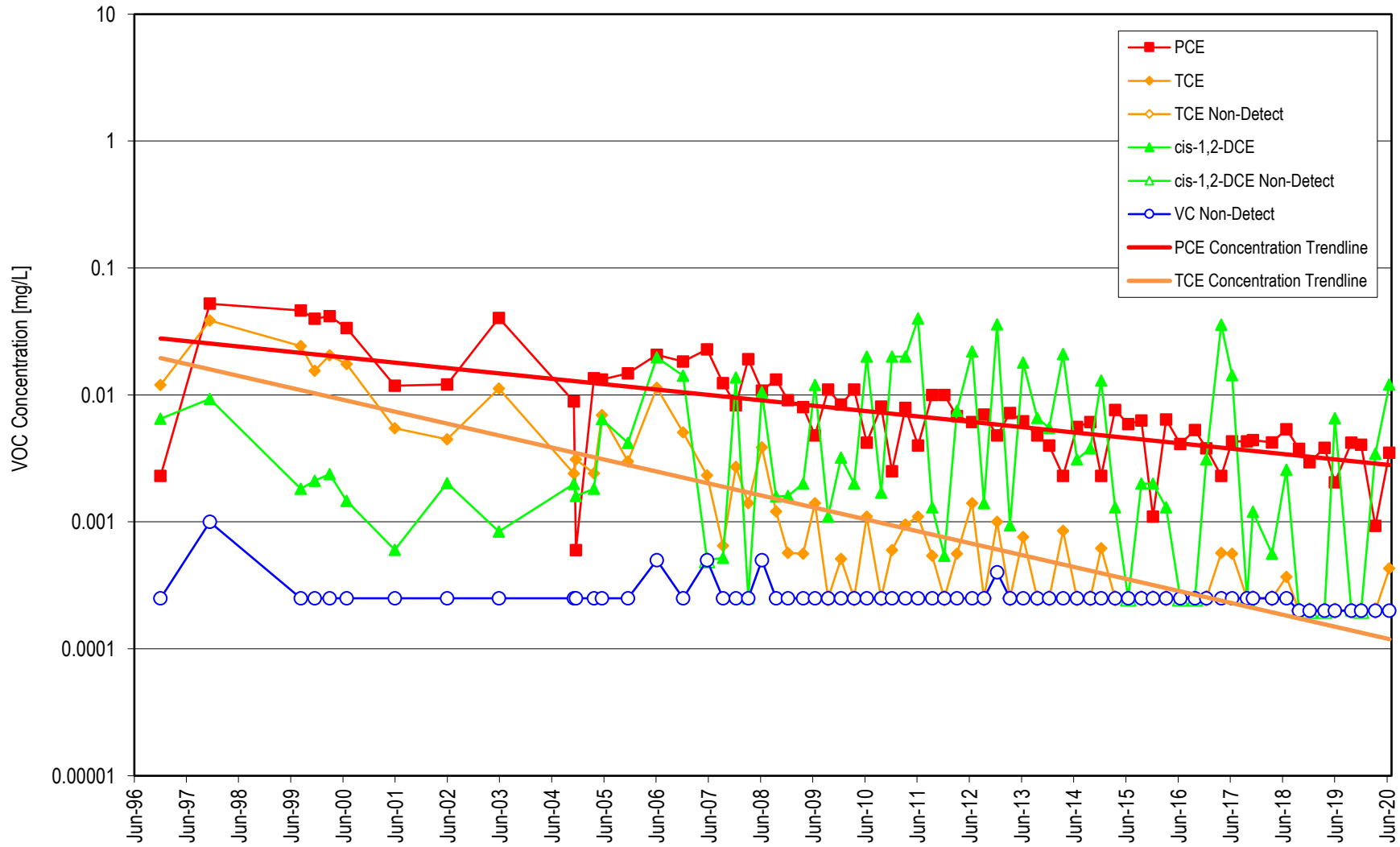
**Note:** Not detected values plotted at 1/2 the reporting limit.

### VOC Concentrations in MW-7



**Note:** Not detected values plotted at 1/2 the reporting limit.

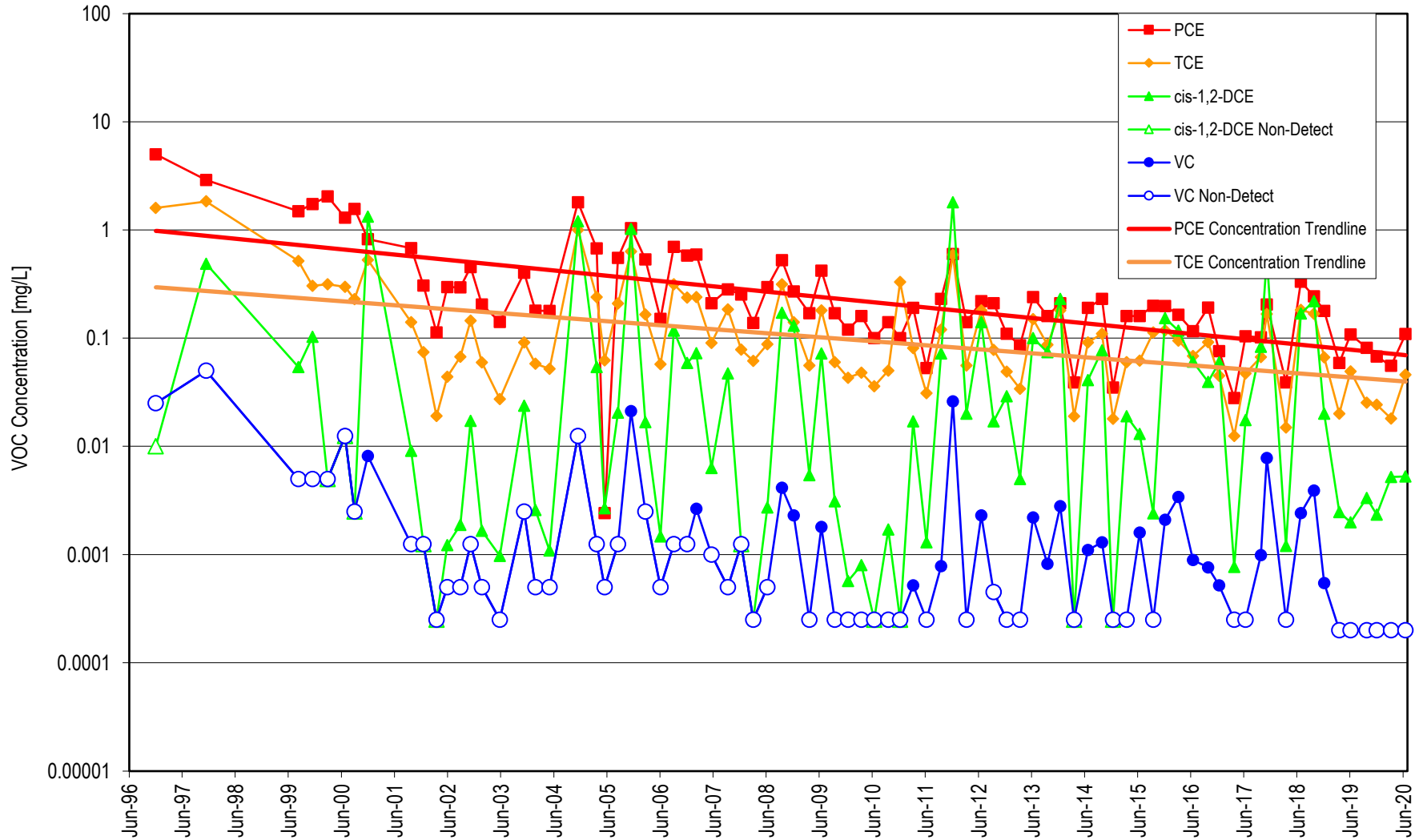
### VOC Concentrations in MW-8



**Note:** Not detected values plotted at 1/2 the reporting limit.

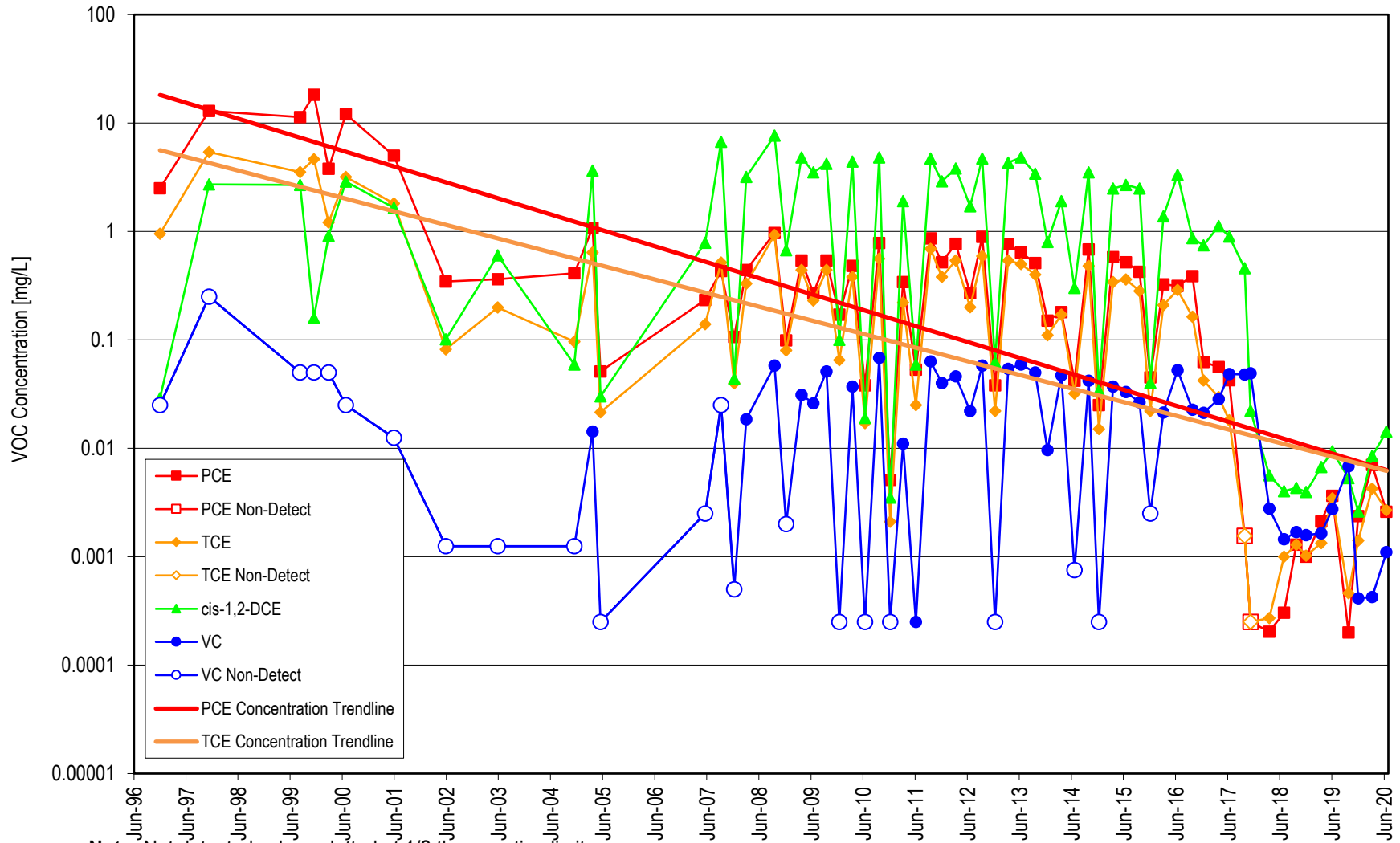


### VOC Concentrations in MW-9



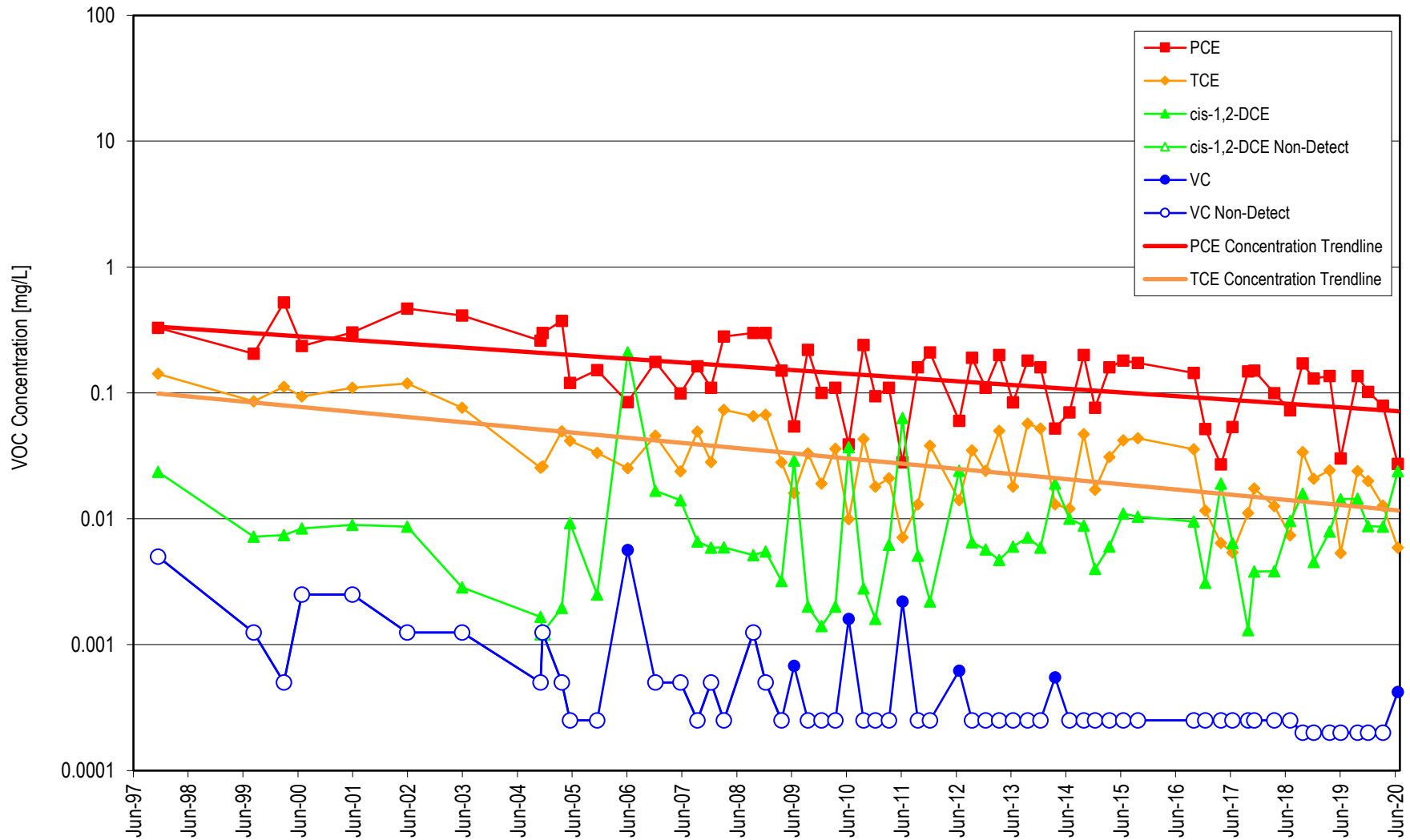
**Note:** Not detected values plotted at 1/2 the reporting limit.

### VOC Concentrations in MW-12



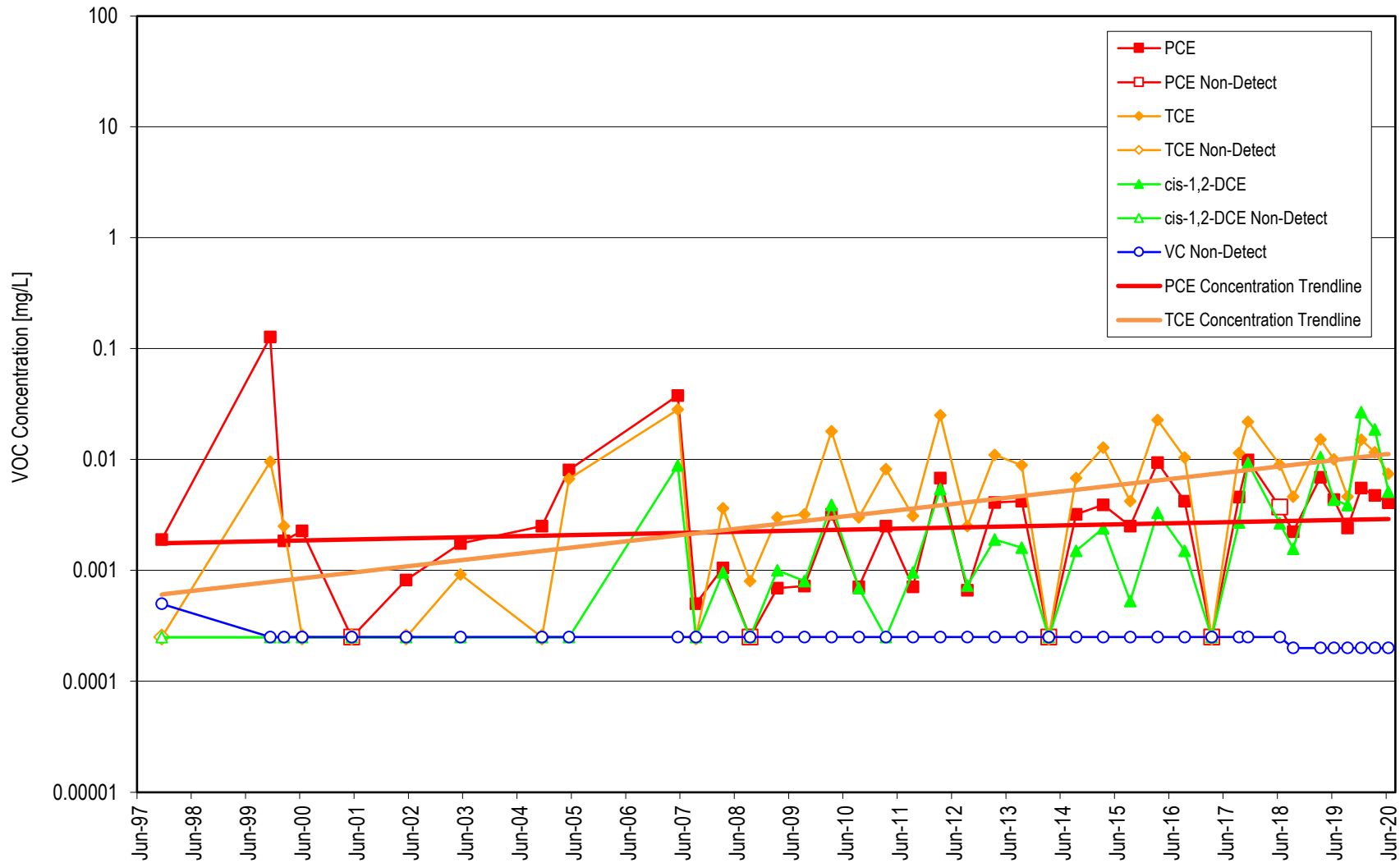
**Note:** Not detected values plotted at 1/2 the reporting limit.

### VOC Concentrations in MW-16



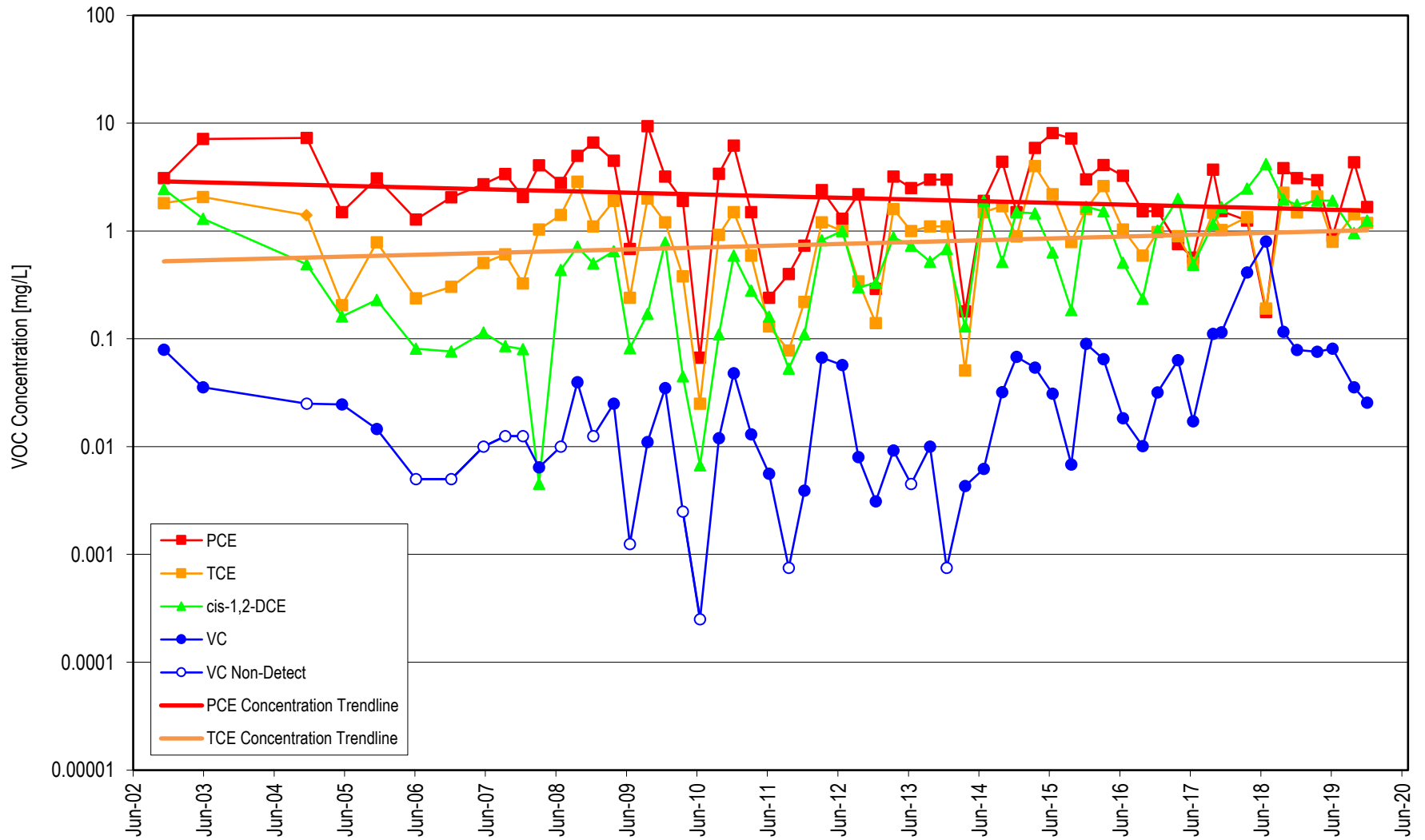
**Note:** Not detected values plotted at 1/2 the reporting limit.

### VOC Concentrations in MW-17



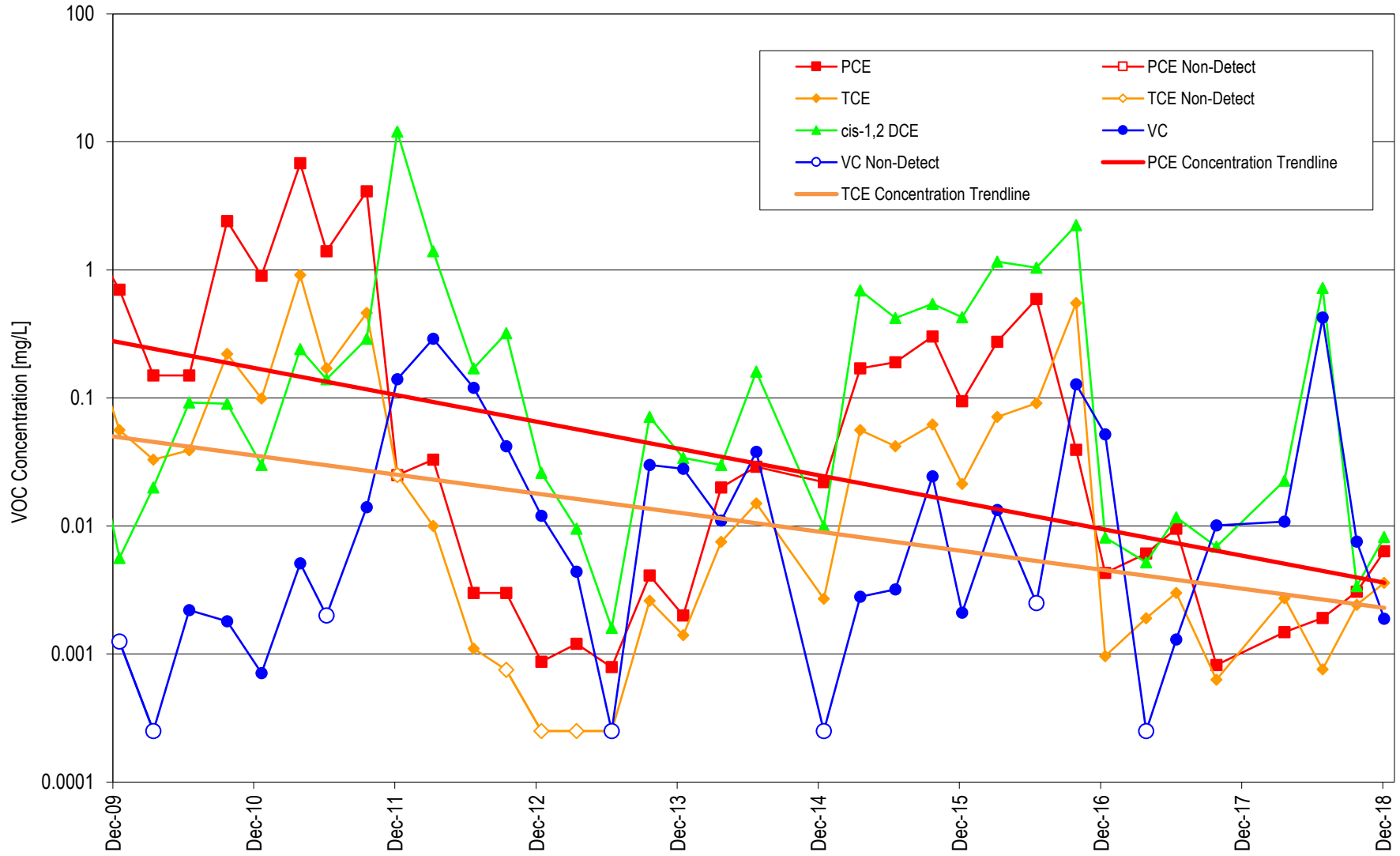
**Note:** Not detected values plotted at 1/2 the reporting limit.

### VOC Concentrations in MW-19



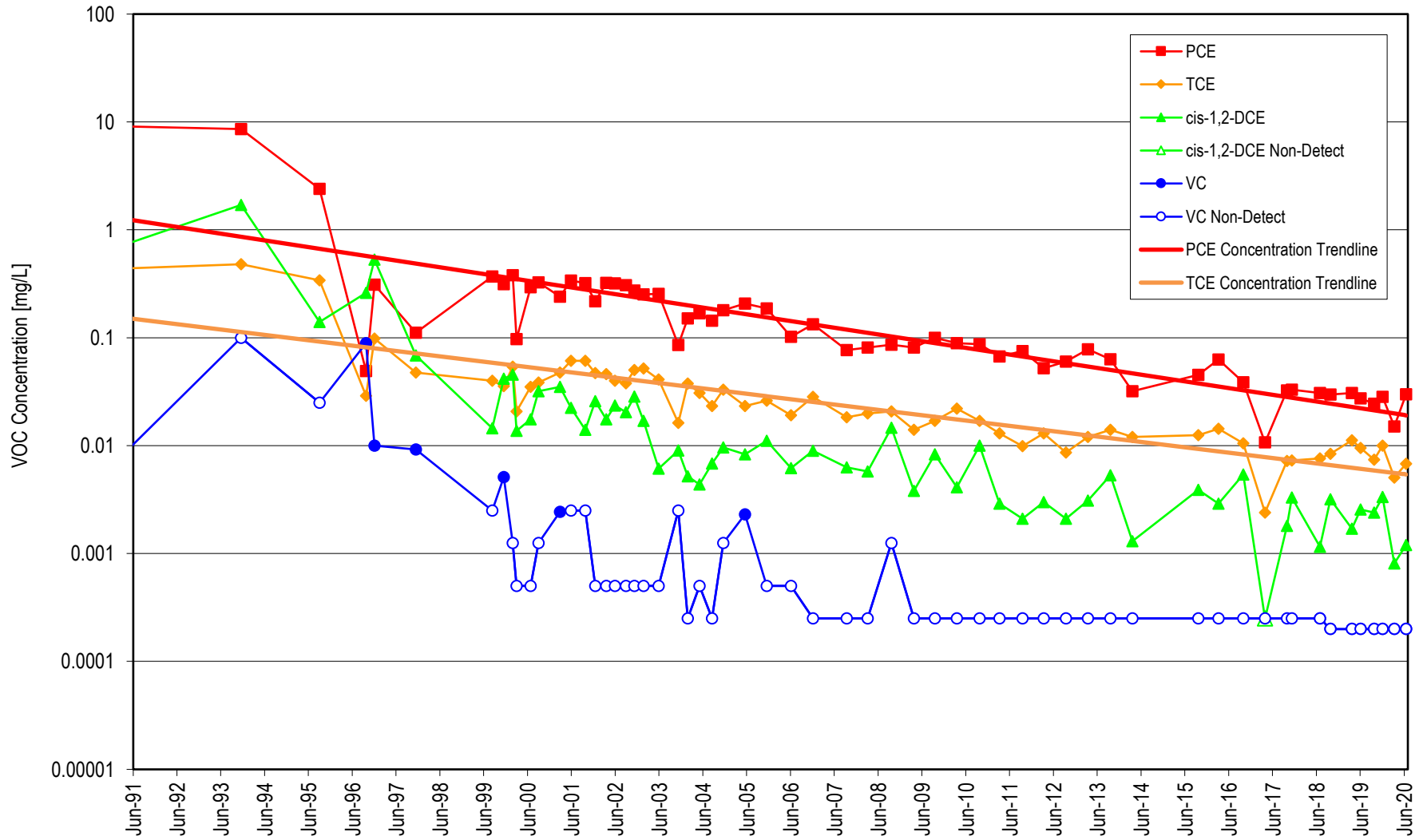
**Note:** Not detected values plotted at 1/2 the reporting limit.

### VOC Concentrations in EX



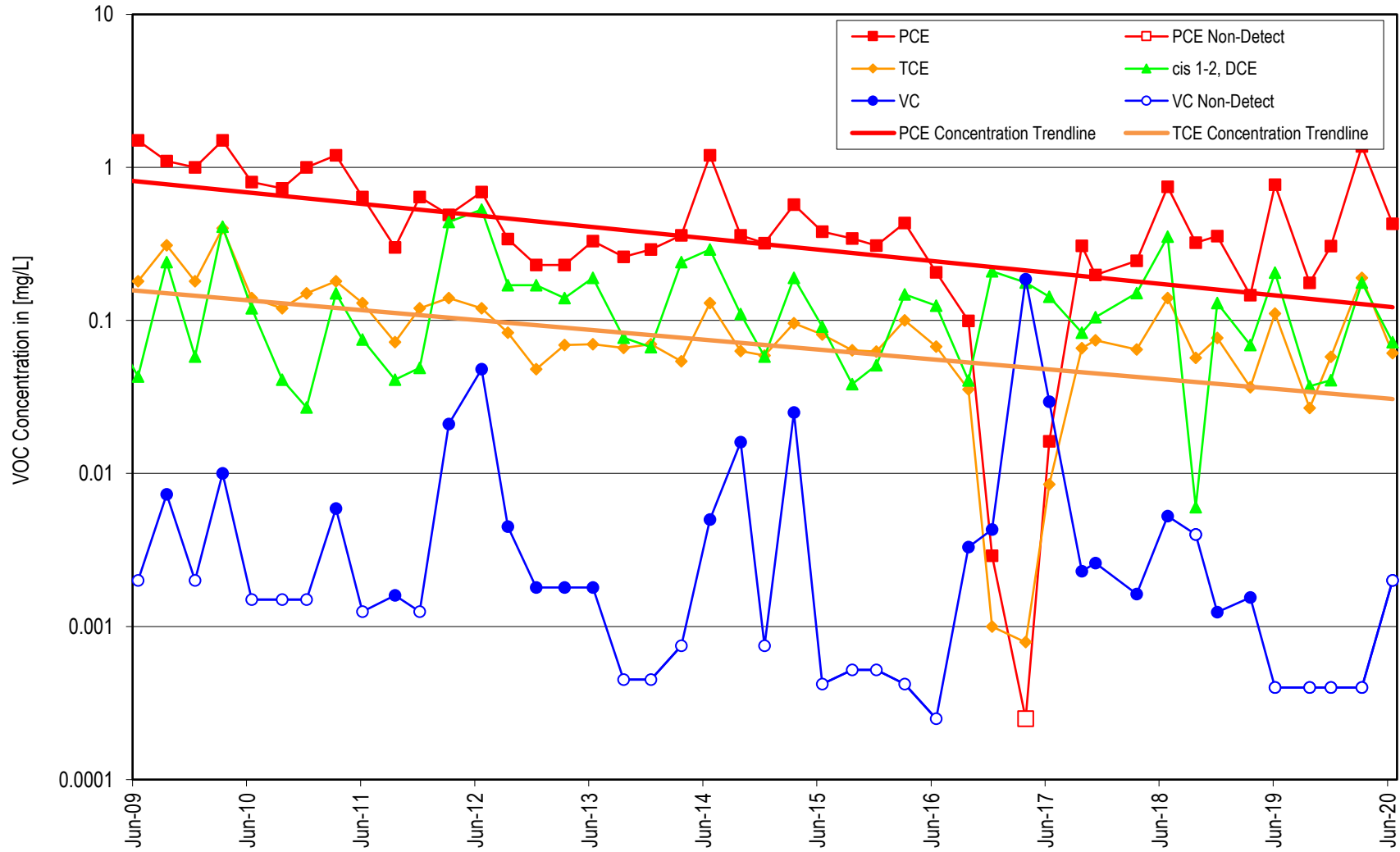
**Note:** Not detected values plotted at 1/2 the reporting limit.

### VOC Concentrations in EW-1



**Note:** Not detected values plotted at 1/2 the reporting limit.

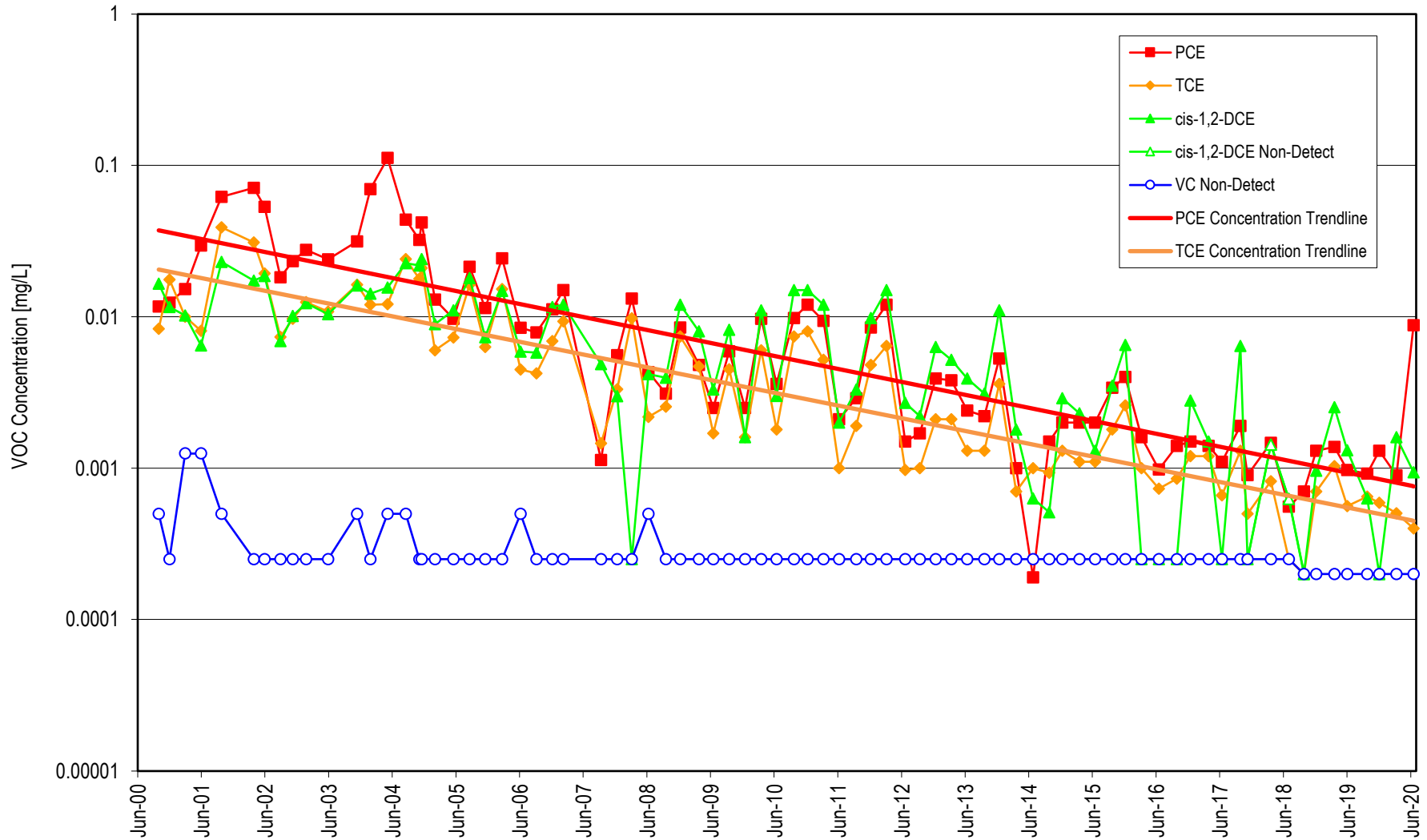
### VOC Concentrations in MP-1



**Note:** Not detected values plotted at 1/2 the reporting limit.

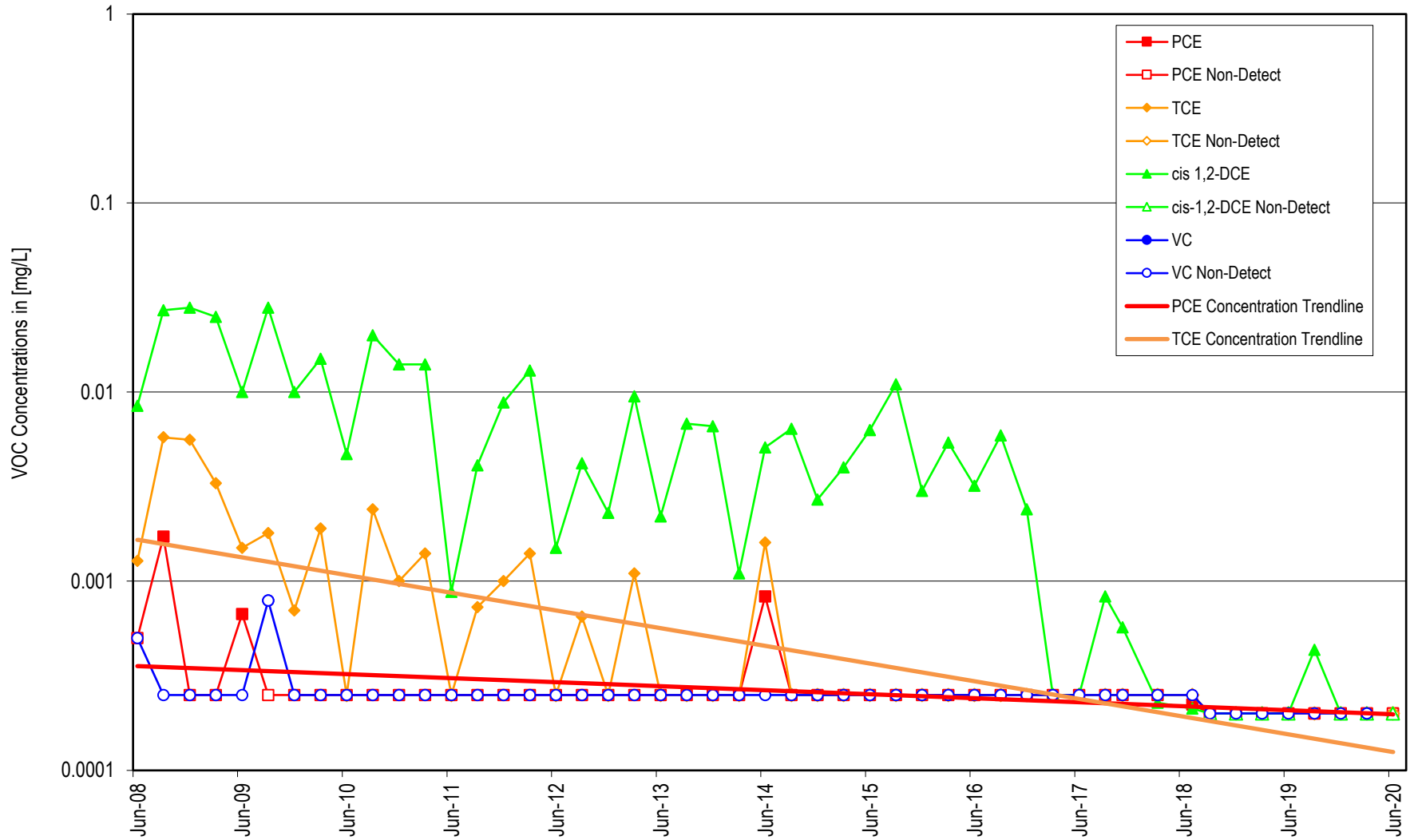


### VOC Concentrations in MW-18i



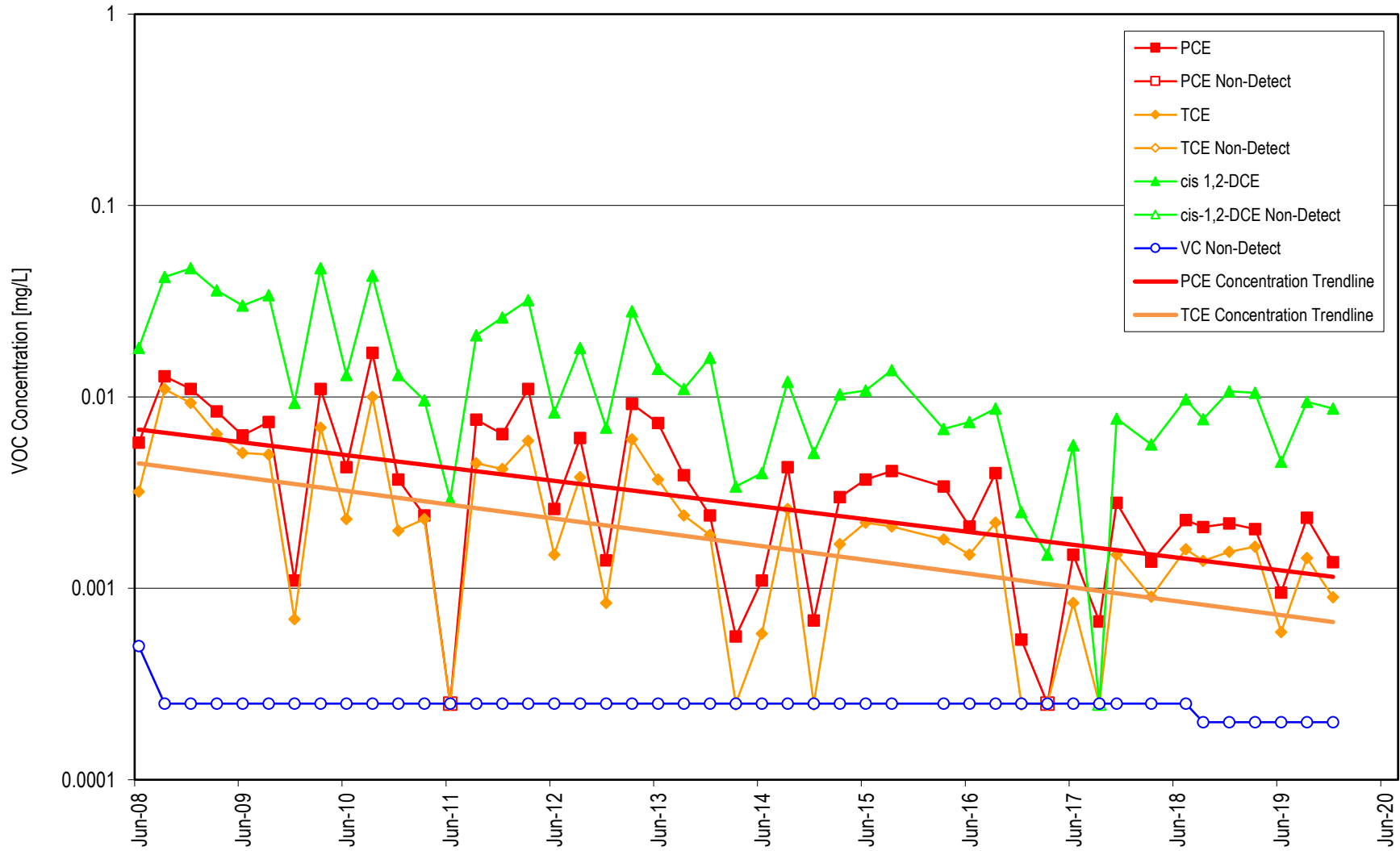
**Note:** Not detected values plotted at 1/2 the reporting limit.

### VOC Concentrations in MW-19i

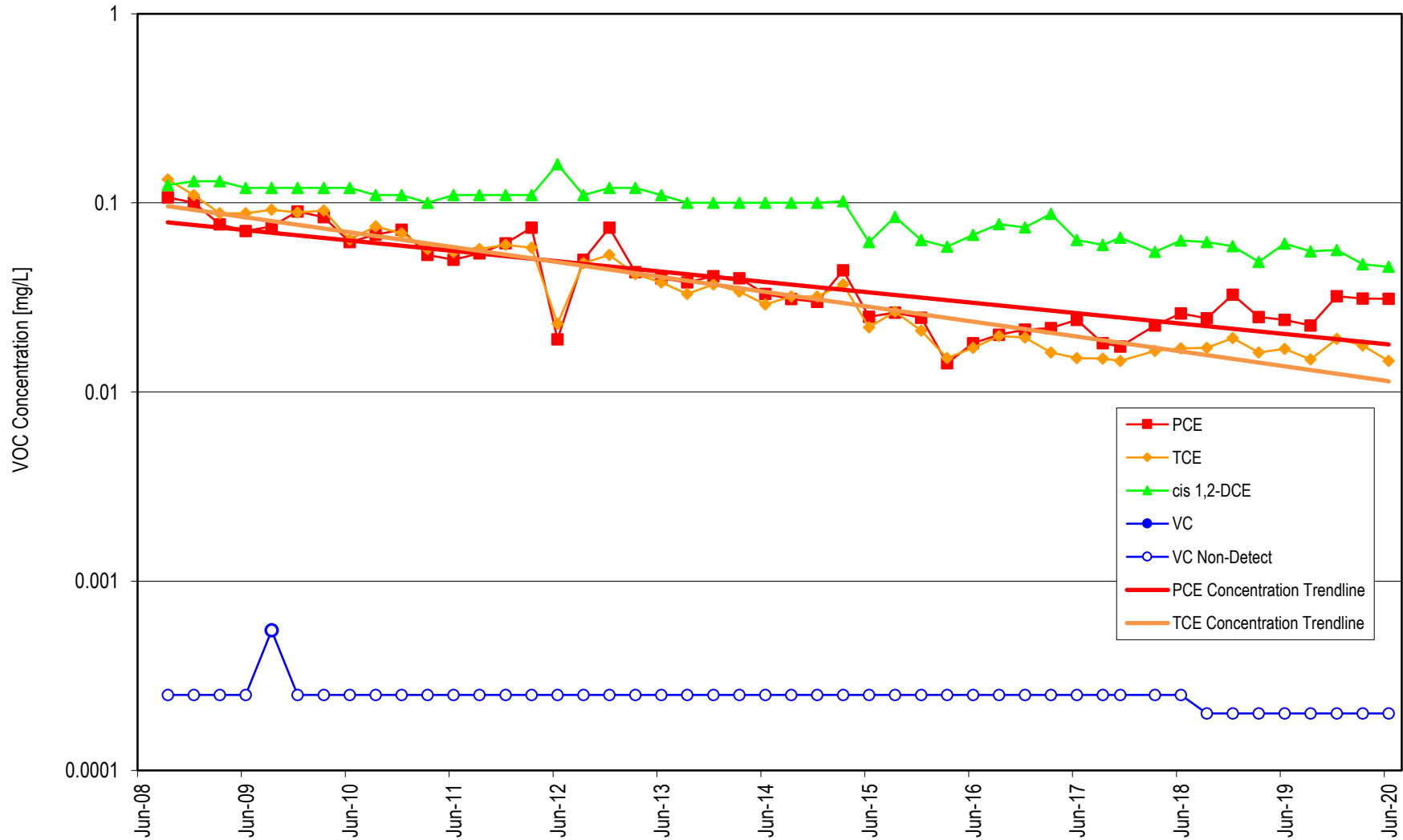


**Note:** Not detected values plotted at 1/2 the reporting limit.

### VOC Concentrations in MW-20i

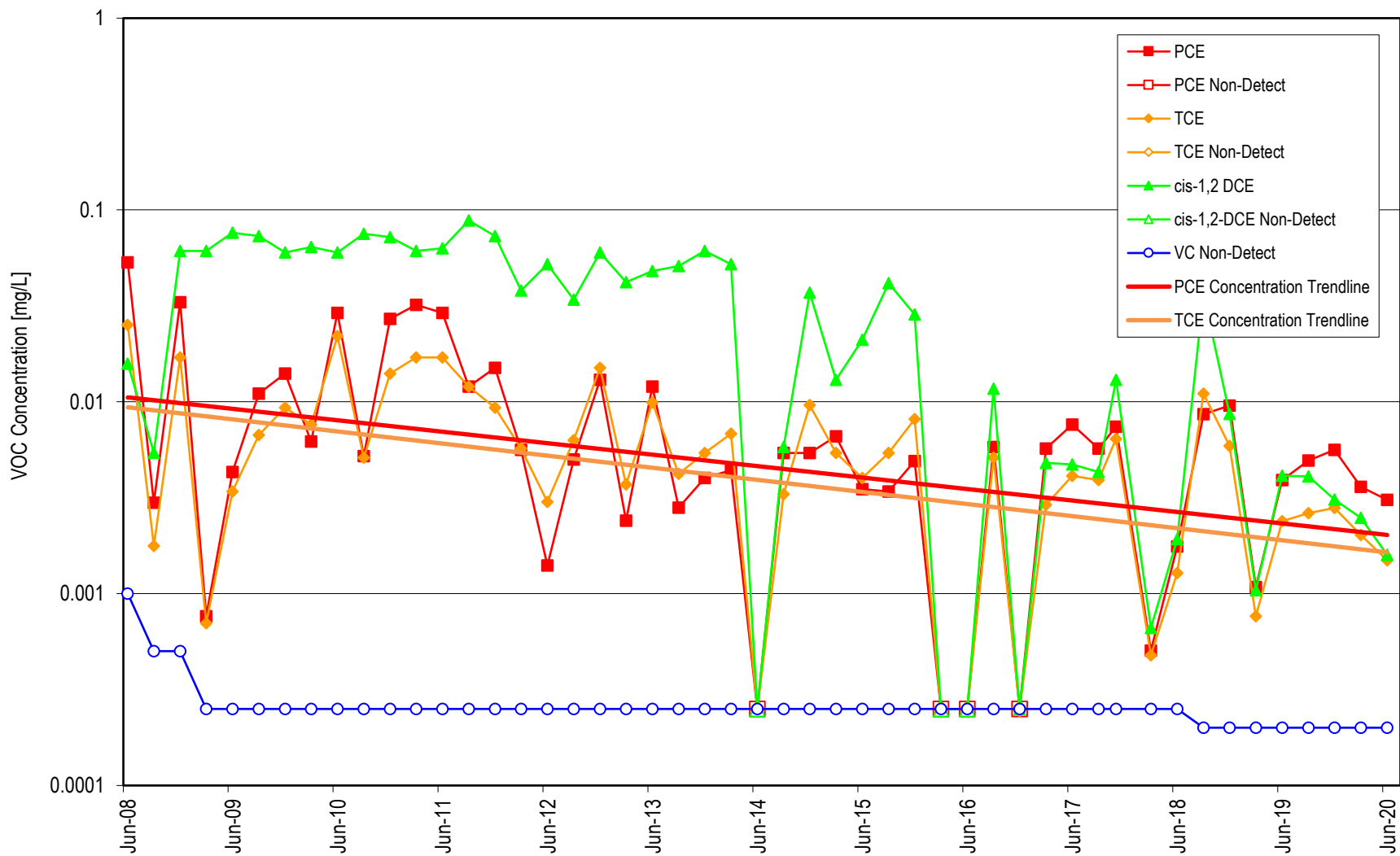


### VOC Concentrations in MW-21i-40



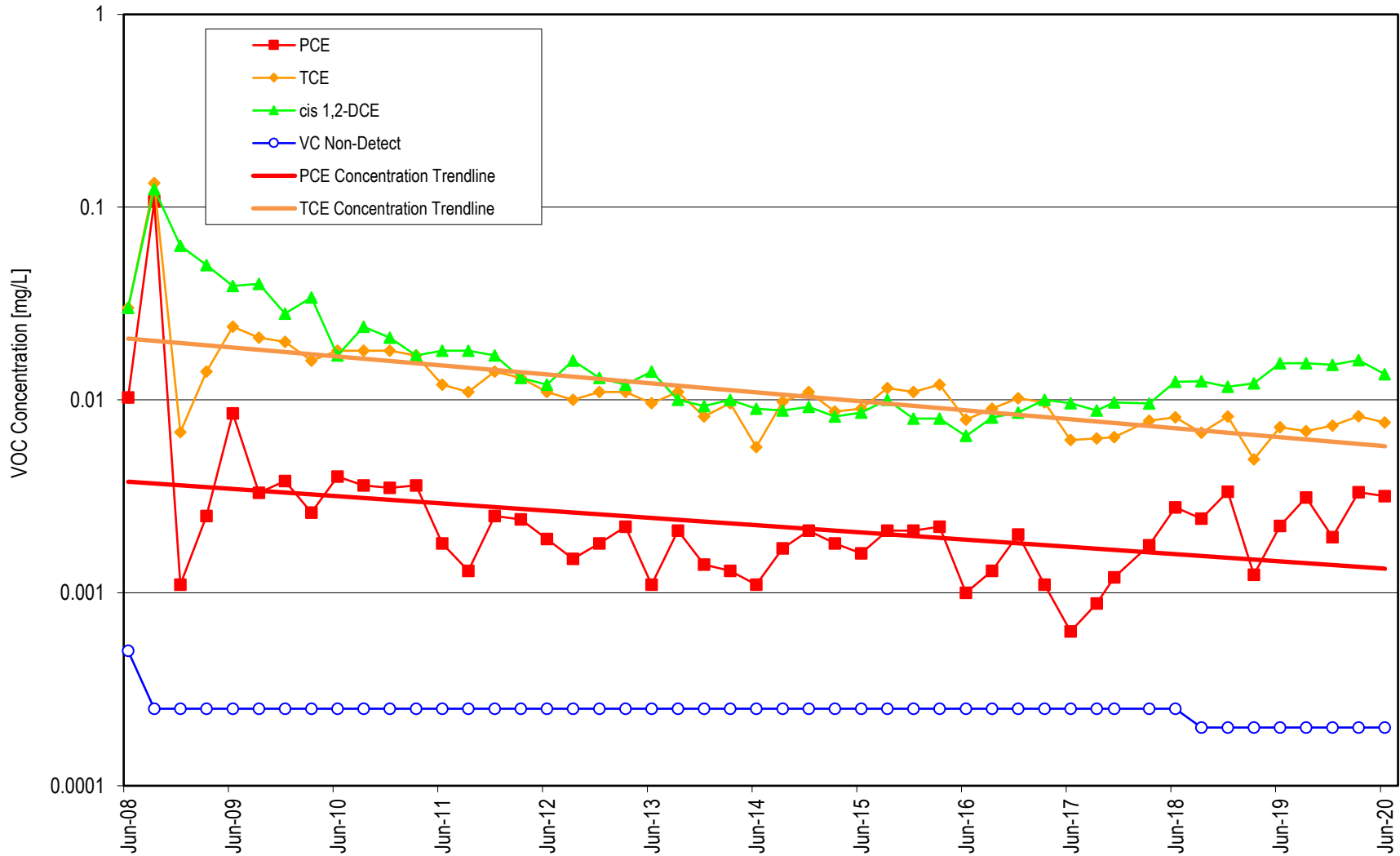
**Note:** Not detected values plotted at 1/2 the reporting limit.

### VOC Concentrations in MW-21i-105



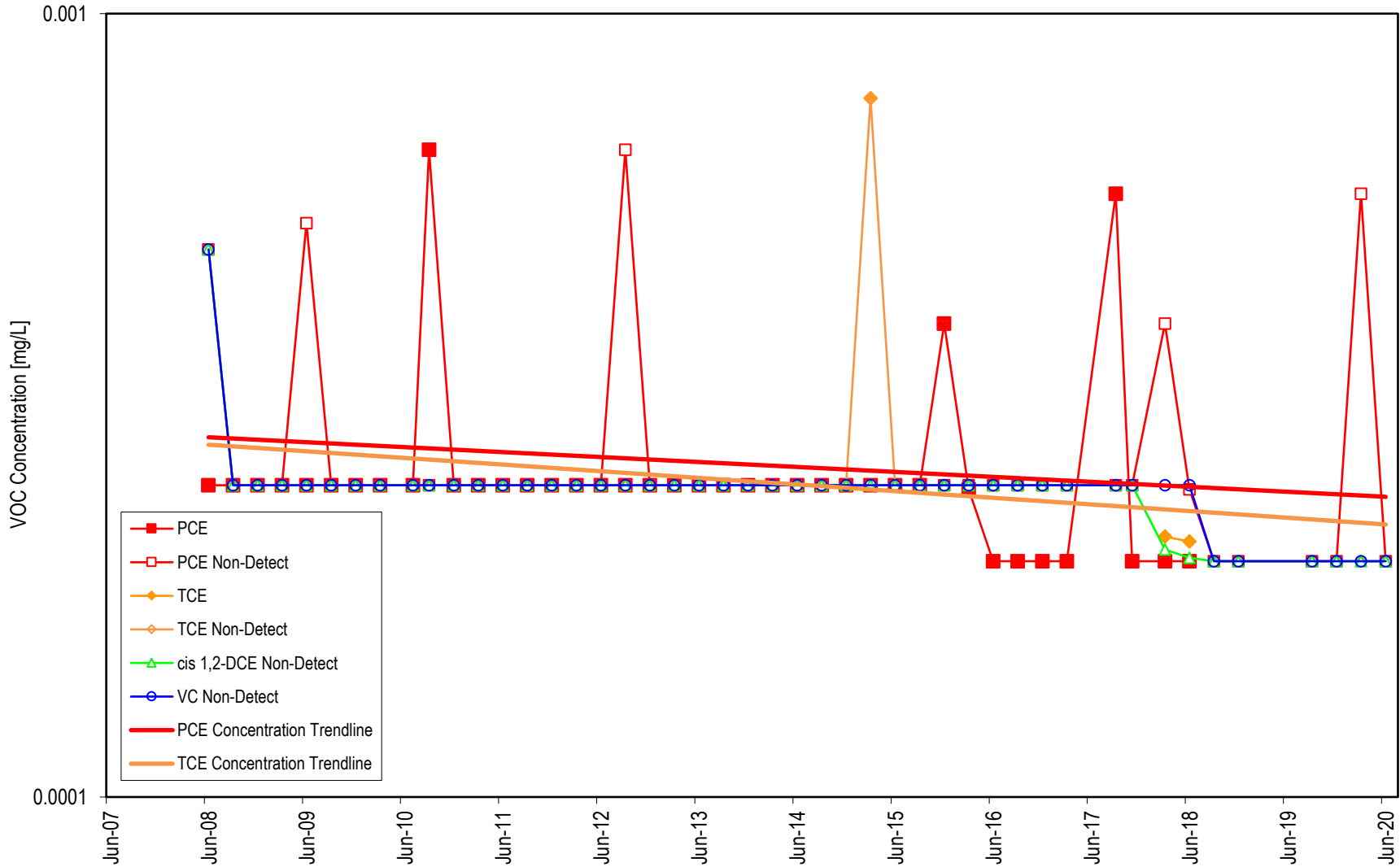
Note: Not detected values plotted at 1/2 the reporting limit.

### VOC Concentrations in MW-22i



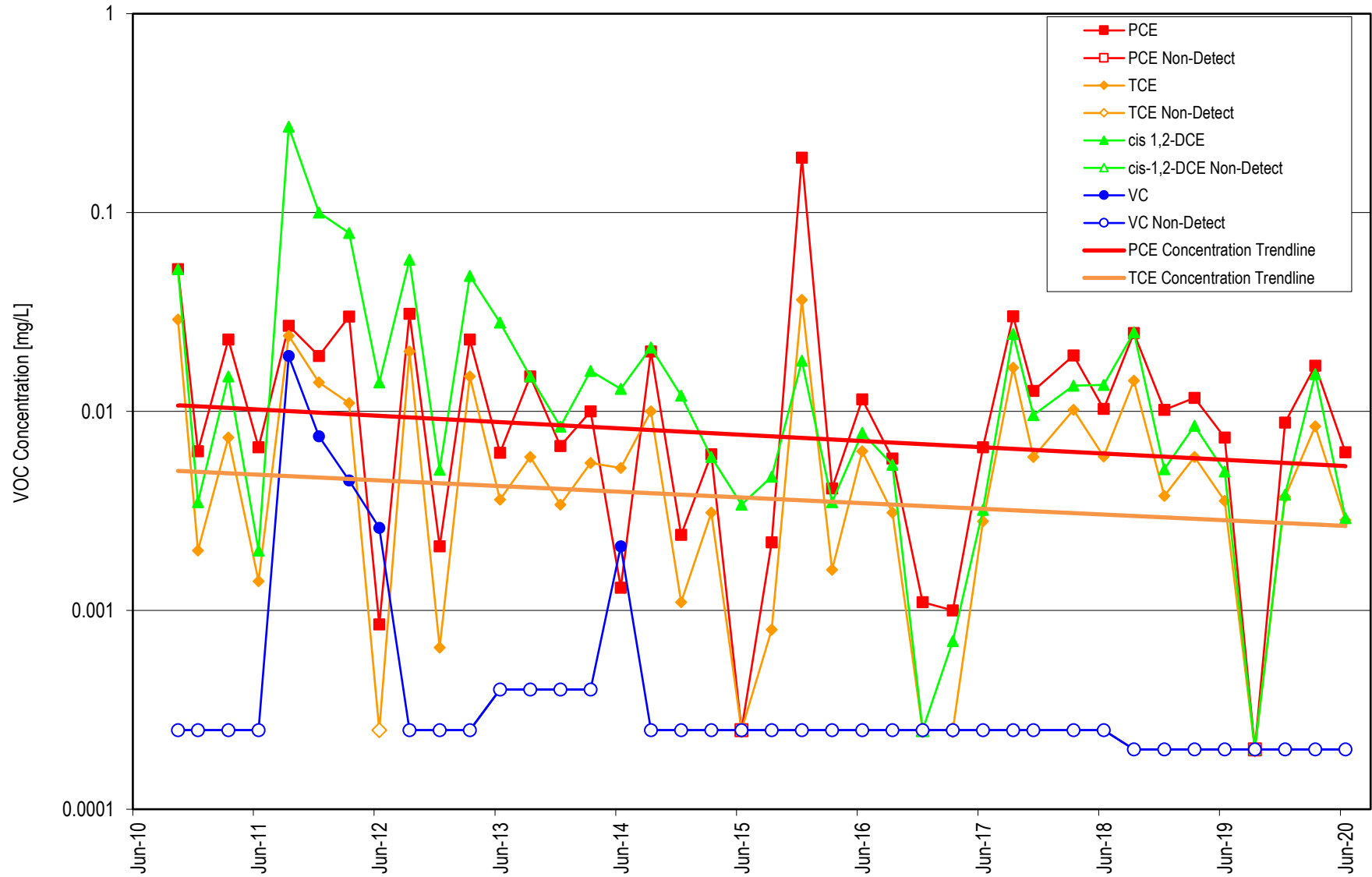
**Note:** Not detected values plotted at 1/2 the reporting limit.

### VOC Concentrations in MW-23i



**Note:** Not detected values plotted at 1/2 the reporting limit.

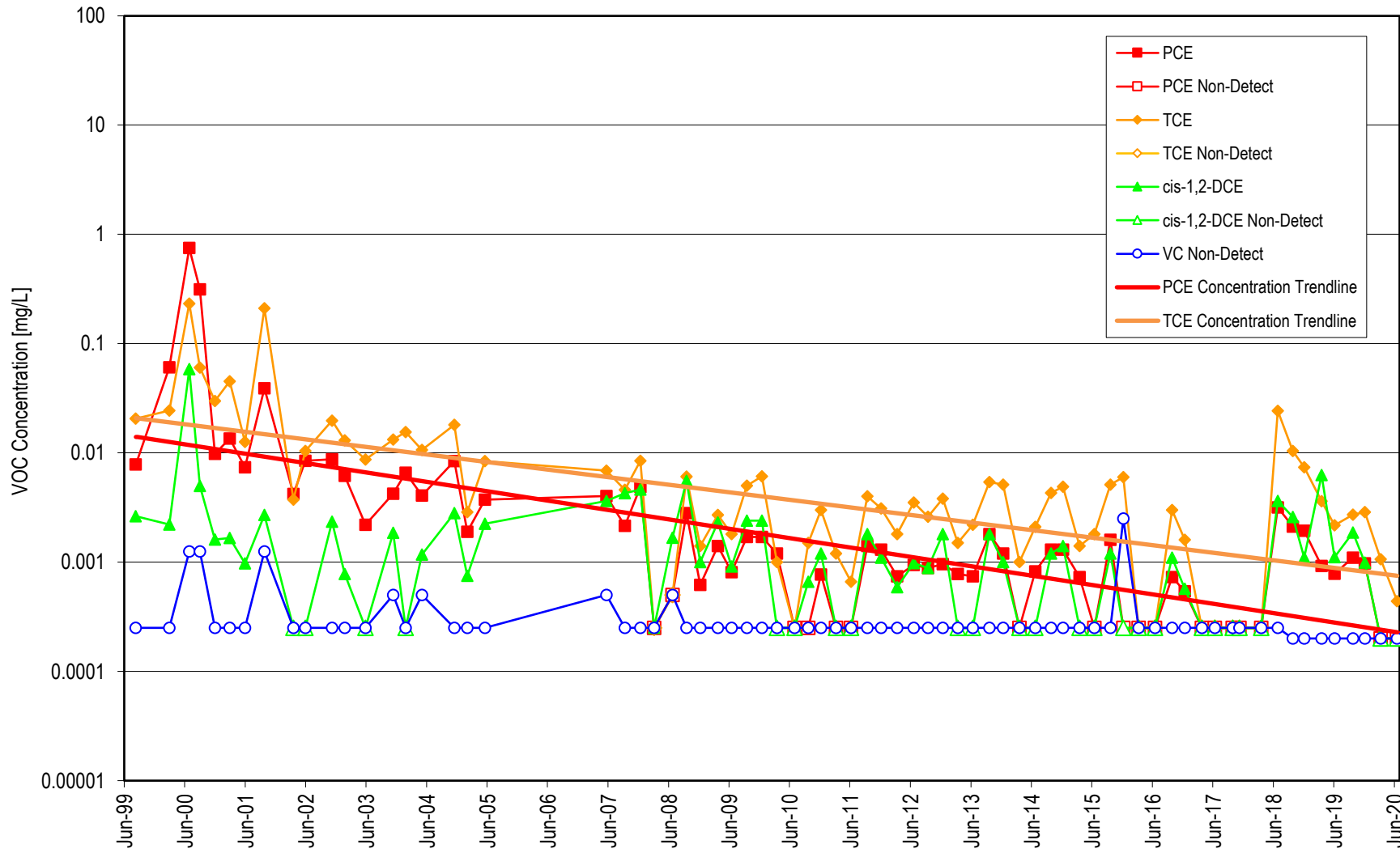
### VOC Concentrations in MW-24i



**Note:** Not detected values plotted at 1/2 the reporting limit.

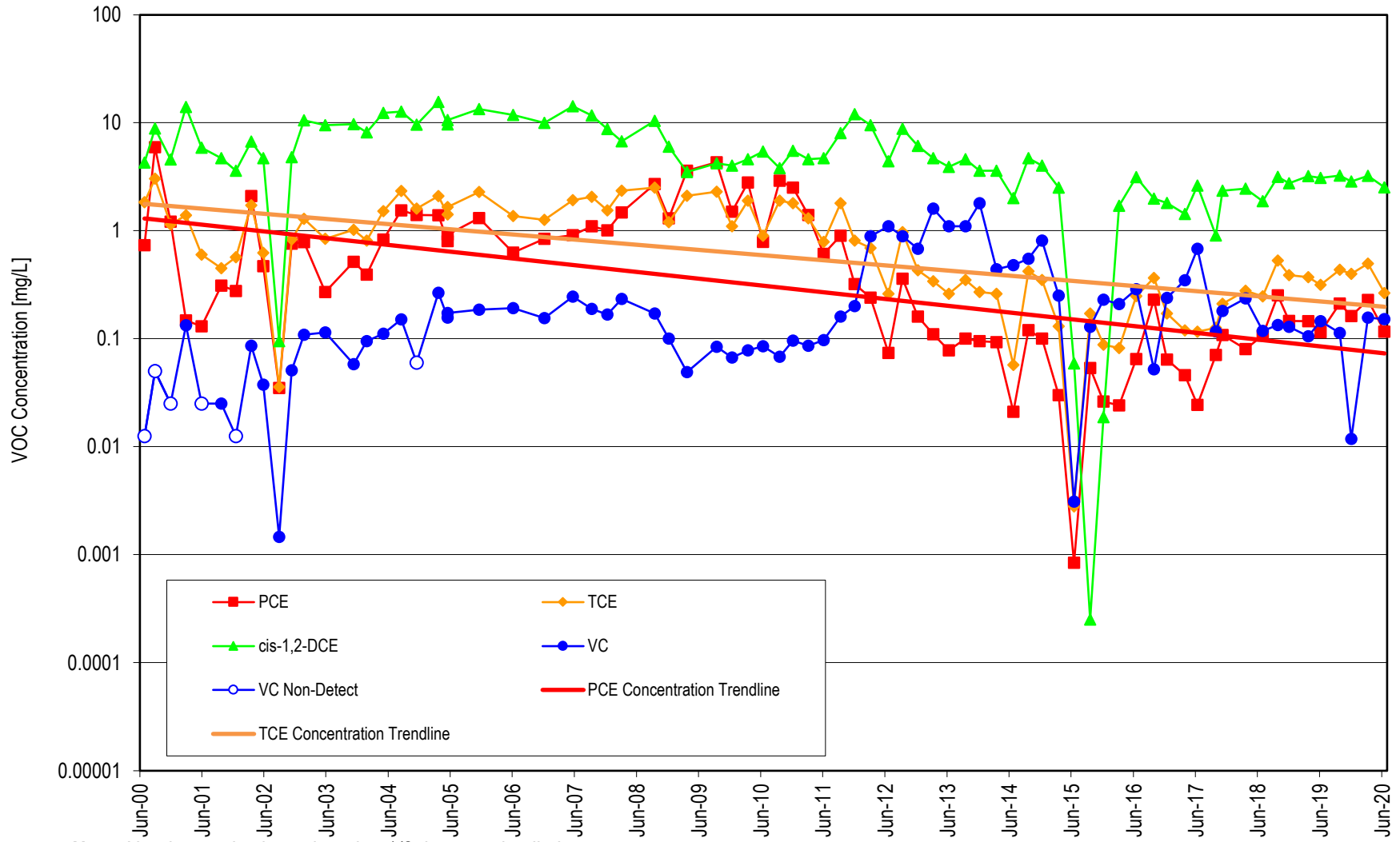


### VOC Concentrations in S-1



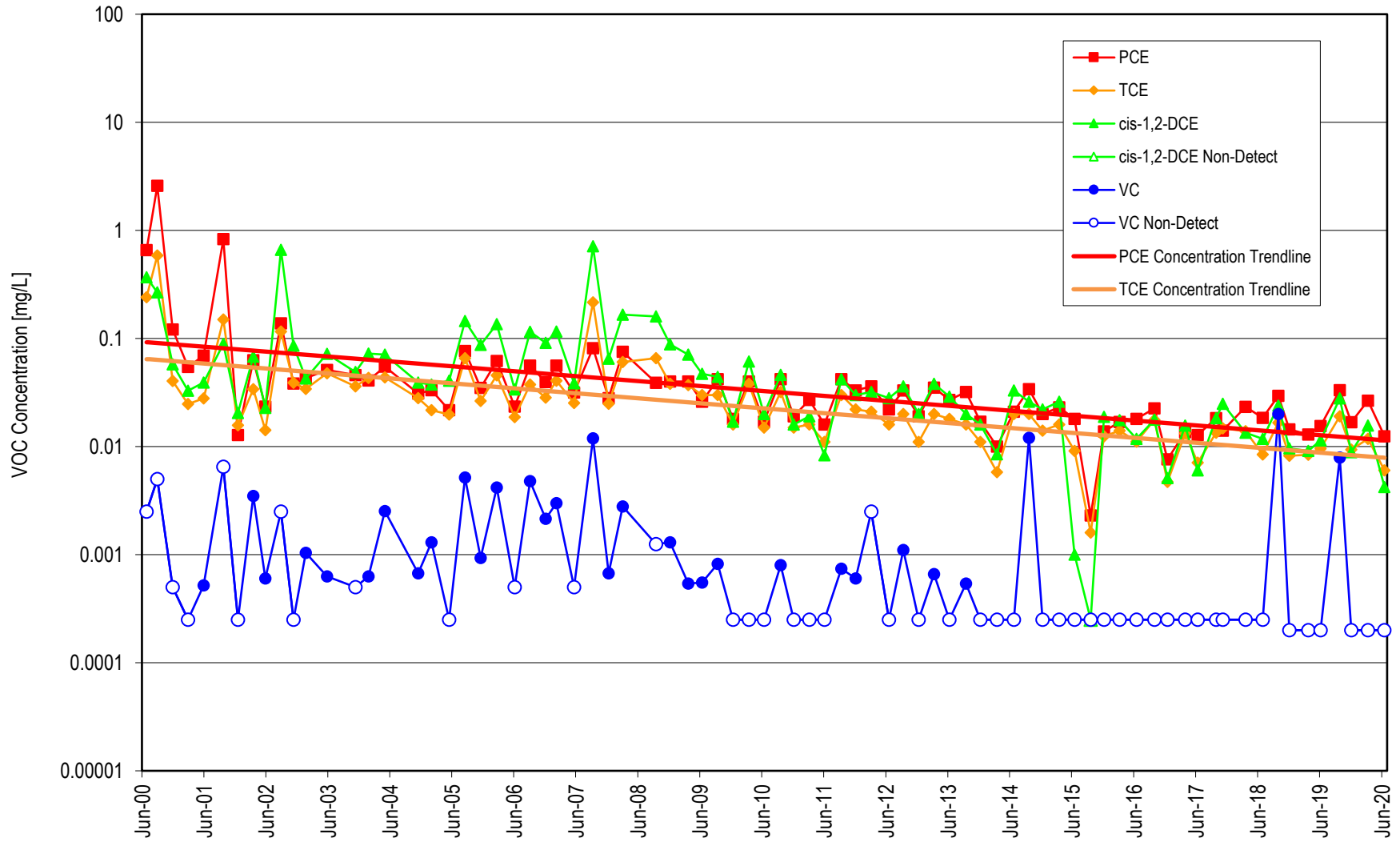
**Note:** Not detected values plotted at 1/2 the reporting limit.

### VOC Concentrations in MGMS1-43



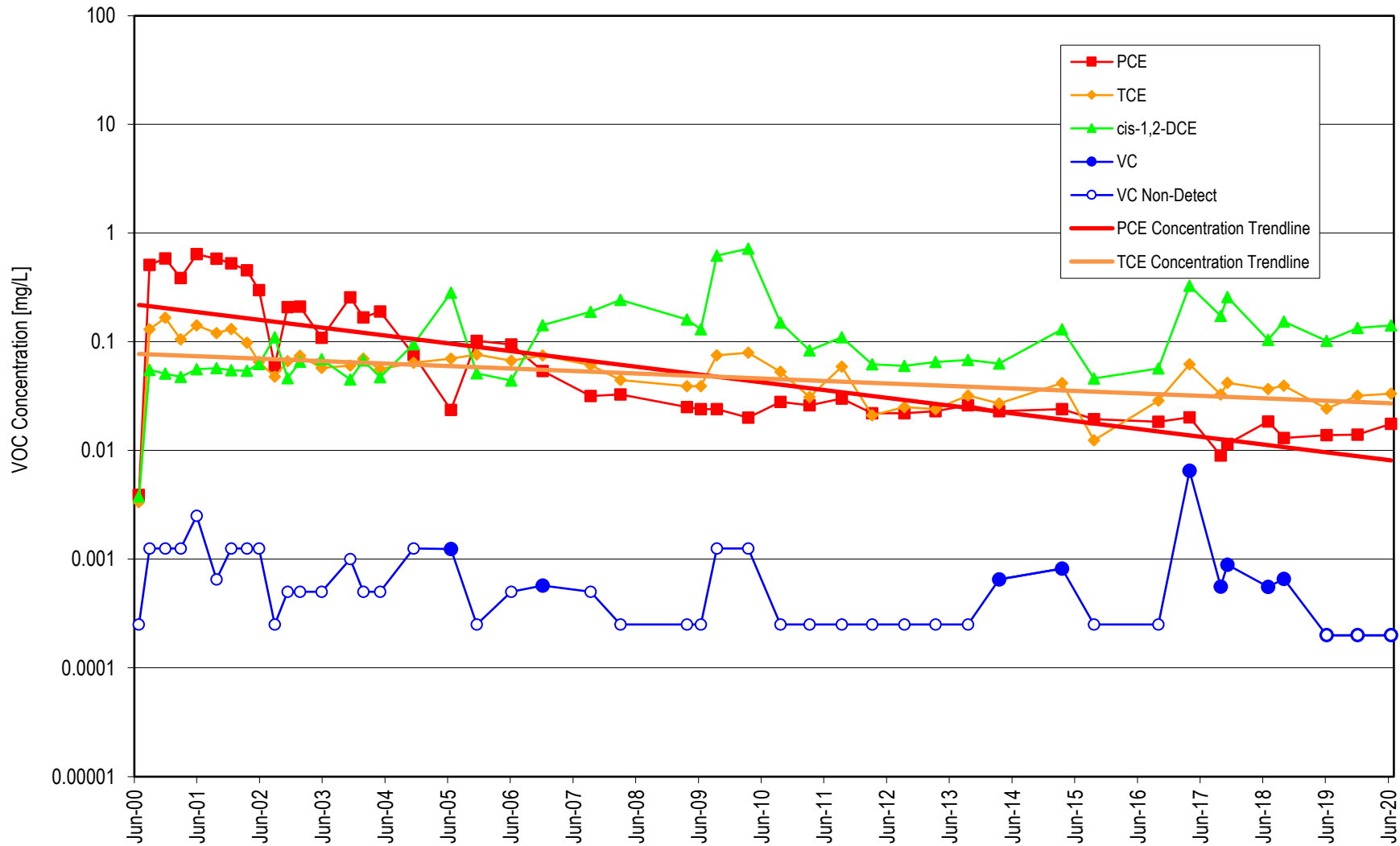
**Note:** Not detected values plotted at 1/2 the reporting limit.

### VOC Concentrations in MGMS1-60



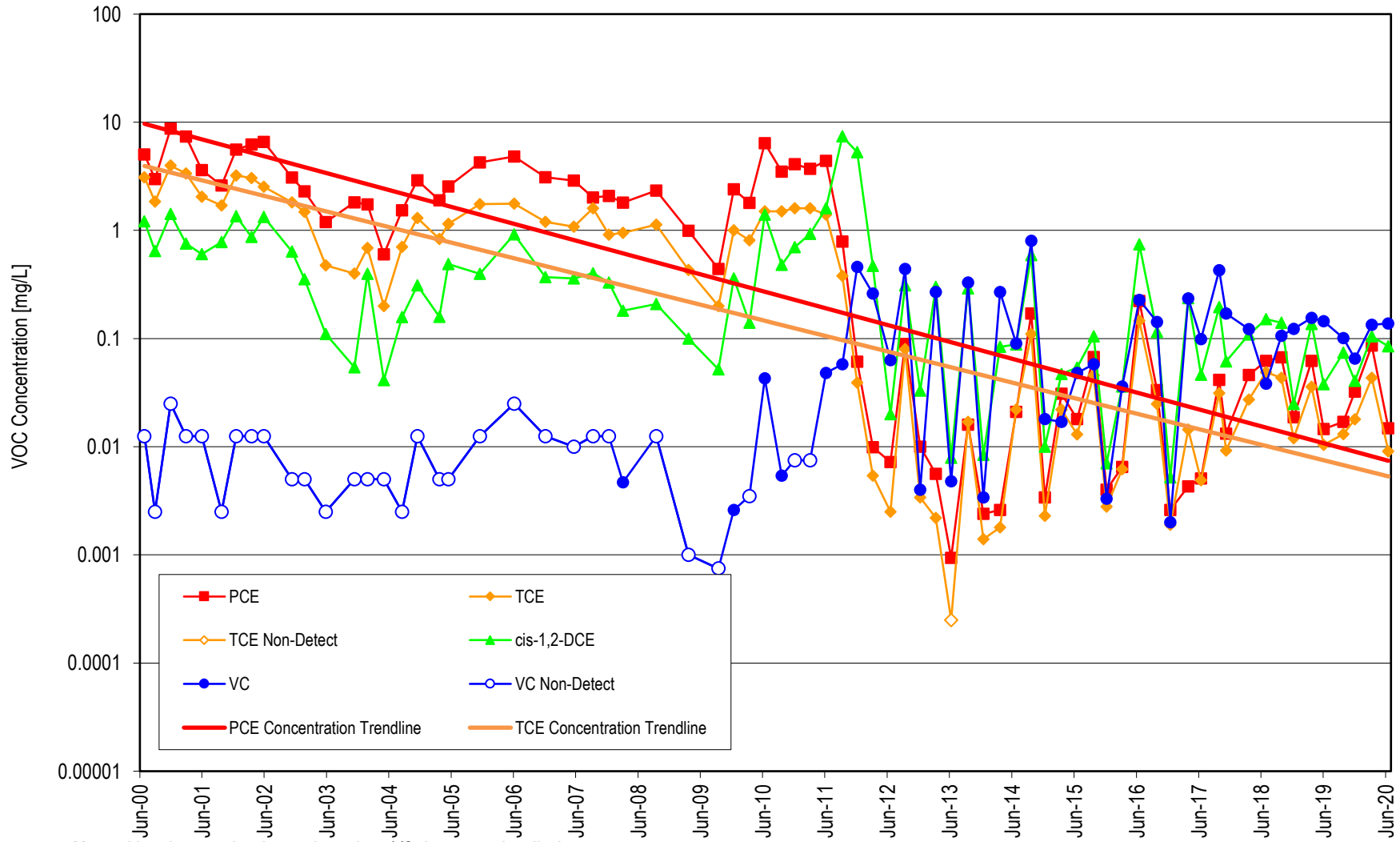
**Note:** Not detected values plotted at 1/2 the reporting limit.

### VOC Concentrations in MGMS1-110



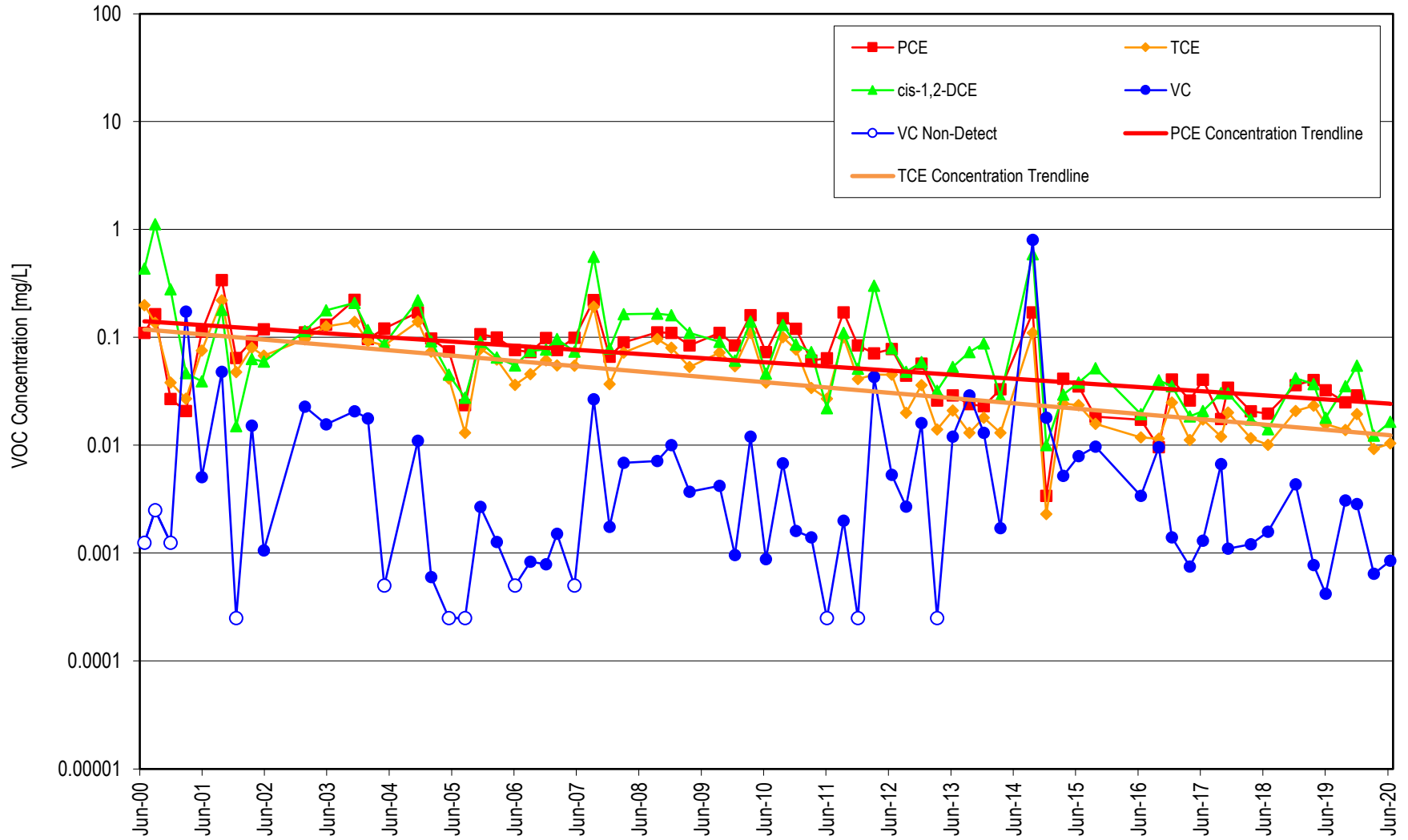
**Note:** Not detected values plotted at 1/2 the reporting limit.

### VOC Concentrations in MGMS2-40



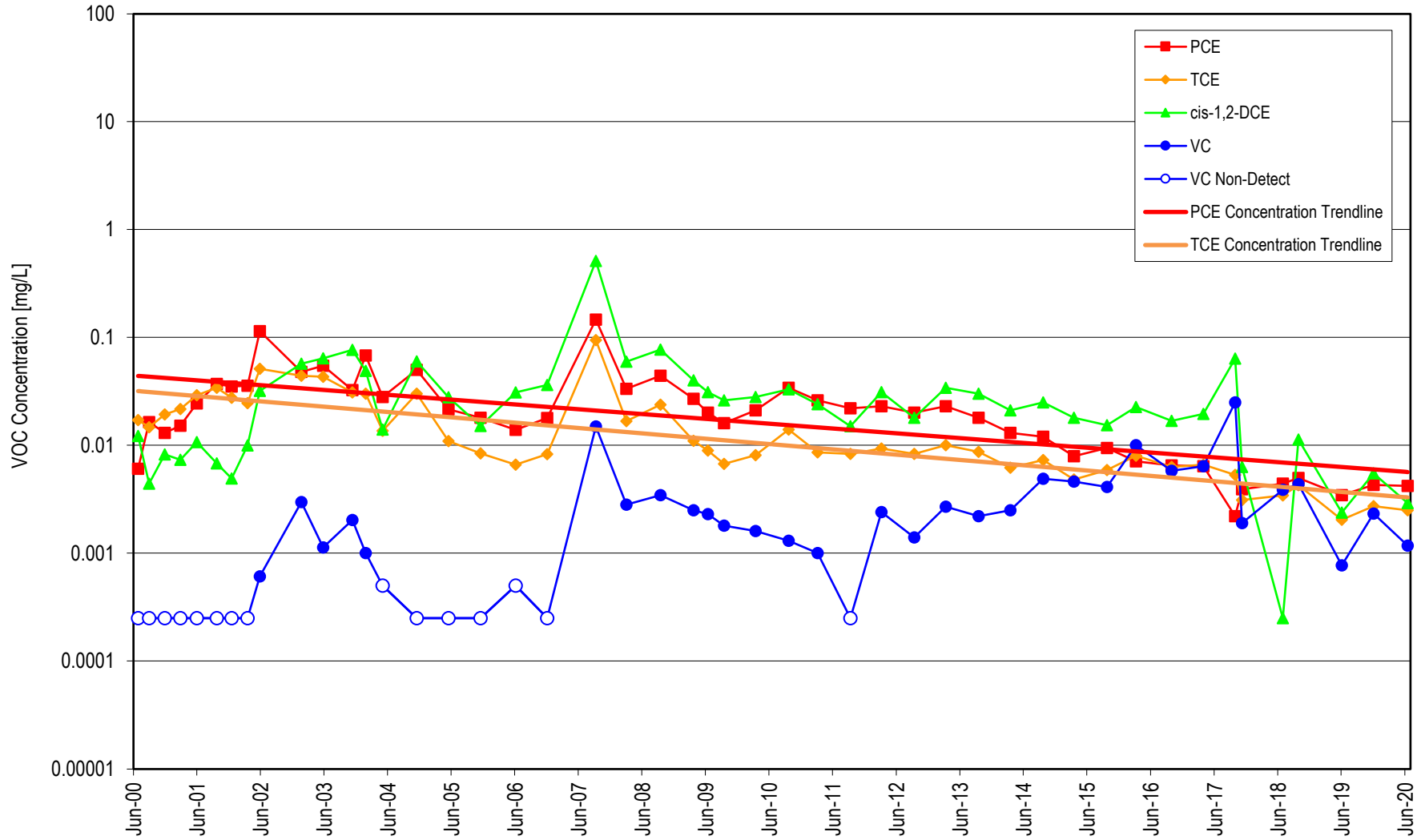
**Note:** Not detected values plotted at 1/2 the reporting limit.

### VOC Concentrations in MGMS2-60



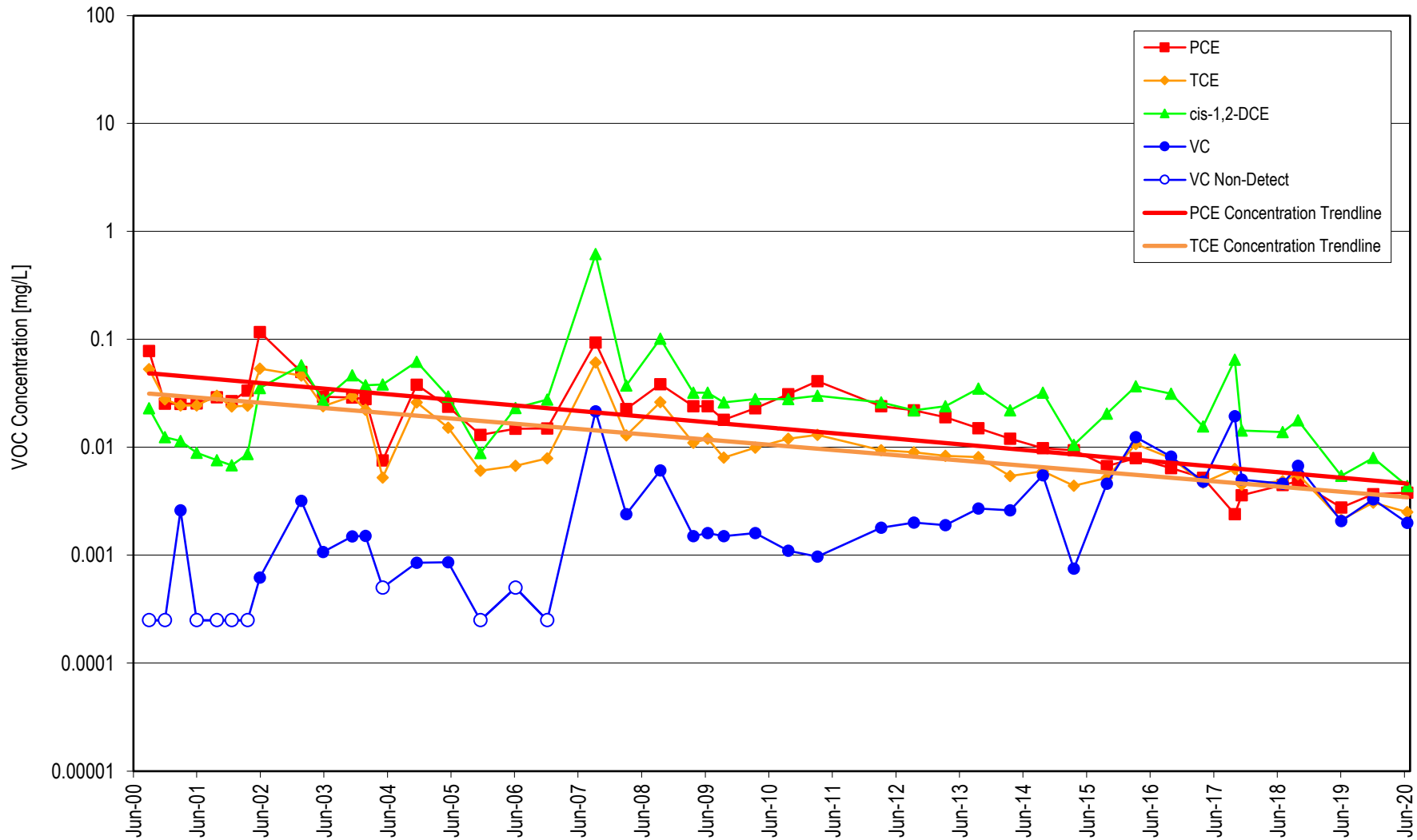
**Note:** Not detected values plotted at 1/2 the reporting limit.

### VOC Concentrations in MGMS2-110



Note: Not detected values plotted at 1/2 the reporting limit.

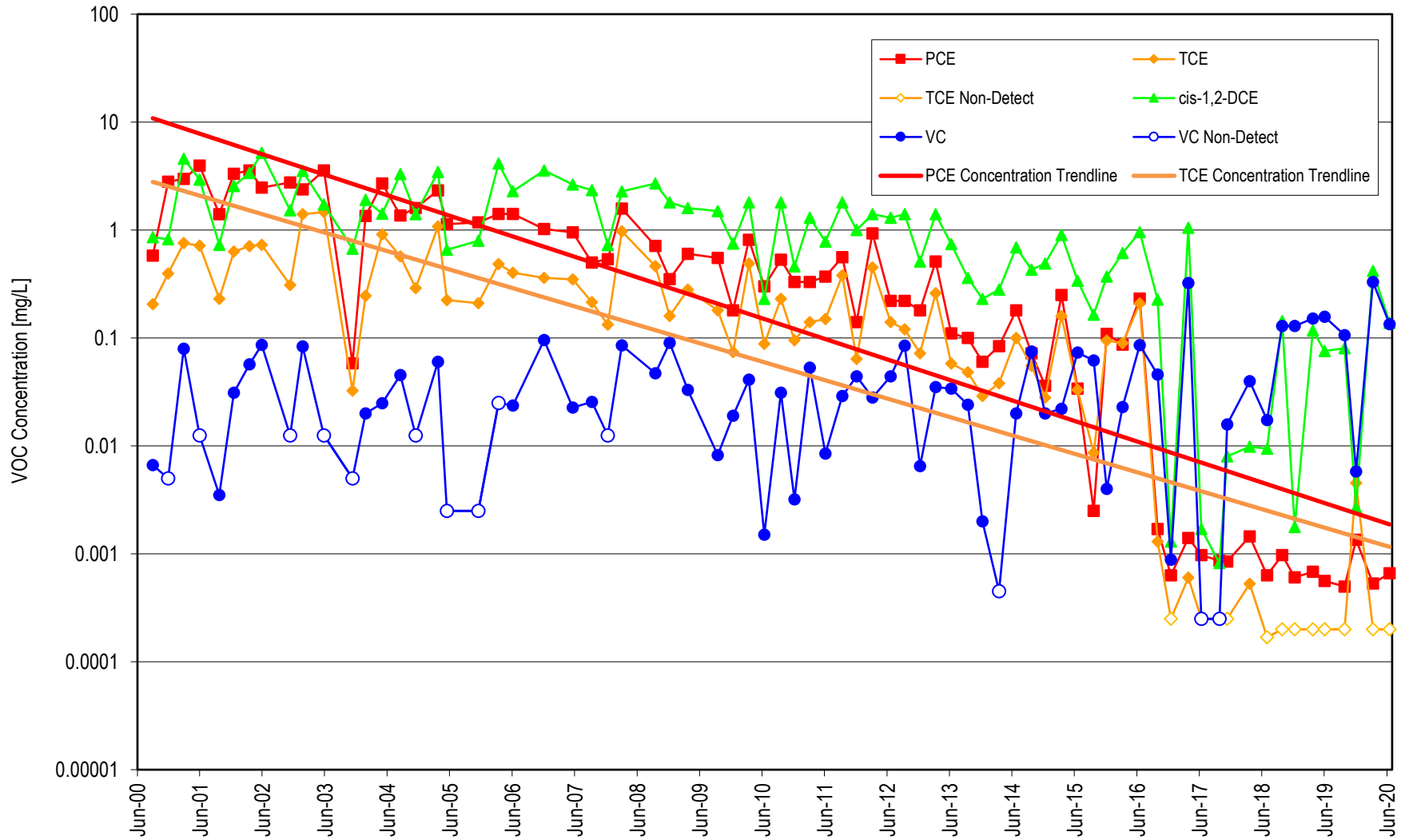
### VOC Concentrations in MGMS2-132



**Note:** Not detected values plotted at 1/2 the reporting limit.

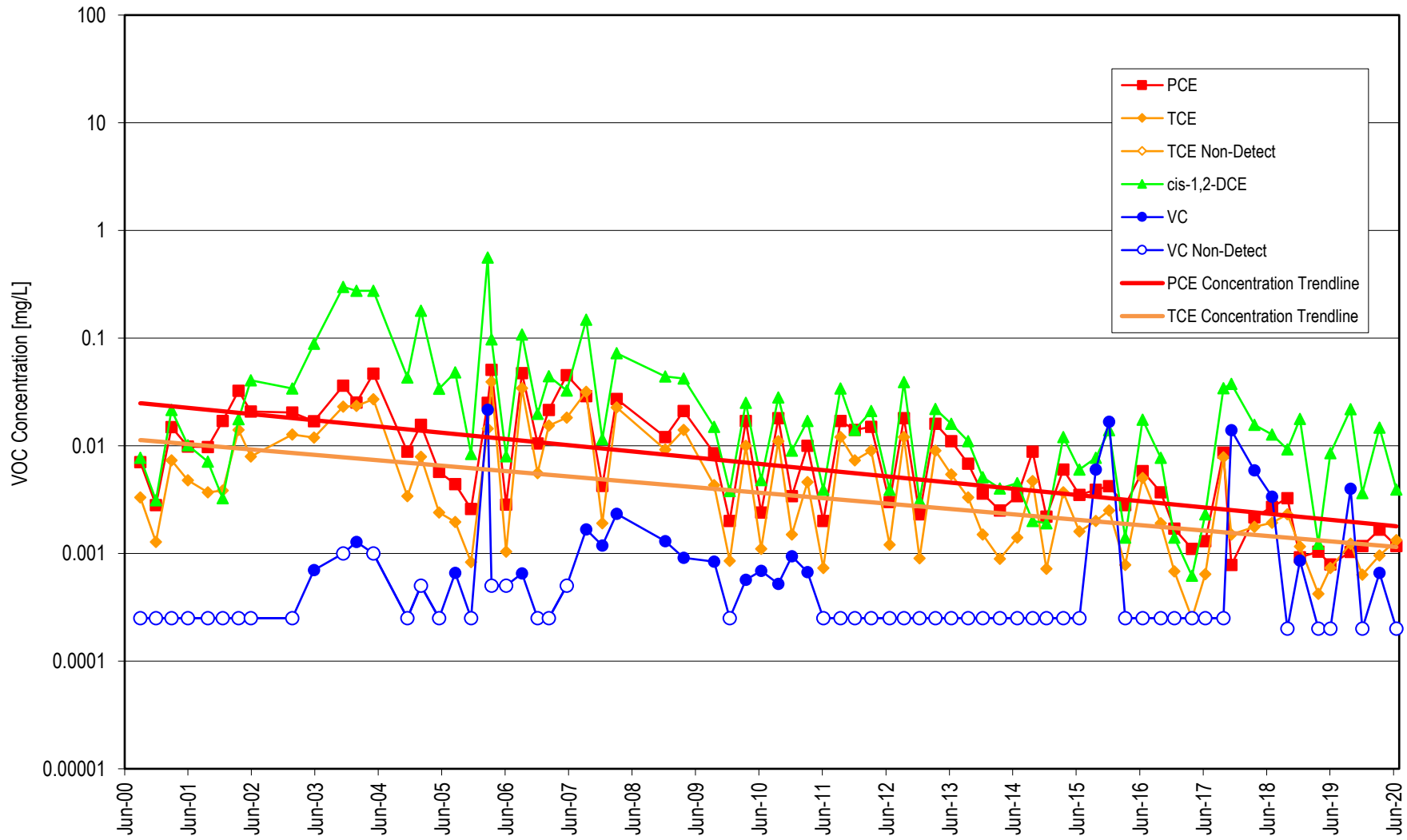


### VOC Concentrations in MGMS3-40



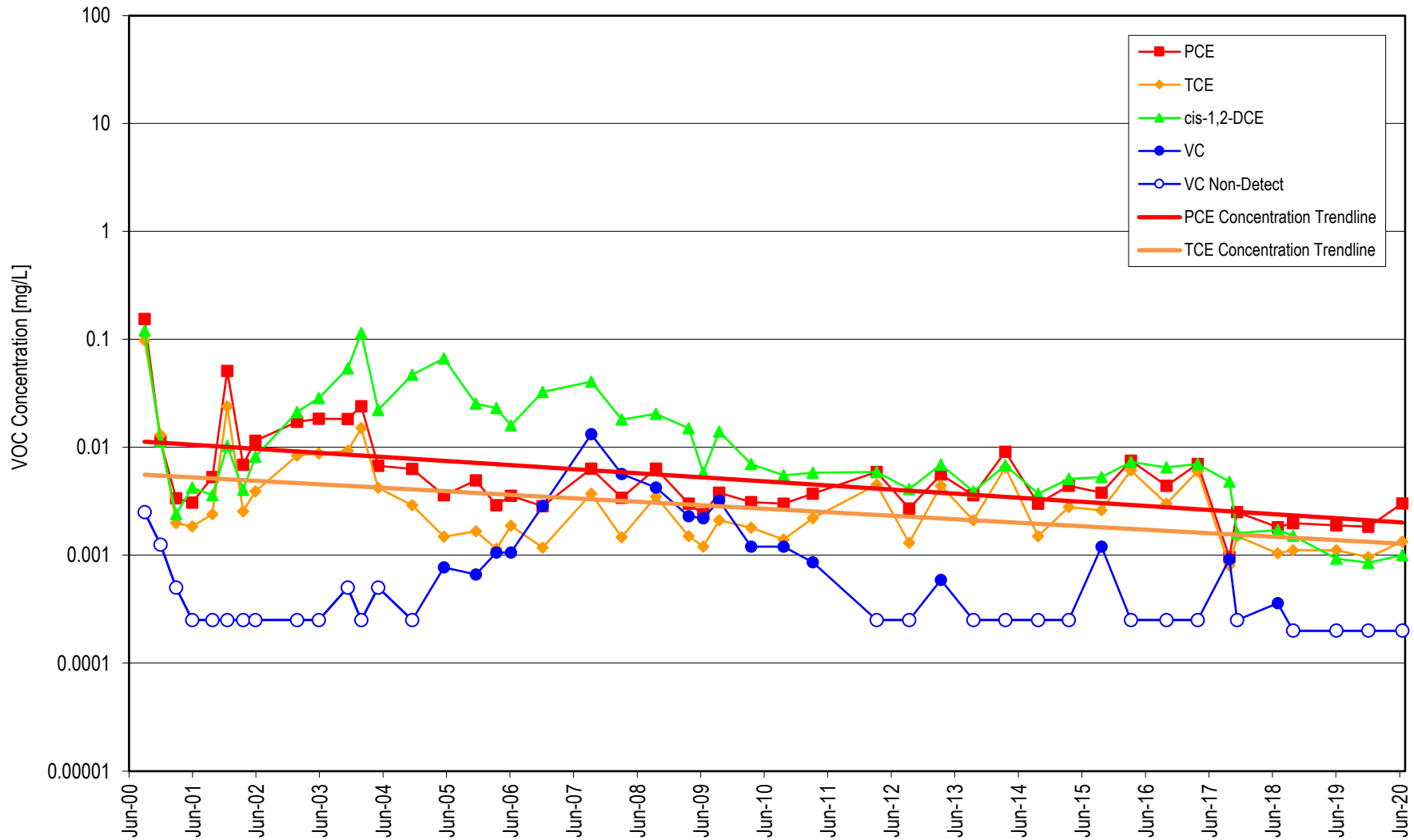
**Note:** Not detected values plotted at 1/2 the reporting limit.

### VOC Concentrations in MGMS3-60



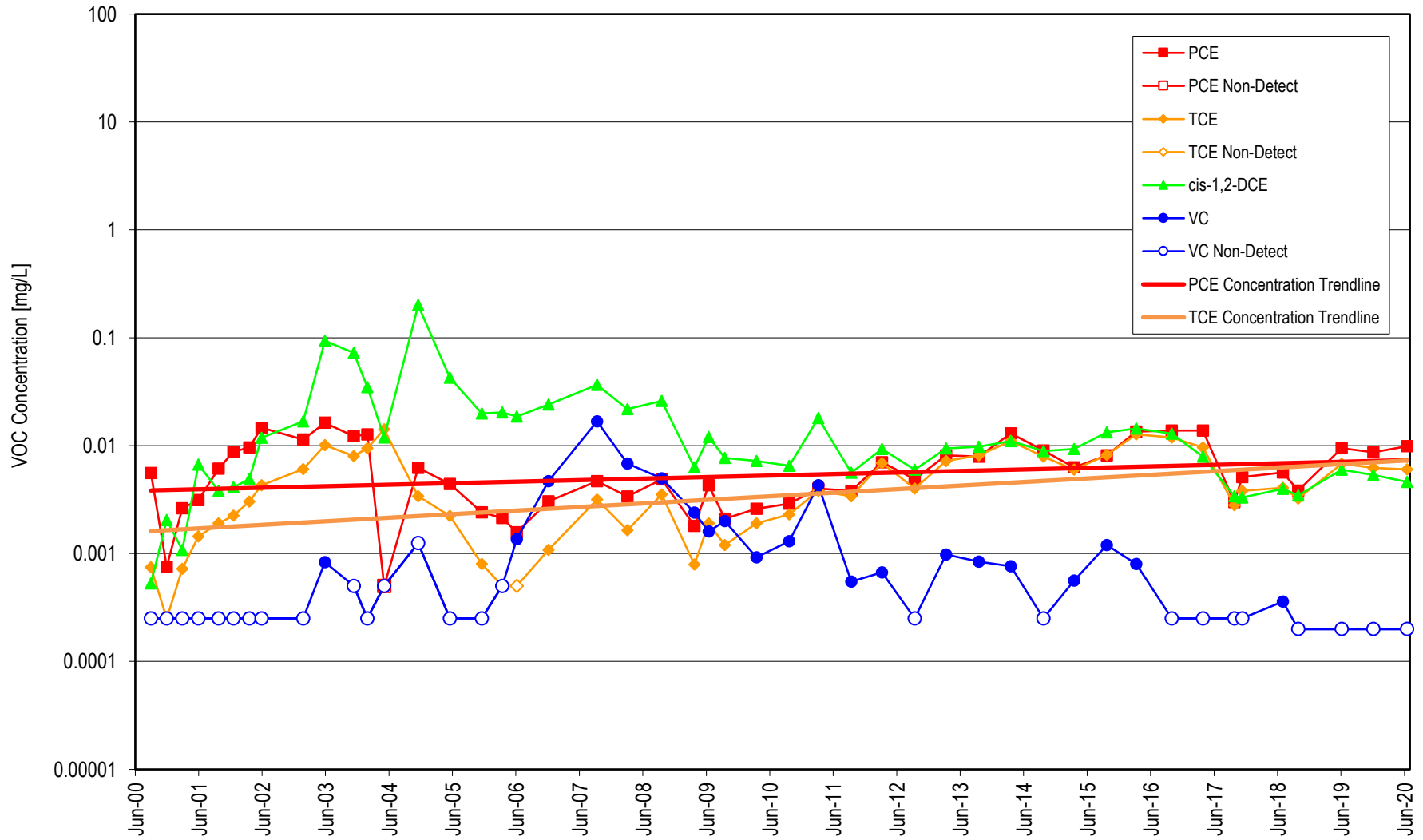
**Note:** Not detected values plotted at 1/2 the reporting limit.

### VOC Concentrations in MGMS3-101



**Note:** Not detected values plotted at 1/2 the reporting limit.

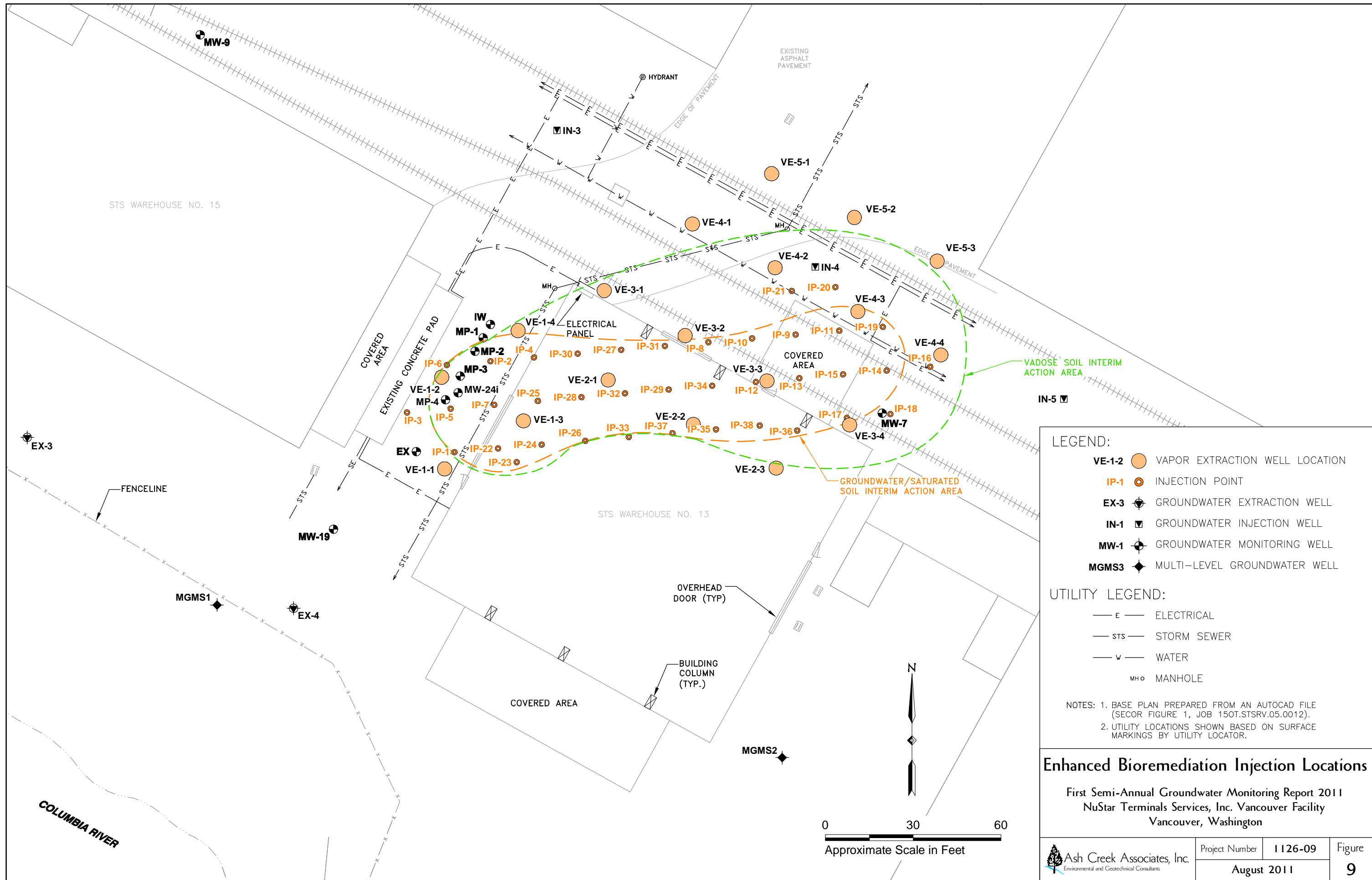
### VOC Concentrations in MGMS3-132

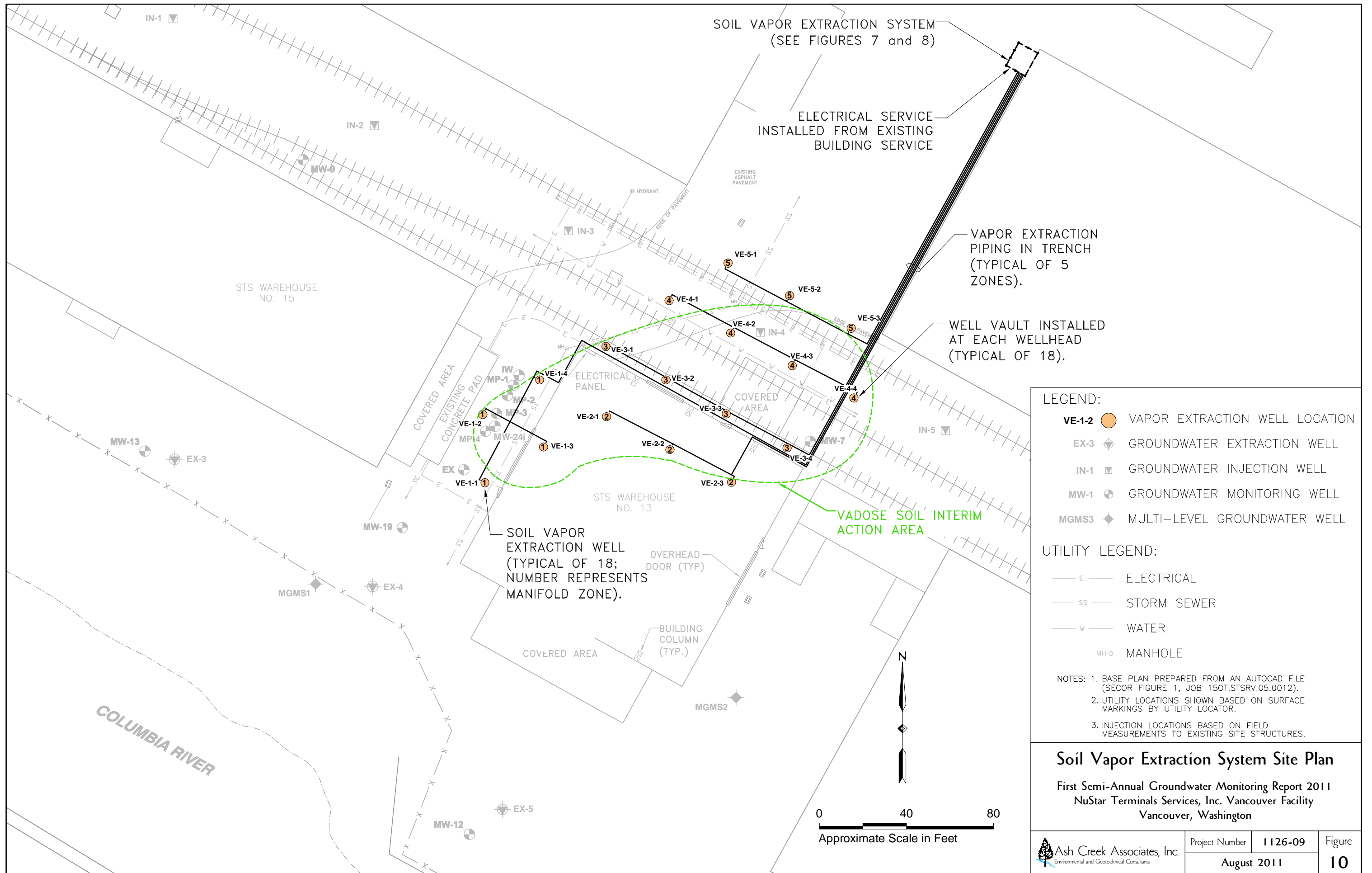


**Note:** Not detected values plotted at 1/2 the reporting limit.

**APPENDIX E**

2008 – SVE AND BIOREMEDIATION INJECTION LAYOUT AND  
MASS REMOVAL CHART





**LEGEND:**

- VE-1-2** ○ VAPOR EXTRACTION WELL LOCATION
- EX-3** ⊕ GROUNDWATER EXTRACTION WELL
- IN-1** ▽ GROUNDWATER INJECTION WELL
- MW-1** ⊕ GROUNDWATER MONITORING WELL
- MGMS3** ◆ MULTI-LEVEL GROUNDWATER WELL

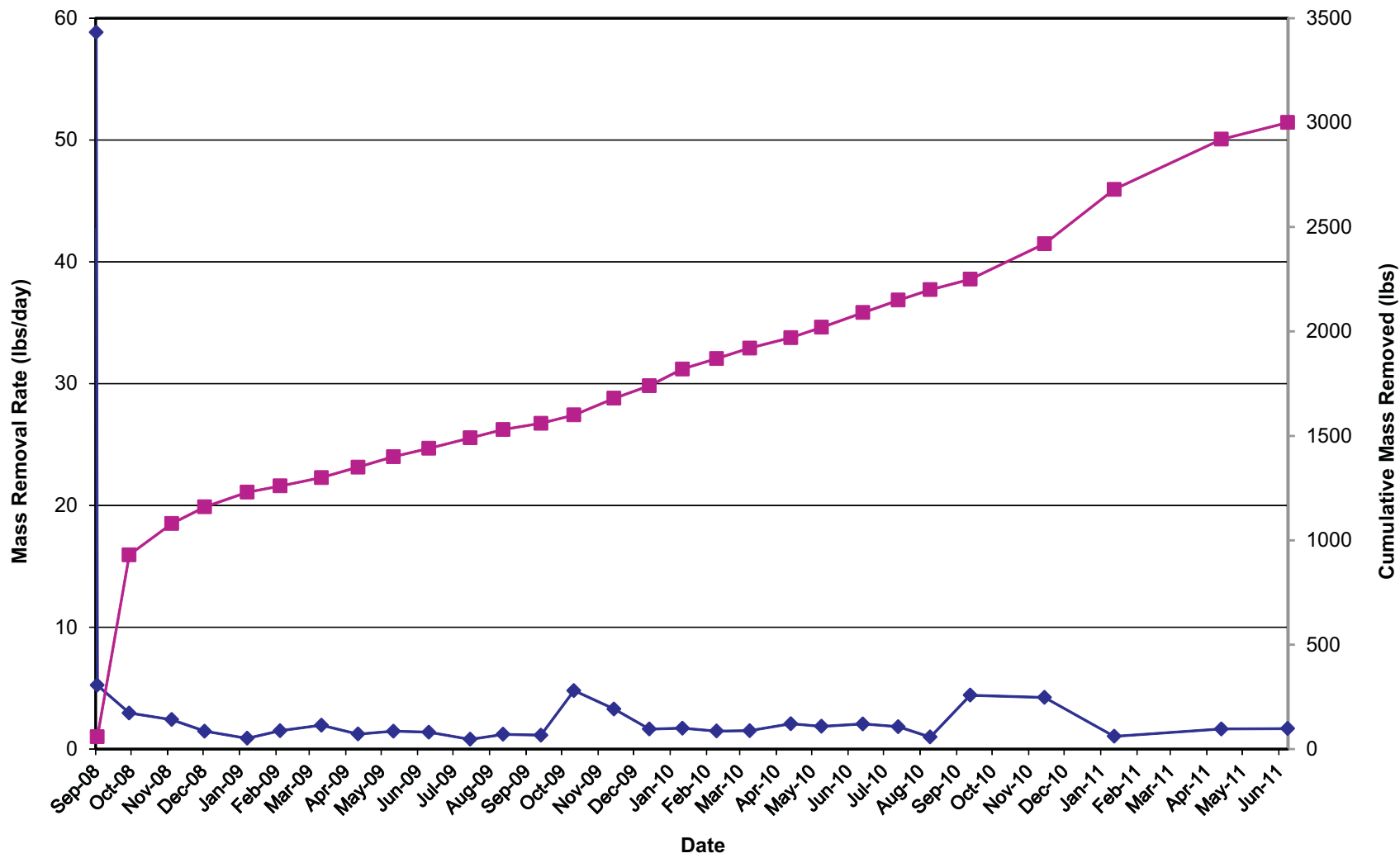
**UTILITY LEGEND:**

- E — ELECTRICAL
- SS — STORM SEWER
- W — WATER
- MH ○ MANHOLE

**NOTES:**

1. BASE PLAN PREPARED FROM AN AUTOCAD FILE (SECOR FIGURE 1, JOB 150T.STSRV.05.0012).
2. UTILITY LOCATIONS SHOWN BASED ON SURFACE MARKINGS BY UTILITY LOCATOR.
3. INJECTION LOCATIONS BASED ON FIELD MEASUREMENTS TO EXISTING SITE STRUCTURES.

**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



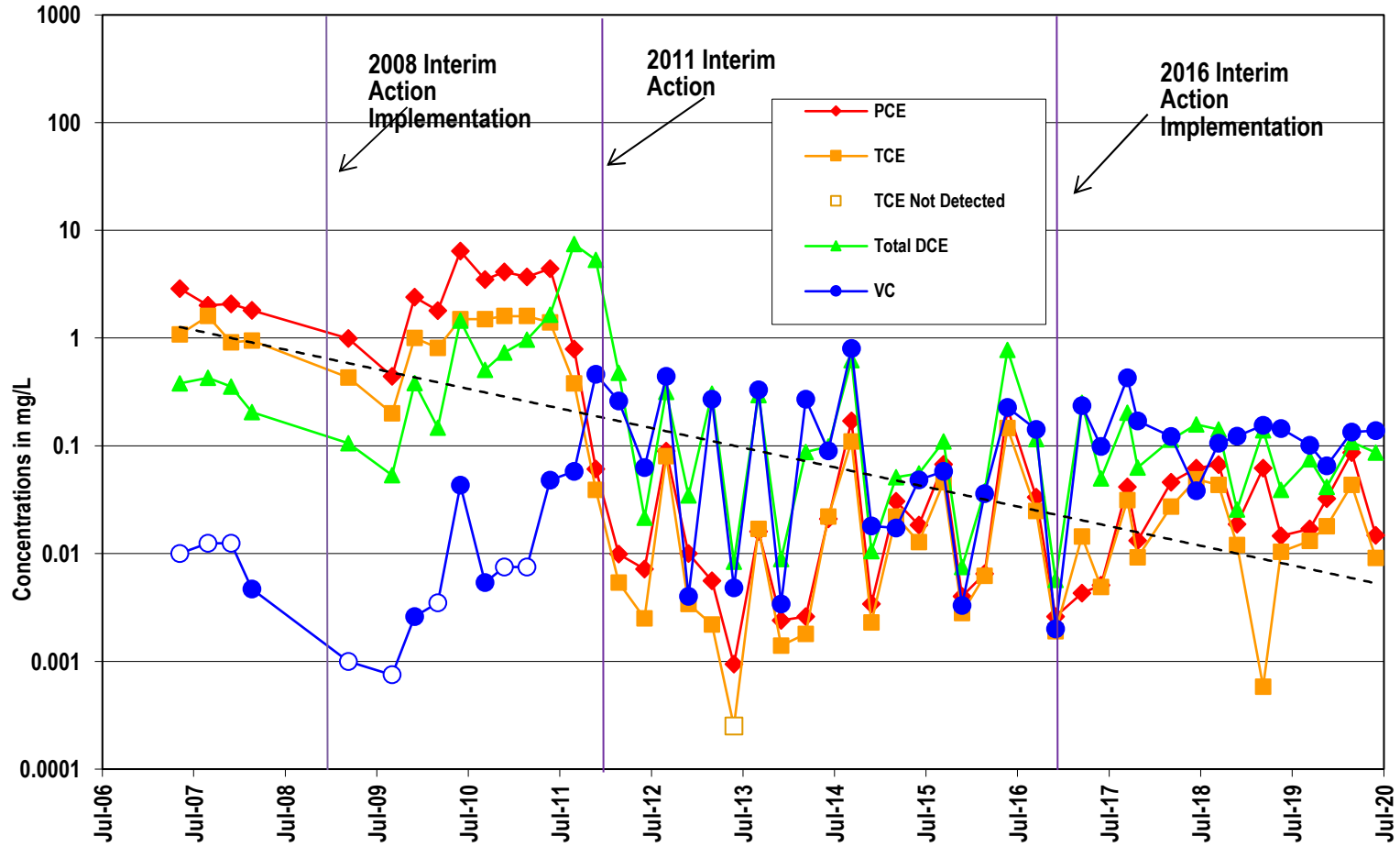
Project Number	1126-09
January 2012	

Figure  
**11**



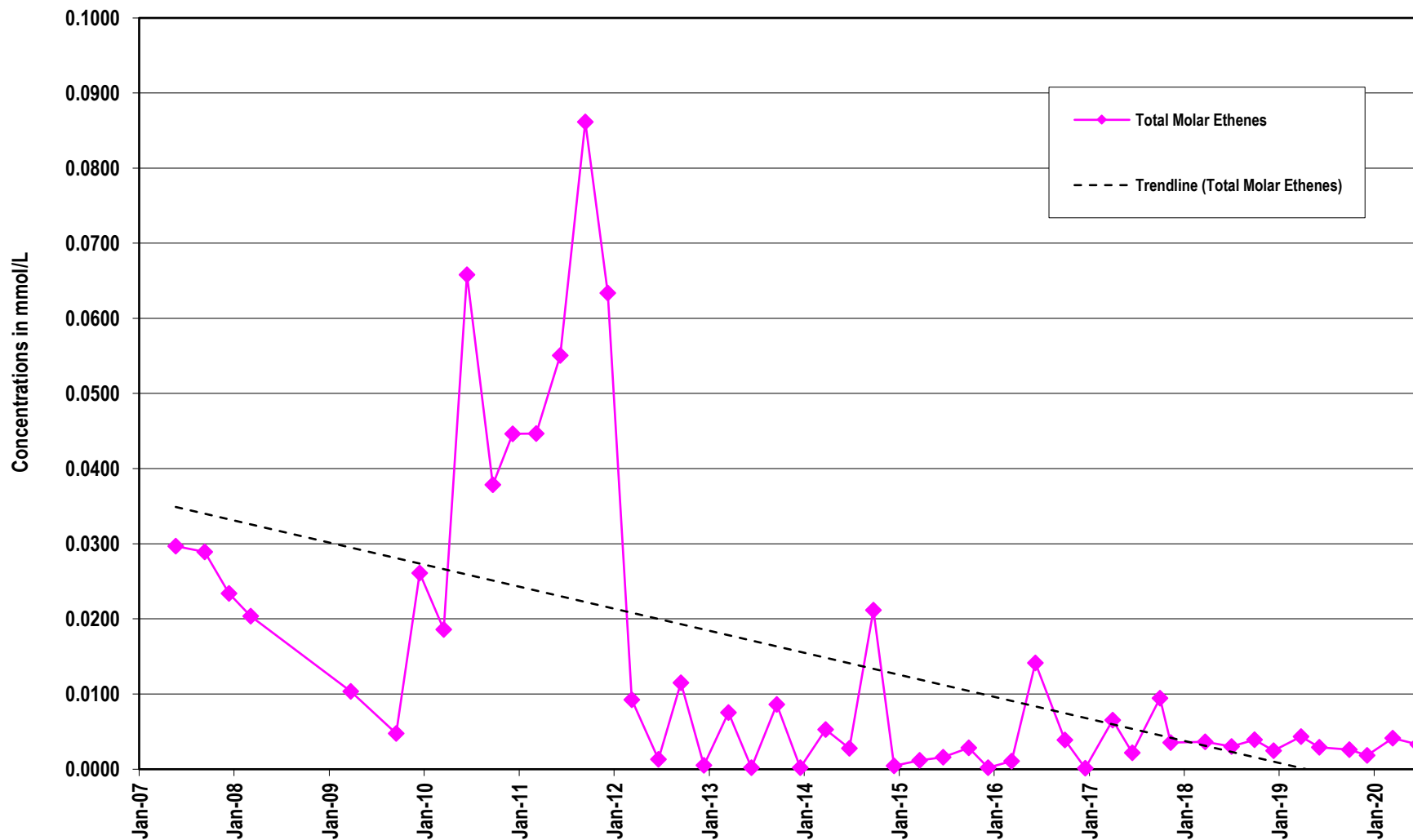
**APPENDIX F**  
MOLAR CONCENTRATION TREND PLOTS –  
INTERIM ACTION WELLS

### Interim Action Area - VOC Trends: MGMTS2-40

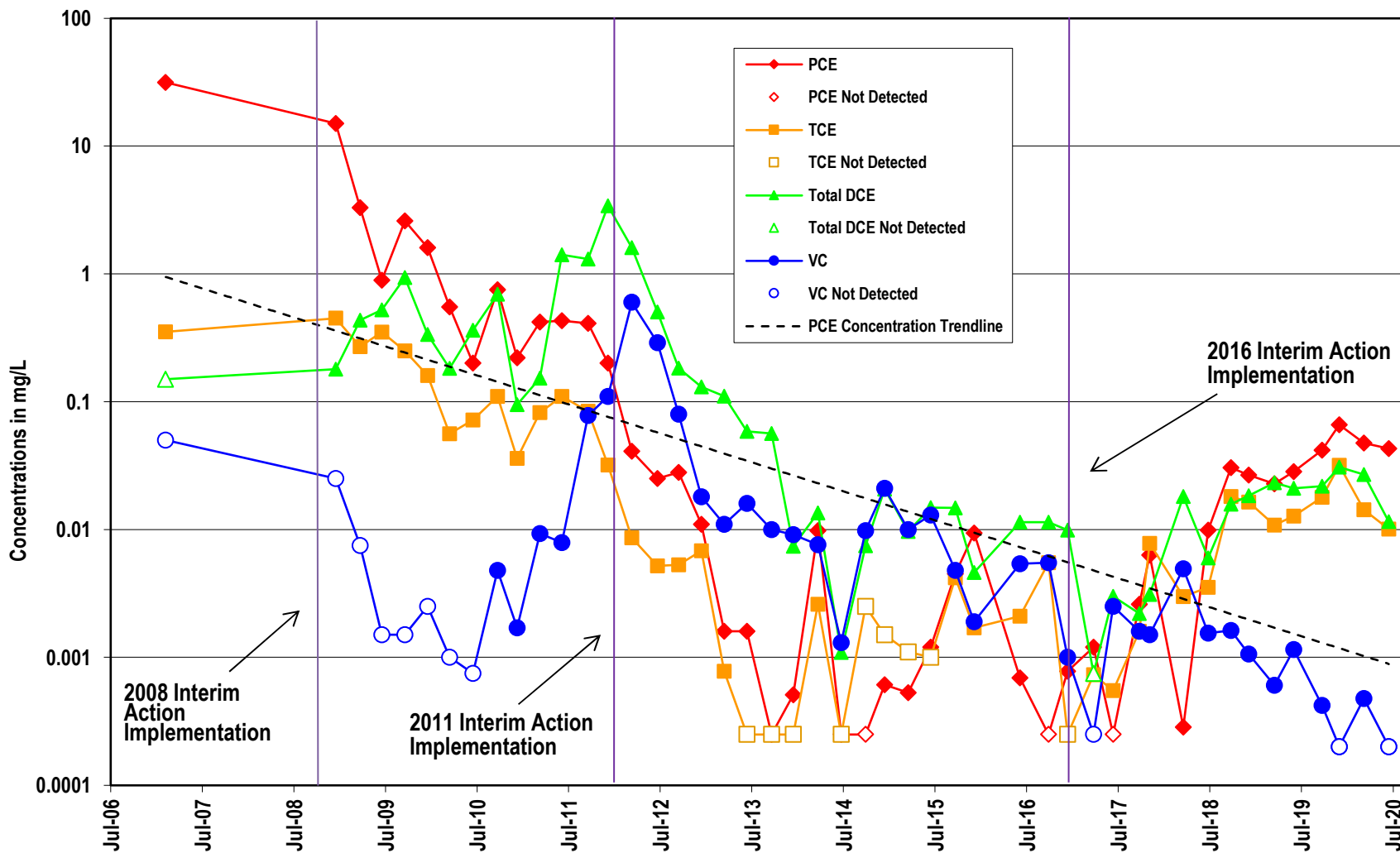


**Note:** Not detected values plotted at 1/2 the reporting limit.

Total Molar Ethenes in MGMS2-40

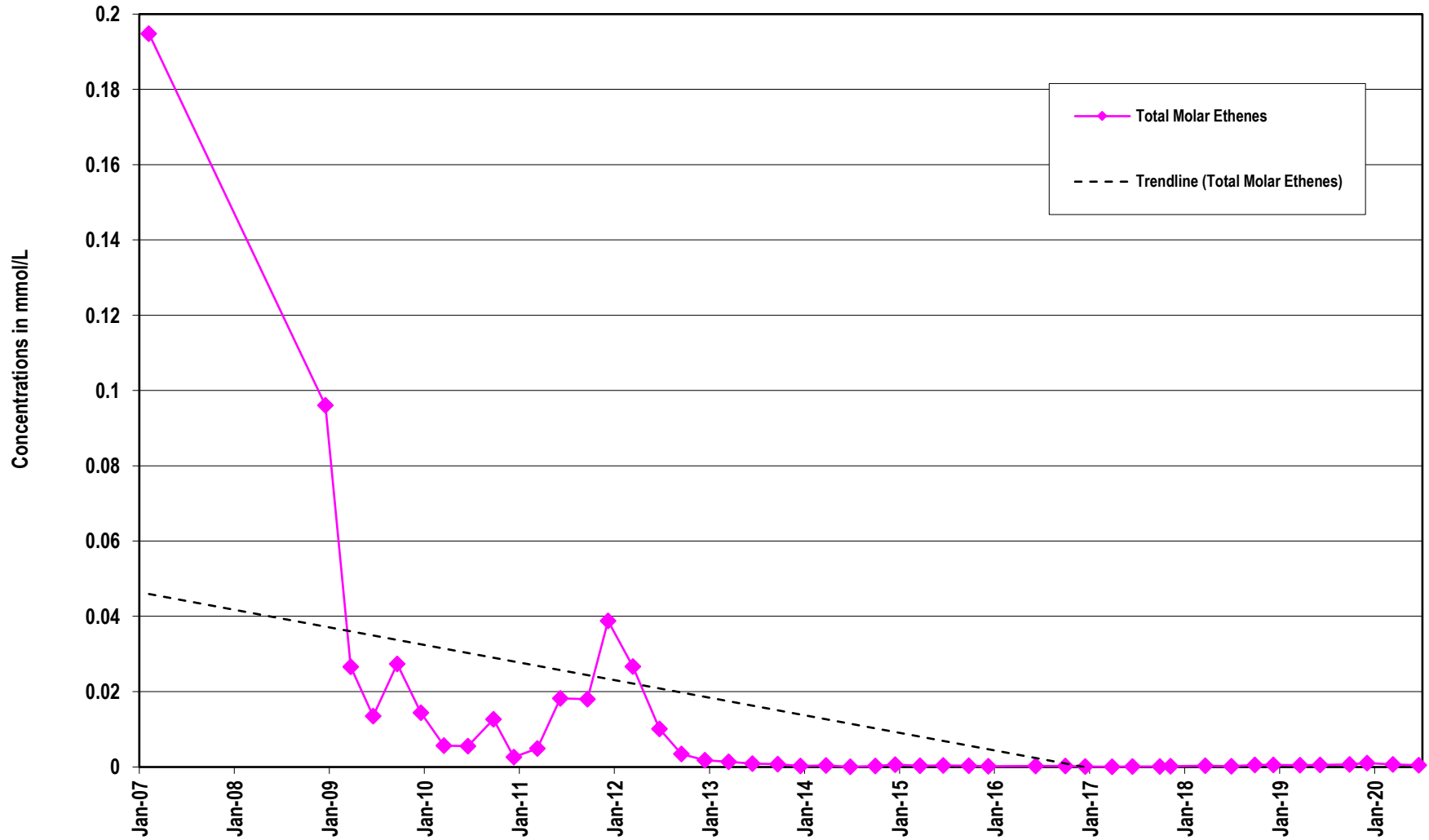


### Interim Action Area - VOC Trends: MW-7

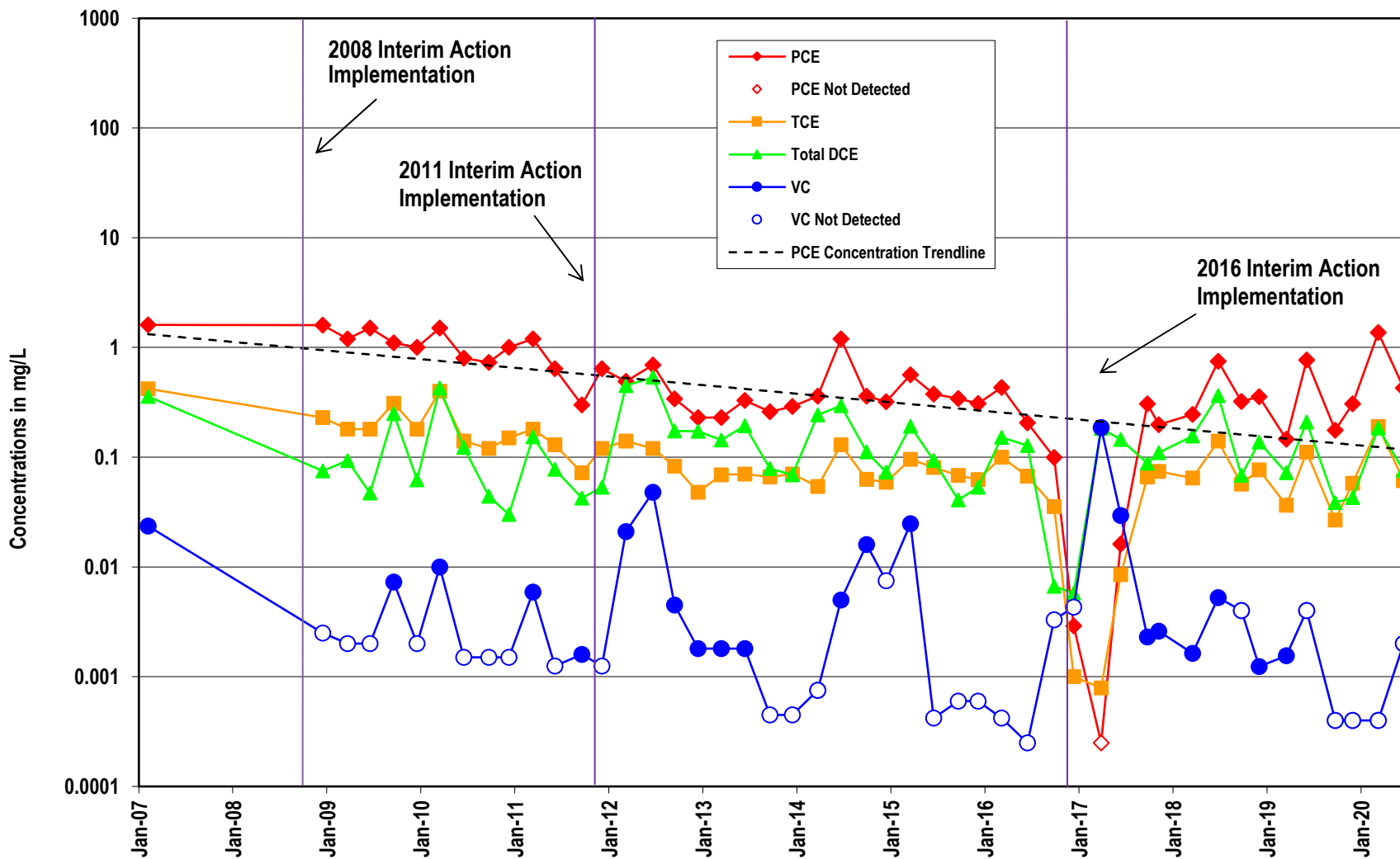


Notes: Not detected values plotted at 1/2 the reporting limit.

Total Molar Ethenes in MW-7

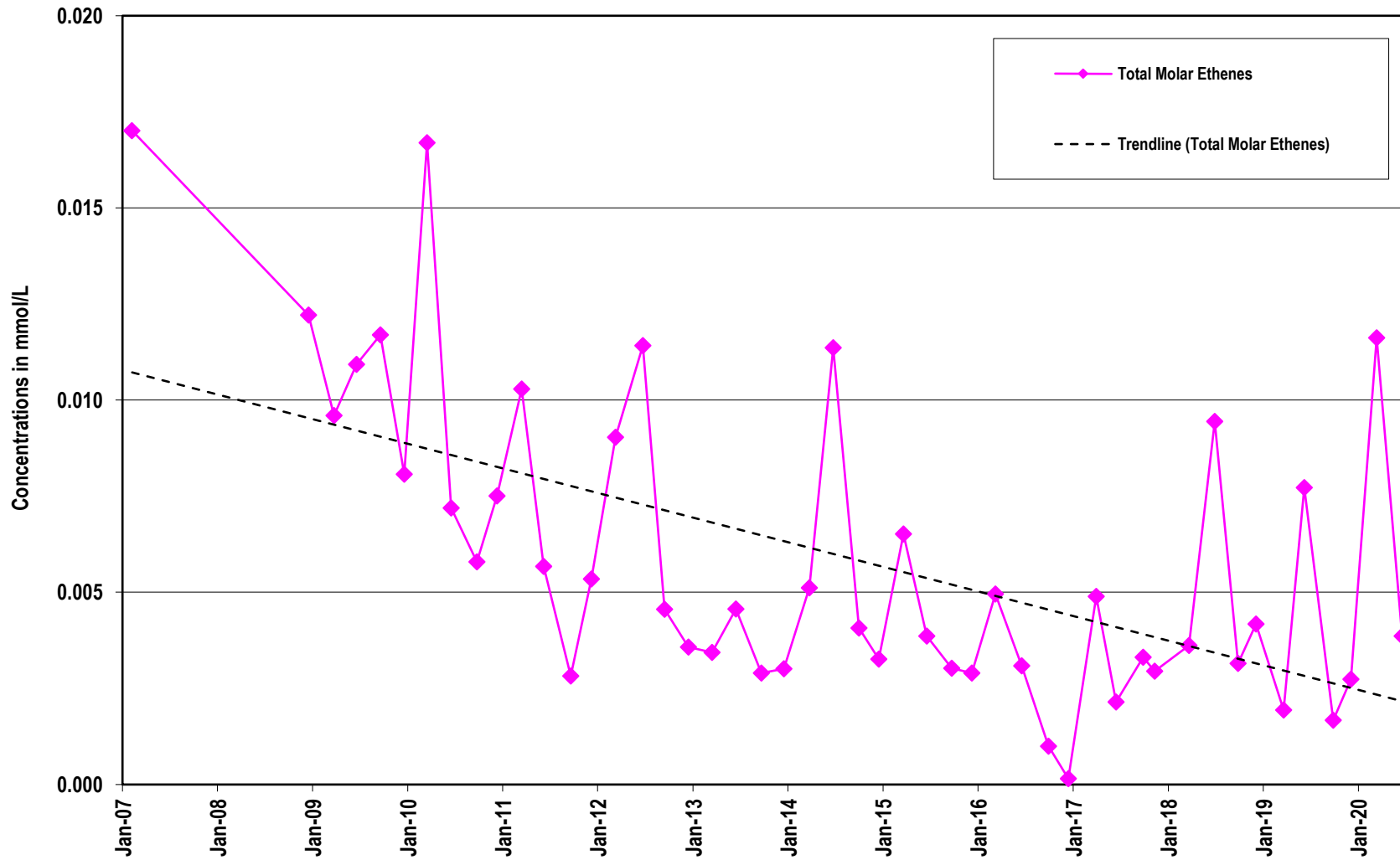


### Interim Action Area - VOC Trends: MP-1

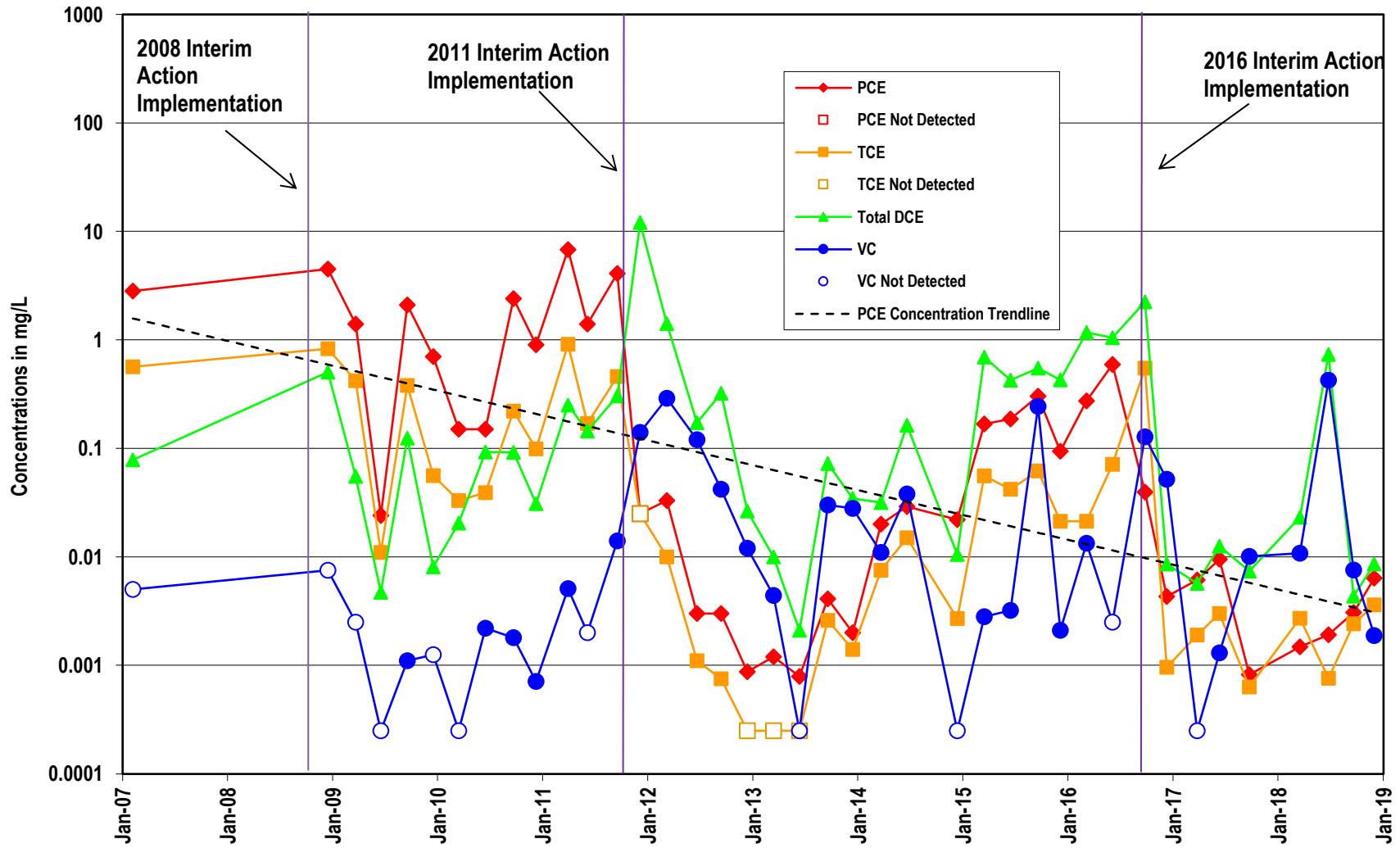


Note: Not detected values plotted at 1/2 the reporting limit.

Total Molar Ethenes in MP-1



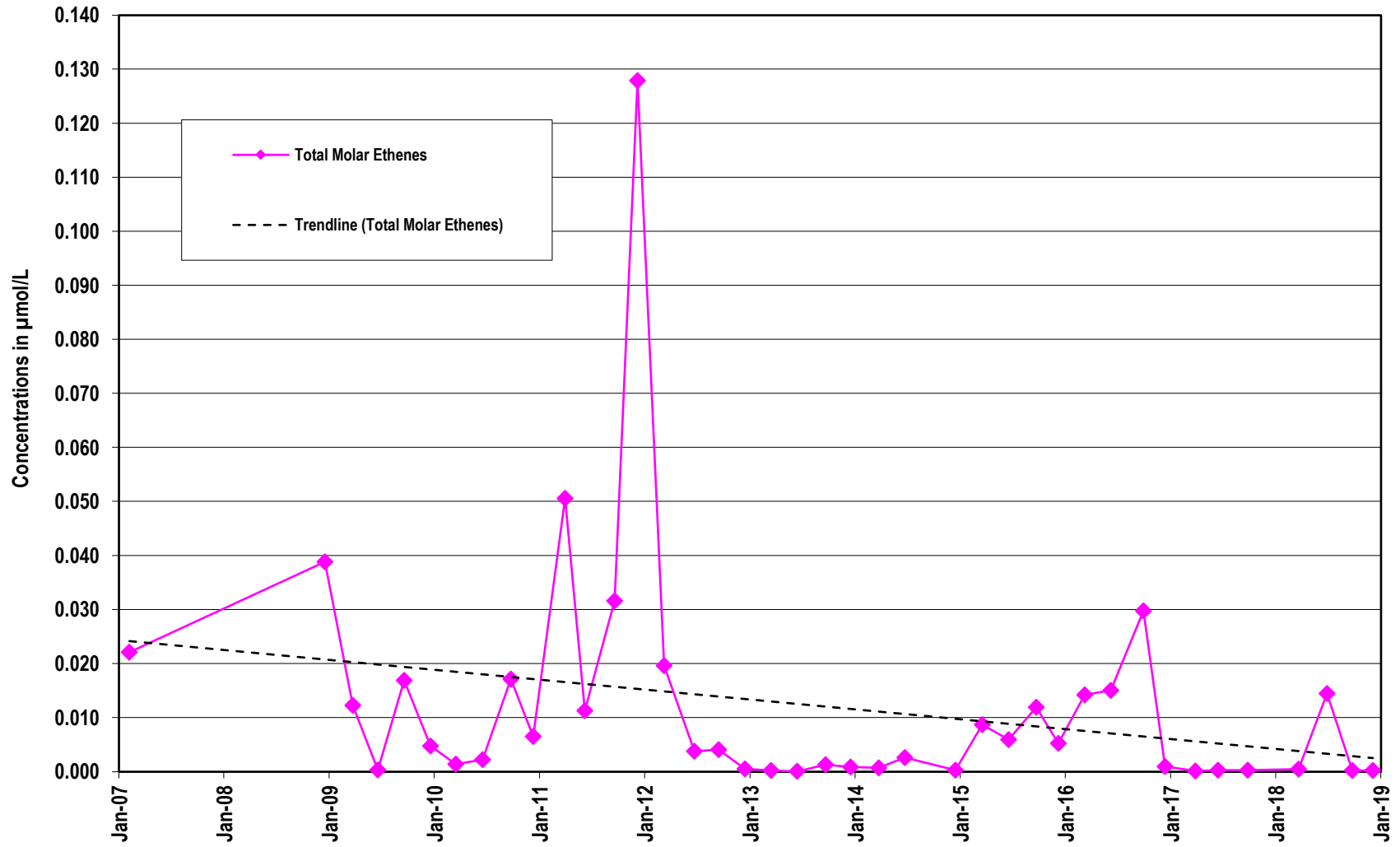
### Interim Action Area - VOC Trends: EX



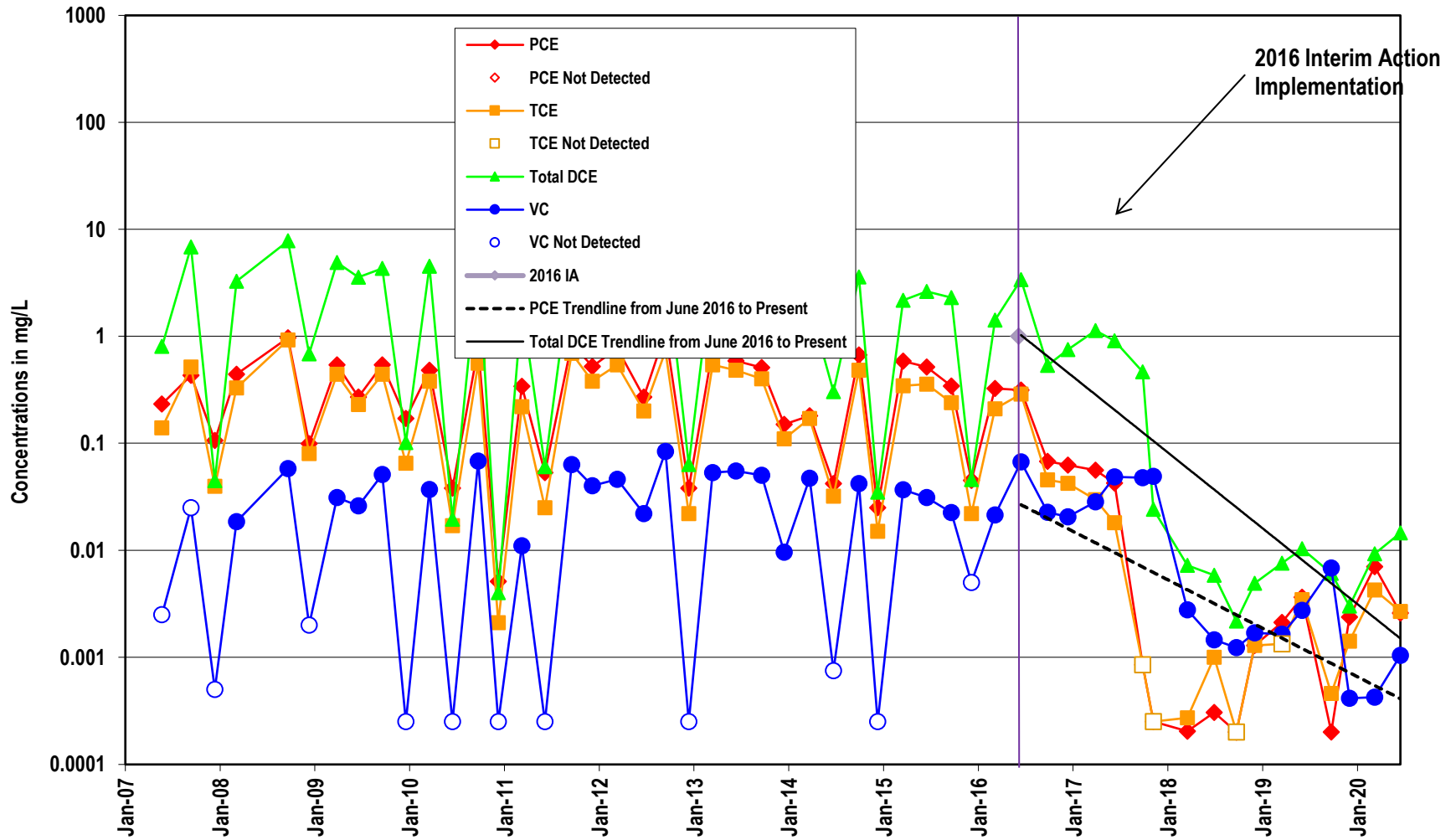
**Note:** Not detected values plotted at 1/2 the reporting limit.



### Total Molar Ethenes in EX

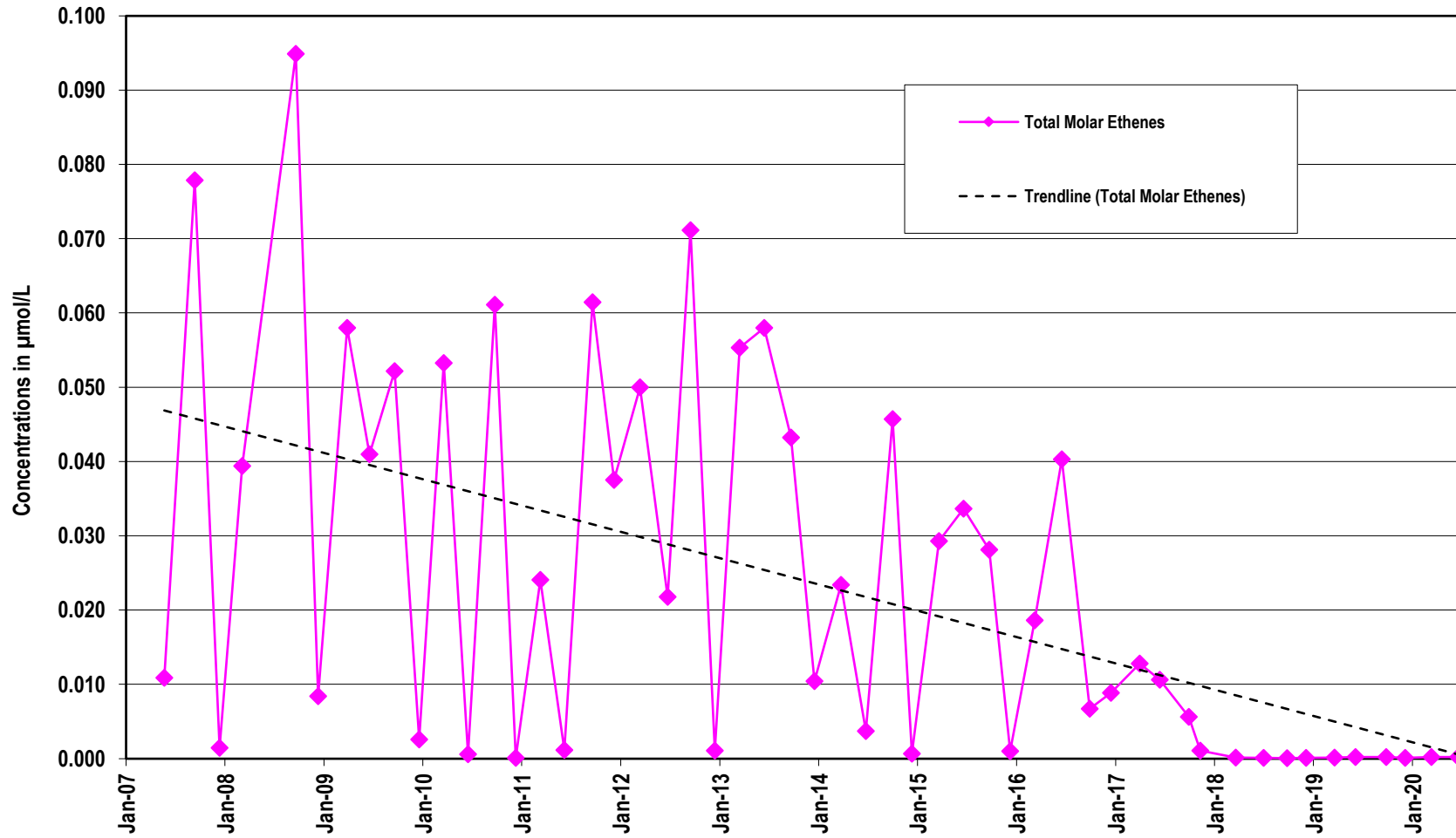


### Interim Action Area - VOC Trends: MW-12

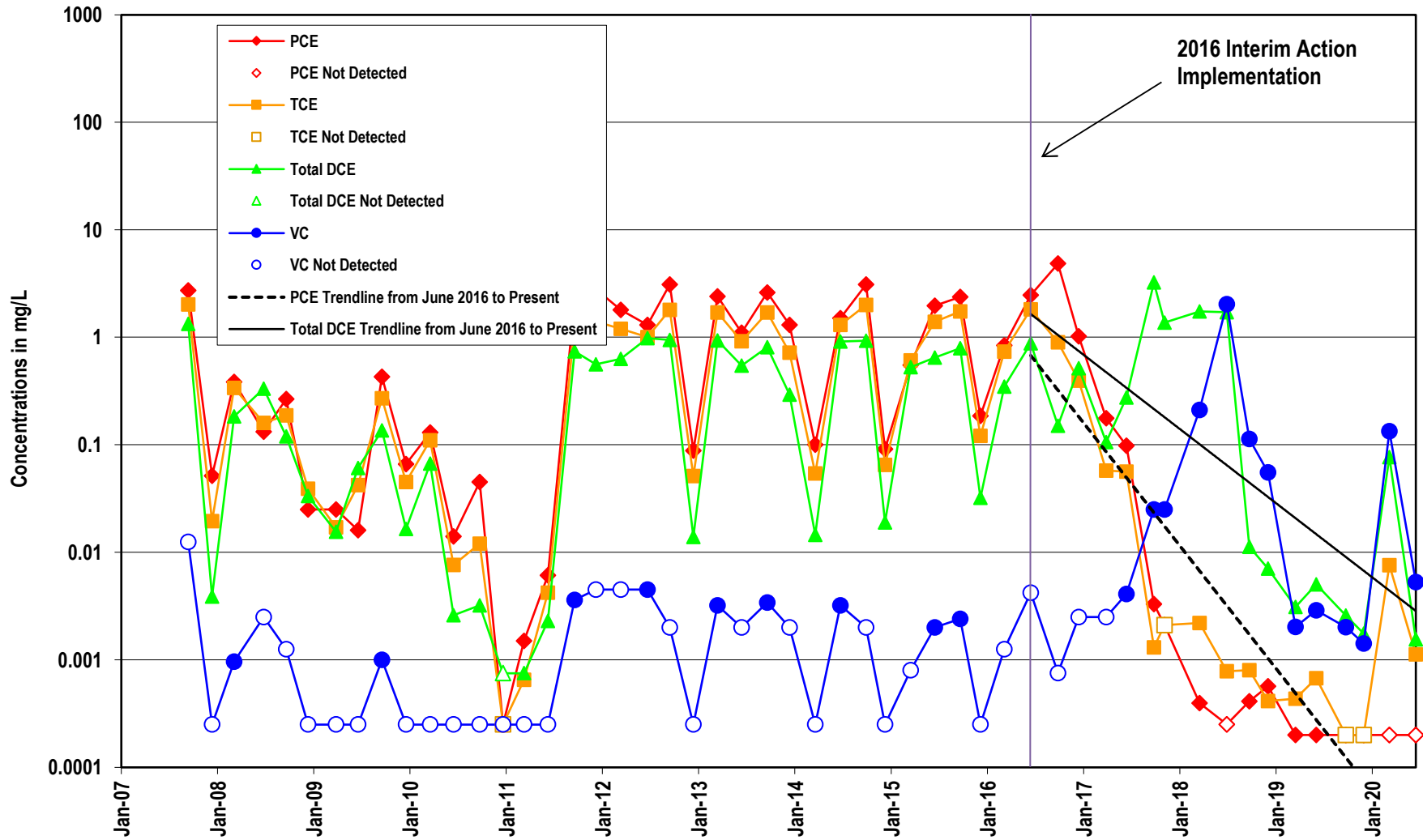


**Note:** Not detected values plotted at 1/2 the reporting limit.

### Total Molar Ethenes in MW-12

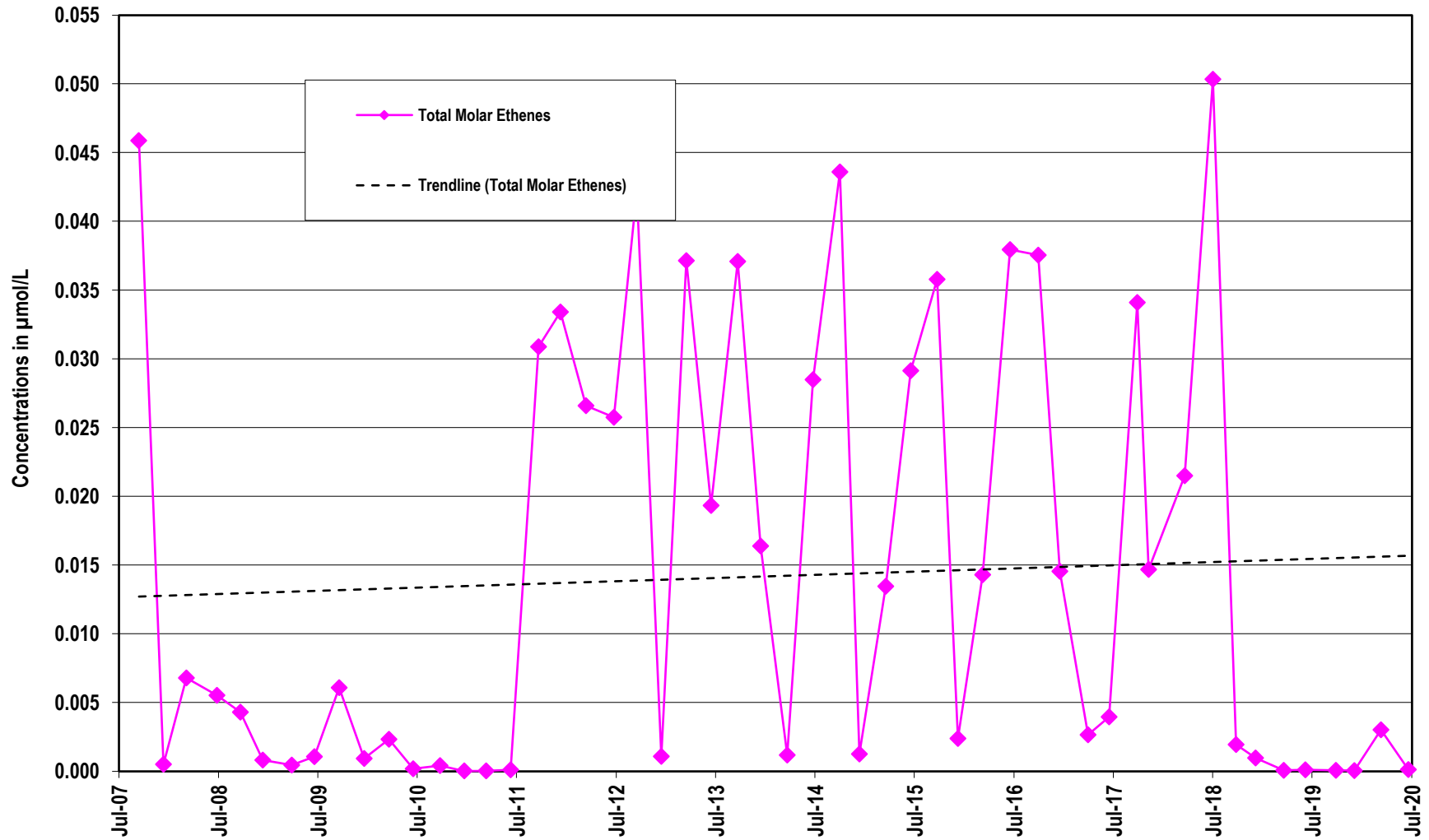


### Interim Action Area - VOC Trends: MW-13

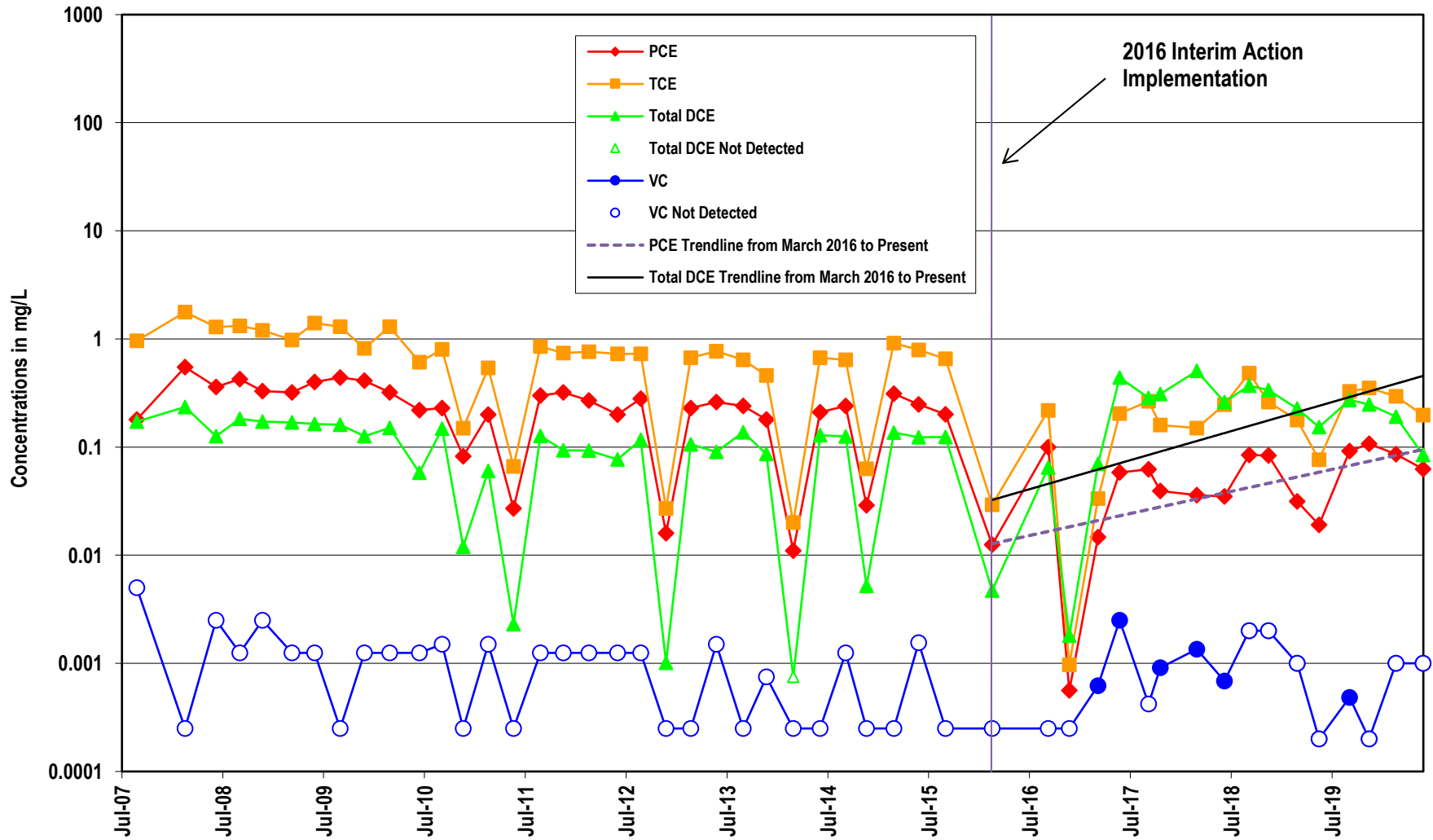


**Note:** Not detected values plotted at 1/2 the reporting limit.

### Total Molar Ethenes in MW-13

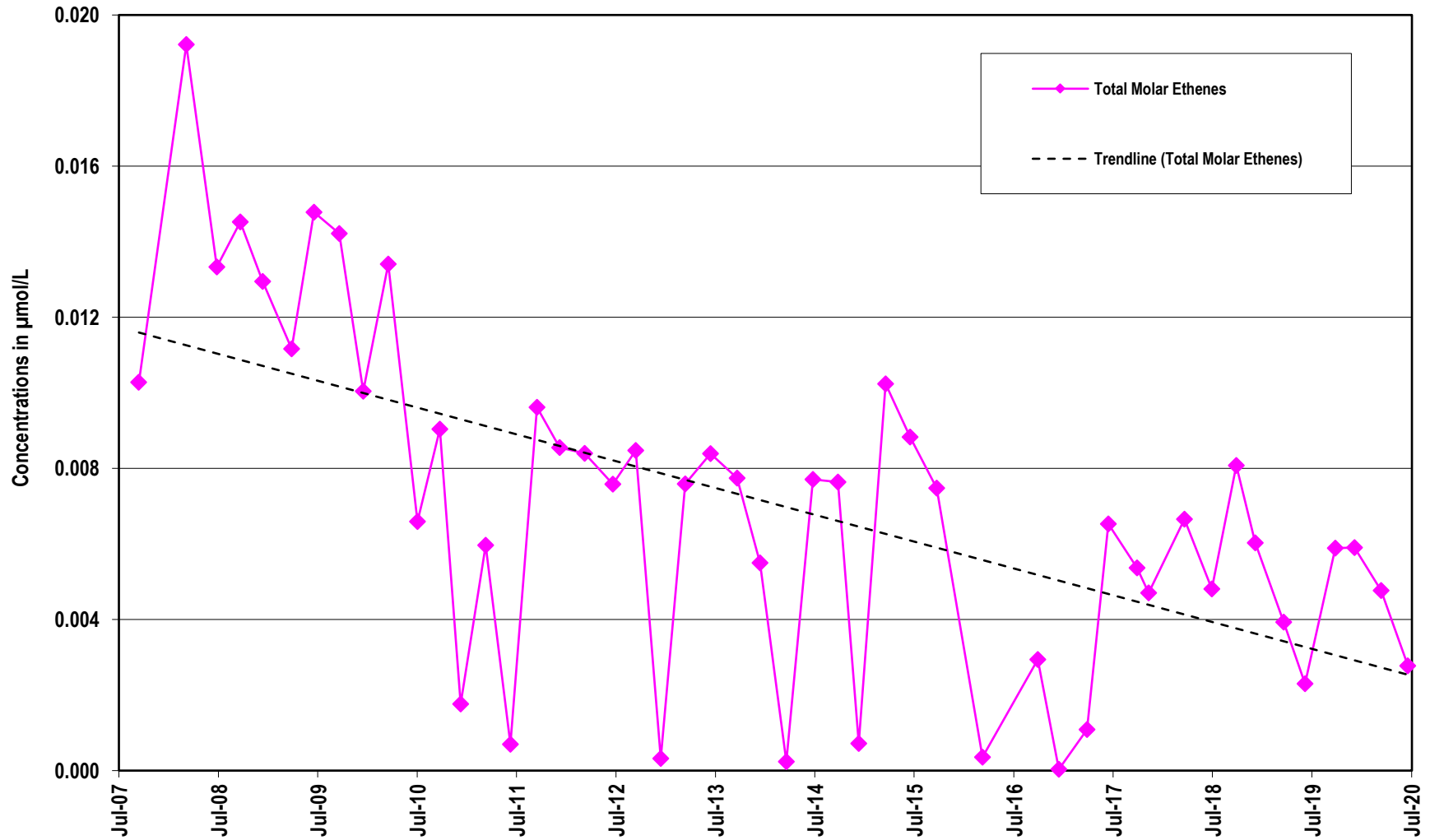


### Interim Action Area - VOC Trends: MW-14

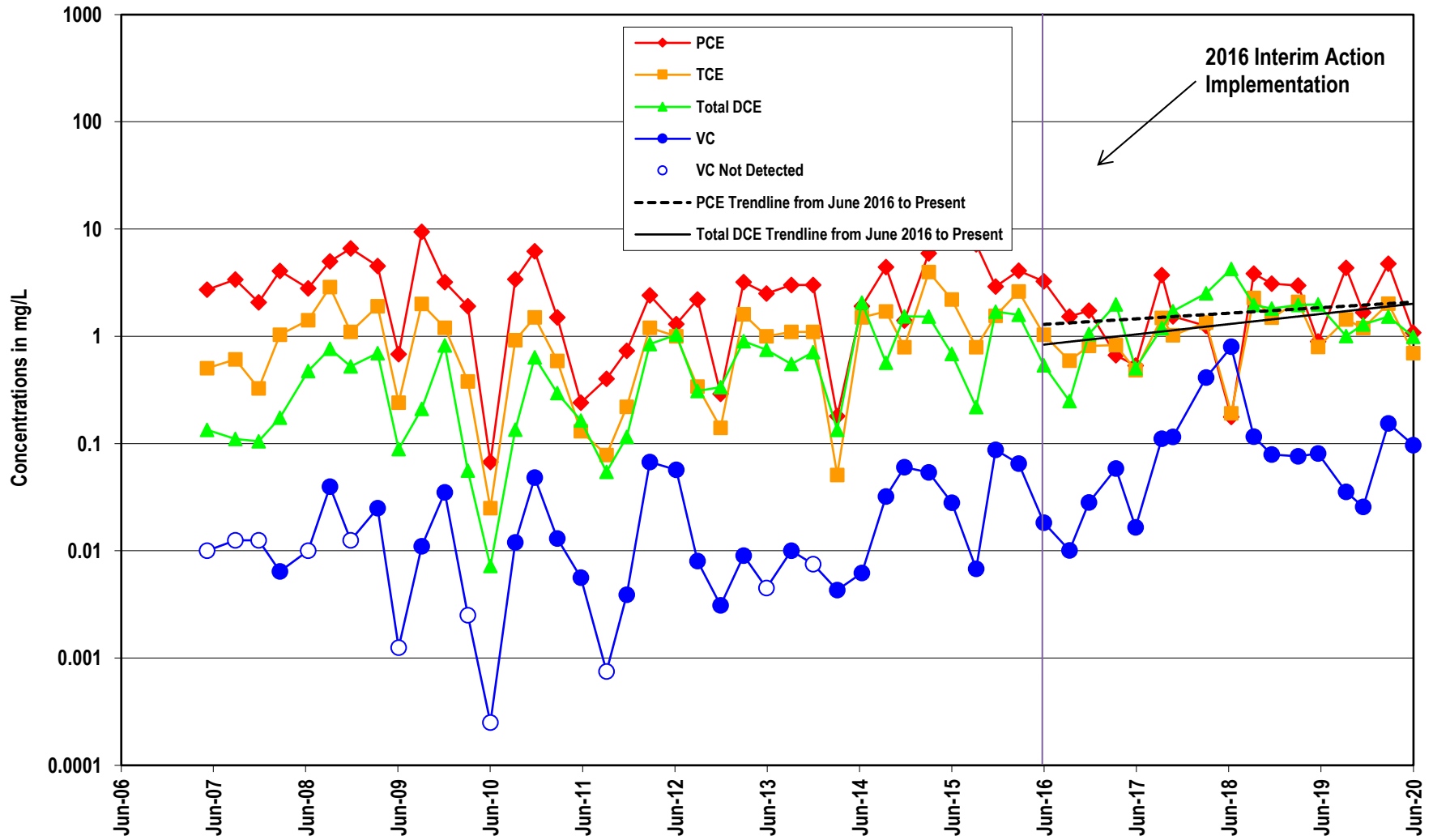


Note: Not detected values plotted at 1/2 the reporting limit.

### Total Molar Ethenes in MW-14



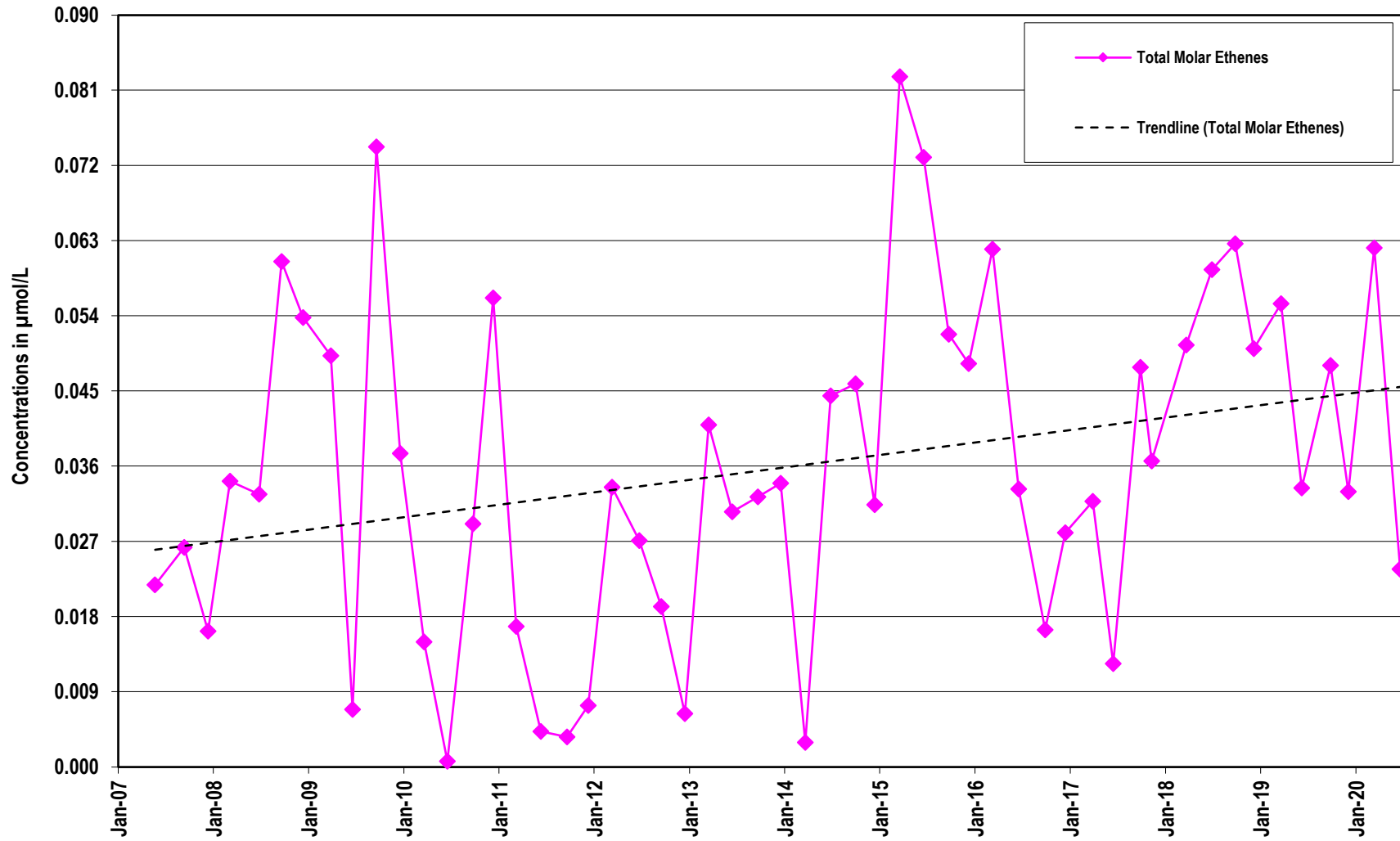
### Interim Action Area - VOC Trends: MW-19



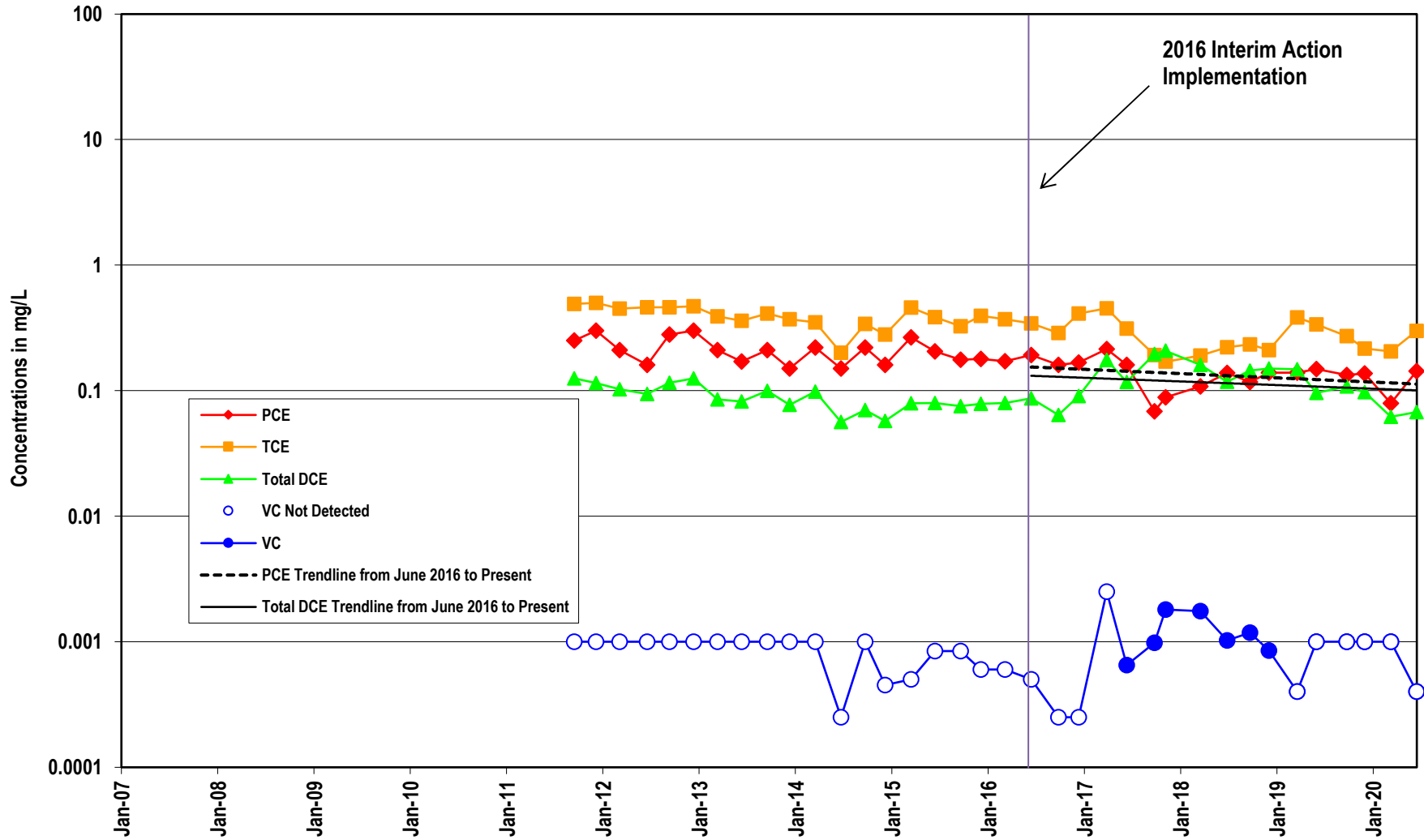
Note: Not detected values plotted at 1/2 the reporting limit.



Total Molar Ethenes in MW-19

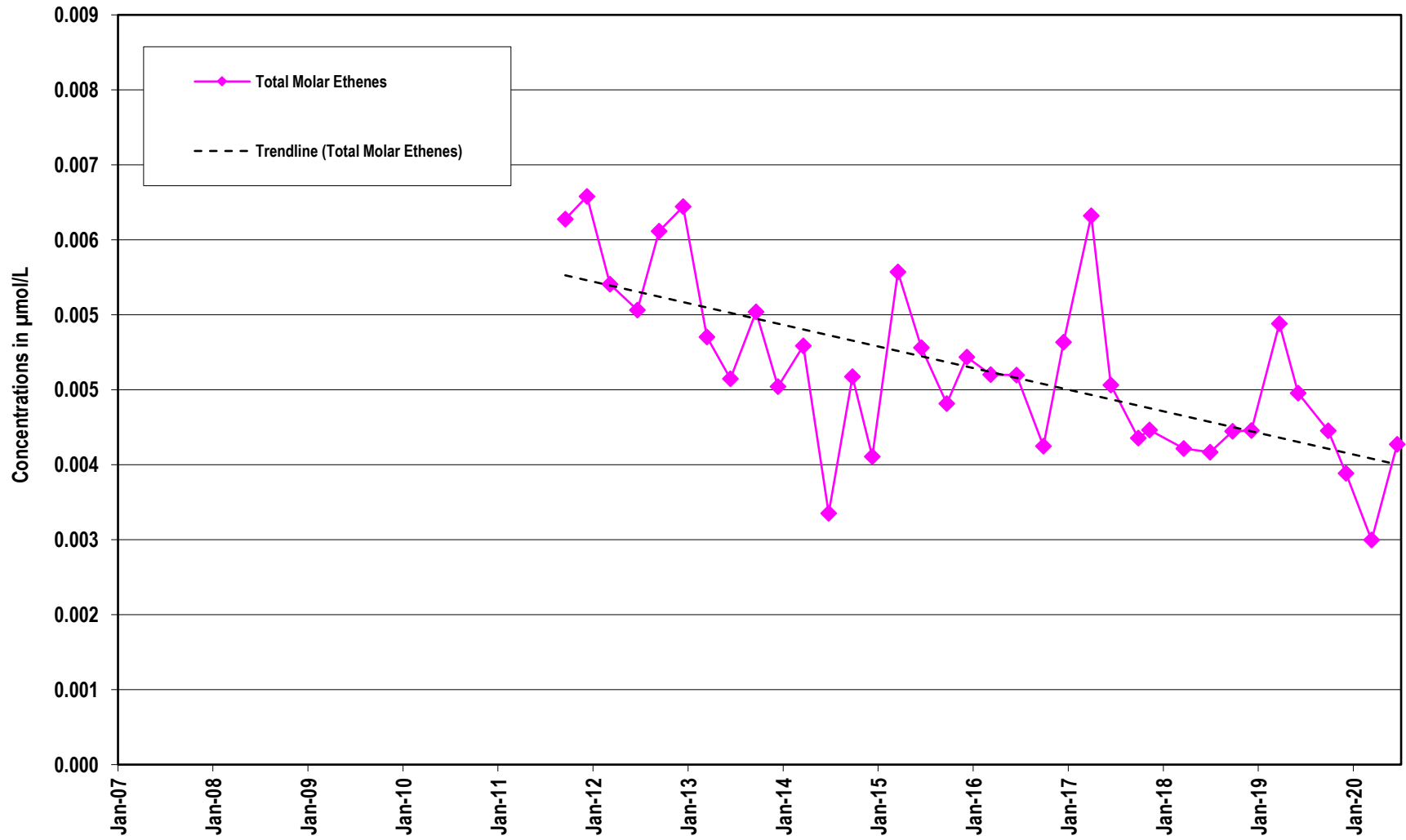


### Interim Action Area - VOC Trends: MW-26

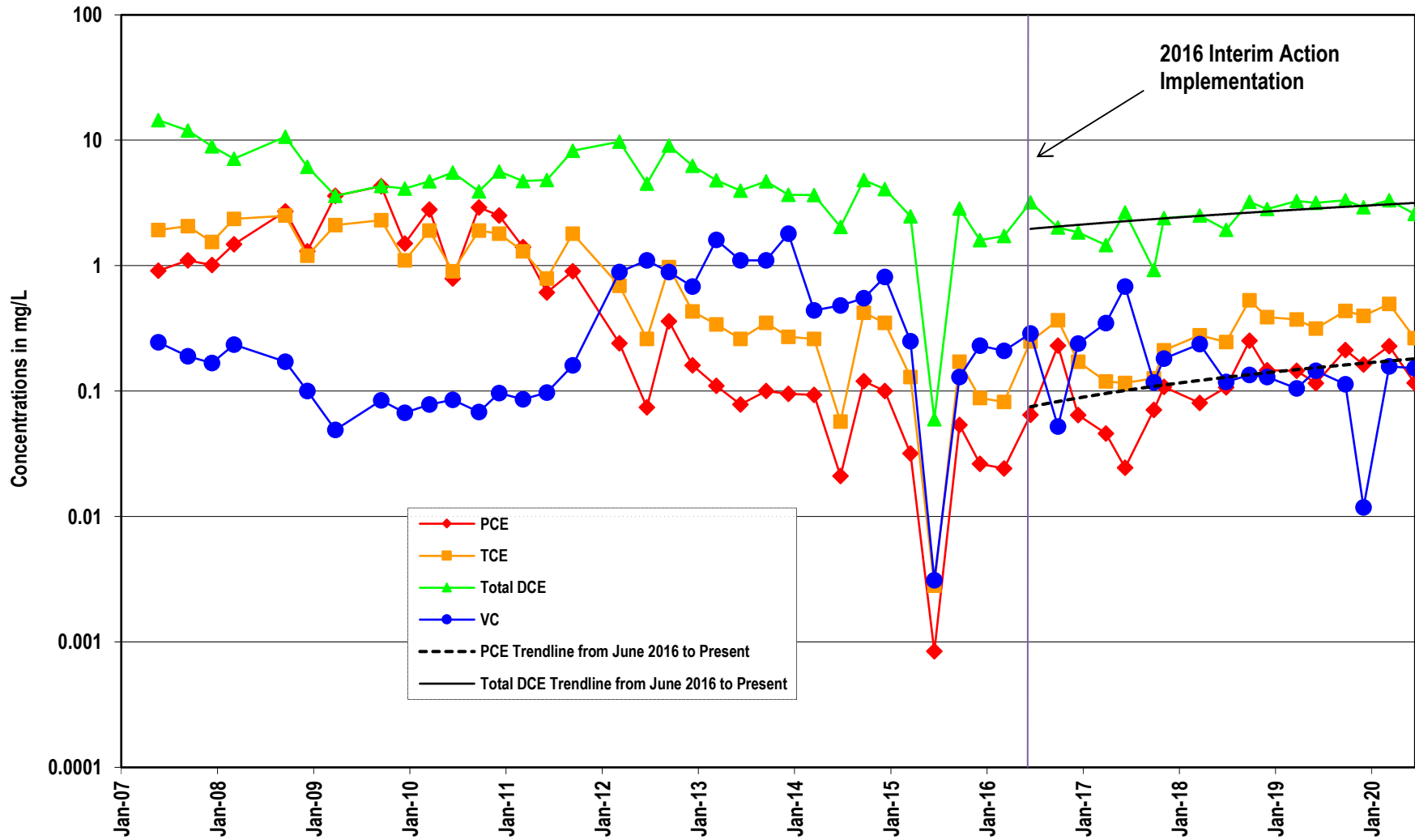


Note: Not detected values plotted at 1/2 the reporting limit.

### Total Molar Ethenes in MW-26

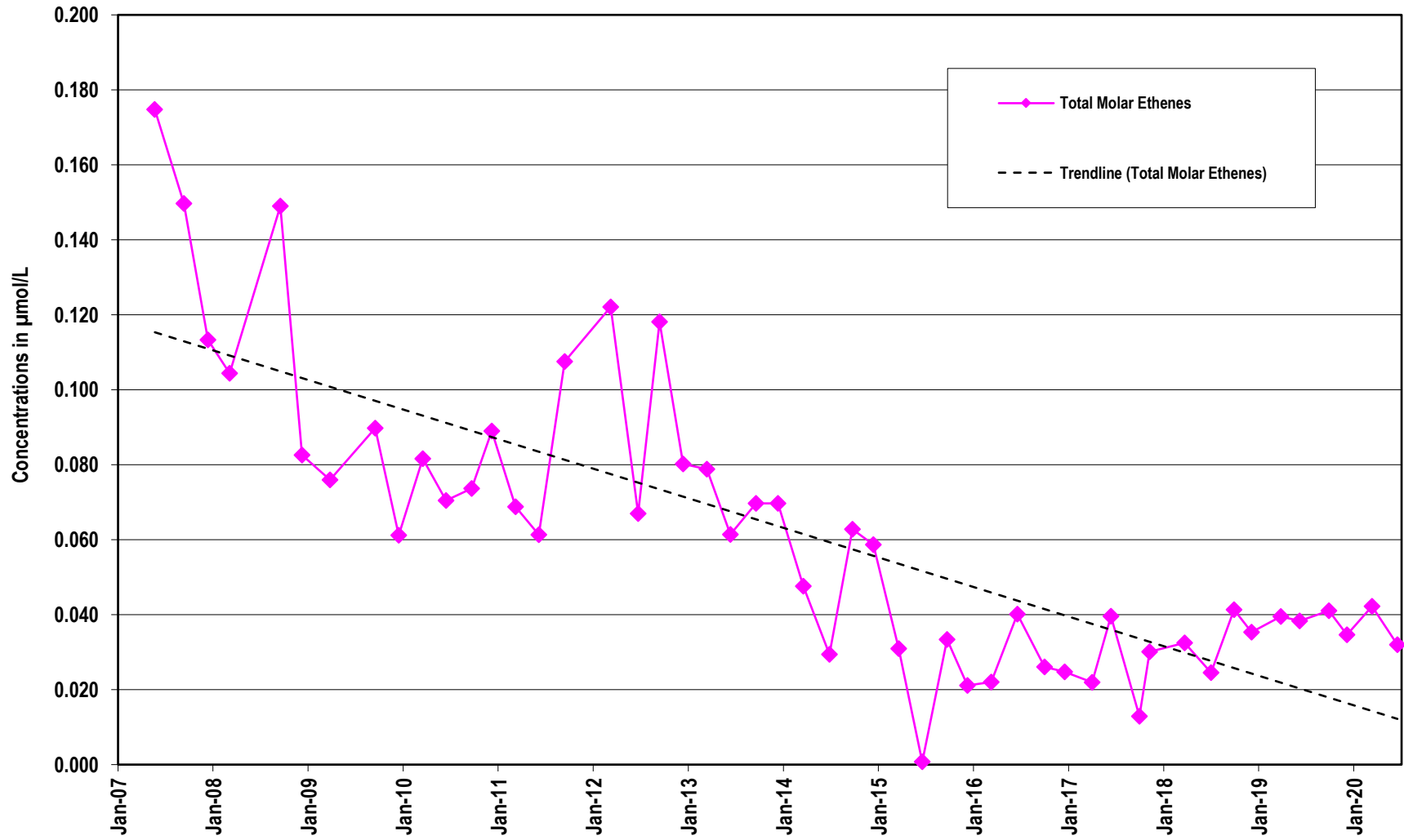


### Interim Action Area - VOC Trends: MGMS1-43

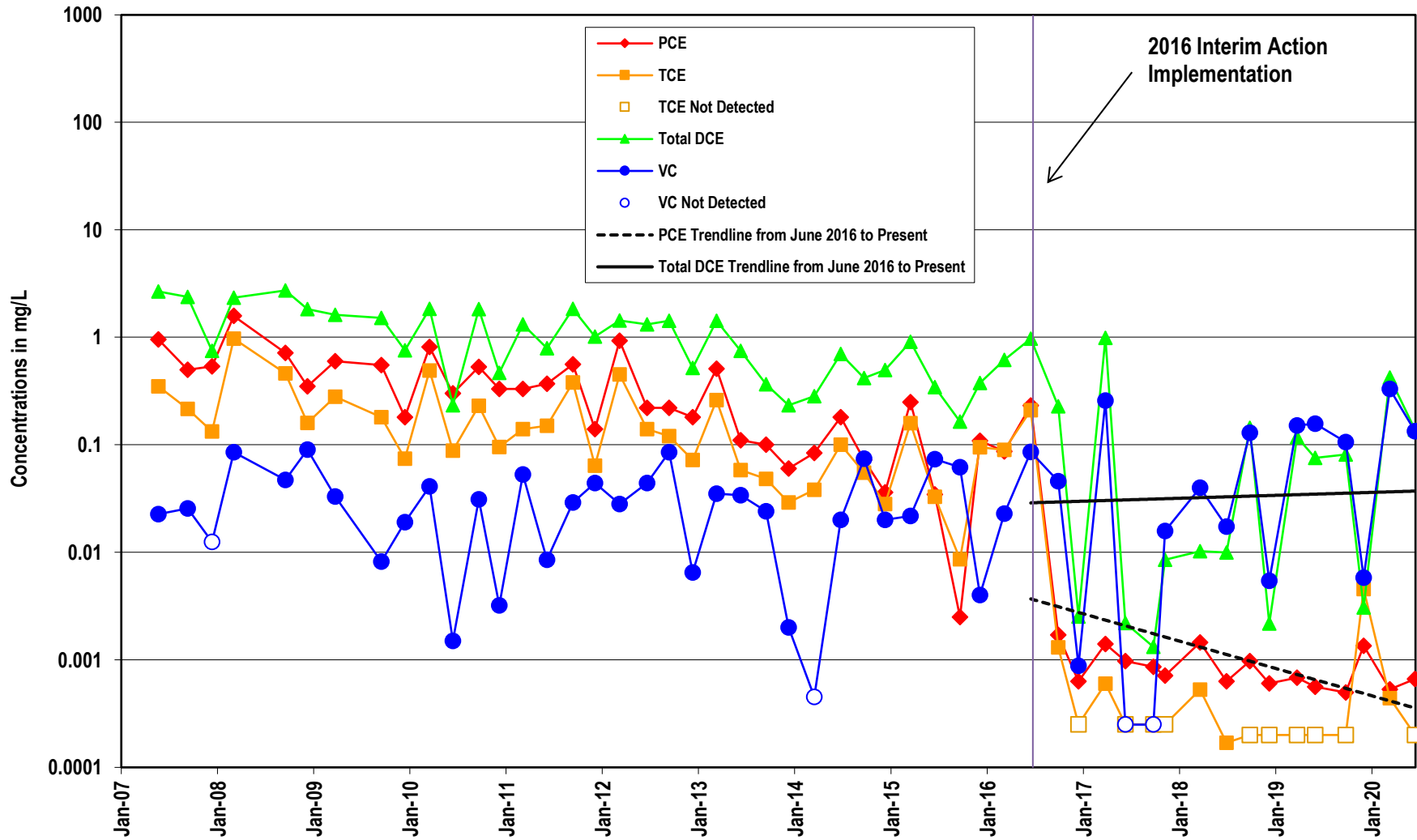


Note: Not detected values plotted at 1/2 the reporting limit.

Total Molar Ethenes in MGMS1-43

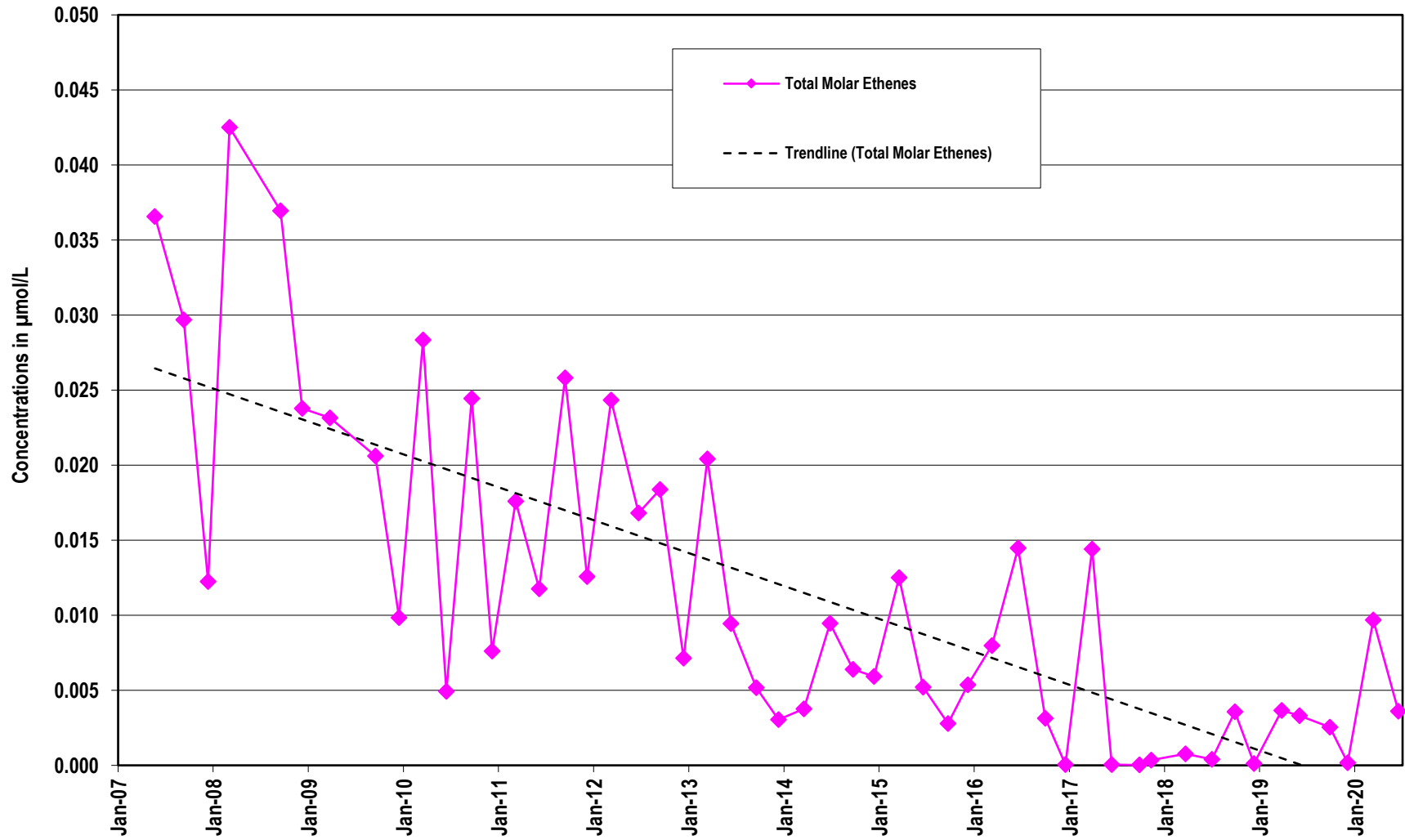


### Interim Action Area - VOC Trends: MGMS3-40



**Note:** Not detected values plotted at 1/2 the reporting limit.

Total Molar Ethenes in MGMS3-40





**Cascadia**  
Associates, LLC