

2023 ANNUAL REPORT  
SLUDGE DISPOSAL FACILITY  
LIMITED PURPOSE LANDFILL  
HF SINCLAIR  
PUGET SOUND REFINING LLC  
MARCH 20, 2024  
REVISED 4/22/2024

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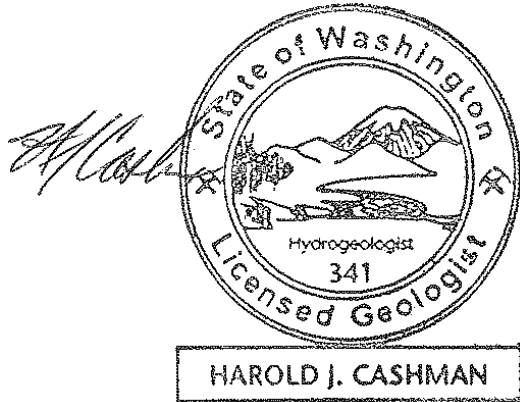
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## CERTIFICATION STATEMENT

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All geologic and hydrogeologic work performed pursuant to this report was conducted under the supervision and direction of the geologist listed below:



4/22/2024

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Harold Cashman P.G.

Date

All engineering work performed pursuant to this report was conducted under the supervision and direction of the engineer listed below:



4/22/2024

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Eric Libolt P.E.

Date

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## **1. INTRODUCTION**

This report summarizes the 2023 quarterly groundwater monitoring data collected at the Sludge Disposal Facility (SDF) limited purpose landfill located at the HF Sinclair Puget Sound Refining, LLC (HFSPSR) site at 8505 South Texas Road in Anacortes (Skagit County), Washington.

The Puget Sound Refinery Permit for the SDF limited purpose landfill was updated on January 1, 2023 by Skagit County Public Health and Community Services (the jurisdictional Health Department). The Permit was issued in accordance with the provisions of chapter 70.95 RCW, Chapter 173-350 WAC, and Chapter 12.16 Skagit County Code (SCC). A copy of the Permit is included in Appendix C.

### **1.1 SITE DESCRIPTION**

The SDF is located near the northeast corner of the refinery and encompasses approximately 5.5 acres. It was designed to treat aerobic digester sludge from the PSR Effluent Plant. The SDF location is shown on Figure 1.

The SDF is completely contained within a clay berm. The leachate from the SDF is collected and routed to the Sludge Disposal Facility sump at the SE corner of the site where it is returned to the Effluent Plant by the oily water sewer system, then into the final holding pond for regulated discharge under authority of the PSR NPDES permit.

Starting the week of April 12, 2021, wastewater sludge has been centrifuged once per month by a third-party vendor. Centrifuging the wastewater sludge results in a higher solids content in the sludge 'cake', therefore resulting in less volume of sludge being shipped off-site for reuse as Alternative Daily Cover. The centrifuged sludge 'cake' does not require additional dewatering at the SDF.

### **1.2 SCOPE OF WORK**

Quarterly groundwater monitoring was conducted at the SDF in 2023. Groundwater samples were collected from four SDF groundwater monitoring wells per the Permit requirements. The SDF groundwater monitoring well system is shown on Figure 2.

## **2. 2023 GROUNDWATER MONITORING**

Groundwater samples were collected from the SDF monitoring well network on February 6th, May 29th, August 9th, and November 8th, 2023.

### **2.1 GROUNDWATER SURFACE MEASUREMENTS**

The SDF groundwater monitoring network consists of the following monitoring wells (see Figure 2 for locations):

- W-47 (upgradient/background)
- W-112 (downgradient)
- W-113 (downgradient)
- W-127 (downgradient)

Groundwater surface elevations were determined from depth-to-water measurements collected quarterly in conjunction with each sampling event. Depth-to-water (DTW) measurements and groundwater surface elevation results collected and calculated during 2023 are provided in Table 1. Groundwater surface gradient maps representing each quarter's sampling event are provided as Figures 2 through 5. Based on the 2023 measurements, the average groundwater surface appears to be located approximately 5.15 feet below the SDF with a gradient of approximately 0.036 ft/ft towards the east.

### **2.2 GROUNDWATER SAMPLE COLLECTION**

Groundwater samples were collected using a low-flow sampling technique recommended and approved by the U.S. Environmental Protection Agency (USEPA, 2017) with some modifications. The low-flow sampling technique minimizes the impact of the purging process on groundwater chemistry and provides an accurate representation of the groundwater's condition at the time of sampling. A YSI Model 556 multi-parameter water meter (or equivalent) was used in conjunction with a flow-through cell to monitor groundwater chemistry during the low-flow purging process. Purging was considered adequate and groundwater samples were collected when the water chemistry parameters stabilized. Water chemistry parameters include: Temperature, Electrical Conductivity (EC), Total Dissolved Solids (TDS), Salinity, Dissolved Oxygen (DO), pH, and Oxidation/Reduction Potential (ORP). If stabilization was not occurring and the procedure had been strictly followed, then a sample was collected after the well had been purged

for approximately one hour. The quarterly water chemistry parameters, recorded at the time of sampling, are shown on Table 1.

Groundwater samples were collected in sample bottles provided by the analytical laboratory and stored on ice in a cooler immediately after collection. The sample containers included a sample label which indicated the site identification, sample identification, the sampling date and time, the sampler's name, the analysis requested, and sample preservation information. Groundwater samples were identified by the monitoring well identification number and the date collected. One duplicate sample and one field equipment blank sample were also collected during each sampling event. The duplicate and blank samples were identified with a unique name and the date collected that did not indicate the sample source to the analytical laboratory. Standard industry protocols regarding sample collection, preservation, chain-of-custody, and shipping were followed.

During the 2023 sampling events, the groundwater monitoring system was analyzed for the following parameters per the Permit document:

- pH, specific conductance, temperature, and static water level;
- total dissolved solids and chloride;
- alkalinity and bicarbonate;
- nitrate, nitrite, nitrate + nitrite, ammonia, and sulfate;
- chemical oxygen demand;
- total organic carbon;
- total arsenic, iron, magnesium, and manganese;
- dissolved arsenic, iron, magnesium, manganese, calcium, potassium, and sodium;
- total arsenic, antimony, chromium, lead, mercury, nickel, selenium, vanadium, and zinc;
- BTEX constituents (benzene, toluene, ethylbenzene; and xylenes);
- total petroleum hydrocarbons (NWTPH-Gx and NWTPH-Dx);
- carcinogenic polycyclic aromatic hydrocarbons;
- total coliform.

The 2023 Solid Waste Permit was received on February 1, 2023 by HF Sinclair Puget Sound Refining LLC. There was a new section under Part I.G.5, Notification of an Exceedance of a Performance Standard (WAC 173-350 Landfills), that states if statistical analyses determine a significant increase over background, then

the owner or operator must notify the jurisdictional health department and the department of this finding within thirty days of receipt of the sampling data, resample parameter(s) showing statistically significant increase(s) in the monitoring well(s) where the statistically significant increase has occurred within thirty days, and establish a groundwater protection standard. The section states that if the background concentration level established in the facility's monitoring record for a constituent is greater than the numeric criterion for the constituent in chapter 173-200 WAC, Water quality standards for groundwaters of the state of Washington, then the owner or operator must use the background concentration as the protection standard. Groundwater resamples were collected per permit section Part I.G.5.

### **2.3 GROUNDWATER ANALYTICAL RESULTS**

The samples were analyzed at Eurofins Seattle in Tacoma, Washington and Edge Analytical in Burlington and Bellingham, Washington. Eurofins Seattle and Edge Analytical are accredited by the Washington State Department of Ecology. All samples were analyzed within the prescribed holding times, and the equipment blank and duplicate sample results were within acceptable limits, except as discussed below:

1. In the first quarter, the Eurofins laboratory reported that the alkalinity of sample SDF-FEB-1-020623 (580-123226-6) could not be determined because the pH has to be at least 4.5.
2. In the second quarter, the Eurofins laboratory issued a revised report to check Method 300.0 samples SDF-DUP-1-050923 (580-127159-5) and SDF-FEB1-050923 (580-127156-6). The samples were visually checked and re-analyzed to check the possibility of the two samples being switched at the time of analysis. Re-runs were reported. The laboratory also reported that for Method 8270E SIM, the laboratory control sample and laboratory control sample duplicate for preparation batch 580-426094 and analytical batch 580-426485 recovered outside control limits for the following analytes: benzo(a)anthracene, chrysene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, dibenzo(a,h)anthracene, benzo(b)fluoranthene and benzo(k)fluoranthene. These analytes were biased high in the laboratory control sample and were not detected in the associated samples; therefore, the data were reported. The laboratory also reported that for Method SM 5220D, the matrix spike (MS) recovery for preparation batch 580-426585 and analytical batch 580-426596 was outside control limits for one or more analytes. Sample matrix interference and/or non-homogeneity were suspected because the associated laboratory control sample recovery was within acceptance limits. Lastly, the lab reported that for Method 300.0, the matrix spike/matrix spike duplicate



(MS/MSD) recoveries for analytical batch 580-428719 were outside control limits for one or more analytes. Sample matrix interference was suspected because the associated LCS recovery was within acceptance limits.

For the Quarter 2 re-sample event that occurred on June 23, 2023, W-112 was re-sampled for chloride and W-127 was re-sampled for chloride and COD. The Eurofins laboratory reported that for Method SM 5220D, the matrix spike/sample duplicate precision for preparation batch 580-431073 and analytical batch 580-431087 was outside control limits. Sample matrix interference and/or non-homogeneity were suspected because the associated laboratory control sample/laboratory control sample duplicate precision was within acceptance limits.

3. During the third quarter, the laboratory reported that for Method NWTPH-Gx, the continuing calibration verification (CCV) associated with batch 580-434912 recovered above the upper control limit for gasoline. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data were reported. The associated samples were impacted: W-112-080923 (580-130475-2), W-113-080923 (580-130475-3), W-127-080923 (580-130475-5), SDF-DUP-1-080923 (580-130475-5), SDF-FEB-1-080923 (580-130475-6), Trip Blanks (580-130475-7), (CCV 580-434912/27) and (CCVIS 580-434912/5).
4. In the fourth quarter, there was a note in the Edge Analytical laboratory report that sample SDF-DUP-1-110823 was received and analyzed past holding time. However, this sample was the duplicate sample and was collected at same time as the W-113 sample, and labeled with a different time so as to be blind to the laboratory. W-113 was collected within hold time, so the duplicate sample was as well. The Eurofins laboratory reported that for Method NWTPH-Dx, the CCV associated with batch 580-443806 recovered outside of the Percent Drift criteria for 0-Terphenyl (Surr). The associated client and laboratory quality control samples recovered within, and were not biased into, passing criteria for this analyte; therefore, the data were reported.

Groundwater analytical data collected during the four quarters of 2023 are summarized in Table 1. Historical groundwater monitoring well data for the PSR Sludge Disposal Facility are included in Tables 2 through 6: parameters measured in the field are summarized in Table 2; diesel and oil range TPH and BTEX constituent data are summarized in Table 3; dissolved metals analytical data are summarized in Table 4; total metals analytical data are summarized in Table 4; laboratory analyzed water chemistry parameters

are summarized in Table 5; cPAH analytical data are summarized in Table 6. The original 2023 groundwater laboratory analytical data reports are provided in Appendix D.

Quarterly equipment blank sample results are not shown on the data tables, but the results are included in the original laboratory analytical data reports. Some equipment blank sample analytes were detected at concentrations exceeding the laboratory reporting limit during Quarter 2, Quarter 3, and Quarter 4 in 2023. None of the detections would be considered significant and do not impact the overall results.

All groundwater samples collected in 2023 met the applicable water quality criteria set forth in Part I(C)(5) and Part I(D) of the Permit document, with some exceptions:

1. Metals - Total manganese in well W-127 exceeded the groundwater quality standard set forth in WAC 173-200-040-Table 1 during the fourth quarter of 2023. Total manganese exceeded the groundwater quality standard in the first quarter sampling event in well W-47. Total iron in well W-113 exceeded the groundwater quality standard during the third quarter sampling event. However, in all other quarters during 2023, total iron in well W-113 was non-detect. Total arsenic concentrations in wells W-47, W-112, and W-113 exceeded the groundwater quality standard in all quarters. There was a spike in dissolved chromium in W-113 at the Quarter 3 re-sampling event, though it did not exceed the historical maximum for dissolved chromium at that well. There also was a spike in total chromium in W-113 and W-127 and at the Quarter 3 sampling event, all of which exceeded the historical maximums for total chromium.
2. Total Dissolved Solids (TDS) - TDS results in 2023 consistently exceeded the groundwater quality standard of 0.5 g/L at every sampling event at every well. The results remained in the range of the historical record for wells W-47 and W-113. The results exceeded the range of the historical record for wells W-112 and W-127.
3. pH - pH results in well W-127 fell outside of the groundwater quality standard interval in the quarter 2 and quarter 3 sampling events.

### **2.3.1 Metals Results**

Manganese results for samples collected in 2023 exceeded the groundwater quality standard during the fourth quarter of 2023 for the sample collected from well W-127, and during the first quarter for the sample collected from well W-47 (upgradient and considered as background for the site). The manganese concentrations are believed to be the result of natural processes, or introduced from an up-gradient

source, and not an indication of a SDF basin release. EPA's secondary standard (recommended contaminant level) for manganese is 50 µg/L.

Total iron exceeded the groundwater quality standard of 300 µg/L in the third quarter for the sample collected from well W-113. Dissolved and total iron have never been detected above the reporting limit in this well before.

Arsenic concentrations in wells W-112, W-113, and W-47 (upgradient and considered as background for the site) exceeded the groundwater quality standard in all quarterly sampling events. The arsenic concentrations are not believed to be an indication of a SDF basin release.

Though there were spikes in chromium during 2023, all chromium results were below the Groundwater Quality Standard for total chromium of 50 µg/L, with the highest measured concentration for total chromium being 1.6 µg/L in well W-113 in Quarter 3.

There are no drinking water supply wells located downgradient of the SDF.

### **2.3.2 Total Dissolved Solids**

Total dissolved solids (TDS) were detected at concentrations exceeding the water quality standards in all wells in 2023, including the background well W-47. The data for wells W-47, W-113, and W-127 remain within at least two standard deviations of the average of the historical dataset. The data for well W-112 did not remain within at least two standard deviations of the average of the historical record, as the value measured at the Quarter 3 sampling event is the highest value on record. Results in 2023 at both wells W-112 and W-127 exceeded the maximum values of their historical datasets.

TDS is not considered a primary water pollutant and is generally used as an indicator of aesthetic quality. There are no drinking water supply wells located downgradient of the SDF.

### **2.3.3 pH**

The pH at well W-127 fell outside of the groundwater quality standard interval of 6.5 - 8.5 during both the Quarter 2 and Quarter 3 sampling events. However, pH was back within the groundwater standard

interval at the Quarter 2 and Quarter 3 re-sampling events, which occurred before the end of each respective quarter. pH has consistently been within the WAC 173-200-040 groundwater quality standard interval in years prior to 2023.

## **2.4 GROUNDWATER RESULTS ANALYSIS**

The 2023 laboratory analytical results were statistically evaluated per the Permit requirements to determine if any statistically significant temporal or locational changes had occurred within the site groundwater system. Additionally, the laboratory analytical results were statistically evaluated per Permit section Part I.G.5, Notification of an Exceedance of a Performance Standard (WAC 173-350 Landfills), to determine whether a significant increase over background had occurred for any of the analytes in any of the wells after each quarterly sampling event. If so, then HF Sinclair PSR was required to notify the jurisdictional health department of this finding within thirty days of receipt of the sampling data and to re-sample the appropriate wells for the appropriate analytes within the same timeframe.

Data from 2010 through 2023 were used to conduct the statistical analysis. Older data were not used because sample collection techniques differed from the present and may not be comparable to samples collected using the 'low-flow' technique (USEPA, 2017).

Two assumptions were made when preparing the dataset for statistical analysis. The first assumption was that any result reported as 'Non-Detect' (ND) had a value equivalent to zero for the Mann Kendall Trend test and a value equivalent to the laboratory reporting limit (RL) for the time series plots. This assumption was used instead of the standard 'RL divided by two' ( $\frac{1}{2}$  RL) because Mann Kendall test uses rank sum to calculate a trend and a detection that is lower than a reporting limit would incorrectly count the Non-Detect as higher. The reporting limit value is used for the time series plots to create a more accurate visual representation since it is unlikely the Non-Detect values are actually zero. The second assumption was regarding the reported concentrations of duplicate sample results. If a duplicate sample was collected at a well, the highest value of either the duplicate or the original sample was used.

### 2.4.1 Inter-well Analysis

Inter-well analysis was performed with all results using box plots and prediction limits. Each quarter, analyte concentrations in wells W-112, W-113, and W-127 were compared to the prediction limit. The prediction limit is the maximum value recorded in W-47. The Type I error, alpha, was also calculated using the formula  $1 - (n/(n+m))$ , where n is the number of values in the dataset for W-47 and m denotes the number of consecutive sampling events being compared to the prediction limit; since sampling occurs quarterly, m was set as equal to 4.

For each sampling event, if an analyte exceeded the prediction limit at W-112, W-113, or W-127, then it was flagged. If the value exceeded the prediction limit and was determined to be significantly increasing, then it was flagged to be re-sampled within 30 days per permit section I.G.5, Notification of an Exceedance of a Performance Standard (WAC 173-350 Landfills), Box plots for flagged analytes are provided in Appendix E.

### 2.4.2 Intra-well Analysis

Intra-well trend analysis included the use of both time series plots of individual monitoring well results, as well as the Mann-Kendall trend test. The time series plots were evaluated using a simple “best fit line” linear regression analysis. The Mann-Kendall trend test was used to determine if any statistically significant trends existed within the historical groundwater dataset and whether the trends were increasing or decreasing.

Each quarter, Mann-Kendall tests were run for analytes which exceeded the prediction limit. The Mann-Kendall test was not run for analytes if there were not at least eight data points. Time series plots were created for analytes in wells which had a trend according to Mann-Kendall analysis.

Output worksheets for the intra-well analyses are provided in Appendix F.

### 2.4.3 Cation-Anion Balance/Stiff and Piper Diagrams

Field and laboratory water chemistry parameters were compared. The cation-anion balances were calculated quarterly for each well. In addition, Maucha, Stiff, and Piper diagrams were plotted from the

water chemistry data. All results appeared to remain within the historical dataset ranges without any significant outliers. Output worksheets documenting the results of the analysis are provided in Appendix G.

#### **2.4.4 Results of Groundwater Data Analysis**

Statistical analyses outlined above determined a significant increase over background for some analytes in Quarter 2, Quarter 3 and Quarter 4. The Quarter 2 re-sample event occurred on June 23, 2023, at which time W-112 was re-sampled for chloride and W-127 was re-sampled for chloride and COD. The re-sampling event data confirmed that chloride was above the prediction limit and showed an increasing trend in wells W-112 and W-127, and also that COD was above the prediction limit and showed an increasing trend in W-127.

The Quarter 3 re-sampling event occurred on September 28, 2023, at which time W-47 was re-sampled for dissolved and total chromium, W-112 was re-sampled for dissolved and total chromium, dissolved magnesium, and chloride, W-113 was re-sampled for dissolved and total chromium, and W-127 was re-sampled for dissolved and total chromium, chloride, and COD. All wells were resampled for dissolved and total chromium because of a chromium hit in the equipment blank in Quarter 3 and elevated chromium results in the wells. However, resample results also showed elevated chromium results as compared to previous sampling events. The re-sampling event data confirmed that chloride was above the prediction limit and showed an increasing trend in W-112 and W-127, that dissolved magnesium was above the prediction limit and showed an increasing trend in W-112, and that COD was above the prediction limit and showed an increasing trend in W-127.

The Quarter 4 re-sampling event occurred on December 13, 2023, at which time W-112 was re-sampled for dissolved magnesium and chloride, and W-127 was re-sampled for chloride. The re-sampling event data confirmed that chloride was above the prediction limit and showed an increasing trend in W-112 and W-127, and that dissolved magnesium was above the prediction limit and showed an increasing trend in W-112. COD was no longer above the prediction limit in Quarter 4 of 2023 in W-127.

There have not been any detections of petroleum contaminants in the background well W-47 in the entire historical dataset; all values have been non-detect. If there are fewer than 8 detected values, then the

prediction limit does not apply. In 2023, well W-112 also continued to show no detectable concentrations of petroleum contaminants. However, Mann-Kendall analysis was still performed on NWTPH-Dx in wells W-113 and W-127 because of a history of past detections in these wells. Concentrations of diesel range TPH in well W-127 continue to show a statistically significant decrease over time based on the Mann-Kendall trend analysis. Oil range TPH data in well W-127 also show a decreasing trend over time as of the end of 2023. Concentrations of diesel range TPH in W-113 show no trend over time as of the end of 2023. Oil range TPH has only been detected in W-113 two times since December of 2009, so Mann-Kendall analysis was not conducted because a minimum of eight data points was not met.

### **3. 2023 FACILITY MAINTENANCE AND ACTIVITY SUMMARY**

Historically, PSR applied 'wet' sludge from the wastewater treatment process to the Sludge Disposal Facility. The sludge was pumped into large capacity dewatering bags located within the bermed perimeter of the SDF, and the filtrate from the dewatering bags was returned to the wastewater treatment plant for further processing. 'Dry' sludge was removed from the dewatering bags and shipped off-site for beneficial re-use as landfill Alternative Daily Cover (ADC).

In April 2021, PSR began dewatering wastewater sludge using a centrifuge located at the Effluent Plant. The wastewater sludge is centrifuged once per month by a third-party vendor. Centrifuging the wastewater sludge results in a higher solids content in the sludge 'cake', therefore resulting in less volume of sludge being shipped off-site. The centrifuge eliminated the need for the sludge to be land treated at the SDF.

During 2023, approximately 1,259.4 tons of centrifuged sludge were shipped off-site. 3,189.32 tons of centrifuged sludge have been shipped off-site since centrifuging began (April 2021) through the end of 2023. The sludge was shipped to the Waste Management transfer station in Seattle, WA, and delivered to the Columbia Ridge Landfill and Recycling Center site in Arlington, Oregon to be used as ADC.

No additional 'wet' sludge from the wastewater treatment process was applied to the SDF during 2023. No 'dry' tons of treated sludge were removed from the SDF in 2023. Approximately 4,905 tons of sludge are estimated to be left within the bermed perimeter of the SDF.

Analytical results from sludge samples collected during 2023 are included as Appendix H.



## 4. 2023 SUMMARY

Review of the annual groundwater data shows that the sampled media meet the majority of performance standards set forth in the approved Permit, with some exceptions summarized below. Some analytes were also consistently shown to be statistically above background, prompting resampling, according to permit section I.G.5, Notification of an Exceedance of a Performance Standard (WAC 173-350 Landfills), However, none of those analytes were above the groundwater quality criteria set forth in WAC 173-200-040-Table 1.

### *Petroleum Contaminants*

There have not been any detections of petroleum contaminants in the background well W-47 in the entire historical dataset; all values have been non-detect. Both wells W-47 and W-112 continued to show no detectable concentrations of petroleum contaminants. If there are fewer than 8 detected values, then the prediction limit does not apply. There are no groundwater quality standards for diesel or oil range TPH in WAC 173-200-040.

Mann-Kendall analysis was still performed on NWTPH-Dx in wells W-113 and W-127 because of a history of past detections in these wells. Well W-113 remained within its historical range for diesel range TPH during 2023; when analyzed with silica gel cleanup, there were no detectable concentrations of diesel range TPH in W-113. There were no detectable concentrations of oil range TPH in W-113 during 2023. Concentrations of diesel range TPH in well W-113 show no trend over time as of the end of 2023, based on the Mann-Kendall trend analysis. Oil range TPH has only been detected in W-113 two times since December of 2009, and was not detected in 2023.

Well W-127 remained within its historical ranges for both diesel and oil range TPH concentrations during 2023; when analyzed with silica gel cleanup, there were no detectable concentrations of either diesel or oil range TPH. Concentrations of diesel range TPH in well W-127 continue to show a statistically significant decrease over time as of the end of 2023, based on the Mann-Kendall trend analysis. Oil range TPH concentrations in well W-127 also show a statistically significant decrease over time as of the end of 2023.

### *Manganese*

Dissolved manganese was not determined to be statistically above background in any well in any quarter during 2023. Total manganese results could not be determined to be statistically above background

because there were fewer than eight data points of historical data to compare the most recent data result to. However, total manganese results exceeded the groundwater quality criteria of 50 ug/L during Quarter 4 in well W-127 and during Quarter 1 in well W-47 (upgradient and considered as background for the site). The manganese concentrations are believed to be the result of natural processes, or introduced from an up-gradient source, and not an indication of a SDF basin release.

#### *Iron*

Total iron exceeded the groundwater quality standard of 300 ug/L in the third quarter for the sample collected from well W-113. Dissolved and total iron have never been detected above the reporting limit in this well before, or in any well in the SDF network.

#### *Arsenic*

Arsenic concentrations in wells W-112, W-113, and W-47 (upgradient and considered as background for the site) exceeded the groundwater quality standard in all quarterly sampling events. Total and dissolved arsenic results could not be determined to be statistically above background because there were fewer than eight data points of historical data to compare the most recent data result to. Sampling for total and dissolved arsenic began in Quarter 2 of 2022. The arsenic concentrations are not believed to be an indication of a SDF basin release.

#### *Chromium*

Though there were spikes in chromium during 2023, all chromium results were below the Groundwater Quality Standard for total chromium of 50 ug/L, with the highest measured concentration for total chromium being 1.6 ug/L in well W-113 in Quarter 3. Total and dissolved chromium results could not be determined to be statistically above background because there were fewer than eight data points of historical total chromium data to compare the most recent data result to, since total metals were first sampled for in Quarter 1 of 2022, as well as fewer than eight detections of both total and dissolved chromium in the background well.

#### *TDS*

Total dissolved solids were detected at concentrations exceeding the water quality standards in all wells in 2023, including the background well W-47. The value measured in well W-112 at the Quarter 3 sampling

event is the highest value on record. Results in 2023 at both wells W-112 and W-127 exceeded the maximum values of their historical datasets.

#### *pH*

The pH at well W-127 fell outside of the groundwater quality standard interval of 6.5 - 8.5 during both the Quarter 2 and Quarter 3 sampling events. However, pH was back within the groundwater standard interval at the Quarter 2 and Quarter 3 re-sampling events, which occurred before the end of each respective quarter.

#### *Chloride*

Chloride was determined to be statistically above background in wells W-112 and W-127 in Quarter 2 - 4. However, the maximum concentration of chloride detected in 2023 did not exceed 42 mg/L, which is well below the groundwater quality standard of 250 mg/L.

#### *COD*

COD was determined to be statistically above background in well W-127 in Quarters 2 and 3. However, COD was below the prediction limit in Quarter 4. There is no groundwater quality standard for COD in WAC 173-200-040.

#### *Magnesium*

Dissolved magnesium was determined to be statistically above background in well W-112 in Quarter 3 and Quarter 4. Total magnesium results could not be determined to be statistically above background because there were fewer than eight data points of historical data to compare the most recent data result to, since total metals were first sampled for in Quarter 1 of 2022. There is no groundwater quality standard for magnesium in WAC 173-200-040.

All sampling in 2023 was conducted according to the procedures outlined in the Permit. There were no deviations other than those discussed in Section 2.0.

## 5. REFERENCES

U.S. Environmental Protection Agency, September 19, 2017 (rev. 4), Low Stress (low flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells, EQASOP-GW4, 30 pp. (<https://www.epa.gov/sites/default/files/2017-10/documents/eqasop-gw4.pdf>)

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**APPENDIX A -  
FIGURES**

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Fidalgo Bay

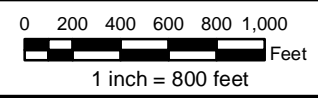
North Texas Road

Padilla Bay


West March Point Road

South Texas Road

SDF Location



### Sludge Disposal Facility (SDF) Location Map

 Facility Fenceline

All data are approximate and should be used for relative location reference only.

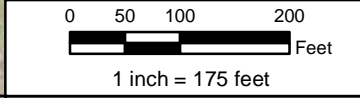
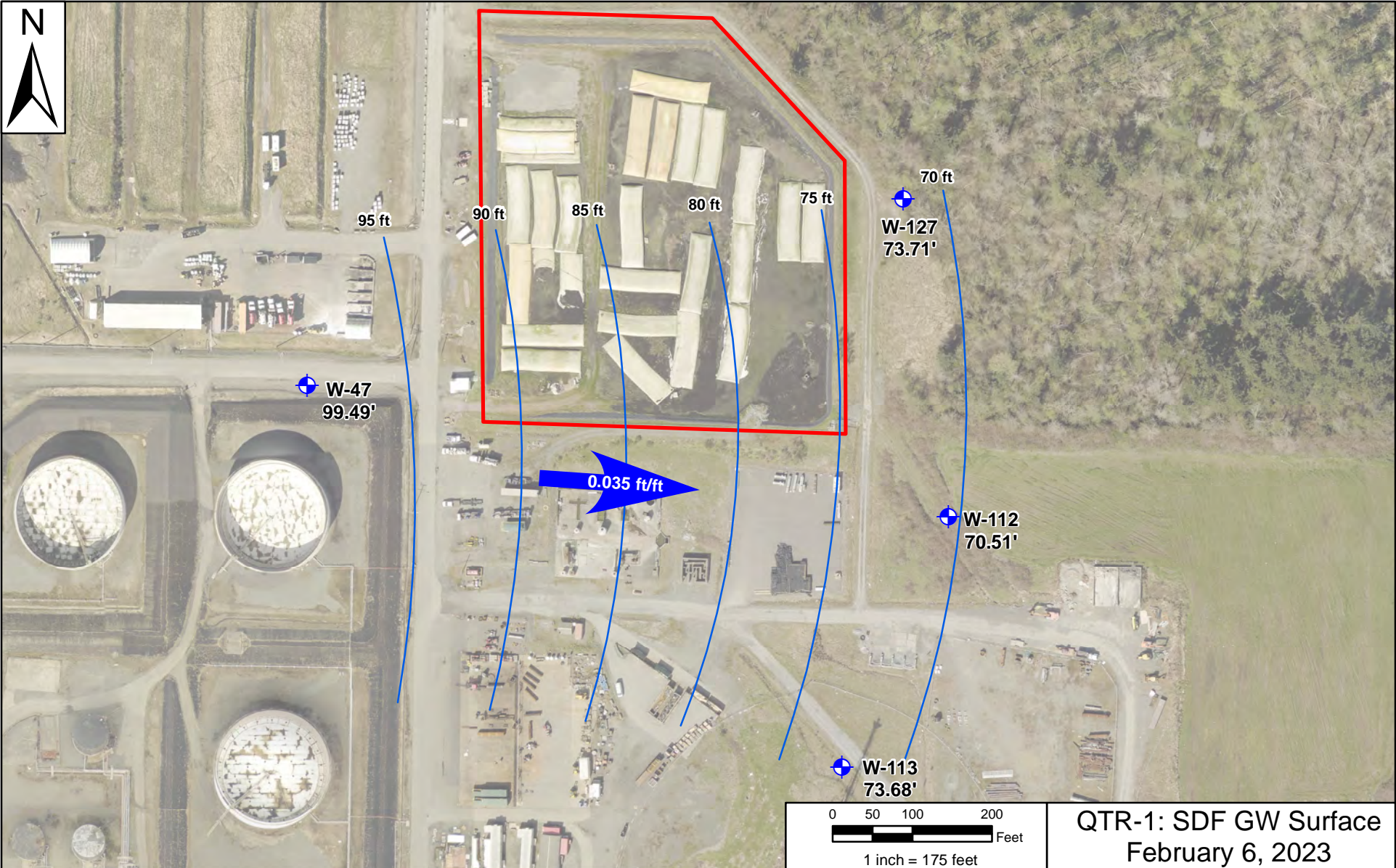
Prepared for:  
 **HF Sinclair**

Prepared by:  
 **ALL4**




8505 South Texas Road  
Anacortes, WA 98221

HF Sinclair PSR: SDF  
3/12/2024

# Figure 1



**QTR-1: SDF GW Surface**  
**February 6, 2023**

- 99.49 ft** GW Elevation at Well (ft)
-  GW Surface Elevation (ft)
-  SDF Monitoring Wells
-  SDF Area

All data are approximate and should be used for relative location reference only.

Prepared for:  

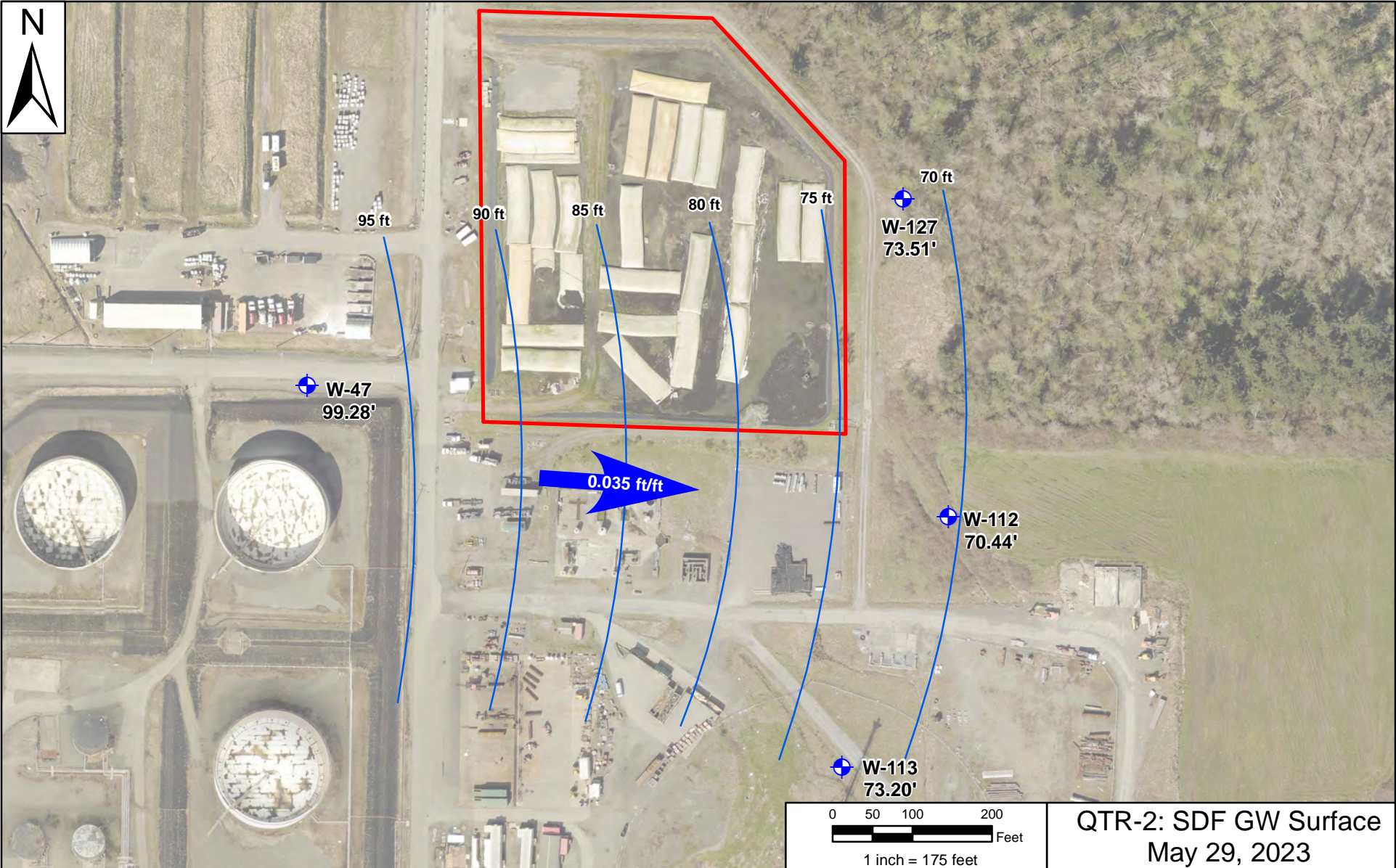

Prepared by:  


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Anacortes, WA 98221

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**Figure 2**





99.28 ft GW Elevation at Well (ft)  
— GW Surface Elevation (ft)  
⊕ SDF Monitoring Wells  
□ SDF Area

All data are approximate and should be used for relative location reference only.

Prepared for:

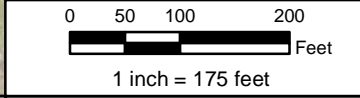
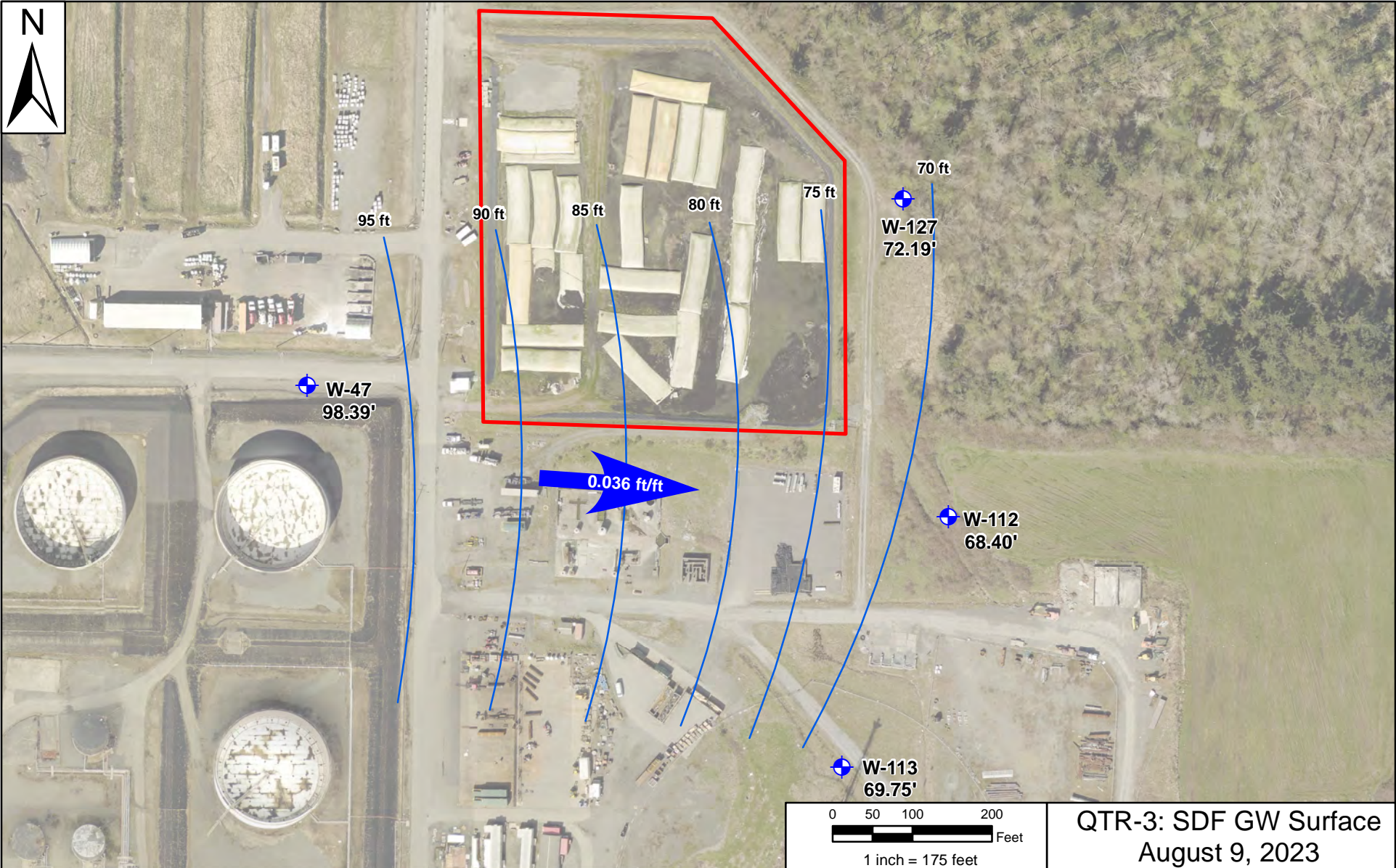
Prepared by:

QTR-2: SDF GW Surface  
May 29, 2023



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3/12/2024

Figure 3



**QTR-3: SDF GW Surface**  
**August 9, 2023**

**98.39 ft** GW Elevation at Well (ft)  
 — GW Surface Elevation (ft)  
 SDF Monitoring Wells  
 SDF Area

All data are approximate and should be used for relative location reference only.

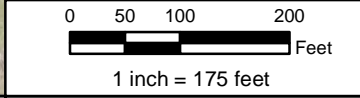
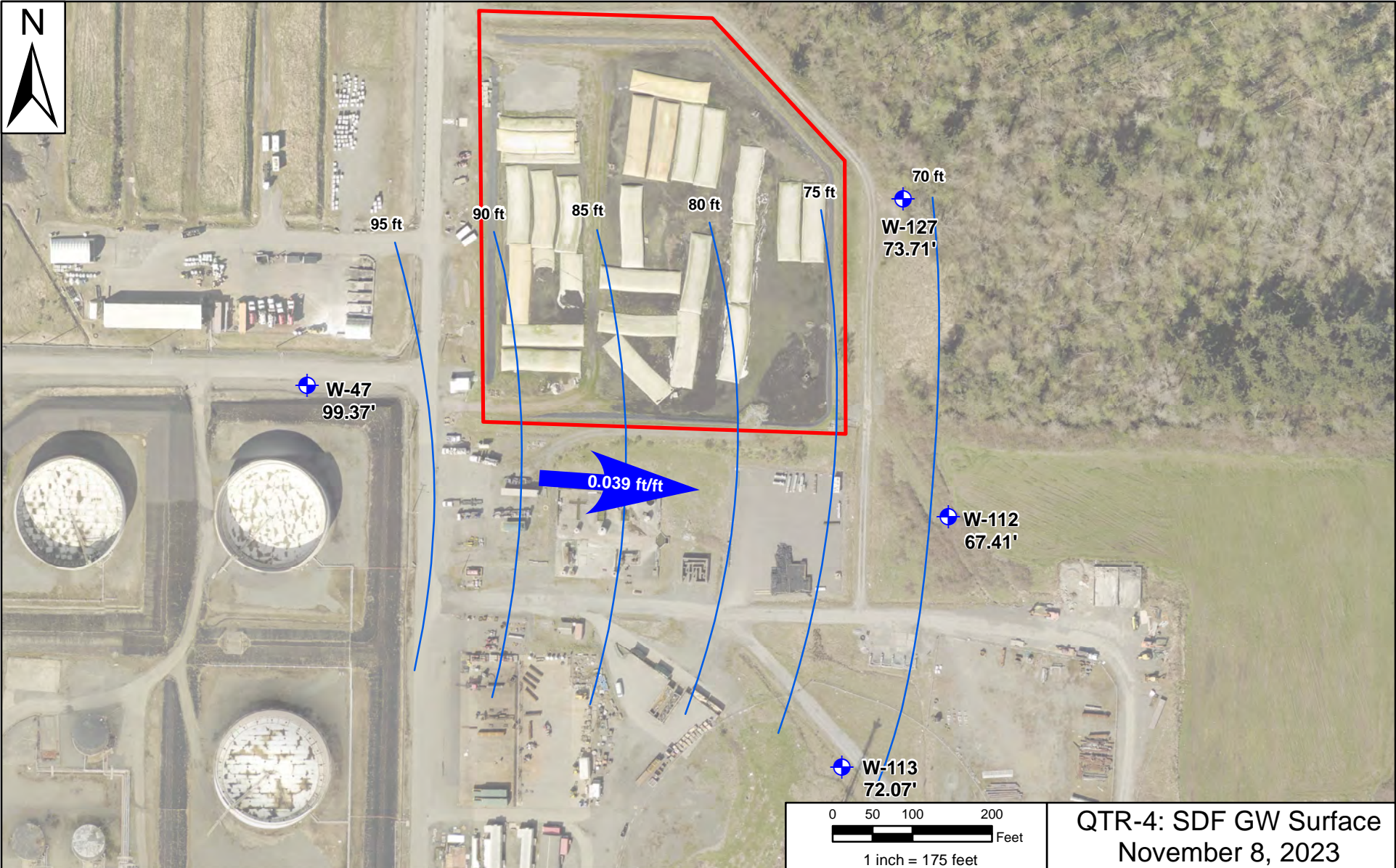
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**Figure 4**



QTR-4: SDF GW Surface  
November 8, 2023

98.39 ft GW Elevation at Well (ft)  
— GW Surface Elevation (ft)  
⊕ SDF Monitoring Wells  
□ SDF Area

All data are approximate and should be used for relative location reference only.

Prepared for:

Prepared by:

8505 South Texas Road  
Anacortes, WA 98221

HF Sinclair PSR  
3/12/2024

Figure 5

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**APPENDIX B -  
TABLES**

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**Table 1A. Annual SDF Groundwater Analytical Data Summary - W-47 and W-112**

Sample ID	Groundwater Quality Standards (WAC 173-200-040):	MTCA Method B Cleanup Level:	Toxicity Equivalency Factor (TEF) (WAC 173-340-900 table 708.2):	Well 47 (Upgradient) & Considered as Background for the Site					Well 112 (Downgradient)								
				Date	2/6/2023	5/9/2023	8/9/2023	9/28/2023 (re-sample)	11/8/2023	2/6/2023	5/9/2023	6/23/2023 (re-sample)	8/9/2023	9/28/2023 (re-sample)	11/8/2023	12/13/2023 (re-sample)	12/13/2023 (dup.)
<b>Field Chemistry Parameters</b>																	
Depth to Water	ft bgs	--	--	--	2.74	2.95	3.84	3.41	2.86	7.20	7.27	8.23	9.31	10.92	10.30	7.66	NA
Groundwater Surface Elevation	ft msl	--	--	--	99.49	99.28	98.39	98.82	99.37	70.51	70.44	69.48	68.40	66.79	67.41	70.05	NA
Temperature	°C	--	--	--	10.4	14.2	18.9	17.3	14.2	10.00	14.28	14.27	15.70	14.00	13.56	11.10	NA
Conductivity	mS/cm	--	--	--	0.806	0.787	0.775	0.802	0.799	1.146	1.056	1.054	1.207	1.185	1.093	1.169	NA
Total Dissolved Solids	g/L	0.5	--	--	<b>0.524</b>	<b>0.511</b>	<b>0.504</b>	<b>0.521</b>	<b>0.520</b>	<b>0.745</b>	<b>0.686</b>	<b>0.684</b>	<b>0.785</b>	<b>0.77</b>	<b>0.71</b>	<b>0.76</b>	NA
Salinity	ppt	--	--	--	0.4	0.39	0.38	0.4	0.39	0.57	0.53	0.52	0.61	0.59	0.55	0.59	NA
Dissolved Oxygen	mg/L	--	--	--	3.69	0.32	5.94	3.47	3.08	2.41	1.11	0.77	3.39	1.16	1.25	6.04	NA
pH	pH units	6.5-8.5	--	--	7.98	7.17	7.01	7.47	7.34	6.87	6.79	6.63	7.02	7.73	6.89	7.28	NA
Oxidation/Reduction Potential	mV	--	--	--	221.8	126.80	58.20	87.00	102.20	128.20	-12.00	79.20	103.40	45.40	-17.30	109.40	NA
<b>TPH</b>																	
NWTPH-Gx Gasoline	ug/L	--	--	--	ND(<50)	ND(<50)	ND(<50)	NA	ND(<100)	ND(<50)	ND(<50)	NA	ND(<50)	NA	ND(<100)	NA	NA
NWTPH-Dx Diesel Range	ug/L	--	--	--	ND(<110)	ND(<110)	ND(<110)	NA	ND(<110)	ND(<110)	ND(<110)	NA	110	NA	ND(<110)	NA	NA
NWTPH-Dx Diesel Range w/ Silica Gel Cleanup	ug/L	--	--	--	ND(<110)	ND(<110)	ND(<110)	NA	ND(<110)	ND(<110)	ND(<110)	NA	ND(<110)	NA	ND(<110)	NA	NA
NWTPH-Dx Lube Oil-Range	ug/L	--	--	--	ND(<360)	ND(<360)	ND(<360)	NA	ND(<360)	ND(<360)	ND(<360)	NA	ND(<350)	NA	ND(<360)	NA	NA
NWTPH-Dx Lube Oil-Range w/ Silica Gel Cleanup	ug/L	--	--	--	ND(<360)	ND(<360)	ND(<360)	NA	ND(<360)	ND(<360)	ND(<360)	NA	ND(<350)	NA	ND(<360)	NA	NA
EPA-8021 Benzene	ug/L	1	0.8	--	ND(<1)	ND(<1)	ND(<1)	NA	ND(<1)	ND(<1)	ND(<1)	NA	ND(<1)	NA	ND(<1)	NA	NA
EPA-8021 Toluene	ug/L	--	640	--	ND(<1)	ND(<1)	ND(<1)	NA	ND(<1)	ND(<1)	ND(<1)	NA	ND(<1)	NA	ND(<1)	NA	NA
EPA-8021 Ethylbenzene	ug/L	--	800	--	ND(<1)	ND(<1)	ND(<1)	NA	ND(<1)	ND(<1)	ND(<1)	NA	ND(<1)	NA	ND(<1)	NA	NA
EPA-8021 Xylenes	ug/L	--	1,600	--	ND(<2)	ND(<2)	ND(<2)	NA	ND(<2)	ND(<2)	ND(<2)	NA	ND(<2)	NA	ND(<2)	NA	NA
<b>Metals: Dissolved</b>																	
Arsenic	ug/L	0.05	0.058	--	<b>1.6</b>	<b>1.3</b>	<b>1.3</b>	NA	<b>1.4</b>	<b>1.9</b>	<b>1.5</b>	NA	<b>1.4</b>	NA	<b>1.8</b>	NA	NA
Calcium	ug/L	--	--	--	66,000	68,000	63,000	NA	69,000	96,000	99,000	NA	100,000	NA	100,000	NA	NA
Chromium	ug/L	--	--	--	ND(<0.8)	ND(<0.8)	ND(<0.8)	ND(<0.8)	ND(<0.8)	ND(<0.8)	ND(<0.8)	NA	ND(<0.8)	ND(<0.8)	ND(<0.8)	NA	NA
Iron	ug/L	--	11,000	--	ND(<500)	ND(<500)	ND(<500)	NA	ND(<500)	ND(<500)	ND(<500)	NA	ND(<500)	NA	ND(<500)	NA	NA
Lead	ug/L	--	--	--	ND(<0.4)	ND(<0.4)	ND(<0.4)	NA	ND(<0.4)	ND(<0.4)	ND(<0.4)	NA	ND(<0.4)	NA	ND(<0.4)	NA	NA
Magnesium	ug/L	--	--	--	48,000	47,000	45,000	NA	49,000	71,000	70,000	NA	77,000	73,000	75,000	74,000	73,000
Manganese	ug/L	50	750	--	<b>58</b>	20	2.5	NA	5.8	3.1	4.4	NA	ND(<2)	NA	ND(<2)	NA	NA
Nickel	ug/L	--	320	--	ND(<3)	ND(<3)	ND(<3)	NA	ND(<3)	ND(<3)	ND(<3)	NA	ND(<3)	NA	ND(<3)	NA	NA
Potassium	ug/L	--	--	--	5,600	6,600	4,300	NA	5,100	7,500	8,100	NA	6,500	NA	8,700	NA	NA
Selenium	ug/L	--	80	--	ND(<8)	ND(<8)	ND(<8)	NA	ND(<8)	ND(<8)	ND(<8)	NA	ND(<8)	NA	ND(<8)	NA	NA
Sodium	ug/L	--	--	--	35,000	37,000	34,000	NA	38,000	52,000	56,000	NA	52,000	NA	58,000	NA	NA
Mercury	ug/L	--	--	--	ND(<0.3)	ND(<0.3)	ND(<0.3)	NA	ND(<0.3)	ND(<0.3)	ND(<0.3)	NA	ND(<0.3)	NA	ND(<0.3)	NA	NA
<b>Metals: Total</b>																	
Arsenic	ug/L	0.05	0.058	--	<b>1.6</b>	<b>1.3</b>	<b>1.2</b>	NA	<b>1.2</b>	<b>2</b>	<b>1.3</b>	NA	<b>1.4</b>	NA	<b>2.1</b>	NA	NA
Chromium	ug/L	50	--	--	ND(<0.8)	ND(<0.8)	ND(<0.8)	ND(<0.8)	ND(<0.8)	ND(<0.8)	ND(<0.8)	NA	ND(<0.8)	0.94	ND(<0.8)	NA	NA
Iron	ug/L	300	11,000	--	ND(<500)	ND(<500)	ND(<500)	NA	ND(<500)	ND(<500)	ND(<500)	NA	ND(<500)	NA	ND(<500)	NA	NA
Lead	ug/L	50	--	--	ND(<0.4)	ND(<0.4)	ND(<0.4)	NA	ND(<0.4)	ND(<0.4)	ND(<0.4)	NA	ND(<0.4)	NA	ND(<0.4)	NA	NA
Magnesium	ug/L	--	--	--	46,000	48,000	50,000	NA	49,000	68,000	69,000	NA	80,000	NA	72,000	NA	NA
Manganese	ug/L	50	750	--	<b>61</b>	41	23	NA	22	24	27	NA	17	NA	31	NA	NA
Nickel	ug/L	--	320	--	ND(<3)	ND(<3)	ND(<3)	NA	ND(<3)	ND(<3)	ND(<3)	NA	ND(<3)	NA	ND(<3)	NA	NA
Selenium	ug/L	10	80	--	ND(<8)	ND(<8)	ND(<8)	NA	ND(<8)	ND(<8)	ND(<8)	NA	ND(<8)	NA	ND(<8)	NA	NA

**Table 1A. Annual SDF Groundwater Analytical Data Summary - W-47 and W-112**

Sample ID	Groundwater Quality Standards (WAC 173-200-040):	MTC Method B Cleanup Level:	Toxicity Equivalency Factor (TEF) (WAC 173-340-900 table 708.2):	Well 47 (Upgradient) & Considered as Background for the Site					Well 112 (Downgradient)										
				Date	2/6/2023	5/9/2023	8/9/2023	9/28/2023 (re-sample)	11/8/2023	2/6/2023	5/9/2023	6/23/2023 (re-sample)	8/9/2023	9/28/2023 (re-sample)	11/8/2023	12/13/2023 (re-sample)	12/13/2023 (dup.)		
Mercury	ug/L	2	--	--	ND(<0.3)	ND(<0.3)	ND(<0.3)	NA	ND(<0.3)	ND(<0.3)	ND(<0.3)	ND(<0.3)	NA	ND(<0.3)	NA	ND(<0.3)	NA	NA	
<b>Groundwater Laboratory Chemistry Parameters</b>																			
Alkalinity	mg/L	--	--	--	350	350	360	NA	340	560	540	NA	640	NA	560	NA	NA	NA	
Bicarbonate Alkalinity	mg/L	--	--	--	350	350	360	NA	340	560	540	NA	640	NA	560	NA	NA	NA	
Total Organic Carbon	mg/L	--	--	--	1.4	4.9	4.8	NA	1.6	1.9	6.9	NA	8.4	NA	2.5	NA	NA	NA	
Chemical Oxygen Demand	mg/L	--	--	--	ND(<10)	ND(<10)	ND(<10)	NA	ND(<10)	11	11	NA	ND(<10)	NA	11	NA	NA	NA	
Total Coliform	FC/100m	1/100 ml	--	--	ND(<1)	ND(<1)	ND(<1)	NA	ND(<1)	ND(<1)	ND(<1)	NA	ND(<1)	NA	ND(<1)	NA	NA	NA	
Nitrite-N	mg/L	--	1,600	--	ND(<0.005)	ND(<0.1)	ND(<0.005)	NA	0.054J	ND(<0.005)	ND(<0.1)	NA	ND(<0.005)	NA	ND(<0.005)	NA	NA	NA	
Nitrate-N	mg/L	10	26,000	--	0.073	0.03	0.035	NA	0.0153J	0.019	0.01	NA	0.04	NA	0.0335J	NA	NA	NA	
Nitrite + Nitrate	mg/L	--	--	--	0.07	0.04	0.04	NA	0.02	0.02	0.02	NA	0.04	NA	0.03	NA	NA	NA	
Ammonia	mg/L	--	--	--	ND(<0.5)	ND(<0.5)	ND(<0.3)	NA	ND(<0.3)	ND(<0.5)	ND(<0.5)	NA	ND(<0.3)	NA	ND(<0.3)	NA	NA	NA	
Chloride	mg/L	250	--	--	15	15	14	NA	13	38	39	18	42	38	38	39	39	39	
Sulfate	mg/L	250	--	--	55	51	58	NA	61	5	4.1	NA	6	NA	6.7	NA	NA	NA	
<b>Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)</b>																			
Benzo[a]pyrene	ug/L	0.008	0.023	1	ND(<0.10)	ND(<0.10)	ND(<0.11)	NA	ND(<0.10)	ND(<0.11)	ND(<0.10)	NA	ND(<0.10)	NA	ND(<0.10)	NA	NA	NA	
Benzo[a]anthracene	ug/L	0.01	--	0.1	ND(<0.051)	ND(<0.051)	ND(<0.054)	NA	ND(<0.052)	ND(<0.054)	ND(<0.051)	NA	ND(<0.051)	NA	ND(<0.052)	NA	NA	NA	
Benzo[b]fluoranthene	ug/L	0.01	--	0.1	ND(<0.10)	ND(<0.10)	ND(<0.11)	NA	ND(<0.10)	ND(<0.11)	ND(<0.10)	NA	ND(<0.10)	NA	ND(<0.10)	NA	NA	NA	
Benzo[k]fluoranthene	ug/L	0.01	--	0.1	ND(<0.051)	ND(<0.051)	ND(<0.054)	NA	ND(<0.052)	ND(<0.054)	ND(<0.051)	NA	ND(<0.051)	NA	ND(<0.052)	NA	NA	NA	
Chrysene	ug/L	0.01	--	0.01	ND(<0.10)	ND(<0.10)	ND(<0.11)	NA	ND(<0.10)	ND(<0.11)	ND(<0.10)	NA	ND(<0.10)	NA	ND(<0.10)	NA	NA	NA	
Dibenz[a,h]anthracene	ug/L	0.01	--	0.1	ND(<0.10)	ND(<0.10)	ND(<0.11)	NA	ND(<0.10)	ND(<0.11)	ND(<0.10)	NA	ND(<0.10)	NA	ND(<0.10)	NA	NA	NA	
Indeno[1,2,3-cd]pyrene	ug/L	0.01	--	0.1	ND(<0.051)	ND(<0.051)	ND(<0.054)	NA	ND(<0.052)	ND(<0.054)	ND(<0.051)	NA	ND(<0.051)	NA	ND(<0.052)	NA	NA	NA	
Total cPAH Equivalent (TEq) <sup>a</sup>	mg/kg	--	0.1 <sup>b</sup>	--	0.068	0.068	0.075	NA	0.068	0.075	0.068	NA	0.068	NA	0.068	NA	NA	NA	

-- indicates there is no quality standard for the specific analyte

**Bold and shaded type** indicates samples that exceed the Water Quality Standards (WAC 173-200-040)

Note: Field chemistry parameters collected during purging using a YSI 556 MPS water meter equipped with a flow-through cell.

NA indicates that the specified analyte was Not Analyzed

ND indicates analyte was not detected at level above reporting limit (shown in parentheses)

a - Toxicity Equivalency to benzo(a)pyrene, calculated by multiplying result by appropriate TEF.

For ND values, the TEF was multiplied by one half the reporting limit

b - Method A cleanup level of Benzo[a]pyrene

**Table 1B. Annual SDF Groundwater Analytical Data Summary - W-113 and W-127**

Sample ID	Groundwater Quality Standards (WAC 173-200-040):	MTCB Method B Cleanup Level:	Toxicity Equivalency Factor (TEF) (WAC 173-340-900 table 708.2):	Well 113 (Downgradient)								Well 127 (Downgradient)								
				Date	2/6/2023	2/6/2023 (dup.)	5/9/2023	8/9/2023	8/9/2023 (dup.)	9/28/2023 (re-sample)	11/8/2023	11/8/2023 (dup.)	2/6/2023	5/9/2023	5/9/2023 (dup.)	6/23/2023 (re-sample)	8/9/2023	9/28/2023 (re-sample)	9/28/2023 (dup.)	11/8/2023
<b>Field Chemistry Parameters</b>																				
Depth to Water	ft bgs	--	--	1.56	NA	2.04	5.49	NA	6.54	3.17	NA	5.49	5.69	NA	6.45	7.01	7.36	NA	5.49	5.49
Groundwater Surface Elevation	ft msl	--	--	73.68	NA	73.20	69.75	NA	68.70	72.07	NA	73.71	73.51	NA	72.75	72.19	71.84	NA	73.71	73.71
Temperature	°C	--	--	8.40	NA	15.66	17.4	NA	14	10.18	NA	9.6	13.0	NA	14.3	15.8	15.4	NA	13.70	11.70
Conductivity	mS/cm	--	--	0.995	NA	0.919	0.990	NA	1.000	0.929	NA	1.133	1.118	NA	1.127	1.114	1.131	NA	1.090	1.158
Total Dissolved Solids	g/L	0.5	--	<b>0.646</b>	NA	<b>0.597</b>	<b>0.643</b>	NA	<b>0.659</b>	<b>0.604</b>	NA	<b>0.736</b>	<b>0.726</b>	NA	<b>0.732</b>	<b>0.724</b>	<b>0.735</b>	NA	<b>0.708</b>	<b>0.753</b>
Salinity	ppt	--	--	0.49	NA	0.46	0.49	NA	0.5	0.46	NA	0.57	0.56	NA	0.56	0.56	0.57	NA	0.54	0.58
Dissolved Oxygen	mg/L	--	--	2.94	NA	0.85	5.26	NA	2.12	3.7	NA	2.08	0.23	NA	0.15	3.47	0.91	NA	4.85	3.12
pH	pH units	6.5-8.5	--	8.17	NA	6.74	7.42	NA	7.35	6.89	NA	6.58	<b>6.48</b>	NA	6.54	<b>6.43</b>	7.09	NA	6.81	6.66
Oxidation/Reduction Potential	mV	--	--	232.40	NA	27.6	135.2	NA	121.7	22.5	NA	193.2	113.4	NA	146.0	105.4	67.0	NA	120.6	168.0
<b>TPH</b>																				
NWTPH-Gx Gasoline	ug/L	--	--	ND(<50)	ND(<50)	ND(<50)	ND(<50)	ND(<50)	NA	ND(<100)	ND(<100)	ND(<50)	ND(<50)	ND(<50)	NA	ND(<50)	NA	NA	ND(<100)	NA
NWTPH-Dx Diesel Range	ug/L	--	--	ND(<110)	ND(<110)	ND(<110)	120	130	NA	120	120	220	200	260	NA	280	NA	NA	250	NA
NWTPH-Dx Diesel Range w/ Silica Gel Cleanup	ug/L	--	--	ND(<110)	ND(<110)	ND(<110)	ND(<110)	ND(<110)	NA	ND(<110)	ND(<110)	ND(<120)	ND(<110)	ND(<120)	NA	ND(<110)	NA	NA	ND(<110)	NA
NWTPH-Dx Lube Oil-Range	ug/L	--	--	ND(<360)	ND(<360)	ND(<360)	ND(<350)	ND(<350)	NA	ND(<360)	ND(<360)	380	ND(<360)	ND(<370)	NA	480	NA	NA	ND(<350)	NA
NWTPH-Dx Lube Oil-Range w/ Silica Gel Cleanup	ug/L	--	--	ND(<360)	ND(<360)	ND(<360)	ND(<350)	ND(<350)	NA	ND(<360)	ND(<360)	ND(<370)	ND(<360)	ND(<370)	NA	ND(<360)	NA	NA	ND(<350)	NA
EPA-8021 Benzene	ug/L	1	0.8	ND(<1)	ND(<1)	ND(<1)	ND(<1)	ND(<1)	NA	ND(<1)	ND(<1)	ND(<1)	ND(<1)	ND(<1)	NA	ND(<1)	NA	NA	ND(<1)	NA
EPA-8021 Toluene	ug/L	--	640	ND(<1)	ND(<1)	ND(<1)	ND(<1)	ND(<1)	NA	ND(<1)	ND(<1)	ND(<1)	ND(<1)	ND(<1)	NA	ND(<1)	NA	NA	ND(<1)	NA
EPA-8021 Ethylbenzene	ug/L	--	800	ND(<1)	ND(<1)	ND(<1)	ND(<1)	ND(<1)	NA	ND(<1)	ND(<1)	ND(<1)	ND(<1)	ND(<1)	NA	ND(<1)	NA	NA	ND(<1)	NA
EPA-8021 Xylenes	ug/L	--	1,600	ND(<2)	ND(<2)	ND(<2)	ND(<2)	ND(<2)	NA	ND(<2)	ND(<2)	ND(<2)	ND(<2)	ND(<2)	NA	ND(<2)	NA	NA	ND(<2)	NA
<b>Metals: Dissolved</b>																				
Arsenic	ug/L	0.05	0.058	<b>1.5</b>	<b>1.3</b>	<b>1.9</b>	<b>1.7</b>	<b>1.5</b>	NA	<b>2.9</b>	<b>2.8</b>	ND(<1)	ND(<1)	ND(<1)	NA	ND(<1)	NA	NA	ND(<1)	NA
Calcium	ug/L	--	--	78,000	78,000	78,000	75,000	76,000	NA	70,000	75,000	110,000	120,000	110,000	NA	100,000	NA	NA	110,000	NA
Chromium	ug/L	--	--	ND(<0.8)	ND(<0.8)	ND(<0.8)	ND(<0.8)	ND(<0.8)	5.1	ND(<0.8)	ND(<0.8)	ND(<0.8)	ND(<0.8)	ND(<0.8)	NA	ND(<0.8)	ND(<0.8)	ND(<0.8)	ND(<0.8)	NA
Iron	ug/L	--	11,000	ND(<500)	ND(<500)	ND(<500)	ND(<500)	ND(<500)	NA	ND(<500)	ND(<500)	ND(<500)	ND(<500)	ND(<500)	NA	ND(<500)	NA	NA	ND(<500)	NA
Lead	ug/L	--	--	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	NA	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	NA	ND(<0.4)	NA	NA	ND(<0.4)	NA
Magnesium	ug/L	--	--	64,000	64,000	63,000	64,000	63,000	NA	63,000	66,000	71,000	72,000	68,000	NA	69,000	NA	NA	71,000	NA
Manganese	ug/L	50	750	ND(<2)	ND(<2)	ND(<2)	ND(<2)	ND(<2)	NA	ND(<2)	ND(<2)	18	20	45	NA	ND(<2)	NA	NA	<b>76</b>	NA
Nickel	ug/L	--	320	ND(<3)	ND(<3)	ND(<3)	ND(<3)	ND(<3)	NA	ND(<3)	ND(<3)	ND(<3)	ND(<3)	ND(<3)	NA	ND(<3)	NA	NA	4.2	NA
Potassium	ug/L	--	--	5,600	5,200	8,200	6,600	6,800	NA	9,200	9,600	ND(<3,300)	3,800	ND(<3,300)	NA	ND(<3,300)	NA	NA	3,700	NA
Selenium	ug/L	--	80	ND(<8)	ND(<8)	ND(<8)	ND(<8)	ND(<8)	NA	ND(<8)	ND(<8)	ND(<8)	ND(<8)	ND(<8)	NA	ND(<8)	NA	NA	ND(<8)	NA
Sodium	ug/L	--	--	47,000	46,000	52,000	47,000	46,000	NA	51,000	54,000	40,000	43,000	42,000	NA	41,000	NA	NA	44,000	NA
Mercury	ug/L	--	--	ND(<0.3)	ND(<0.3)	ND(<0.3)	ND(<0.3)	ND(<0.3)	NA	ND(<0.3)	ND(<0.3)	ND(<0.3)	ND(<0.3)	ND(<0.3)	NA	ND(<0.3)	NA	NA	ND(<0.3)	NA
<b>Metals: Total</b>																				
Arsenic	ug/L	0.05	0.058	<b>1.4</b>	<b>1.4</b>	<b>1.8</b>	<b>1.7</b>	<b>1.6</b>	NA	<b>2.8</b>	<b>2.7</b>	ND(<1)	ND(<1)	ND(<1)	NA	ND(<1)	NA	NA	ND(<1)	NA
Chromium	ug/L	50	--	ND(<0.8)	ND(<0.8)	ND(<0.8)	0.82	1.6	0.92	ND(<0.8)	ND(<0.8)	ND(<0.8)	ND(<0.8)	ND(<0.8)	NA	1.2	0.86	ND(<0.8)	ND(<0.8)	NA
Iron	ug/L	300	11,000	ND(<500)	ND(<500)	ND(<500)	ND(<500)	<b>810</b>	NA	ND(<500)	ND(<500)	ND(<500)	ND(<500)	ND(<500)	NA	ND(<500)	NA	NA	ND(<500)	NA
Lead	ug/L	50	--	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	NA	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	NA	ND(<0.4)	NA	NA	ND(<0.4)	NA
Magnesium	ug/L	--	--	60,000	60,000	63,000	68,000	70,000	NA	64,000	65,000	67,000	71,000	72,000	NA	74,000	NA	NA	72,000	NA
Manganese	ug/L	50	750	2.3	ND(<2)	4.3	12	38	NA	ND(<2)	4.9	22	22	22	NA	11	NA	NA	<b>80</b>	NA
Nickel	ug/L	--	320	ND(<3)	ND(<3)	ND(<3)	ND(<3)	ND(<3)	NA	ND(<3)	ND(<3)	ND(<3)	ND(<3)	ND(<3)	NA	ND(<3)	NA	NA	4.3	NA
Selenium	ug/L	10	80	ND(<8)	ND(<8)	ND(<8)	ND(<8)	ND(<8)	NA	ND(<8)	ND(<8)	ND(<8)	ND(<8)	ND(<8)	NA	ND(<8)	NA	NA	ND(<8)	NA
Mercury	ug/L	2	--	ND(<0.3)	ND(<0.3)	ND(<0.3)	ND(<0.3)	ND(<0.3)	NA	ND(<0.3)	ND(<0.3)	ND(<0.3)	ND(<0.3)	ND(<0.3)	NA	ND(<0.3)	NA	NA	ND(<0.3)	NA
<b>Groundwater Laboratory Chemistry Parameters</b>																				
Alkalinity	mg/L	--	--	450	450	430	470	480	NA	440	440	510	500	500	NA	540	NA	NA	500	NA
Bicarbonate Alkalinity	mg/L	--	--	450	450	430	470	480	NA	440	440	510	500	500	NA	540	NA	NA	500	NA
Total Organic Carbon	mg/L	--	--	1.7	1.7	5.9	6.1	5.9	NA	2.0	2.0	6.2	12	12	NA	13	NA	NA	7.1	NA
Chemical Oxygen Demand	mg/L	--	--	11	ND(<10)	ND(<10)	ND(<10)	ND(<10)	NA	ND(<10)	ND(<10)	21	18	23	17	18	24	19	10	NA
Total Coliform	TC/100m	1/100 ml	--	ND(<1)	ND(<1)	ND(<1)	ND(<1)	ND(<1)	NA	ND(<1)	ND(<1) <sup>a</sup>	ND(<1)	ND(<1)	ND(<1)	NA	ND(<1)	NA	NA	ND(<1)	NA
Nitrite-N	mg/L	--	1,600	ND(<0.005)	ND(<0.005)	ND(<0.1)	ND(<0.005)	ND(<0.005)	NA	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.1)	ND(<0.1)	NA	ND(<0.005)	NA	NA	ND(<0.005)	NA



**Table 1B. Annual SDF Groundwater Analytical Data Summary - W-113 and W-127**

Sample ID	Groundwater Quality Standards (WAC 173-200-040):	MTC Method B Cleanup Level:	Toxicity Equivalency Factor (TEF) (WAC 173-340-900 table 708.2):	Well 113 (Downgradient)									Well 127 (Downgradient)								
				Date	2/6/2023	2/6/2023 (dup.)	5/9/2023	8/9/2023	8/9/2023 (dup.)	9/28/2023 (re-sample)	11/8/2023	11/8/23 (dup.)	2/6/2023	5/9/2023	5/9/2023 (dup.)	6/23/2023 (re-sample)	8/9/2023	9/28/2023 (re-sample)	9/28/2023 (dup.)	11/8/2023	12/13/2023 (re-sample)
Nitrate-N	mg/L	10	26,000	--	0.013	0.014	0.004	0.02	0.02	NA	0.0198J	0.0198J	ND(<0.005)	ND(<0.1)	ND(<0.1)	NA	0.09	NA	NA	0.17	NA
Nitrite + Nitrate	mg/L	--	--	--	0.01	0.01	0.01	0.02	0.02	NA	0.02	0.02	ND(<0.01)	0.0047J	ND(<0.01)	NA	0.09	NA	NA	0.17	NA
Ammonia	mg/L	--	--	--	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.3)	ND(<0.3)	NA	ND(<0.3)	ND(<0.3)	ND(<0.5)	ND(<0.5)	ND(<0.5)	NA	ND(<0.3)	NA	NA	ND(<0.3)	NA
Chloride	mg/L	250	--	--	31	31	31	26	26	NA	27	27	38	38	13 <sup>a,b</sup>	21	39	39	39	37	37
Sulfate	mg/L	250	--	--	49	49	44	55	54	NA	49	50	54	48	49 <sup>a,b</sup>	NA	51	NA	NA	48	NA
<b>Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)</b>																					
Benzo[a]pyrene	ug/L	0.008	0.023	1	ND(<0.10)	ND(<0.10)	ND(<0.10)	ND(<0.10)	ND(<0.10)	NA	ND(<0.10)	ND(<0.11)	ND(<0.11)	ND(<0.11)	NA	ND(<0.10)	NA	NA	NA	ND(<0.10)	NA
Benzo[a]anthracene	ug/L	0.01	--	0.1	ND(<0.051)	ND(<0.051)	ND(<0.052)	ND(<0.051)	ND(<0.052)	NA	ND(<0.051)	ND(<0.053)	ND(<0.053)	ND(<0.053)	NA	ND(<0.052)	NA	NA	NA	ND(<0.051)	NA
Benzo[b]fluoranthene	ug/L	0.01	--	0.1	ND(<0.10)	ND(<0.10)	ND(<0.10)	ND(<0.10)	ND(<0.10)	NA	ND(<0.10)	ND(<0.11)	ND(<0.11)	ND(<0.11)	NA	ND(<0.10)	NA	NA	NA	ND(<0.10)	NA
Benzo[k]fluoranthene	ug/L	0.01	--	0.1	ND(<0.051)	ND(<0.051)	ND(<0.052)	ND(<0.051)	ND(<0.052)	NA	ND(<0.051)	ND(<0.053)	ND(<0.053)	ND(<0.053)	NA	ND(<0.052)	NA	NA	NA	ND(<0.051)	NA
Chrysene	ug/L	0.01	--	0.01	ND(<0.10)	ND(<0.10)	ND(<0.10)	ND(<0.10)	ND(<0.10)	NA	ND(<0.10)	ND(<0.11)	ND(<0.11)	ND(<0.11)	NA	ND(<0.10)	NA	NA	NA	ND(<0.10)	NA
Dibenz[a,h]anthracene	ug/L	0.01	--	0.1	ND(<0.10)	ND(<0.10)	ND(<0.10)	ND(<0.10)	ND(<0.10)	NA	ND(<0.10)	ND(<0.11)	ND(<0.11)	ND(<0.11)	NA	ND(<0.10)	NA	NA	NA	ND(<0.10)	NA
Indeno[1,2,3-cd]pyrene	ug/L	0.01	--	0.1	ND(<0.051)	ND(<0.051)	ND(<0.052)	ND(<0.051)	ND(<0.052)	NA	ND(<0.051)	ND(<0.053)	ND(<0.053)	ND(<0.053)	NA	ND(<0.052)	NA	NA	NA	ND(<0.051)	NA
Total cPAH Equivalent (TEq) <sup>a</sup>	mg/kg	--	0.1 <sup>b</sup>	--	0.068	0.068	0.068	0.068	0.068	NA	0.068	0.075	0.075	0.075	0.075	NA	0.068	NA	NA	0.068	NA

-- indicates there is no quality standard for the specific analyte

**Bold and shaded type** indicates samples that exceed the Water Quality Standards (WAC 173-200-040)

Note: Field chemistry parameters collected during purging using a YSI 556 MPS water meter equipped with a flow-through cell.

NA indicates that the specified analyte was Not Analyzed

ND indicates analyte was not detected at level above reporting limit (shown in parentheses)

a - Toxicity Equivalency to benzo(a)pyrene, calculated by multiplying result by appropriate TEF.

For ND values, the TEF was multiplied by one half the reporting limit

b - Method A cleanup level of Benzo[a]pyrene

**Table 2. Groundwater Surface Elevation and Field Chemistry Parameters\* - HF Sinclair PSR SDF**

Well ID	Depth to Water		Groundwater Surface Elevation	Temperature	Conductivity	Total Dissolved Solids	Salinity	Dissolved Oxygen	pH	Oxidation/Reduction Potential
	units:	ft bgs	ft msl	°C	mS/cm	g/L	ppt	mg/L	pH units	mV
<b>Groundwater Quality Standards: WAC 173-200-040</b>	--	--	--	--	--	0.5	--	--	6.5–8.5	--
<b>MTC A Method B Cleanup Level:</b>	--	--	--	--	--	--	--	--	--	--
<b>Well 47 (Upgradient) &amp; Considered as Background for the Site</b>										
3/3/2011		4.62	97.61	NA	NA	NA	NA	NA	NA	NA
6/20/2011		3.42	98.81	13.05	0.79	<b>0.514</b>	0.39	0.1	7.36	45
9/27/2011		4.35	97.88	16.04	0.794	<b>0.517</b>	0.39	0.06	7.28	47.1
12/5/2011		3.55	98.68	12.8	0.769	<b>0.5</b>	0.38	0.91	7.75	66.1
3/21/2012		3.27	98.96	11.08	0.787	<b>0.512</b>	0.39	0.33	7.72	5.6
6/25/2012		2.79	99.44	14.23	0.782	<b>0.509</b>	0.39	0.01	7.67	-26.5
9/18/2012		4.74	97.49	16.4	0.777	<b>0.505</b>	0.38	0.02	7.59	-45.4
11/20/2012		3.53	98.70	12.62	0.859	<b>0.559</b>	0.43	0.24	7.35	51.3
2/19/2013		3.37	98.86	11.36	0.77	<b>0.501</b>	0.38	0.03	7.47	-32.2
4/22/2013		3.3	98.93	12.07	0.776	<b>0.504</b>	0.38	0.02	7.65	-19.9
7/31/2013		4.04	98.19	15.83	0.778	<b>0.506</b>	0.38	0.01	7.7	-27.4
11/25/2013		2.88	99.35	12.09	0.832	<b>0.541</b>	0.41	4.77	7.75	66
3/25/2014		2.78	99.45	12.34	0.845	<b>0.549</b>	0.42	1.22	7.8	54.9
6/11/2014		3.36	98.87	16.31	0.789	<b>0.513</b>	0.39	0.01	7.46	34.3
8/20/2014		3.39	98.84	17.84	0.847	<b>0.551</b>	0.42	0.23	7.62	17.60
11/10/2014		2.75	99.48	14.39	0.842	<b>0.547</b>	0.42	0.52	7.76	32.60
2/18/2015		2.78	99.45	12.77	0.794	<b>0.516</b>	0.39	1.77	7.31	211.40
5/28/2015		3.00	99.23	17.92	0.810	<b>0.526</b>	0.4	0.19	7.34	70.40
6/25/2015		NA	NA	20.16	0.797	<b>0.518</b>	0.39	0.24	7.32	57.30
9/1/2015		3.27	98.96	15.58	0.789	<b>0.513</b>	0.39	0.5	7.32	110.10
10/28/2015		2.77	99.46	14.25	0.774	<b>0.503</b>	0.38	3.45	7.45	142.00
2/22/2016		2.54	99.69	12.87	0.771	<b>0.501</b>	0.38	2.16	7.55	-54.00
5/11/2016		3.30	98.93	18.65	0.773	<b>0.503</b>	0.38	0.72	7.21	-142.00
8/9/2016		4.53	97.70	17.35	0.806	<b>0.524</b>	0.4	0.39	7.85	-67.40
11/10/2016		2.60	99.63	15.77	0.773	<b>0.502</b>	0.38	0.9	7.30	148.90
2/2/2017		3.20	99.03	11.33	0.767	0.499	0.38	1.76	8.11	-12.50
5/10/2017		2.70	99.53	15.01	0.769	<b>0.5</b>	0.38	0.35	7.45	152.70

**Table 2. Groundwater Surface Elevation and Field Chemistry Parameters\* - HF Sinclair PSR SDF**

Well ID	Depth to Water		Groundwater Surface Elevation	Temperature	Conductivity	Total Dissolved Solids	Salinity	Dissolved Oxygen	pH	Oxidation/Reduction Potential
	units:	ft bgs	ft msl	°C	mS/cm	g/L	ppt	mg/L	pH units	mV
<b>Groundwater Quality Standards: WAC 173-200-040</b>	--	--	--	--	--	0.5	--	--	6.5–8.5	--
<b>MTC A Method B Cleanup Level:</b>	--	--	--	--	--	--	--	--	--	--
<b>Well 47 (Upgradient) &amp; Considered as Background for the Site</b>										
8/9/2017		3.63	98.60	21.44	0.773	<b>0.503</b>	0.38	0.59	7.28	154.80
11/7/2017		2.74	99.49	13.62	0.734	0.477	0.36	2.87	8.17	74.00
2/21/2018		2.91	99.32	5.3	0.782	<b>0.508</b>	0.38	1.89	<b>11.62</b>	-269.90
4/11/2018		2.40	99.83	11.7	0.740	0.481	0.36	0.92	8.27	37.10
9/7/2018		2.85	99.38	16.33	0.739	0.48	0.36	1.89	7.76	4.60
11/6/2018		2.52	99.71	15.08	0.764	0.496	0.36	2.77	7.40	-9.50
2/25/2019		2.60	99.63	10.5	0.803	<b>0.522</b>	0.4	1.6	7.61	212.80
5/21/2019		2.88	99.35	14.46	0.798	<b>0.518</b>	0.39	0.16	7.66	-92.50
6/5/2019		3.52	98.71	15	0.798	<b>0.519</b>	0.39	0.16	7.40	70.50
9/3/2019		3.42	98.81	21.54	0.807	<b>0.524</b>	0.4	0.26	7.60	7.50
11/13/2019		2.58	99.65	14.48	0.764	0.496	0.38	4.8	7.63	41.30
12/5/2019		2.85	99.38	12.58	0.785	<b>0.51</b>	0.39	4.2	7.62	29.90
2/12/2020		2.68	99.55	11.45	0.775	<b>0.504</b>	0.38	1.81	7.28	123.80
4/29/2020		2.75	99.48	14.38	0.765	0.500	0.38	1.31	7.32	82.80
8/5/2020		3.36	98.87	17.65	0.781	<b>0.508</b>	0.38	0.21	7.17	40.50
11/3/2020		2.78	99.45	14.53	0.751	0.488	0.37	4.03	7.45	93.10
2/10/2021		2.72	99.51	10.45	0.777	<b>0.505</b>	0.38	2.54	7.44	91.70
5/25/2021		2.65	99.58	14.18	0.783	<b>0.511</b>	0.39	0.53	8.10	43.20
8/4/2021		4.57	97.66	21.79	0.764	0.497	0.37	0.49	7.82	-47.60
11/9/2021		2.47	99.76	11.47	0.710	0.461	0.35	5.91	7.28	110.90
2/15/2022		2.84	99.39	9.84	0.744	0.484	0.37	2.3	6.99	118.60
4/18/2022		3.15	99.08	11.82	0.834	<b>0.542</b>	0.41	0.92	8.49	-107.20
8/10/2022		3.58	98.65	17.71	0.747	0.486	0.37	0.69	6.84	60.40
11/16/2022		3.97	98.26	12.06	0.728	0.473	0.36	5.65	6.97	61.00
2/6/2023		2.74	99.49	10.4	0.806	<b>0.524</b>	0.4	3.69	7.98	221.80
5/9/2023		2.95	99.28	14.2	0.787	<b>0.511</b>	0.39	0.32	7.17	126.80
8/9/2023		3.84	98.39	18.9	0.775	<b>0.504</b>	0.38	5.94	7.01	58.20
9/28/2023		3.41	98.82	17.3	0.802	<b>0.521</b>	0.4	3.47	7.47	87.00

**Table 2. Groundwater Surface Elevation and Field Chemistry Parameters\* - HF Sinclair PSR SDF**

Well ID	Depth to Water		Groundwater Surface Elevation	Temperature	Conductivity	Total Dissolved Solids	Salinity	Dissolved Oxygen	pH	Oxidation/Reduction Potential
	units:	ft bgs	ft msl	°C	mS/cm	g/L	ppt	mg/L	pH units	mV
<b>Groundwater Quality Standards: WAC 173-200-040</b>	--	--	--	--	--	0.5	--	--	6.5-8.5	--
<b>MTC A Method B Cleanup Level:</b>	--	--	--	--	--	--	--	--	--	--
<b>Well 47 (Upgradient) &amp; Considered as Background for the Site</b>										
11/8/2023		2.86	99.37	14.2	0.799	<b>0.520</b>	0.39	3.08	7.34	102.20
<b>Well 112 (Downgradient)</b>										
3/3/2011		7.15	70.56	NA	NA	NA	NA	NA	NA	NA
6/20/2011		7.63	70.08	11.62	0.996	<b>0.648</b>	0.5	0.06	7.08	22
9/27/2011		10.8	66.91	13.79	0.993	<b>0.645</b>	0.49	0.04	7.2	52.4
12/5/2011		11.88	65.83	11.58	0.992	<b>0.645</b>	0.49	0.18	7.24	38.8
3/21/2012		6.99	70.72	10.88	0.997	<b>0.648</b>	0.5	0.28	7.52	-8.4
6/25/2012		7.83	69.88	13.28	0.987	<b>0.641</b>	0.49	0.03	7.32	-17
9/18/2012		10.51	67.20	15.18	0.985	<b>0.64</b>	0.49	0.02	7.47	-60.9
11/20/2012		9.54	68.17	12.06	1.072	<b>0.697</b>	0.53	0.28	7.19	35.6
2/19/2013		6.77	70.94	11.15	0.984	<b>0.639</b>	0.49	0.03	7.37	-46.7
4/22/2013		6.79	70.92	12.19	0.998	<b>0.649</b>	0.5	0.02	7.68	-28.5
7/31/2013		9.32	68.39	13.34	0.991	<b>0.644</b>	0.49	0.01	7.52	-26.7
11/25/2013		8.9	68.81	11.33	1.093	<b>0.71</b>	0.55	0.34	7.45	50.3
3/25/2014		6.67	71.04	11.51	1.087	<b>0.707</b>	0.54	1.33	7.54	59.6
6/11/2014		7.70	70.01	14.5	1.013	<b>0.659</b>	0.5	0.02	7.42	38.7
8/20/2014		9.95	67.76	14.59	1.097	<b>0.713</b>	0.55	0.20	7.56	12.5
11/10/2014		8.46	69.25	12.98	1.101	<b>0.715</b>	0.55	0.27	7.74	14.5
2/18/2015		6.78	70.93	12.62	1.046	<b>0.679</b>	0.52	1.61	7.06	165.9
5/28/2015		8.00	69.71	15.32	1.056	<b>0.686</b>	0.53	0.22	7.09	55.8
6/25/2015		NA	NA	14.55	1.064	<b>0.691</b>	0.53	0.36	7.16	53.3
9/1/2015		10.84	66.87	13.51	1.051	<b>0.683</b>	0.52	0.62	7.18	107.5
10/28/2015		11.28	66.43	12.63	1.057	<b>0.687</b>	0.53	1.03	7.23	125.1
2/22/2016		6.68	71.03	13.12	1.032	<b>0.671</b>	0.51	2.73	7.05	-34.00
5/11/2016		7.77	69.94	15.74	1.037	<b>0.674</b>	0.52	1.17	6.96	-116.20
8/9/2016		10.41	67.30	14.21	1.090	<b>0.709</b>	0.54	0.31	7.87	-74.00
11/10/2016		10.88	66.83	13.84	1.020	<b>0.665</b>	0.51	0.81	6.98	157.60

**Table 2. Groundwater Surface Elevation and Field Chemistry Parameters\* - HF Sinclair PSR SDF**

Well ID	Depth to Water		Groundwater Surface Elevation	Temperature	Conductivity	Total Dissolved Solids	Salinity	Dissolved Oxygen	pH	Oxidation/Reduction Potential
	units:	ft bgs	ft msl	°C	mS/cm	g/L	ppt	mg/L	pH units	mV
<b>Groundwater Quality Standards: WAC 173-200-040</b>	--	--	--	--	--	0.5	--	--	6.5–8.5	--
<b>MTC A Method B Cleanup Level:</b>	--	--	--	--	--	--	--	--	--	--
<b>Well 112 (Downgradient)</b>										
2/2/2017		7.76	69.95	10.05	1.034	<b>0.672</b>	0.52	2.6	7.55	64.80
5/10/2017		7.06	70.65	12.43	1.050	<b>0.682</b>	0.52	0.4	7.20	170.40
8/9/2017		9.49	68.22	15.42	1.050	<b>0.68</b>	0.52	0.27	7.15	184.60
11/7/2017		10.23	67.48	10.34	1.029	<b>0.669</b>	0.51	0.32	7.94	49.80
2/21/2018		6.80	70.91	7.62	1.060	<b>0.692</b>	0.53	1.56	<b>8.90</b>	-279.70
4/11/2018		6.50	71.21	11.13	1.020	<b>0.667</b>	0.51	1.4	7.75	43.10
9/7/2018		10.61	67.10	14.88	1.016	<b>0.661</b>	0.51	0.25	7.99	-1.30
11/6/2018		10.96	66.75	13.00	1.040	<b>0.676</b>	0.52	1.44	7.26	-32.40
2/25/2019		7.20	70.51	9.22	1.100	<b>0.72</b>	0.55	1.8	7.27	221.60
5/21/2019		7.60	70.11	11.55	1.100	<b>0.715</b>	0.55	0.39	7.48	-53.70
6/5/2019		8.21	69.50	12.51	1.115	<b>0.725</b>	0.56	0.2	7.25	39.60
9/3/2019		10.82	66.89	15.01	1.116	<b>0.726</b>	0.56	0.16	7.44	7.40
11/13/2019		9.85	67.86	12.35	1.120	<b>0.73</b>	0.56	0.4	7.07	53.80
12/5/2019		8.70	69.01	11.30	1.140	<b>0.74</b>	0.58	0.32	7.25	-41.30
2/12/2020		6.80	70.91	10.53	1.090	<b>0.714</b>	0.55	1.64	7.05	148.40
4/29/2020		7.45	70.26	11.08	1.090	<b>0.71</b>	0.55	0.84	6.98	99.70
8/5/2020		9.02	68.69	13.83	1.100	<b>0.71</b>	0.55	0.32	7.01	70.30
11/3/2020		9.89	67.82	12.18	1.090	<b>0.74</b>	0.55	0.44	7.04	87.80
2/10/2021		6.78	70.93	8.98	1.090	<b>0.71</b>	0.55	2.3	7.20	104.60
5/25/2021		7.96	69.75	14.34	1.100	<b>0.714</b>	0.55	0.66	7.17	59.40
8/4/2021		9.89	67.82	16.90	1.079	<b>0.701</b>	0.54	0.68	7.53	-10.30
11/9/2021		8.92	68.79	11.80	1.040	<b>0.676</b>	0.52	0.99	6.72	91.30
2/15/2022		7.13	70.58	10.29	1.048	<b>0.681</b>	0.52	2.06	6.83	117.00
4/18/2022		7.02	70.69	10.46	1.179	<b>0.766</b>	0.59	0.95	8.37	-80.20
8/10/2022		8.58	69.13	16.00	1.133	<b>0.737</b>	0.57	1.19	7.12	151.30
11/16/2022		9.65	68.06	12.59	1.035	<b>0.673</b>	0.52	0.74	6.88	30.80
2/6/2023		7.20	70.51	10.00	1.146	<b>0.745</b>	0.57	2.41	6.87	128.20
5/9/2023		7.27	70.44	14.28	1.056	<b>0.686</b>	0.53	1.11	6.79	-12.00

**Table 2. Groundwater Surface Elevation and Field Chemistry Parameters\* - HF Sinclair PSR SDF**

Well ID	Depth to Water		Groundwater Surface Elevation	Temperature	Conductivity	Total Dissolved Solids	Salinity	Dissolved Oxygen	pH	Oxidation/Reduction Potential
	units:	ft bgs	ft msl	°C	mS/cm	g/L	ppt	mg/L	pH units	mV
<b>Groundwater Quality Standards: WAC 173-200-040</b>	--	--	--	--	--	0.5	--	--	6.5-8.5	--
<b>MTCB Method B Cleanup Level:</b>	--	--	--	--	--	--	--	--	--	--
<b>Well 112 (Downgradient)</b>										
6/23/2023		8.23	69.48	14.27	1.054	<b>0.684</b>	0.52	0.77	6.63	79.20
8/9/2023		9.31	68.40	15.70	1.207	<b>0.785</b>	0.61	3.39	7.02	103.40
9/28/2023		10.92	66.79	14.00	1.185	<b>0.77</b>	0.59	1.16	7.73	45.40
11/8/2023		10.30	67.41	13.56	1.093	<b>0.71</b>	0.55	1.25	6.89	-17.30
12/13/2023		7.66	70.05	11.10	1.169	<b>0.76</b>	0.59	6.04	7.28	109.40
<b>Well 113 (Downgradient)</b>										
3/3/2011		1.45	73.79	NA	NA	NA	NA	NA	NA	NA
6/20/2011		3	72.24	13.60	0.960	<b>0.624</b>	0.48	0.04	7.39	-4.0
9/27/2011		4.59	70.65	17.32	0.963	<b>0.626</b>	0.48	0.04	7.39	5.1
12/5/2011		5.92	69.32	8.62	0.955	<b>0.621</b>	0.47	0.38	7.52	29.5
3/21/2012		1.53	73.71	10.34	0.961	<b>0.625</b>	0.48	0.30	7.71	-3.6
6/25/2012		2.77	72.47	14.83	0.951	<b>0.618</b>	0.47	0.02	7.65	-29.8
9/18/2012		4.66	70.58	19.86	0.970	<b>0.630</b>	0.48	0.02	7.74	-66.8
11/20/2012		2.28	72.96	11.08	1.026	<b>0.667</b>	0.51	3.67	7.61	36.2
2/19/2013		1.32	73.92	10.15	0.942	<b>0.612</b>	0.47	0.04	7.15	-67.0
4/22/2013		1.45	73.79	14.53	0.958	<b>0.623</b>	0.48	0.02	7.78	-43.2
7/31/2013		4.46	70.78	16.70	0.958	<b>0.623</b>	0.48	0.01	7.70	-26.8
11/25/2013		1.73	73.51	12.81	1.041	<b>0.677</b>	0.52	0.48	7.75	0.0
3/25/2014		1.40	73.84	12.27	1.033	<b>0.671</b>	0.51	1.34	7.70	72.8
6/11/2014		3.48	71.76	19.61	0.974	<b>0.633</b>	0.48	0.01	7.60	17.5
8/21/2014		4.98	70.26	15.99	1.039	<b>0.675</b>	0.52	0.29	7.97	15.0
11/10/2014		1.43	73.81	12.23	1.040	<b>0.676</b>	0.52	0.37	7.98	21
2/18/2015		1.44	73.80	11.6	0.980	<b>0.637</b>	0.49	1.71	7.31	191.9
5/28/2015		3.44	71.80	17.1	0.983	<b>0.639</b>	0.49	0.23	7.38	132.8
6/25/2015		NA	NA	20.64	0.997	<b>0.648</b>	0.49	0.4	7.46	29.4
9/1/2015		4.54	70.70	16.11	0.986	<b>0.641</b>	0.49	0.75	7.44	123.4
10/28/2015		3.71	71.53	12.3	0.976	<b>0.634</b>	0.49	3.04	7.55	169.5

**Table 2. Groundwater Surface Elevation and Field Chemistry Parameters\* - HF Sinclair PSR SDF**

Well ID	Depth to Water		Groundwater Surface Elevation	Temperature	Conductivity	Total Dissolved Solids	Salinity	Dissolved Oxygen	pH	Oxidation/Reduction Potential
	units:	ft bgs	ft msl	°C	mS/cm	g/L	ppt	mg/L	pH units	mV
<b>Groundwater Quality Standards: WAC 173-200-040</b>	--	--	--	--	--	0.5	--	--	6.5-8.5	--
<b>MTCB Method B Cleanup Level:</b>	--	--	--	--	--	--	--	--	--	--
<b>Well 113 (Downgradient)</b>										
2/22/2016		1.42	73.82	10.17	0.949	<b>0.617</b>	0.47	3.42	7.53	-37.9
5/11/2016		3.37	71.87	18.7	0.956	<b>0.621</b>	0.47	1.2	7.3	-115.9
8/9/2016		5.28	69.96	14.69	1.011	<b>0.657</b>	0.5	0.3	8.01	-81.8
11/10/2016		1.41	73.83	13.65	0.941	<b>0.612</b>	0.47	3.73	6.73	174.7
2/2/2017		1.75	73.49	6.43	0.958	<b>0.623</b>	0.47	2.33	7.77	65.3
5/10/2017		2.17	73.07	14.16	0.960	<b>0.624</b>	0.48	0.41	7.45	195.2
8/9/2017		5.10	70.14	17.73	0.957	<b>0.622</b>	0.47	0.34	7.36	168.2
11/7/2017		1.77	73.47	8.02	0.929	<b>0.604</b>	0.46	3.59	8.23	91.5
2/21/2018		1.50	73.74	2.24	0.980	<b>0.637</b>	0.48	2.03	8.37	-172.3
4/11/2018		1.35	73.89	11.32	0.918	<b>0.597</b>	0.46	1.08	7.72	29.4
9/7/2018		4.55	70.69	17.97	0.934	<b>0.607</b>	0.46	0.32	8.15	-3
11/6/2018		1.54	73.70	12.09	0.960	<b>0.624</b>	0.48	2.85	7.53	-15.7
2/25/2019		1.45	73.79	7.93	0.997	<b>0.648</b>	0.49	1.84	7.54	227
5/21/2019		3.51	71.73	12.5	0.969	<b>0.63</b>	0.48	5.23	7.64	12.1
6/5/2019		4.00	71.24	13.54	1.002	<b>0.652</b>	0.5	0.34	7.33	42.8
9/3/2019		5.80	69.44	18.64	1.010	<b>0.657</b>	0.5	0.25	7.66	0.9
11/13/2019		2.60	72.64	12.26	1.010	<b>0.65</b>	0.5	0.52	7.2	46.3
12/5/2019		2.20	73.50	10.51	1.000	<b>0.653</b>	0.5	2.59	7.29	59
2/12/2020		1.47	73.77	8.32	0.974	<b>0.633</b>	0.48	1.81	7.12	134.8
4/29/2020		2.45	72.79	10.94	0.960	<b>0.62</b>	0.48	0.48	7.07	95.5
8/5/2020		4.58	70.66	15.45	0.975	<b>0.634</b>	0.48	0.54	7.28	86.2
11/3/2020		2.35	72.89	11.38	0.966	<b>0.628</b>	0.48	5.42	7.35	90.2
2/10/2021		1.40	73.84	5.03	0.975	<b>0.634</b>	0.48	2.84	7.16	105.1
5/25/2021		3.78	71.46	15.43	0.977	<b>0.635</b>	0.48	0.6	7.42	36.5
8/4/2021		5.70	69.54	13.41	0.951	<b>0.618</b>	0.47	0.38	7.24	-4.2
11/9/2021		1.40	73.84	9.91	0.909	<b>0.591</b>	0.45	4.13	7.12	79.5
2/15/2022		1.57	73.67	8.49	0.916	<b>0.595</b>	0.45	2.2	6.83	123.4
4/18/2022		2.05	73.19	11.35	1.036	<b>0.674</b>	0.52	1.29	8.32	-85.8

**Table 2. Groundwater Surface Elevation and Field Chemistry Parameters\* - HF Sinclair PSR SDF**

Well ID	Depth to Water		Groundwater Surface Elevation	Temperature	Conductivity	Total Dissolved Solids	Salinity	Dissolved Oxygen	pH	Oxidation/Reduction Potential
	units:	ft bgs	ft msl	°C	mS/cm	g/L	ppt	mg/L	pH units	mV
<b>Groundwater Quality Standards: WAC 173-200-040</b>	--	--	--	--	--	0.5	--	--	6.5–8.5	--
<b>MTCA Method B Cleanup Level:</b>	--	--	--	--	--	--	--	--	--	--
<b>Well 113 (Downgradient)</b>										
8/10/2022		4.70	70.54	17.75	0.928	<b>0.603</b>	0.46	0.88	6.82	55.5
11/16/2022		1.74	73.50	8.6	0.996	<b>0.647</b>	0.49	3.83	7.88	277.2
2/6/2023		1.56	73.68	8.4	0.995	<b>0.646</b>	0.49	2.94	8.17	232.4
5/9/2023		2.04	73.20	15.66	0.919	<b>0.597</b>	0.46	0.85	6.74	27.6
8/9/2023		5.49	69.75	17.4	0.990	<b>0.643</b>	0.49	5.26	7.42	135.2
9/28/2023		6.54	68.70	14	1.000	<b>0.659</b>	0.5	2.12	7.35	121.7
11/8/2023		3.17	72.07	10.18	0.929	<b>0.604</b>	0.46	3.7	6.89	22.5
<b>Well 127 (Downgradient)</b>										
3/3/2011		5.05	74.15	NA	NA	NA	NA	NA	NA	NA
6/20/2011		5.85	73.35	12.67	1.037	<b>0.674</b>	0.52	0.12	6.75	68.5
9/27/2011		8.18	71.02	14.67	1.041	<b>0.677</b>	0.52	0.13	6.61	81.3
12/5/2011		5.82	73.38	11.55	1.051	<b>0.683</b>	0.52	0.30	6.82	83.3
3/21/2012		5.6	73.60	11.10	1.038	<b>0.675</b>	0.52	0.25	7.06	17.5
6/25/2012		5.35	73.85	13.07	1.030	<b>0.669</b>	0.51	0.08	6.90	31.4
9/18/2012		8.92	70.28	15.90	1.041	<b>0.676</b>	0.52	0.07	6.91	-9.8
11/20/2012		4.9	74.30	12.50	1.127	<b>0.733</b>	0.56	3.32	6.80	98.2
2/19/2013		5.08	74.12	10.07	1.012	<b>0.568</b>	0.50	0.03	7.14	-9.0
4/22/2013		5.4	73.80	10.78	1.036	<b>0.637</b>	0.52	0.04	7.25	-0.3
7/31/2013		7.71	71.49	14.81	1.031	<b>0.670</b>	0.51	0.02	7.20	-3.1
11/25/2013		5.29	73.91	12.23	1.129	<b>0.734</b>	0.56	2.77	7.14	71.9
3/25/2014		5.52	73.68	10.46	1.138	<b>0.740</b>	0.57	1.12	7.06	98.5
6/11/2014		6.41	72.79	16.03	1.049	<b>0.682</b>	0.52	0.01	7.30	15.4
8/20/2014		7.81	71.39	16.27	1.111	<b>0.722</b>	0.55	0.15	7.10	31.1
11/10/2014		5.38	73.82	13.16	1.107	<b>0.72</b>	0.55	2.21	7.41	36.3
2/18/2015		5.45	73.75	11.93	1.044	<b>0.679</b>	0.52	1.35	6.68	210.9
5/28/2015		6.46	72.74	14.39	1.050	<b>0.682</b>	0.52	0.17	6.68	117.8
6/25/2015		NA	NA	16.36	1.033	<b>0.671</b>	0.51	0.32	6.74	108.6
9/1/2015		9.74	69.46	15.18	1.029	<b>0.669</b>	0.51	0.83	6.69	83.2



**Table 2. Groundwater Surface Elevation and Field Chemistry Parameters\* - HF Sinclair PSR SDF**

Well ID	Depth to Water		Groundwater Surface Elevation	Temperature	Conductivity	Total Dissolved Solids	Salinity	Dissolved Oxygen	pH	Oxidation/Reduction Potential
	units:	ft bgs								
<b>Groundwater Quality Standards: WAC 173-200-040</b>	--	--	--	--	--	0.5	--	--	6.5-8.5	--
<b>MTCB Method B Cleanup Level:</b>	--	--	--	--	--	--	--	--	--	--
<b>Well 127 (Downgradient)</b>										
10/28/2015		8.36	70.84	14.07	1.025	<b>0.666</b>	0.51	1.13	6.72	171.3
2/22/2016		5.32	73.88	11.13	1.010	<b>0.657</b>	0.5	3.31	7.13	-41.2
5/11/2016		6.22	72.98	13.58	0.960	<b>0.624</b>	0.48	1.32	6.63	-74.4
8/9/2016		9.17	70.03	15.01	1.009	<b>0.656</b>	0.5	0.22	7.47	-58.2
11/10/2016		5.45	73.75	13.93	0.736	0.479	0.36	0.87	6.71	155.7
5/10/2017		5.48	73.72	12.02	0.980	<b>0.637</b>	0.49	0.18	6.86	187.3
8/9/2017		8.34	70.86	17.2	0.873	<b>0.567</b>	0.44	0.33	6.67	136.5
11/7/2017		5.53	73.67	12.55	0.535	0.36	0.27	2.52	7.59	102.3
2/21/2018		5.43	73.77	8	0.793	<b>0.519</b>	0.39	2.56	<b>10.48</b>	-287.8
4/11/2018		5.12	74.08	10.69	0.822	<b>0.534</b>	0.41	1.24	7.43	49.4
9/7/2018		10.31	68.89	17.3	0.805	<b>0.523</b>	0.4	0.25	7.14	10.8
11/6/2018		5.55	73.65	13.57	0.481	0.313	0.23	4.4	6.65	33
2/25/2019		5.40	73.80	8.69	0.862	<b>0.56</b>	0.43	2.34	6.95	225.1
5/21/2019		6.30	72.90	11.43	0.838	<b>0.544</b>	0.41	0.22	7.25	-66.4
6/5/2019		6.72	72.48	12.44	0.502	<b>0.522</b>	0.4	0.16	6.57	35.2
9/3/2019		10.35	68.85	16.94	0.861	<b>0.569</b>	0.42	0.2	6.98	24.1
11/13/2019		5.69	73.51	12.84	0.514	0.334	0.25	2.43	6.65	60.6
12/5/2019		5.70	73.50	11.91	0.636	0.414	0.31	1.86	6.75	44.0
2/12/2020		5.26	73.94	10.15	0.801	<b>0.52</b>	0.4	2.02	6.69	129.2
4/29/2020		4.52	74.68	10.81	0.800	<b>0.517</b>	0.39	0.31	6.52	120.2
8/5/2020		7.25	71.95	15.12	0.803	<b>0.522</b>	0.4	0.22	6.53	45.2
11/3/2020		5.70	73.50	13.16	0.616	0.4	0.3	1	6.52	103.6
2/10/2021		5.30	73.90	8.71	0.878	<b>0.57</b>	0.43	2.01	6.77	97.5
5/25/2021		5.72	73.48	12.71	0.798	<b>0.519</b>	0.39	0.32	8.31	38.1
8/4/2021		8.50	70.70	17.27	0.850	<b>0.552</b>	0.42	0.31	7.56	-23.9
11/9/2021		5.23	73.97	12.04	0.746	0.485	0.37	1.7	6.25	119.4
2/15/2022		5.63	73.57	9.37	0.978	<b>0.636</b>	0.49	1.55	6.4	133.3
4/18/2022		5.65	73.55	10.13	1.129	<b>0.734</b>	0.56	0.54	8.1	-94.7

**Table 2. Groundwater Surface Elevation and Field Chemistry Parameters\* - HF Sinclair PSR SDF**

Well ID	Depth to Water		Groundwater Surface Elevation	Temperature	Conductivity	Total Dissolved Solids	Salinity	Dissolved Oxygen	pH	Oxidation/Reduction Potential
	units:	ft bgs								
<b>Groundwater Quality Standards: WAC 173-200-040</b>	--	--	--	--	--	0.5	--	--	6.5-8.5	--
<b>MTCA Method B Cleanup Level:</b>	--	--	--	--	--	--	--	--	--	--
<b>Well 127 (Downgradient)</b>										
8/10/2022		6.41	72.79	16.0	0.996	<b>0.647</b>	0.5	2.2	6.56	107.3
11/16/2022		5.60	73.60	11.8	1.075	<b>0.699</b>	0.54	3.01	7.05	197.5
2/6/2023		5.49	73.71	9.6	1.133	<b>0.736</b>	0.57	2.08	6.58	193.2
5/9/2023		5.69	73.51	13.0	1.118	<b>0.726</b>	0.56	0.23	<b>6.48</b>	113.4
6/23/2023		6.45	72.75	14.3	1.127	<b>0.732</b>	0.56	0.15	6.54	146.0
8/9/2023		7.01	72.19	15.8	1.114	<b>0.724</b>	0.56	3.47	<b>6.43</b>	105.4
9/28/2023		7.36	71.84	15.4	1.131	<b>0.735</b>	0.57	0.91	7.09	67.0
11/8/2023		5.49	73.71	13.7	1.090	<b>0.708</b>	0.54	4.85	6.81	120.6
12/13/2023		5.49	73.71	11.7	1.158	<b>0.753</b>	0.58	3.12	6.66	168.0

\* - Groundwater chemistry parameters collected during purging using a YSI 556 MPS water meter, or equivalent, equipped with a flow-through cell.

-- indicates there is no quality standard or MTCA B cleanup level for the specific analyte

NA indicates that the specified analyte was Not Analyzed

**Bold type** indicates samples that exceed or fall outside of the Water Quality Standards (WAC 173-200-040) or MTCA cleanup level

**Table 3. Groundwater TPH and BTEX Analytical Results - HF Sinclair PSR SDF**

Well ID	TPH-Gx Gasoline Range	TPH-Dx Diesel Range	TPH-Dx Diesel Range w/ Silica Gel Cleanup	TPH-Dx Lube Oil Range	TPH-Dx Lube Oil Range w/ Silica Gel Cleanup	Benzene	Toluene	Ethylbenzene	Xylenes
	units: µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
<b>Groundwater Quality Standards: WAC 173-200-040</b>	--	--	--	--	--	1	--	--	--
<b>MTCA Method B Cleanup Level:</b>	--	--	--	--	--	0.8	640	800	1,600
<b>Well 47 (Upgradient) &amp; Considered as Background for the Site</b>									
3/25/1998	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
6/28/1998	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
9/28/1998	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
12/28/1998	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
3/17/1999	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
6/16/1999	NA	ND(<500)	NA	ND(<1490)	NA	ND(<1)	ND(<1)	ND(<1)	ND(<2)
9/14/1999	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	1.56
12/8/1999	NA	ND(<498)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	1.63
3/28/2000	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
6/20/2000	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
9/19/2000	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
12/5/2000	NA	ND(<250)	NA	ND(<750)	NA	NA	NA	NA	NA
3/14/2001	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
6/25/2001	NA	ND(<250)	NA	ND(<750)	NA	NA	NA	NA	NA
9/25/2001	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
12/4/2001	NA	ND(<250)	NA	ND(<750)	NA	NA	NA	NA	NA
3/20/2002	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
6/11/2002	NA	ND(<250)	NA	ND(<750)	NA	NA	NA	NA	NA
9/4/2002	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
12/3/2002	NA	ND(<250)	NA	ND(<750)	NA	NA	NA	NA	NA
3/18/2003	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
6/24/2003	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
9/9/2003	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
12/2/2003	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
3/17/2004	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
6/23/2004	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
9/14/2004	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
12/7/2004	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
3/8/2005	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
6/28/2005	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
9/13/2005	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
12/6/2005	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
4/5/2006	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
6/13/2006	NA	ND(<272)	NA	ND(<543)	NA	NA	NA	NA	NA
9/19/2006	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
12/19/2006	NA	ND(<245)	NA	ND(<490)	NA	NA	NA	NA	NA

**Table 3. Groundwater TPH and BTEX Analytical Results - HF Sinclair PSR SDF**

Well ID	TPH-Gx	TPH-Dx	TPH-Dx	TPH-Dx	TPH-Dx	Benzene	Toluene	Ethylbenzene	Xylenes
	Gasoline Range	Diesel Range	Diesel Range	Lube Oil Range	Lube Oil Range				
	units:	µg/L	µg/L	w/ Silica Gel Cleanup µg/L	µg/L				
<b>Groundwater Quality Standards: WAC 173-200-040</b>	--	--	--	--	--	1	--	--	--
<b>MTCA Method B Cleanup Level:</b>	--	--	--	--	--	0.8	640	800	1,600
<b>Well 47 (Upgradient) &amp; Considered as Background for the Site</b>									
3/21/2007	NA	ND(<245)	NA	ND(<490)	NA	NA	NA	NA	NA
6/20/2007	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
9/4/2007	NA	ND(<243)	NA	ND(<485)	NA	NA	NA	NA	NA
12/4/2007	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
3/11/2008	NA	ND(<245)	NA	ND(<490)	NA	NA	NA	NA	NA
6/3/2008	NA	ND(<245)	NA	ND(<490)	NA	NA	NA	NA	NA
9/9/2008	NA	ND(<243)	NA	ND(<485)	NA	NA	NA	NA	NA
12/2/2008	NA	ND(<243)	NA	ND(<485)	NA	NA	NA	NA	NA
3/18/2009	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
6/10/2009	NA	ND(<71)	NA	ND(<46)	NA	NA	NA	NA	NA
9/16/2009	NA	ND(<95.2)	NA	ND(<95.2)	NA	NA	NA	NA	NA
12/8/2009	NA	ND(<120)	NA	ND(<250)	NA	NA	NA	NA	NA
3/29/2010	NA	ND(<130)	NA	ND(<260)	NA	NA	NA	NA	NA
6/23/2010	NA	ND(<120)	NA	ND(<250)	NA	NA	NA	NA	NA
9/14/2010	NA	ND(<120)	NA	ND(<240)	NA	NA	NA	NA	NA
12/7/2010	NA	ND(<120)	NA	ND(<240)	NA	NA	NA	NA	NA
3/3/2011	NA	ND(<120)	NA	ND(<240)	NA	NA	NA	NA	NA
6/20/2011	NA	ND(<120)	NA	ND(<240)	NA	NA	NA	NA	NA
9/27/2011	NA	ND(<120)	NA	ND(<240)	NA	NA	NA	NA	NA
12/5/2011	NA	ND(<120)	NA	ND(<240)	NA	NA	NA	NA	NA
3/21/2012	NA	ND(<120)	NA	ND(<240)	NA	NA	NA	NA	NA
6/25/2012	NA	ND(<120)	NA	ND(<240)	NA	NA	NA	NA	NA
9/18/2012	NA	ND(<120)	NA	ND(<240)	NA	NA	NA	NA	NA
11/20/2012	NA	ND(<120)	NA	ND(<240)	NA	NA	NA	NA	NA
2/19/2013	NA	ND(<120)	NA	ND(<240)	NA	NA	NA	NA	NA
4/22/2013	NA	ND(<120)	NA	ND(<240)	NA	NA	NA	NA	NA
7/31/2013	NA	ND(<120)	NA	ND(<240)	NA	NA	NA	NA	NA
11/25/2013	NA	ND(<120)	NA	ND(<240)	NA	NA	NA	NA	NA
3/25/2014	NA	ND(<120)	NA	ND(<240)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)
6/11/2014	NA	ND(<120)	NA	ND(<240)	NA	ND(<1)	ND(<1)	ND(<1)	ND(<2)
8/20/2014	NA	ND(<120)	NA	ND(<240)	NA	ND(<1)	ND(<1)	ND(<1)	ND(<2)
11/10/2014	NA	ND(<130)	NA	ND(<260)	NA	ND(<1)	ND(<1)	ND(<1)	ND(<2)
2/18/2015	NA	ND(<120)	NA	ND(<240)	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)
5/28/2015	NA	ND(<130)*	NA	ND(<260)*	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)
9/1/2015	NA	ND(<110)**	NA	ND(<250)**	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)
10/28/2015	NA	ND(<110)	NA	ND(<260)	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)

**Table 3. Groundwater TPH and BTEX Analytical Results - HF Sinclair PSR SDF**

Well ID	TPH-Gx	TPH-Dx	TPH-Dx	TPH-Dx	TPH-Dx	Benzene	Toluene	Ethylbenzene	Xylenes
	Gasoline Range	Diesel Range	Diesel Range	Lube Oil Range	Lube Oil Range				
	units:	µg/L	µg/L	w/ Silica Gel Cleanup µg/L	µg/L				
<b>Groundwater Quality Standards: WAC 173-200-040</b>	--	--	--	--	--	1	--	--	--
<b>MTCA Method B Cleanup Level:</b>	--	--	--	--	--	0.8	640	800	1,600
<b>Well 47 (Upgradient) &amp; Considered as Background for the Site</b>									
10/28/2015 (dup.)	NA	ND(<110)	NA	ND(<250)	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)
2/22/2016	NA	ND(<110)	NA	ND(<260)	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)
5/11/2016	NA	ND(<110)	NA	ND(<250)	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)
5/11/2016 (dup.)	NA	ND(<110)	NA	ND(<250)	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)
8/9/2016	NA	SA	NA	SA	NA	SA	SA	SA	SA
11/10/2016	NA	ND(<120)	NA	ND(<260)	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)
2/2/2017	NA	SA	NA	SA	NA	SA	SA	SA	SA
5/10/2017	NA	56	NA	ND(<270)	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)
5/10/2017 (dup.)	NA	53	NA	ND(<270)	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)
8/9/2017	NA	SA	NA	SA	NA	SA	SA	SA	SA
11/7/2017	NA	ND(<110)	NA	ND(<260)	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)
2/21/2018	NA	SA	NA	SA	NA	SA	SA	SA	SA
4/11/2018	NA	ND(<120)	NA	ND(<370)	NA	ND(<3)	ND(<2)	ND(<3)	ND(<3)
9/7/2018	NA	SA	NA	SA	NA	SA	SA	SA	SA
11/6/2018	NA	ND(<120)	NA	ND(<390)	NA	ND(<3)	ND(<2)	ND(<3)	ND(<3)
2/25/2019	NA	SA	NA	SA	NA	SA	SA	SA	SA
5/21/2019	NA	ND(<110)	NA	ND(<360)	NA	NA	NA	NA	NA
6/5/2019	NA	NA	NA	NA	NA	ND(<3)	ND(<2)	ND(<3)	ND(<3)
9/3/2019	NA	SA	NA	SA	NA	SA	SA	SA	SA
11/13/2019	NA	ND(<120)	NA	ND(<370)	NA	ND(<3)	ND(<2)	ND(<3)	ND(<3)
2/12/2020	NA	SA	NA	SA	NA	SA	SA	SA	SA
4/29/2020	NA	ND(<110)	NA	ND(<360)	NA	ND(<3)	ND(<2)	ND(<3)	ND(<3)
8/5/2020	NA	SA	NA	SA	NA	SA	SA	SA	SA
11/3/2020	NA	ND(<110)	NA	ND(<340)	NA	ND(<3)	ND(<2)	ND(<3)	ND(<3)
2/10/2021	NA	SA	NA	SA	NA	SA	SA	SA	SA
5/25/2021	NA	ND(<110)	NA	ND(<360)	NA	ND(<1)	ND(<1)	ND(<1)	ND(<2)
8/4/2021	NA	SA	NA	SA	NA	SA	SA	SA	SA
11/9/2021	NA	ND(<110)	NA	ND(<360)	NA	ND(<1)	ND(<1)	ND(<1)	ND(<2)
2/15/2022	NA	SA	NA	SA	NA	SA	SA	SA	SA
4/18/2022	ND(<50)	ND(<110)	NA	ND(<360)	NA	ND(<1)	ND(<1)	ND(<1)	ND(<2)
8/10/2022	ND(<50)***	ND(<110)***	ND(<110)***	ND(<350)***	ND(<350)***	ND(<1)	ND(<1)	ND(<1)	ND(<2)
11/16/2022	ND(<50)***	ND(<110)	ND(<110)	ND(<360)	ND(<360)	ND(<1)	ND(<1)	ND(<1)	ND(<2)
2/6/2023	ND(<50)	ND(<110)	ND(<110)	ND(<360)	ND(<360)	ND(<1)	ND(<1)	ND(<1)	ND(<2)
5/9/2023	ND(<50)	ND(<110)	ND(<110)	ND(<360)	ND(<360)	ND(<1)	ND(<1)	ND(<1)	ND(<2)
8/9/2023	ND(<50)	ND(<110)	ND(<110)	ND(<360)	ND(<360)	ND(<1)	ND(<1)	ND(<1)	ND(<2)
11/8/2023	ND(<100)	ND(<110)	ND(<110)	ND(<360)	ND(<360)	ND(<1)	ND(<1)	ND(<1)	ND(<2)

**Table 3. Groundwater TPH and BTEX Analytical Results - HF Sinclair PSR SDF**

Well ID	TPH-Gx	TPH-Dx	TPH-Dx	TPH-Dx	TPH-Dx	Benzene	Toluene	Ethylbenzene	Xylenes
	Gasoline Range	Diesel Range	Diesel Range	Lube Oil Range	Lube Oil Range				
	units:	µg/L	µg/L	w/ Silica Gel Cleanup µg/L	µg/L				
<b>Groundwater Quality Standards: WAC 173-200-040</b>	--	--	--	--	--	1	--	--	--
<b>MTCA Method B Cleanup Level:</b>	--	--	--	--	--	0.8	640	800	1,600
<b>Well 112 (Downgradient)</b>									
3/25/1998	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
6/28/1998	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
9/28/1998	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
12/28/1998	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
3/17/1999	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
6/16/1999	NA	ND(<500)	NA	ND(<1500)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
9/14/1999	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
12/8/1999	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
3/28/2000	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
6/20/2000	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
9/19/2000	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
12/5/2000	NA	ND(<250)	NA	ND(<750)	NA	NA	NA	NA	NA
3/14/2001	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
6/25/2001	NA	ND(<250)	NA	ND(<750)	NA	NA	NA	NA	NA
9/25/2001	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
12/4/2001	NA	ND(<250)	NA	ND(<750)	NA	NA	NA	NA	NA
3/20/2002	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
6/11/2002	NA	ND(<250)	NA	ND(<750)	NA	NA	NA	NA	NA
9/4/2002	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
12/3/2002	NA	ND(<250)	NA	ND(<750)	NA	NA	NA	NA	NA
3/18/2003	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
6/24/2003	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
9/9/2003	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
12/2/2003	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
3/17/2004	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
6/23/2004	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
9/14/2004	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
12/7/2004	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
3/8/2005	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
6/28/2005	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
9/13/2005	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
12/6/2005	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
4/5/2006	NA	ND(<245)	NA	ND(<490)	NA	NA	NA	NA	NA
6/13/2006	NA	ND(<266)	NA	ND(<532)	NA	NA	NA	NA	NA
9/19/2006	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
12/19/2006	NA	ND(<245)	NA	ND(<490)	NA	NA	NA	NA	NA

**Table 3. Groundwater TPH and BTEX Analytical Results - HF Sinclair PSR SDF**

Well ID	TPH-Gx	TPH-Dx	TPH-Dx	TPH-Dx	TPH-Dx	Benzene	Toluene	Ethylbenzene	Xylenes
	Gasoline Range	Diesel Range	Diesel Range	Lube Oil Range	Lube Oil Range				
	units:	µg/L	µg/L	w/ Silica Gel Cleanup µg/L	µg/L				
<b>Groundwater Quality Standards: WAC 173-200-040</b>	--	--	--	--	--	1	--	--	--
<b>MTCA Method B Cleanup Level:</b>	--	--	--	--	--	0.8	640	800	1,600
<b>Well 112 (Downgradient)</b>									
3/21/2007	NA	ND(<243)	NA	ND(<485)	NA	NA	NA	NA	NA
6/20/2007	NA	ND(<243)	NA	ND(<485)	NA	NA	NA	NA	NA
9/4/2007	NA	ND(<243)	NA	ND(<485)	NA	NA	NA	NA	NA
12/4/2007	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
3/11/2008	NA	ND(<243)	NA	ND(<485)	NA	NA	NA	NA	NA
6/3/2008	NA	ND(<245)	NA	ND(<490)	NA	NA	NA	NA	NA
9/9/2008	NA	ND(<240)	NA	ND(<481)	NA	NA	NA	NA	NA
12/2/2008	NA	ND(<243)	NA	ND(<485)	NA	NA	NA	NA	NA
3/18/2009	NA	ND(<243)	NA	ND(<485)	NA	NA	NA	NA	NA
6/10/2009	NA	ND(<71)	NA	ND(<47)	NA	NA	NA	NA	NA
9/16/2009	NA	ND(<100)	NA	ND(<100)	NA	NA	NA	NA	NA
12/8/2009	NA	ND(<120)	NA	ND(<250)	NA	NA	NA	NA	NA
3/29/2010	NA	ND(<120)	NA	ND(<250)	NA	NA	NA	NA	NA
6/23/2010	NA	ND(<120)	NA	ND(<250)	NA	NA	NA	NA	NA
9/14/2010	NA	ND(<120)	NA	ND(<240)	NA	NA	NA	NA	NA
12/7/2010	NA	ND(<120)	NA	ND(<240)	NA	NA	NA	NA	NA
3/3/2011	NA	ND(<120)	NA	ND(<240)	NA	NA	NA	NA	NA
6/20/2011	NA	ND(<120)	NA	ND(<240)	NA	NA	NA	NA	NA
9/27/2011	NA	ND(<120)	NA	ND(<240)	NA	NA	NA	NA	NA
12/5/2011	NA	ND(<120)	NA	ND(<240)	NA	NA	NA	NA	NA
3/21/2012	NA	ND(<120)	NA	ND(<240)	NA	NA	NA	NA	NA
6/25/2012	NA	ND(<120)	NA	ND(<240)	NA	NA	NA	NA	NA
9/18/2012	NA	ND(<120)	NA	ND(<240)	NA	NA	NA	NA	NA
11/20/2012	NA	ND(<120)	NA	ND(<240)	NA	NA	NA	NA	NA
2/19/2013	NA	ND(<120)	NA	ND(<240)	NA	NA	NA	NA	NA
2/19/2013 (dup.)	NA	NA	NA	NA	NA	NA	NA	NA	NA
4/22/2013	NA	ND(<120)	NA	ND(<240)	NA	NA	NA	NA	NA
7/31/2013	NA	ND(<120)	NA	ND(<240)	NA	NA	NA	NA	NA
11/25/2013	NA	ND(<120)	NA	ND(<240)	NA	NA	NA	NA	NA
3/25/2014	NA	ND(<120)	NA	ND(<240)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)
6/11/2014	NA	ND(<120)	NA	ND(<240)	NA	ND(<1)	ND(<1)	ND(<1)	ND(<2)
8/20/2014	NA	ND(<120)	NA	ND(<240)	NA	ND(<1)	ND(<1)	ND(<1)	ND(<2)
11/10/2014	NA	ND(<130)	NA	ND(<260)	NA	ND(<1)	ND(<1)	ND(<1)	ND(<2)
11/10/2014 (dup.)	NA	ND(<130)	NA	ND(<260)	NA	ND(<1)	ND(<1)	ND(<1)	ND(<2)
2/18/2015	NA	ND(<130)	NA	ND(<250)	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)
2/18/2015 (dup.)	NA	ND(<120)	NA	ND(<240)	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)

**Table 3. Groundwater TPH and BTEX Analytical Results - HF Sinclair PSR SDF**

Well ID	TPH-Gx	TPH-Dx	TPH-Dx	TPH-Dx	TPH-Dx	Benzene	Toluene	Ethylbenzene	Xylenes
	Gasoline Range	Diesel Range	Diesel Range	Lube Oil Range	Lube Oil Range				
	units:	µg/L	µg/L	w/ Silica Gel Cleanup µg/L	µg/L				
<b>Groundwater Quality Standards: WAC 173-200-040</b>	--	--	--	--	--	1	--	--	--
<b>MTCA Method B Cleanup Level:</b>	--	--	--	--	--	0.8	640	800	1,600
<b>Well 112 (Downgradient)</b>									
5/28/2015	NA	ND(<110)*	NA	ND(<250)*	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)
5/28/2015 (dup.)	NA	NA	NA	NA	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)
9/1/2015	NA	ND(<110)**	NA	ND(<260)**	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)
10/28/2015	NA	ND(<110)	NA	ND(<250)	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)
2/22/2016	NA	ND(<110)	NA	ND(<250)	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)
2/22/2016 (dup.)	NA	ND(<110)	NA	ND(<260)	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)
5/11/2016	NA	ND(<110)	NA	ND(<250)	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)
8/9/2016	NA	SA	NA	SA	NA	SA	SA	SA	SA
11/10/2016	NA	ND(<120)	NA	ND(<280)	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)
2/2/2017	NA	SA	NA	SA	NA	SA	SA	SA	SA
2/2/2017 (dup.)	NA	SA	NA	SA	NA	SA	SA	SA	SA
5/10/2017	NA	49	NA	ND(<260)	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)
8/9/2017	NA	SA	NA	SA	NA	SA	SA	SA	SA
11/7/2017	NA	ND(<110)	NA	ND(<260)	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)
2/21/2018	NA	SA	NA	SA	NA	SA	SA	SA	SA
4/11/2018	NA	ND(<120)	NA	ND(<380)	NA	ND(<3)	ND(<2)	ND(<3)	ND(<3)
9/7/2018	NA	SA	NA	SA	NA	SA	SA	SA	SA
11/6/2018	NA	140	NA	ND(<390)	NA	ND(<3)	ND(<2)	ND(<3)	ND(<3)
2/25/2019	NA	ND(<120)	NA	ND(<380)	NA	SA	SA	SA	SA
5/21/2019	NA	ND(<120)	NA	ND(<370)	NA	NA	NA	NA	NA
5/21/2019 (dup)	NA	ND(<110)	NA	ND(<350)	NA	NA	NA	NA	NA
6/5/2019	NA	SA	NA	SA	NA	SA	SA	SA	SA
6/5/2019 (dup)	NA	SA	NA	SA	NA	SA	SA	SA	SA
9/3/2019	NA	ND(<110)	NA	ND(<350)	NA	SA	SA	SA	SA
11/13/2019	NA	ND(<120)	NA	ND(<370)	NA	ND(<3)	ND(<2)	ND(<3)	ND(<3)
2/12/2020	NA	SA	NA	SA	NA	SA	SA	SA	SA
4/29/2020	NA	ND(<110)	NA	ND(<360)	NA	ND(<3)	ND(<2)	ND(<3)	ND(<3)
8/5/2020	NA	SA	NA	SA	NA	SA	SA	SA	SA
11/3/2020	NA	ND(<110)	NA	ND(<360)	NA	ND(<3)	ND(<2)	ND(<3)	ND(<3)
2/10/2021	NA	SA	NA	SA	NA	SA	SA	SA	SA
5/25/2021	NA	ND(<120)	NA	ND(<370)	NA	ND(<1)	ND(<1)	ND(<1)	ND(<2)
8/4/2021	NA	SA	NA	SA	NA	SA	SA	SA	SA
11/9/2021	NA	ND(<110)	NA	ND(<360)	NA	ND(<1)	ND(<1)	ND(<1)	ND(<2)
2/15/2022	NA	SA	NA	SA	NA	SA	SA	SA	SA
4/18/2022	ND(<50)	ND(<110)	NA	ND(<360)	NA	ND(<1)	ND(<1)	ND(<1)	ND(<2)
8/10/2022	ND(<50)***	ND(<110)***	ND(<110)***	ND(<370)***	ND(<370)***	ND(<1)	ND(<1)	ND(<1)	ND(<2)



**Table 3. Groundwater TPH and BTEX Analytical Results - HF Sinclair PSR SDF**

Well ID	TPH-Gx	TPH-Dx	TPH-Dx	TPH-Dx	TPH-Dx	Benzene	Toluene	Ethylbenzene	Xylenes
	Gasoline Range	Diesel Range	Diesel Range	Lube Oil Range	Lube Oil Range				
	units:	µg/L	µg/L	w/ Silica Gel Cleanup µg/L	µg/L				
<b>Groundwater Quality Standards: WAC 173-200-040</b>	--	--	--	--	--	1	--	--	--
<b>MTCA Method B Cleanup Level:</b>	--	--	--	--	--	0.8	640	800	1,600
<b>Well 112 (Downgradient)</b>									
11/16/2022	ND(<50)***	ND(<110)	ND(<110)	ND(<360)	ND(<360)	ND(<1)	ND(<1)	ND(<1)	ND(<2)
2/6/2023	ND(<50)	ND(<110)	ND(<110)	ND(<360)	ND(<360)	ND(<1)	ND(<1)	ND(<1)	ND(<2)
5/9/2023	ND(<50)	ND(<110)	ND(<110)	ND(<360)	ND(<360)	ND(<1)	ND(<1)	ND(<1)	ND(<2)
8/9/2023	ND(<50)	110	ND(<110)	ND(<350)	ND(<350)	ND(<1)	ND(<1)	ND(<1)	ND(<2)
11/8/2023	ND(<100)	ND(<110)	ND(<110)	ND(<360)	ND(<360)	ND(<1)	ND(<1)	ND(<1)	ND(<2)
<b>Well 113 (Downgradient)</b>									
3/25/1998	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
6/28/1998	NA	318	NA	1070	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
9/28/1998	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
12/28/1998	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
3/17/1999	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
6/16/1999	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
9/14/1999	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
12/8/1999	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
3/28/2000	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
6/20/2000	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
9/19/2000	NA	ND(<515)	NA	ND(<1550)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
12/5/2000	NA	ND(<250)	NA	ND(<750)	NA	NA	NA	NA	NA
3/14/2001	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
6/25/2001	NA	ND(<250)	NA	ND(<750)	NA	NA	NA	NA	NA
9/25/2001	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
12/4/2001	NA	ND(<250)	NA	ND(<750)	NA	NA	NA	NA	NA
3/20/2002	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
6/11/2002	NA	ND(<250)	NA	ND(<750)	NA	NA	NA	NA	NA
9/4/2002	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
12/3/2002	NA	ND(<250)	NA	ND(<750)	NA	NA	NA	NA	NA
3/18/2003	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
6/24/2003	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
9/9/2003	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
12/2/2003	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
3/17/2004	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
6/23/2004	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
9/14/2004	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
12/7/2004	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
3/8/2005	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
6/28/2005	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA

**Table 3. Groundwater TPH and BTEX Analytical Results - HF Sinclair PSR SDF**

Well ID	TPH-Gx	TPH-Dx	TPH-Dx	TPH-Dx	TPH-Dx	Benzene	Toluene	Ethylbenzene	Xylenes
	Gasoline Range	Diesel Range	Diesel Range	Lube Oil Range	Lube Oil Range				
	units:	µg/L	µg/L	w/ Silica Gel Cleanup µg/L	µg/L				
<b>Groundwater Quality Standards: WAC 173-200-040</b>	--	--	--	--	--	1	--	--	--
<b>MTCA Method B Cleanup Level:</b>	--	--	--	--	--	0.8	640	800	1,600
<b>Well 113 (Downgradient)</b>									
9/13/2005	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
12/6/2005	NA	ND(<243)	NA	ND(<485)	NA	NA	NA	NA	NA
4/5/2006	NA	ND(<248)	NA	ND(<495)	NA	NA	NA	NA	NA
6/13/2006	NA	ND(<258)	NA	ND(<515)	NA	NA	NA	NA	NA
9/19/2006	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
12/19/2006	NA	ND(<245)	NA	ND(<490)	NA	NA	NA	NA	NA
3/21/2007	NA	ND(<245)	NA	ND(<490)	NA	NA	NA	NA	NA
6/20/2007	NA	ND(<243)	NA	ND(<485)	NA	NA	NA	NA	NA
9/4/2007	NA	ND(<243)	NA	ND(<485)	NA	NA	NA	NA	NA
12/4/2007	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
3/11/2008	NA	ND(<240)	NA	ND(<481)	NA	NA	NA	NA	NA
6/3/2008	NA	ND(<245)	NA	ND(<490)	NA	NA	NA	NA	NA
9/9/2008	NA	ND(<243)	NA	ND(<485)	NA	NA	NA	NA	NA
12/2/2008	NA	ND(<243)	NA	ND(<485)	NA	NA	NA	NA	NA
3/18/2009	NA	ND(<245)	NA	ND(<490)	NA	NA	NA	NA	NA
6/10/2009	NA	ND(<71)	NA	ND(<46)	NA	NA	NA	NA	NA
9/16/2009	NA	ND(<100)	NA	ND(<100)	NA	NA	NA	NA	NA
12/8/2009	NA	ND(<120)	NA	250	NA	NA	NA	NA	NA
3/29/2010	NA	ND(<120)	NA	ND(<240)	NA	NA	NA	NA	NA
6/23/2010	NA	140	NA	ND(<250)	NA	NA	NA	NA	NA
9/14/2010	NA	ND(<120)	NA	ND(<240)	NA	NA	NA	NA	NA
12/7/2010	NA	130	NA	ND(<240)	NA	NA	NA	NA	NA
3/3/2011	NA	ND(<120)	NA	ND(<240)	NA	NA	NA	NA	NA
6/20/2011	NA	140	NA	ND(<240)	NA	NA	NA	NA	NA
6/20/2011 (dup.)	NA	140	NA	ND(<240)	NA	NA	NA	NA	NA
9/27/2011	NA	ND(<120)	NA	ND(<240)	NA	NA	NA	NA	NA
12/5/2011	NA	120	NA	ND(<240)	NA	NA	NA	NA	NA
3/21/2012	NA	190	NA	ND(<240)	NA	NA	NA	NA	NA
6/25/2012	NA	140	NA	ND(<240)	NA	NA	NA	NA	NA
6/25/2012 (dup.)	NA	120	NA	ND(<240)	NA	NA	NA	NA	NA
9/18/2012	NA	ND(<120)	NA	ND(<240)	NA	NA	NA	NA	NA
11/20/2012	NA	150	NA	ND(<240)	NA	NA	NA	NA	NA
11/21/2012 (dup.)	NA	180	NA	ND(<240)	NA	NA	NA	NA	NA
2/19/2013	NA	170	NA	ND(<240)	NA	NA	NA	NA	NA
4/22/2013	NA	ND(<120)	NA	ND(<240)	NA	NA	NA	NA	NA
7/31/2013	NA	ND(<120)	NA	ND(<240)	NA	NA	NA	NA	NA

**Table 3. Groundwater TPH and BTEX Analytical Results - HF Sinclair PSR SDF**

Well ID	TPH-Gx	TPH-Dx	TPH-Dx	TPH-Dx	TPH-Dx	Benzene	Toluene	Ethylbenzene	Xylenes
	Gasoline Range	Diesel Range	Diesel Range	Lube Oil Range	Lube Oil Range				
	units:	µg/L	µg/L	w/ Silica Gel Cleanup µg/L	µg/L				
<b>Groundwater Quality Standards: WAC 173-200-040</b>	--	--	--	--	--	1	--	--	--
<b>MTCA Method B Cleanup Level:</b>	--	--	--	--	--	0.8	640	800	1,600
<b>Well 113 (Downgradient)</b>									
7/31/2013 (dup.)	NA	ND(<120)	NA	ND(<240)	NA	NA	NA	NA	NA
11/25/2013	NA	160	NA	ND(<240)	NA	NA	NA	NA	NA
3/25/2014	NA	130	NA	ND(<240)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)
6/11/2014	NA	ND(<120)	NA	ND(<240)	NA	ND(<1)	ND(<1)	ND(<1)	ND(<2)
8/21/2014	NA	ND(<120)	NA	ND(<240)	NA	ND(<1)	ND(<1)	ND(<1)	ND(<2)
11/10/2014	NA	ND(<130)	NA	ND(<260)	NA	ND(<1)	ND(<1)	ND(<1)	ND(<2)
2/18/2015	NA	140	NA	ND(<240)	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)
5/28/2015	NA	ND(<110)*	NA	ND(<250)*	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)
6/25/2015 (dup.)	NA	110	NA	ND(<250)	NA	NA	NA	NA	NA
9/1/2015	NA	ND(<110)**	NA	ND(<250)**	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)
9/1/2015 (dup.)	NA	ND(<110)**	NA	ND(<250)**	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)
10/28/2015	NA	ND(<110)	NA	ND(<260)	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)
2/22/2016	NA	ND(<110)	NA	ND(<250)	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)
5/11/2016	NA	ND(<110)	NA	ND(<250)	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)
8/9/2016	NA	ND(<120)	NA	ND(<270)	NA	SA	SA	SA	SA
8/9/2016 (dup.)	NA	ND(<120)	NA	ND(<260)	NA	NA	NA	NA	NA
11/10/2016	NA	ND(<120)	NA	ND(<260)	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)
11/10/16 (dup.)	NA	ND(<120)	NA	ND(<270)	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)
2/2/2017	NA	SA	NA	SA	NA	SA	SA	SA	SA
5/10/2017	NA	94	NA	ND(<260)	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)
8/9/2017	NA	ND(<110)	NA	SA	NA	SA	SA	SA	SA
11/7/2017	NA	ND(<110)	NA	ND(<260)	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)
11/7/17 (dup.)	NA	ND(<110)	NA	ND(<250)	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)
2/21/2018	NA	ND(<110)	NA	ND(<250)	NA	SA	SA	SA	SA
4/11/2018	NA	ND(<120)	NA	ND(<380)	NA	ND(<3)	ND(<2)	ND(<3)	ND(<3)
9/7/2018	NA	ND(<110)	NA	ND(<350)	NA	SA	SA	SA	SA
11/6/2018	NA	120	NA	ND(<380)	NA	ND(<3)	ND(<2)	ND(<3)	ND(<3)
11/6/2018 (dup.)	NA	ND(<110)	NA	ND(<370)	NA	ND(<3)	ND(<2)	ND(<3)	ND(<3)
2/25/2019	NA	ND(<120)	NA	ND(<390)	NA	SA	SA	SA	SA
2/25/2019 (dup.)	NA	ND(<120)	NA	ND(<390)	NA	SA	SA	SA	SA
5/21/2019	NA	ND(<110)	NA	ND(<360)	NA	NA	NA	NA	NA
6/5/2019	NA	SA	NA	SA	NA	ND(<3)	ND(<2)	ND(<3)	ND(<3)
9/3/2019	NA	ND(<110)	NA	ND(<350)	NA	SA	SA	SA	SA
9/3/2019 (dup)	NA	ND(<110)	NA	ND(<350)	NA	SA	SA	SA	SA
11/13/2019	NA	ND(<110)	NA	ND(<360)	NA	ND(<3)	ND(<2)	ND(<3)	ND(<3)
2/12/2020	NA	ND(<120)	NA	ND(<390)	NA	SA	SA	SA	SA

**Table 3. Groundwater TPH and BTEX Analytical Results - HF Sinclair PSR SDF**

Well ID	TPH-Gx	TPH-Dx	TPH-Dx	TPH-Dx	TPH-Dx	Benzene	Toluene	Ethylbenzene	Xylenes
	Gasoline Range	Diesel Range	Diesel Range	Lube Oil Range	Lube Oil Range				
	units:	µg/L	µg/L	w/ Silica Gel Cleanup µg/L	µg/L				
<b>Groundwater Quality Standards: WAC 173-200-040</b>	--	--	--	--	--	1	--	--	--
<b>MTCA Method B Cleanup Level:</b>	--	--	--	--	--	0.8	640	800	1,600
<b>Well 113 (Downgradient)</b>									
4/29/2020	NA	ND(<110)	NA	ND(<360)	NA	ND(<3)	ND(<2)	ND(<3)	ND(<3)
8/5/2020	NA	ND(<110)	NA	ND(<360)	NA	SA	SA	SA	SA
11/3/2020	NA	180	NA	350	NA	ND(<3)	ND(<2)	ND(<3)	ND(<3)
2/10/2021	NA	ND(<120)	NA	ND(<390)	NA	SA	SA	SA	SA
5/25/2021	NA	160	NA	ND(<380)	NA	ND(<1)	ND(<1)	ND(<1)	ND(<2)
8/4/2021	NA	260	NA	440	NA	SA	SA	SA	SA
11/9/2021	NA	ND(<110)	NA	ND(<360)	NA	ND(<1)	ND(<1)	ND(<1)	ND(<2)
11/9/2021 (dup.)	NA	ND(<110)	NA	ND(<360)	NA	ND(<1)	ND(<1)	ND(<1)	ND(<2)
2/15/2022	NA	110	NA	ND(<360)	NA	SA	SA	SA	SA
4/18/2022	ND(<50)	ND(<110)	NA	ND(<360)	NA	ND(<1)	ND(<1)	ND(<1)	ND(<2)
4/18/2022 (dup.)	ND(<50)	ND(<110)	NA	ND(<360)	NA	ND(<1)	ND(<1)	ND(<1)	ND(<2)
8/10/2022	ND(<50)***	ND(<110)***	ND(<110)***	ND(<360)***	ND(<360)***	ND(<1)	ND(<1)	ND(<1)	ND(<2)
11/16/2022	ND(<50)***	ND(<120)	ND(<120)	ND(<380)	ND(<380)	ND(<1)	ND(<1)	ND(<1)	ND(<2)
2/6/2023	ND(<50)	ND(<110)	ND(<110)	ND(<360)	ND(<360)	ND(<1)	ND(<1)	ND(<1)	ND(<2)
2/6/2023 (dup.)	ND(<50)	ND(<110)	ND(<110)	ND(<360)	ND(<360)	ND(<1)	ND(<1)	ND(<1)	ND(<2)
5/9/2023	ND(<50)	ND(<110)	ND(<110)	ND(<360)	ND(<360)	ND(<1)	ND(<1)	ND(<1)	ND(<2)
8/9/2023	ND(<50)	120	ND(<110)	ND(<350)	ND(<350)	ND(<1)	ND(<1)	ND(<1)	ND(<2)
8/9/2023 (dup.)	ND(<50)	130	ND(<110)	ND(<350)	ND(<350)	ND(<1)	ND(<1)	ND(<1)	ND(<2)
11/8/2023	ND(<100)	120	ND(<110)	ND(<360)	ND(<360)	ND(<1)	ND(<1)	ND(<1)	ND(<2)
11/8/2023 (dup.)	ND(<100)	120	ND(<110)	ND(<360)	ND(<360)	ND(<1)	ND(<1)	ND(<1)	ND(<2)
<b>Well 127 (Downgradient)</b>									
3/25/1998	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
6/28/1998	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
9/28/1998	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
12/28/1998	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
3/17/1999	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
6/16/1999	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
9/14/1999	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
12/8/1999	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
3/28/2000	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
6/20/2000	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)

**Table 3. Groundwater TPH and BTEX Analytical Results - HF Sinclair PSR SDF**

Well ID	TPH-Gx	TPH-Dx	TPH-Dx	TPH-Dx	TPH-Dx	Benzene	Toluene	Ethylbenzene	Xylenes
	Gasoline Range	Diesel Range	Diesel Range	Lube Oil Range	Lube Oil Range				
	units:	µg/L	µg/L	w/ Silica Gel Cleanup µg/L	µg/L				
<b>Groundwater Quality Standards: WAC 173-200-040</b>	--	--	--	--	--	1	--	--	--
<b>MTCA Method B Cleanup Level:</b>	--	--	--	--	--	0.8	640	800	1,600
<b>Well 127 (Downgradient)</b>									
9/19/2000	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
12/5/2000	NA	ND(<250)	NA	ND(<750)	NA	NA	NA	NA	NA
3/14/2001	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
6/25/2001	NA	ND(<250)	NA	ND(<750)	NA	NA	NA	NA	NA
9/25/2001	NA	ND(<250)	NA	ND(<750)	NA	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
12/4/2001	NA	ND(<250)	NA	ND(<750)	NA	NA	NA	NA	NA
3/20/2002	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
6/11/2002	NA	ND(<250)	NA	ND(<750)	NA	NA	NA	NA	NA
9/4/2002	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
12/3/2002	NA	ND(<250)	NA	ND(<750)	NA	NA	NA	NA	NA
3/18/2003	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
6/24/2003	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
9/9/2003	NA	268	NA	ND(<500)	NA	NA	NA	NA	NA
12/2/2003	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
3/17/2004	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
6/23/2004	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
9/14/2004	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
12/7/2004	NA	315	NA	ND(<500)	NA	NA	NA	NA	NA
3/8/2005	NA	287	NA	ND(<500)	NA	NA	NA	NA	NA
6/28/2005	NA	373	NA	ND(<500)	NA	NA	NA	NA	NA
9/13/2005	NA	288	NA	ND(<500)	NA	NA	NA	NA	NA
12/6/2005	NA	378	NA	ND(<490)	NA	NA	NA	NA	NA
4/5/2006	NA	351	NA	ND(<490)	NA	NA	NA	NA	NA
6/13/2006	NA	ND(<253)	NA	ND(<505)	NA	NA	NA	NA	NA
9/19/2006	NA	ND(<250)	NA	ND(<500)	NA	NA	NA	NA	NA
12/19/2006	NA	ND(<245)	NA	ND(<490)	NA	NA	NA	NA	NA
3/21/2007	NA	299	NA	ND(<490)	NA	NA	NA	NA	NA
6/20/2007	NA	ND(<243)	NA	ND(<485)	NA	NA	NA	NA	NA
9/4/2007	NA	ND(<248)	NA	ND(<495)	NA	NA	NA	NA	NA

**Table 3. Groundwater TPH and BTEX Analytical Results - HF Sinclair PSR SDF**

Well ID	TPH-Gx	TPH-Dx	TPH-Dx	TPH-Dx	TPH-Dx	Benzene	Toluene	Ethylbenzene	Xylenes
	Gasoline Range	Diesel Range	Diesel Range	Lube Oil Range	Lube Oil Range				
	units:	µg/L	µg/L	w/ Silica Gel Cleanup µg/L	w/ Silica Gel Cleanup µg/L				
<b>Groundwater Quality Standards: WAC 173-200-040</b>	—	—	—	—	—	1	—	—	—
<b>MTCA Method B Cleanup Level:</b>	—	—	—	—	—	0.8	640	800	1,600
<b>Well 127 (Downgradient)</b>									
12/4/2007	NA	282	NA	ND(<500)	NA	NA	NA	NA	NA
3/11/2008	NA	243	NA	ND(<481)	NA	NA	NA	NA	NA
6/3/2008	NA	347	NA	ND(<485)	NA	NA	NA	NA	NA
9/9/2008	NA	362	NA	ND(<481)	NA	NA	NA	NA	NA
12/2/2008	NA	249	NA	ND(<485)	NA	NA	NA	NA	NA
3/18/2009	NA	272	NA	ND(<485)	NA	NA	NA	NA	NA
6/10/2009	NA	ND(<71)	NA	ND(<47)	NA	NA	NA	NA	NA
9/16/2009	NA	200	NA	110	NA	NA	NA	NA	NA
12/8/2009	NA	290	NA	510	NA	NA	NA	NA	NA
3/29/2010	NA	270	NA	520	NA	NA	NA	NA	NA
6/23/2010	NA	560	NA	850	NA	NA	NA	NA	NA
9/14/2010	NA	300	NA	500	NA	NA	NA	NA	NA
12/7/2010	NA	460	NA	570	NA	NA	NA	NA	NA
3/3/2011	NA	220	NA	ND(<240)	NA	NA	NA	NA	NA
3/3/2011 (dup.)	NA	230	NA	240	NA	NA	NA	NA	NA
6/20/2011	NA	420	NA	460	NA	NA	NA	NA	NA
9/27/2011	NA	460	NA	640	NA	NA	NA	NA	NA
9/27/2011 (dup.)	NA	420	NA	580	NA	NA	NA	NA	NA
12/5/2011	NA	370	NA	440	NA	NA	NA	NA	NA
3/21/2012	NA	500	NA	640	NA	NA	NA	NA	NA
6/25/2012	NA	390	NA	570	NA	NA	NA	NA	NA
9/18/2012	NA	410	NA	610	NA	NA	NA	NA	NA
11/20/2012	NA	400	NA	530	NA	NA	NA	NA	NA
2/19/2013	NA	320	NA	410	NA	NA	NA	NA	NA
4/22/2013	NA	310	NA	590	NA	NA	NA	NA	NA
4/22/2013 (dup.)	NA	350	NA	670	NA	NA	NA	NA	NA
7/31/2013	NA	190	NA	ND(<240)	NA	NA	NA	NA	NA
11/25/2013	NA	250	NA	260	NA	NA	NA	NA	NA
11/25/2013 (dup.)	NA	290	NA	270	NA	NA	NA	NA	NA
3/25/2014	NA	200	NA	310	NA	ND(<5)	ND(<5)	ND(<5)	ND(<5)
3/25/2014 (dup.)	NA	190	NA	310	NA	ND(<5)	ND(<5)	ND(<5)	ND(<5)
6/11/2014	NA	190	NA	ND(<250)	NA	ND(<1)	ND(<1)	ND(<1)	ND(<2)
8/20/2014	NA	170	NA	ND(<240)	NA	ND(<1)	ND(<1)	ND(<1)	ND(<2)
8/20/2014 (dup.)	NA	170	NA	ND(<240)	NA	ND(<1)	ND(<1)	ND(<1)	ND(<2)
11/10/2014	NA	200	NA	ND(<260)	NA	ND(<1)	ND(<1)	ND(<1)	ND(<2)
2/18/2015	NA	260	NA	ND(<240)	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)

**Table 3. Groundwater TPH and BTEX Analytical Results - HF Sinclair PSR SDF**

Well ID	TPH-Gx	TPH-Dx	TPH-Dx	TPH-Dx	TPH-Dx	Benzene	Toluene	Ethylbenzene	Xylenes
	Gasoline Range	Diesel Range	Diesel Range	Lube Oil Range	Lube Oil Range				
	units:	µg/L	µg/L	w/ Silica Gel Cleanup µg/L	µg/L				
<b>Groundwater Quality Standards: WAC 173-200-040</b>	--	--	--	--	--	1	--	--	--
<b>MTCA Method B Cleanup Level:</b>	--	--	--	--	--	0.8	640	800	1,600
<b>Well 127 (Downgradient)</b>									
5/28/2015	NA	170*	NA	ND(<250)*	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)
9/1/2015	NA	ND(<110)**	NA	ND(<250)**	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)
10/28/2015	NA	160	NA	ND(<250)	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)
2/22/2016	NA	160	NA	ND(<260)	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)
5/11/2016	NA	190	NA	ND(<250)	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)
8/9/2016	NA	270	NA	350	NA	SA	SA	SA	SA
11/10/2016	NA	140	NA	ND(<270)	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)
2/2/2017	NA	150	NA	ND(<270)	NA	SA	SA	SA	SA
5/10/2017	NA	180	NA	130	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)
8/9/2017	NA	130	NA	ND(<280)	NA	SA	SA	SA	SA
8/9/2017 (dup.)	NA	130	NA	ND(<270)	NA	SA	SA	SA	SA
11/7/2017	NA	240	NA	420	NA	ND(<2)	ND(<2)	ND(<3)	ND(<3)
2/21/2018	NA	160	NA	ND(<370)	NA	SA	SA	SA	SA
2/21/18 (dup.)	NA	160	NA	ND(<370)	NA	SA	SA	SA	SA
4/11/2018	NA	ND(<120)	NA	ND(<380)	NA	ND(<3)	ND(<2)	ND(<3)	ND(<3)
4/11/2018 (dup.)	NA	140	NA	ND(<380)	NA	ND(<3)	ND(<2)	ND(<3)	ND(<3)
9/7/2018	NA	250	NA	ND(<350)	NA	SA	SA	SA	SA
9/7/2018 (dup)	NA	220	NA	ND(<350)	NA	SA	SA	SA	SA
11/6/2018	NA	240	NA	540	NA	ND(<3)	ND(<2)	ND(<3)	ND(<3)
2/25/2019	NA	200	NA	ND(<380)	NA	SA	SA	SA	SA
5/21/2019	NA	130	NA	ND(<370)	NA	NA	NA	NA	NA
6/5/2019	NA	NA	NA	NA	NA	ND(<3)	ND(<2)	ND(<3)	ND(<3)
9/3/2019	NA	270	NA	ND(<360)	NA	SA	SA	SA	SA
11/13/2019	NA	140	NA	ND(<370)	NA	ND(<3)	ND(<2)	ND(<3)	ND(<3)
11/13/2019 (dup.)	NA	140	NA	390	NA	ND(<3)	ND(<2)	ND(<3)	ND(<3)
2/12/2020	NA	130	NA	ND(<380)	NA	SA	SA	SA	SA
2/12/2020 (dup.)	NA	110	NA	ND(<360)	NA	NA	NA	NA	NA
4/29/2020	NA	130	NA	ND(<360)	NA	ND(<3)	ND(<2)	ND(<3)	ND(<3)
4/29/2020 (dup.)	NA	180	NA	ND(<340)	NA	ND(<3)	ND(<2)	ND(<3)	ND(<3)
8/5/2020	NA	200	NA	ND(<340)	NA	SA	SA	SA	SA
8/5/2020 (dup.)	NA	220	NA	370	NA	NA	NA	NA	NA
11/3/2020	NA	330	NA	1,000	NA	ND(<3)	ND(<2)	ND(<3)	ND(<3)
11/3/2020 (dup.)	NA	670	NA	2,200	NA	ND(<3)	ND(<2)	ND(<3)	ND(<3)
2/10/2021	NA	130	NA	ND(<390)	NA	SA	SA	SA	SA
2/10/2021 (dup.)	NA	120	NA	ND(<370)	NA	SA	SA	SA	SA
5/25/2021	NA	310	NA	380	NA	ND(<1)	ND(<1)	ND(<1)	ND(<2)

**Table 3. Groundwater TPH and BTEX Analytical Results - HF Sinclair PSR SDF**

Well ID	TPH-Gx	TPH-Dx	TPH-Dx	TPH-Dx	TPH-Dx	Benzene	Toluene	Ethylbenzene	Xylenes
	Gasoline Range	Diesel Range	Diesel Range	Lube Oil Range	Lube Oil Range				
units:	µg/L	µg/L	w/ Silica Gel Cleanup µg/L	µg/L	w/ Silica Gel Cleanup µg/L	µg/L	µg/L	µg/L	µg/L
<b>Groundwater Quality Standards: WAC 173-200-040</b>	--	--	--	--	--	1	--	--	--
<b>MTCA Method B Cleanup Level:</b>	--	--	--	--	--	0.8	640	800	1,600
<b>Well 127 (Downgradient)</b>									
5/25/2021 (dup.)	NA	380	NA	400	NA	ND(<1)	ND(<1)	ND(<1)	ND(<2)
8/4/2021	NA	430	NA	670	NA	SA	SA	SA	SA
8/4/2021 (dup.)	NA	340	NA	590	NA	SA	SA	SA	SA
11/9/2021	NA	ND(<110)	NA	ND(<350)	NA	ND(<1)	ND(<1)	ND(<1)	ND(<2)
2/15/2022	NA	140	NA	370	NA	SA	SA	SA	SA
2/15/2022 (dup.)	NA	140	NA	370	NA	SA	SA	SA	SA
4/18/2022	ND(<50)	180	NA	ND(<360)	NA	ND(<1)	ND(<1)	ND(<1)	ND(<2)
8/10/2022	ND(<50)***	250***	ND(<120)***	550***	ND(<370)***	ND(<1)	ND(<1)	ND(<1)	ND(<2)
8/10/2022 (dup.)	ND(<50)***	270***	ND(<120)***	570***	ND(<370)***	ND(<1)	ND(<1)	ND(<1)	ND(<2)
11/16/2022	ND(<50)***	220	ND(<120)	370	ND(<370)	ND(<1)	ND(<1)	ND(<1)	ND(<2)
11/16/2022 (dup.)	ND(<50)***	270	ND(<120)	390	ND(<370)	ND(<1)	ND(<1)	ND(<1)	ND(<2)
2/6/2023	ND(<50)	220	ND(<120)	380	ND(<370)	ND(<1)	ND(<1)	ND(<1)	ND(<2)
5/9/2023	ND(<50)	200	ND(<110)	ND(<360)	ND(<360)	ND(<1)	ND(<1)	ND(<1)	ND(<2)
5/9/2023 (dup.)	ND(<50)	260	ND(<120)	ND(<370)	ND(<370)	ND(<1)	ND(<1)	ND(<1)	ND(<2)
8/9/2023	ND(<50)	280	ND(<110)	480	ND(<360)	ND(<1)	ND(<1)	ND(<1)	ND(<2)
11/8/2023	ND(<100)	250	ND(<110)	ND(<350)	ND(<350)	ND(<1)	ND(<1)	ND(<1)	ND(<1)

-- indicates there is no quality standard or MTCA B cleanup level for the specific analyte

ND indicates analyte was not detected at level above reporting limit (shown in parentheses)

**Bold type** indicates samples that exceed MTCA Method-A Clean-up Levels

NA indicates that the specified analyte was Not Analyzed

*Italics* indicates that the laboratory reporting limit was raised to a level exceeding the Groundwater Quality Standards (WAC 173-200-040)

\* - Re-sampled for NWTPH-Dx on 6/25/2015 due to miscommunication between the laboratory and the sampler about using S.G. cleanup.

\*\* - 3rd Quarter Dx analysis was analyzed using the S.G. cleanup method as an error on part of the laboratory staff which could not be corrected.

\*\*\* - Analyses/re-analyses of the samples were performed outside of the analytical hold time.

SA indicates that the analysis occurs on a Semi-Annual basis by permit Part I(C)(5)



**Table 4. Groundwater Dissolved Metals Analytical Results - HF Sinclair PSR SDF**

Well ID	Antimony	Arsenic	Calcium	Chromium	Iron	Lead	Magnesium	Manganese	Nickel	Potassium	Selenium	Sodium	Vanadium	Zinc	Mercury
units:	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
<b>Groundwater Quality Standards: WAC 173-200-040</b>	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<b>MTCA Method B Cleanup Level:</b>	6.4	0.058	--	--	11,000	--	--	750	320	--	80	--	80	4,800	--
<b>Well 47 (Upgradient) &amp; Considered as Background for the Site</b>															
3/25/1998	NA	NA	NA	ND(<10)	NA	NA	NA	NA	ND(<30)	NA	NA	NA	ND(<20)	NA	NA
6/28/1998	NA	NA	NA	ND(<10)	NA	NA	NA	NA	ND(<30)	NA	NA	NA	ND(<20)	NA	NA
9/28/1998	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.13	NA	NA	NA	2	NA	NA
12/28/1998	NA	NA	NA	ND(<1)	NA	NA	NA	NA	2.1	NA	NA	NA	2.04	NA	NA
3/17/1999	NA	NA	NA	ND(<10)	NA	NA	NA	NA	ND(<30)	NA	NA	NA	ND(<200)	NA	NA
6/16/1999	NA	NA	NA	ND(<1)	NA	NA	NA	NA	ND(<1)	NA	NA	NA	1.41	NA	NA
9/14/1999	NA	NA	NA	ND(<1)	NA	NA	NA	NA	3.14	NA	NA	NA	1.91	NA	NA
12/8/1999	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.66	NA	NA	NA	2.29	NA	NA
3/28/2000	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.36	NA	NA	NA	1.44	NA	NA
6/20/2000	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.61	NA	NA	NA	1.59	NA	NA
9/19/2000	NA	NA	NA	ND(<1)	NA	NA	NA	NA	2.06	NA	NA	NA	1.89	NA	NA
12/5/2000	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.43	NA	NA	NA	1.8	NA	NA
3/14/2001	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.35	NA	NA	NA	1.37	NA	NA
6/25/2001	NA	NA	NA	ND(<1)	NA	NA	NA	NA	ND(<1)	NA	NA	NA	1.18	NA	NA
9/25/2001	NA	NA	NA	ND(<1)	NA	NA	NA	NA	ND(<1)	NA	NA	NA	1.87	NA	NA
12/4/2001	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.79	NA	NA	NA	1.8	NA	NA
3/20/2002	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.04	NA	NA	NA	1.73	NA	NA
6/11/2002	NA	NA	NA	ND(<1)	NA	NA	NA	NA	ND(<1)	NA	NA	NA	1.2	NA	NA
9/4/2002	NA	NA	NA	ND(<1)	NA	NA	NA	NA	ND(<1)	NA	NA	NA	1.57	NA	NA
12/3/2002	NA	NA	NA	ND(<1)	NA	NA	NA	NA	ND(<1)	NA	NA	NA	1.72	NA	NA
3/18/2003	NA	NA	NA	ND(<1)	NA	NA	NA	NA	ND(<1)	NA	NA	NA	1.42	NA	NA
6/24/2003	NA	NA	NA	ND(<1)	NA	NA	NA	NA	ND(<1)	NA	NA	NA	1.42	NA	NA
9/9/2003	NA	NA	NA	1.09	NA	NA	NA	NA	1.64	NA	NA	NA	1.67	NA	NA
12/2/2003	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.8	NA	NA	NA	1.92	NA	NA
3/17/2004	NA	NA	NA	ND(<1)	NA	NA	NA	NA	ND(<1)	NA	NA	NA	1.37	NA	NA
6/23/2004	NA	NA	NA	ND(<1)	NA	NA	NA	NA	ND(<1)	NA	NA	NA	1.19	NA	NA
9/14/2004	NA	NA	NA	1.09	NA	NA	NA	NA	1.01	NA	NA	NA	1.69	NA	NA
12/7/2004	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.06	NA	NA	NA	1.54	NA	NA
3/8/2005	NA	NA	NA	ND(<1)	NA	NA	NA	NA	2.92	NA	NA	NA	1.1	NA	NA
6/28/2005	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.03	NA	NA	NA	1.41	NA	NA
9/13/2005	NA	NA	NA	1.25	NA	NA	NA	NA	1.16	NA	NA	NA	1.88	NA	NA
12/6/2005	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.02	NA	NA	NA	2.03	NA	NA
4/5/2006	NA	NA	NA	ND(<1)	NA	NA	NA	NA	ND(<1)	NA	NA	NA	1.28	NA	NA
6/13/2006	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.19	NA	NA	NA	1.21	NA	NA
9/19/2006	NA	NA	NA	1.11	NA	NA	NA	NA	3.14	NA	NA	NA	1.31	NA	NA
12/19/2006	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.57	NA	NA	NA	1.31	NA	NA
3/21/2007	NA	NA	NA	ND(<1)	NA	NA	NA	NA	ND(<1)	NA	NA	NA	1.22	NA	NA
6/20/2007	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.72	NA	NA	NA	1.18	NA	NA
9/4/2007	NA	NA	NA	ND(<1)	NA	NA	NA	NA	ND(<1)	NA	NA	NA	ND(<1)	NA	NA
12/4/2007	NA	NA	NA	ND(<1)	NA	NA	NA	NA	ND(<1)	NA	NA	NA	1.19	NA	NA
3/11/2008	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.02	NA	NA	NA	ND(<1)	NA	NA
6/3/2008	NA	NA	NA	ND(<1)	NA	NA	NA	NA	ND(<1)	NA	NA	NA	ND(<1)	NA	NA
9/9/2008	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.3	NA	NA	NA	ND(<1)	NA	NA
12/2/2008	NA	NA	NA	ND(<1)	NA	NA	NA	NA	ND(<1)	NA	NA	NA	ND(<1)	NA	NA
3/18/2009	NA	NA	NA	ND(<1)	NA	NA	NA	NA	4.12	NA	NA	NA	1.13	NA	NA
6/10/2009	NA	NA	NA	3.3	NA	NA	NA	NA	ND(<0.22)	NA	NA	NA	ND(<0.23)	NA	NA
9/16/2009	NA	NA	NA	ND(<2)	NA	NA	NA	NA	ND(<2)	NA	NA	NA	ND(<2)	NA	NA
12/8/2009	NA	NA	NA	ND(<2)	NA	NA	NA	NA	ND(<2)	NA	NA	NA	3.1	NA	NA

**Table 4. Groundwater Dissolved Metals Analytical Results - HF Sinclair PSR SDF**

Well ID	Antimony	Arsenic	Calcium	Chromium	Iron	Lead	Magnesium	Manganese	Nickel	Potassium	Selenium	Sodium	Vanadium	Zinc	Mercury
units:	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
<b>Groundwater Quality Standards: WAC 173-200-040</b>	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<b>MTCA Method B Cleanup Level:</b>	6.4	0.058	--	--	11,000	--	--	750	320	--	80	--	80	4,800	--
<b>Well 47 (Upgradient) &amp; Considered as Background for the Site</b>															
3/29/2010	NA	NA	NA	ND(<2.0)	NA	NA	NA	NA	ND(<2.0)	NA	NA	NA	ND(<2.0)	NA	NA
6/23/2010	NA	NA	NA	7.8	NA	NA	NA	NA	3	NA	NA	NA	ND(<2.0)	NA	NA
9/14/2010	NA	NA	NA	ND(<2.0)	NA	NA	NA	NA	ND(<2.0)	NA	NA	NA	ND(<10)	NA	NA
12/7/2010	NA	NA	NA	ND(<2)	NA	NA	NA	NA	ND(<2)	NA	NA	NA	ND(<10)	NA	NA
3/3/2011	NA	NA	NA	ND(<20)	NA	NA	NA	NA	2.1	NA	NA	NA	ND(<10)	NA	NA
6/20/2011	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<20)	NA	NA
9/27/2011	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<20)	NA	NA
12/5/2011	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<20)	NA	NA
3/21/2012	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<10)	NA	NA
6/25/2012	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<10)	NA	NA
9/18/2012	NA	NA	NA	ND(<2)	NA	NA	NA	NA	ND(<15)	NA	NA	NA	ND(<10)	NA	NA
11/20/2012	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<10)	NA	NA
2/19/2013	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<20)	NA	NA
4/22/2013	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<20)	NA	NA
7/31/2013	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<20)	NA	NA
11/25/2013	NA	NA	NA	ND(<2)	NA	NA	NA	NA	ND(<15)	NA	NA	NA	ND(<10)	NA	NA
3/25/2014	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<20)	NA	NA
6/11/2014	ND(<2)	NA	76,000	ND(<2)	ND(<200)	ND(<2)	52,000	41	ND(<15)	NA	ND(<5)	ND(<50,000)	ND(<10)	ND(<20)	ND(<0.2)
8/20/2014	ND(<2)	NA	68,000	ND(<2)	ND(<200)	ND(<2)	ND(<50,000)	<b>88</b>	ND(<15)	NA	ND(<5)	ND(<50,000)	ND(<10)	ND(<20)	ND(<0.2)
11/20/2014	ND(<60)	NA	60,000	ND(<25)	ND(<500)	ND(<30)	46,000	<b>78</b>	ND(<20)	NA	ND(<100)	40,000	ND(<20)	ND(<40)	ND(<0.2)
2/18/2015	ND(<2)	NA	66,000	ND(<2)	ND(<200)	ND(<2)	ND(<50,000)	12	ND(<15)	NA	ND(<5)	ND(<50,000)	ND(<20)	ND(<35)	ND(<0.2)
5/28/2015	ND(<2)	NA	70,000	ND(<2)	ND(<200)	ND(<2)	50,000	<b>77</b>	ND(<15)	NA	ND(<5)	ND(<50,000)	ND(<20)	ND(<35)	ND(<0.2)
9/1/2015	ND(<2)	NA	70,000	ND(<2)	<b>370</b>	ND(<2)	50,000	<b>360</b>	ND(<15)	NA	ND(<5)	ND(<50,000)	ND(<20)	ND(<35)	ND(<0.2)
10/28/2015	ND(<2)	NA	87,000	ND(<2)	ND(<200)	ND(<2)	64,000	ND(<10)	ND(<15)	NA	ND(<5)	52,000	ND(<20)	ND(<35)	ND(<0.2)
10/28/2015 (dup.)	ND(<2)	NA	59,000	ND(<2)	ND(<200)	ND(<2)	ND(<50,000)	36	ND(<15)	NA	ND(<5)	ND(<50,000)	ND(<20)	ND(<35)	ND(<0.2)
2/22/2016	ND(<2)	NA	70,000	ND(<2)	ND(<200)	ND(<2)	ND(<50,000)	<b>69</b>	ND(<15)	NA	ND(<5)	ND(<50,000)	ND(<20)	ND(<35)	ND(<0.2)
5/11/2016	ND(<2)	NA	70,000	ND(<2)	ND(<200)	ND(<2)	ND(<50,000)	29	ND(<15)	NA	ND(<5)	ND(<50,000)	ND(<20)	ND(<35)	ND(<0.2)
5/11/2016 (dup.)	ND(<2)	NA	70,000	ND(<2)	ND(<200)	ND(<2)	ND(<50,000)	30	ND(<15)	NA	ND(<5)	ND(<50,000)	ND(<20)	ND(<35)	ND(<0.2)
8/9/2016	SA	NA	69,000	SA	ND(<200)	SA	ND(<50,000)	ND(<10)	SA	NA	SA	ND(<50,000)	SA	SA	SA
11/10/2016	ND(<2)	NA	68,000	ND(<2)	ND(<200)	ND(<2)	ND(<50,000)	47	ND(<15)	NA	ND(<5)	ND(<50,000)	ND(<20)	ND(<35)	ND(<0.2)
2/2/2017	SA	NA	65,000	SA	ND(<500)	SA	46,000	ND(<20)	SA	NA	SA	38,000	SA	SA	SA
5/10/2017	ND(<2)	NA	68,000	ND(<2)	ND(<500)	ND(<4)	53,000	29	0.78	NA	ND(<40)	42,000	ND(<20)	ND(<35)	ND(<0.3)
5/10/2017 (dup.)	ND(<2)	NA	77,000	ND(<2)	ND(<500)	ND(<4)	53,000	42	ND(<15)	NA	ND(<40)	41,000	ND(<20)	ND(<35)	ND(<0.3)
8/9/2017	SA	NA	71,000	SA	ND(<500)	SA	48,000	<b>59</b>	SA	NA	SA	42,000	SA	SA	SA
11/7/2017	ND(<60)	NA	62,000	ND(<25)	ND(<500)	ND(<30)	44,000	32	ND(<20)	NA	ND(<100)	38,000	ND(<30)	ND(<40)	ND(<0.3)
2/21/2018	SA	NA	68,000	SA	NA	SA	48,000	11	SA	NA	SA	40,000	SA	SA	SA
4/11/2018	ND(<0.4)	NA	63,000	0.43	ND(<500)	ND(<0.8)	42,000	16	ND(<3)	NA	ND(<8)	35,000	ND(<4)	ND(<7)	ND(<0.3)
9/7/2018	SA	NA	71,000	SA	SA	SA	49,000	<b>72</b>	SA	NA	SA	38,000	SA	SA	SA
11/6/2018	ND(<0.4)	NA	62,000	1.2	ND(<500)	ND(<0.8)	45,000	39	ND(<3)	NA	ND(<8)	35,000	ND(<4)	ND(<7)	ND(<0.3)
2/25/2019	SA	NA	86,000	SA	SA	SA	68,000	28	SA	NA	SA	54,000	SA	SA	SA
5/21/2019	ND(<0.4)	NA	67,000	ND(<0.4)	ND(<500)	ND(<0.8)	47,000	39	ND(<3)	NA	ND(<8)	37,000	ND(<4)	ND(<7)	ND(<0.3)
9/3/2019	SA	NA	71,000	SA	SA	SA	50,000	ND(<20)	SA	NA	SA	39,000	SA	SA	SA
11/13/2019	ND(<0.4)	NA	67,000	0.41	ND(<500)	ND(<0.8)	48,000	9.7	ND(<3)	NA	ND(<8)	39,000	ND(<4)	ND(<7)	ND(<0.3)
2/12/2020	SA	NA	69,000	SA	SA	SA	47,000	32	SA	NA	SA	36,000	SA	SA	SA
4/29/2020	ND(<0.8)	NA	75,000	ND(<0.8)	ND(<500)	ND(<0.8)	52,000	36	ND(<3)	NA	ND(<8)	40,000	ND(<4)	ND(<7)	ND(<0.3)
8/5/2020	SA	NA	70,000	SA	SA	SA	49,000	<b>110</b>	SA	NA	SA	38,000	SA	SA	SA
11/3/2020	ND(<0.8)	NA	67,000	ND(<0.8)	ND(<500)	ND(<0.8)	49,000	<b>97</b>	ND(<3)	NA	ND(<8)	37,000	ND(<4)	ND(<7)	ND(<0.3)
2/10/2021	SA	NA	68,000	SA	SA	SA	51,000	39	SA	NA	SA	39,000	SA	SA	SA
5/25/2021	ND(<0.8)	NA	73,000	ND(<0.8)	ND(<500)	ND(<0.4)	51,000	24	ND(<3)	NA	ND(<8)	39,000	ND(<4)	ND(<7)	ND(<0.3)
8/4/2021	SA	NA	67,000	SA	SA	SA	45,000	<b>75</b>	SA	NA	SA	38,000	SA	SA	SA

**Table 4. Groundwater Dissolved Metals Analytical Results - HF Sinclair PSR SDF**

Well ID	Antimony	Arsenic	Calcium	Chromium	Iron	Lead	Magnesium	Manganese	Nickel	Potassium	Selenium	Sodium	Vanadium	Zinc	Mercury
units:	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
<b>Groundwater Quality Standards: WAC 173-200-040</b>	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<b>MTCA Method B Cleanup Level:</b>	6.4	0.058	--	--	11,000	--	--	750	320	--	80	--	80	4,800	--
<b>Well 47 (Upgradient) &amp; Considered as Background for the Site</b>															
11/9/2021	ND(<0.8)	NA	70,000	ND(<0.8)	ND(<500)	ND(<0.4)	49,000	6.1	ND(<3)	NA	ND(<8)	36,000	ND(<4)	ND(<7)	ND(<0.3)
2/15/2022	SA	NA	64,000	SA	SA	SA	44,000	4.9	SA	6,500	SA	34,000	SA	SA	SA
4/18/2022	ND(<0.8)	1.2	61,000	ND(<0.8)	ND(<500)	ND(<0.4)	44,000	35	ND(<3)	5,900	ND(<8)	32,000	ND(<4)	ND(<7)	ND(<0.3)
8/10/2022	ND(<0.8)	1.3	65,000	1.9	ND(<500)	ND(<0.4)	42,000	<b>230</b>	5.6	5,500	ND(<8)	37,000	ND(<4)	ND(<7)	ND(<0.3)
11/16/2022	ND(<0.8)	1.1	66,000	ND(<0.8)	ND(<500)	ND(<0.4)	46,000	24	ND(<3)	4,500	ND(<8)	40,000	ND(<4)	ND(<7)	ND(<0.3)
2/6/2023	NA	1.6	66,000	ND(<0.8)	ND(<500)	ND(<0.4)	48,000	58	ND(<3)	5,600	ND(<8)	35,000	NA	NA	ND(<0.3)
5/9/2023	NA	1.3	68,000	ND(<0.8)	ND(<500)	ND(<0.4)	47,000	20	ND(<3)	6,600	ND(<8)	37,000	NA	NA	ND(<0.3)
8/9/2023	NA	1.3	63,000	ND(<0.8)	ND(<500)	ND(<0.4)	45,000	2.5	ND(<3)	4,300	ND(<8)	34,000	NA	NA	ND(<0.3)
9/28/2023	NA	NA	NA	ND(<0.8)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
11/8/2023	NA	1.4	69,000	ND(<0.8)	ND(<500)	ND(<0.4)	49,000	5.8	ND(<3)	5,100	ND(<8)	38,000	NA	NA	ND(<0.3)
<b>Well 112 (Downgradient)</b>															
3/25/1998	NA	NA	NA	ND(<10)	NA	NA	NA	NA	ND(<30)	NA	NA	NA	ND(<20)	NA	NA
6/28/1998	NA	NA	NA	ND(<10)	NA	NA	NA	NA	ND(<30)	NA	NA	NA	ND(<20)	NA	NA
9/28/1998	NA	NA	NA	ND(<1)	NA	NA	NA	NA	2.29	NA	NA	NA	ND(<1)	NA	NA
12/28/1998	NA	NA	NA	ND(<1)	NA	NA	NA	NA	4.04	NA	NA	NA	ND(<1)	NA	NA
3/17/1999	NA	NA	NA	ND(<10)	NA	NA	NA	NA	ND(<30)	NA	NA	NA	ND(<200)	NA	NA
6/16/1999	NA	NA	NA	ND(<1)	NA	NA	NA	NA	3.68	NA	NA	NA	ND(<1)	NA	NA
9/14/1999	NA	NA	NA	ND(<1)	NA	NA	NA	NA	5.05	NA	NA	NA	ND(<1)	NA	NA
12/8/1999	NA	NA	NA	ND(<1)	NA	NA	NA	NA	3.39	NA	NA	NA	ND(<1)	NA	NA
3/28/2000	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.8	NA	NA	NA	ND(<1)	NA	NA
6/20/2000	NA	NA	NA	ND(<1)	NA	NA	NA	NA	9.04	NA	NA	NA	ND(<1)	NA	NA
9/19/2000	NA	NA	NA	ND(<1)	NA	NA	NA	NA	3.19	NA	NA	NA	ND(<1)	NA	NA
12/5/2000	NA	NA	NA	ND(<1)	NA	NA	NA	NA	2.6	NA	NA	NA	ND(<1)	NA	NA
3/14/2001	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.65	NA	NA	NA	ND(<1)	NA	NA
6/25/2001	NA	NA	NA	ND(<1)	NA	NA	NA	NA	2.43	NA	NA	NA	ND(<1)	NA	NA
9/25/2001	NA	NA	NA	ND(<1)	NA	NA	NA	NA	2.03	NA	NA	NA	ND(<1)	NA	NA
12/4/2001	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.6	NA	NA	NA	ND(<1)	NA	NA
3/20/2002	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.38	NA	NA	NA	ND(<1)	NA	NA
6/11/2002	NA	NA	NA	ND(<1)	NA	NA	NA	NA	2.22	NA	NA	NA	ND(<1)	NA	NA
9/4/2002	NA	NA	NA	ND(<1)	NA	NA	NA	NA	2.88	NA	NA	NA	ND(<1)	NA	NA
12/3/2002	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.78	NA	NA	NA	ND(<1)	NA	NA
3/18/2003	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.56	NA	NA	NA	ND(<1)	NA	NA
6/24/2003	NA	NA	NA	ND(<1)	NA	NA	NA	NA	2.44	NA	NA	NA	ND(<1)	NA	NA
9/9/2003	NA	NA	NA	ND(<1)	NA	NA	NA	NA	3.35	NA	NA	NA	ND(<1)	NA	NA
12/2/2003	NA	NA	NA	ND(<1)	NA	NA	NA	NA	3.08	NA	NA	NA	ND(<1)	NA	NA
3/17/2004	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.64	NA	NA	NA	ND(<1)	NA	NA
6/23/2004	NA	NA	NA	ND(<1)	NA	NA	NA	NA	2.92	NA	NA	NA	ND(<1)	NA	NA
9/14/2004	NA	NA	NA	ND(<1)	NA	NA	NA	NA	2.87	NA	NA	NA	ND(<1)	NA	NA
12/7/2004	NA	NA	NA	ND(<1)	NA	NA	NA	NA	3.54	NA	NA	NA	ND(<1)	NA	NA
3/8/2005	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.88	NA	NA	NA	ND(<1)	NA	NA
6/28/2005	NA	NA	NA	ND(<1)	NA	NA	NA	NA	2.23	NA	NA	NA	ND(<1)	NA	NA
9/13/2005	NA	NA	NA	ND(<1)	NA	NA	NA	NA	2.53	NA	NA	NA	ND(<1)	NA	NA
12/6/2005	NA	NA	NA	1.07	NA	NA	NA	NA	2.08	NA	NA	NA	ND(<1)	NA	NA
4/5/2006	NA	NA	NA	1.04	NA	NA	NA	NA	2.35	NA	NA	NA	ND(<1)	NA	NA
6/13/2006	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.63	NA	NA	NA	ND(<1)	NA	NA
9/19/2006	NA	NA	NA	ND(<1)	NA	NA	NA	NA	5.32	NA	NA	NA	ND(<1)	NA	NA
12/19/2006	NA	NA	NA	ND(<1)	NA	NA	NA	NA	2.89	NA	NA	NA	ND(<1)	NA	NA
3/21/2007	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.26	NA	NA	NA	ND(<1)	NA	NA
6/20/2007	NA	NA	NA	1.02	NA	NA	NA	NA	3.39	NA	NA	NA	1.09	NA	NA

**Table 4. Groundwater Dissolved Metals Analytical Results - HF Sinclair PSR SDF**

Well ID	Antimony	Arsenic	Calcium	Chromium	Iron	Lead	Magnesium	Manganese	Nickel	Potassium	Selenium	Sodium	Vanadium	Zinc	Mercury
units:	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
<b>Groundwater Quality Standards: WAC 173-200-040</b>	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<b>MTCA Method B Cleanup Level:</b>	6.4	0.058	--	--	11,000	--	--	750	320	--	80	--	80	4,800	--
<b>Well 112 (Downgradient)</b>															
9/4/2007	NA	NA	NA	ND(<1)	NA	NA	NA	NA	2.52	NA	NA	NA	ND(<1)	NA	NA
12/4/2007	NA	NA	NA	ND(<1)	NA	NA	NA	NA	2.2	NA	NA	NA	ND(<1)	NA	NA
3/11/2008	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.64	NA	NA	NA	ND(<1)	NA	NA
6/3/2008	NA	NA	NA	ND(<1)	NA	NA	NA	NA	4.59	NA	NA	NA	ND(<1)	NA	NA
9/9/2008	NA	NA	NA	ND(<1)	NA	NA	NA	NA	3.77	NA	NA	NA	ND(<1)	NA	NA
12/2/2008	NA	NA	NA	ND(<1)	NA	NA	NA	NA	2.93	NA	NA	NA	ND(<1)	NA	NA
3/18/2009	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.82	NA	NA	NA	ND(<1)	NA	NA
6/10/2009	NA	NA	NA	2.2	NA	NA	NA	NA	2.9	NA	NA	NA	2	NA	NA
9/16/2009	NA	NA	NA	ND(<2)	NA	NA	NA	NA	3.2	NA	NA	NA	2.4	NA	NA
12/8/2009	NA	NA	NA	ND(<2)	NA	NA	NA	NA	2.8	NA	NA	NA	2.8	NA	NA
3/29/2010	NA	NA	NA	ND(<2.0)	NA	NA	NA	NA	ND(<2.0)	NA	NA	NA	ND(<2.0)	NA	NA
6/23/2010	NA	NA	NA	5.6	NA	NA	NA	NA	4.2	NA	NA	NA	ND(<2.0)	NA	NA
9/14/2010	NA	NA	NA	ND(<2.0)	NA	NA	NA	NA	2.3*	NA	NA	NA	ND(<2.0)	NA	NA
12/7/2010	NA	NA	NA	ND(<2)	NA	NA	NA	NA	2.7	NA	NA	NA	ND(<10)	NA	NA
3/3/2011	NA	NA	NA	2.2	NA	NA	NA	NA	3.3	NA	NA	NA	ND(<10)	NA	NA
6/20/2011	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<20)	NA	NA
9/27/2011	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<20)	NA	NA
12/5/2011	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<20)	NA	NA
3/21/2012	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<10)	NA	NA
6/25/2012	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<10)	NA	NA
9/18/2012	NA	NA	NA	ND(<2)	NA	NA	NA	NA	ND(<15)	NA	NA	NA	ND(<10)	NA	NA
11/20/2012	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<10)	NA	NA
2/19/2013	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<20)	NA	NA
2/19/2013 (dup.)	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<20)	NA	NA
4/22/2013	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<20)	NA	NA
7/31/2013	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<20)	NA	NA
11/25/2013	NA	NA	NA	ND(<2)	NA	NA	NA	NA	ND(<15)	NA	NA	NA	ND(<10)	NA	NA
3/25/2014	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<20)	NA	NA
6/11/2014	ND(<2)	NA	99,000	ND(<2)	ND(<200)	ND(<2)	67,000	4.2	ND(<15)	NA	ND(<5)	54,000	ND(<10)	ND(<20)	ND(<0.2)
8/20/2014	ND(<2)	NA	91,000	ND(<2)	ND(<200)	ND(<2)	62,000	<b>52</b>	ND(<15)	NA	ND(<5)	51,000	ND(<10)	ND(<20)	ND(<0.2)
11/20/2014	ND(<60)	NA	86,000	ND(<25)	ND(<500)	ND(<30)	62,000	<b>69</b>	ND(<20)	NA	ND(<100)	52,000	ND(<20)	ND(<40)	ND(<0.2)
11/20/2014 (dup.)	ND(<60)	NA	87,000	ND(<25)	ND(<500)	ND(<30)	63,000	<b>65</b>	ND(<20)	NA	ND(<100)	53,000	ND(<20)	ND(<40)	ND(<0.2)
2/18/2015	ND(<2)	NA	95,000	ND(<2)	ND(<200)	ND(<2)	64,000	ND(<10)	ND(<15)	NA	ND(<5)	52,000	ND(<20)	ND(<35)	ND(<0.2)
2/18/2015 (dup.)	ND(<2)	NA	92,000	ND(<2)	ND(<200)	ND(<2)	63,000	ND(<10)	ND(<15)	NA	ND(<5)	51,000	ND(<20)	ND(<35)	ND(<0.2)
5/28/2015	ND(<2)	NA	96,000	ND(<2)	ND(<200)	ND(<2)	67,000	ND(<10)	ND(<15)	NA	ND(<5)	53,000	ND(<20)	ND(<35)	ND(<0.2)
5/28/2015 (dup.)	ND(<2)	NA	100,000	ND(<2)	ND(<200)	ND(<2)	69,000	ND(<10)	ND(<15)	NA	ND(<5)	56,000	ND(<20)	ND(<35)	ND(<0.2)
9/1/2015	ND(<2)	NA	100,000	ND(<2)	ND(<200)	ND(<2)	66,000	19	ND(<15)	NA	ND(<5)	ND(<500,000)	ND(<20)	ND(<35)	ND(<0.2)
10/28/2015	ND(<2)	NA	61,000	ND(<2)	ND(<200)	ND(<2)	ND(<50,000)	<b>57</b>	ND(<15)	NA	ND(<5)	ND(<50,000)	ND(<20)	ND(<35)	0.27
2/22/2016	ND(<2)	NA	99,000	ND(<2)	ND(<200)	ND(<2)	ND(<50,000)	ND(<10)	ND(<15)	NA	ND(<5)	57,000	ND(<20)	ND(<35)	ND(<0.2)
2/22/2016 (dup.)	ND(<2)	NA	97,000	ND(<2)	ND(<200)	ND(<2)	68,000	ND(<10)	ND(<15)	NA	ND(<5)	55,000	ND(<20)	ND(<35)	ND(<0.2)
5/11/2016	ND(<2)	NA	95,000	ND(<2)	ND(<200)	ND(<2)	67,000	ND(<10)	ND(<15)	NA	ND(<5)	54,000	ND(<20)	ND(<35)	ND(<0.2)
8/9/2016	SA	NA	100,000	SA	ND(<200)	SA	72,000	ND(<10)	SA	NA	SA	59,000	SA	SA	ND(<0.2)
11/10/2016	ND(<2)	NA	97,000	ND(<2)	ND(<200)	ND(<2)	67,000	<b>70</b>	ND(<15)	NA	ND(<5)	54,000	ND(<20)	ND(<35)	ND(<0.2)
2/2/2017	SA	NA	92,000	SA	SA	SA	72,000	ND(<20)	SA	NA	SA	55,000	SA	SA	ND(<0.2)
2/2/2017 (dup.)	SA	NA	92,000	SA	SA	SA	67,000	ND(<20)	SA	NA	SA	55,000	SA	SA	ND(<0.2)
5/10/2017	ND(<2)	NA	110,000	ND(<2)	ND(<500)	ND(<4)	75,000	ND(<10)	ND(<15)	NA	ND(<40)	59,000	2.3	ND(<35)	ND(<0.3)
8/9/2017	SA	NA	92,000	SA	SA	SA	63,000	ND(<20)	SA	NA	SA	55,000	SA	SA	ND(<0.3)
11/7/2017	ND(<60)	NA	85,000	ND(<25)	ND(<500)	ND(<30)	58,000	<b>94</b>	ND(<20)	NA	ND(<100)	51,000	ND(<30)	ND(<40)	ND(<0.3)
2/21/2018	SA	NA	94,000	SA	SA	SA	66,000	6.3	SA	NA	SA	56,000	ND(<40)	SA	NA
4/11/2018	ND(<0.4)	NA	89,000	ND(<0.4)	ND(<500)	ND(<0.8)	59,000	ND(<2)	ND(<3)	NA	ND(<8)	51,000	ND(<4)	ND(<7)	ND(<0.3)

**Table 4. Groundwater Dissolved Metals Analytical Results - HF Sinclair PSR SDF**

Well ID	Antimony	Arsenic	Calcium	Chromium	Iron	Lead	Magnesium	Manganese	Nickel	Potassium	Selenium	Sodium	Vanadium	Zinc	Mercury
units:	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
<b>Groundwater Quality Standards: WAC 173-200-040</b>	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<b>MTCA Method B Cleanup Level:</b>	6.4	0.058	--	--	11,000	--	--	750	320	--	80	--	80	4,800	--
<b>Well 112 (Downgradient)</b>															
9/7/2018	SA	NA	93,000	SA	SA	SA	68,000	41	SA	NA	SA	56,000	ND(<40)	SA	SA
11/6/2018	ND(<0.4)	NA	90,000	1.1	ND(<500)	ND(<0.8)	64,000	44	ND(<3)	NA	ND(<8)	51,000	ND(<4)	ND(<7)	ND(<0.3)
2/25/2019	SA	NA	100,000	SA	SA	SA	ND(<20,000)	ND(<2)	SA	NA	SA	60,000	ND(<40)	SA	SA
5/21/2019	ND(<4)	NA	99,000	ND(<0.4)	ND(<500)	ND(<8)	69,000	33	ND(<3)	NA	ND(<8)	54,000	ND(<4)	ND(<7)	ND(<0.3)
5/21/2019 (dup.)	ND(<4)	NA	96,000	ND(<0.4)	ND(<500)	ND(<8)	67,000	37	ND(<3)	NA	ND(<8)	53,000	ND(<4)	ND(<7)	ND(<0.3)
9/3/2019	SA	NA	98,000	SA	SA	SA	71,000	ND(<20)	SA	NA	SA	56,000	SA	SA	SA
11/13/2019	ND(<0.4)	NA	96,000	0.41	ND(<500)	ND(<0.8)	67,000	5.2	ND(<3)	NA	ND(<8)	54,000	ND(<4)	10	ND(<0.3)
2/20/2020	SA	NA	96,000	SA	SA	SA	65,000	ND(<2)	SA	NA	SA	50,000	SA	ND(<7)	SA
4/29/2020	ND(<0.8)	NA	110,000	ND(<0.8)	ND(<500)	ND(<0.8)	75,000	2.4	ND(<3)	NA	ND(<8)	59,000	ND(<4)	ND(<7)	ND(<0.3)
8/5/2020	SA	NA	95,000	SA	SA	SA	70,000	ND(<2)	SA	NA	SA	54,000	SA	SA	SA
11/3/2020	ND(<0.8)	NA	91,000	ND(<0.8)	ND(<500)	ND(<0.8)	66,000	4.3	ND(<3)	NA	ND(<8)	55,000	ND(<4)	ND(<7)	ND(<0.3)
2/10/2021	SA	NA	99,000	SA	SA	SA	73,000	ND(<2)	SA	NA	SA	56,000	SA	SA	SA
5/25/2021	ND(<0.8)	NA	110,000	ND(<0.8)	ND(<500)	ND(<0.4)	74,000	ND(<2)	ND(<3)	NA	ND(<8)	58,000	ND(<4)	ND(<7)	ND(<0.3)
8/4/2021	SA	NA	100,000	SA	SA	SA	67,000	3	SA	NA	SA	58,000	SA	SA	SA
11/9/2021	ND(<0.8)	NA	100,000	ND(<0.8)	ND(<500)	ND(<0.4)	69,000	17	ND(<3)	NA	ND(<8)	51,000	ND(<4)	ND(<7)	ND(<0.3)
2/15/2022	SA	NA	93,000	SA	SA	SA	66,000	ND(<2)	SA	8,500	SA	50,000	SA	SA	SA
4/18/2022	ND(<0.8)	1.3	96,000	ND(<0.8)	ND(<500)	ND(<0.4)	67,000	ND(<2)	ND(<3)	7,900	ND(<8)	52,000	ND(<4)	ND(<7)	ND(<0.3)
8/10/2022	ND(<0.8)	1.9	95,000	ND(<0.8)	ND(<500)	ND(<0.4)	63,000	6.3	ND(<3)	800	ND(<8)	54,000	ND(<4)	ND(<7)	ND(<0.3)
11/16/2022	ND(<0.8)	2.1	94,000	ND(<0.8)	ND(<500)	ND(<0.4)	69,000	32	ND(<3)	7,800	ND(<8)	57,000	ND(<4)	ND(<7)	ND(<0.3)
2/6/2023	NA	1.9	96,000	ND(<0.8)	ND(<500)	ND(<0.4)	71,000	3.1	ND(<3)	7,500	ND(<8)	52,000	NA	NA	ND(<0.3)
5/9/2023	NA	1.5	99,000	ND(<0.8)	ND(<500)	ND(<0.4)	70,000	4.4	ND(<3)	8,100	ND(<8)	56,000	NA	NA	ND(<0.3)
8/9/2023	NA	1.4	100,000	ND(<0.8)	ND(<500)	ND(<0.4)	77,000	ND(<2)	ND(<3)	6,500	ND(<8)	52,000	NA	NA	ND(<0.3)
9/28/2023	NA	NA	NA	ND(<0.8)	NA	NA	73,000	NA	NA	NA	NA	NA	NA	NA	NA
11/8/2023	NA	1.8	100,000	ND(<0.8)	ND(<500)	ND(<0.4)	75,000	ND(<2)	ND(<3)	8,700	ND(<8)	58,000	NA	NA	ND(<0.3)
12/13/2023	NA	NA	NA	NA	NA	NA	74,000	NA	NA	NA	NA	NA	NA	NA	NA
<b>Well 113 (Downgradient)</b>															
3/25/1998	NA	NA	NA	ND(<10)	NA	NA	NA	NA	ND(<30)	NA	NA	NA	ND(<20)	NA	NA
6/28/1998	NA	NA	NA	ND(<10)	NA	NA	NA	NA	ND(<30)	NA	NA	NA	ND(<20)	NA	NA
9/28/1998	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.86	NA	NA	NA	ND(<1)	NA	NA
12/28/1998	NA	NA	NA	ND(<1)	NA	NA	NA	NA	2.5	NA	NA	NA	ND(<1)	NA	NA
3/17/1999	NA	NA	NA	ND(<10)	NA	NA	NA	NA	ND(<30)	NA	NA	NA	ND(<200)	NA	NA
6/16/1999	NA	NA	NA	ND(<1)	NA	NA	NA	NA	2.98	NA	NA	NA	ND(<1)	NA	NA
9/14/1999	NA	NA	NA	ND(<1)	NA	NA	NA	NA	3.41	NA	NA	NA	ND(<1)	NA	NA
12/8/1999	NA	NA	NA	ND(<1)	NA	NA	NA	NA	2.52	NA	NA	NA	ND(<1)	NA	NA
3/28/2000	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.83	NA	NA	NA	1.32	NA	NA
6/20/2000	NA	NA	NA	ND(<1)	NA	NA	NA	NA	24.7	NA	NA	NA	ND(<1)	NA	NA
9/19/2000	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.91	NA	NA	NA	ND(<1)	NA	NA
12/5/2000	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.9	NA	NA	NA	ND(<1)	NA	NA
3/14/2001	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.76	NA	NA	NA	1.36	NA	NA
6/25/2001	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.8	NA	NA	NA	ND(<1)	NA	NA
9/25/2001	NA	NA	NA	ND(<1)	NA	NA	NA	NA	ND(<1)	NA	NA	NA	1.12	NA	NA
12/4/2001	NA	NA	NA	3.7	NA	NA	NA	NA	6.23	NA	NA	NA	ND(<1)	NA	NA
3/20/2002	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.45	NA	NA	NA	1.67	NA	NA
6/11/2002	NA	NA	NA	ND(<1)	NA	NA	NA	NA	2.47	NA	NA	NA	1.01	NA	NA
9/4/2002	NA	NA	NA	2	NA	NA	NA	NA	2.61	NA	NA	NA	1.19	NA	NA
12/3/2002	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1	NA	NA	NA	1.17	NA	NA
3/18/2003	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.32	NA	NA	NA	1.56	NA	NA
6/24/2003	NA	NA	NA	ND(<1)	NA	NA	NA	NA	2.47	NA	NA	NA	1.54	NA	NA
9/9/2003	NA	NA	NA	ND(<1)	NA	NA	NA	NA	3.24	NA	NA	NA	1.75	NA	NA
12/2/2003	NA	NA	NA	ND(<1)	NA	NA	NA	NA	2.93	NA	NA	NA	1.91	NA	NA

**Table 4. Groundwater Dissolved Metals Analytical Results - HF Sinclair PSR SDF**

Well ID	Antimony	Arsenic	Calcium	Chromium	Iron	Lead	Magnesium	Manganese	Nickel	Potassium	Selenium	Sodium	Vanadium	Zinc	Mercury
units:	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
<b>Groundwater Quality Standards: WAC 173-200-040</b>	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<b>MTCA Method B Cleanup Level:</b>	6.4	0.058	--	--	11,000	--	--	750	320	--	80	--	80	4,800	--
<b>Well 113 (Downgradient)</b>															
3/17/2004	NA	NA	NA	ND(<1)	NA	NA	NA	NA	2.57	NA	NA	NA	1.76	NA	NA
6/23/2004	NA	NA	NA	ND(<1)	NA	NA	NA	NA	2.31	NA	NA	NA	1.36	NA	NA
9/14/2004	NA	NA	NA	ND(<1)	NA	NA	NA	NA	2.81	NA	NA	NA	1.58	NA	NA
12/7/2004	NA	NA	NA	ND(<1)	NA	NA	NA	NA	3.13	NA	NA	NA	1.5	NA	NA
3/8/2005	NA	NA	NA	ND(<1)	NA	NA	NA	NA	2.19	NA	NA	NA	1.36	NA	NA
6/28/2005	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.85	NA	NA	NA	1.78	NA	NA
9/13/2005	NA	NA	NA	ND(<1)	NA	NA	NA	NA	2.79	NA	NA	NA	1.68	NA	NA
12/6/2005	NA	NA	NA	1.1	NA	NA	NA	NA	4.43	NA	NA	NA	1.7	NA	NA
4/5/2006	NA	NA	NA	ND(<1)	NA	NA	NA	NA	2.64	NA	NA	NA	1.73	NA	NA
6/13/2006	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.44	NA	NA	NA	1.7	NA	NA
9/19/2006	NA	NA	NA	ND(<1)	NA	NA	NA	NA	5.29	NA	NA	NA	1.36	NA	NA
12/19/2006	NA	NA	NA	ND(<1)	NA	NA	NA	NA	2.97	NA	NA	NA	1.39	NA	NA
3/21/2007	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.76	NA	NA	NA	1.85	NA	NA
6/20/2007	NA	NA	NA	ND(<1)	NA	NA	NA	NA	2.11	NA	NA	NA	1.78	NA	NA
9/4/2007	NA	NA	NA	ND(<1)	NA	NA	NA	NA	2.84	NA	NA	NA	1.52	NA	NA
12/4/2007	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.61	NA	NA	NA	1.31	NA	NA
3/11/2008	NA	NA	NA	ND(<1)	NA	NA	NA	NA	2.41	NA	NA	NA	1.74	NA	NA
6/3/2008	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.59	NA	NA	NA	1.29	NA	NA
9/9/2008	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.97	NA	NA	NA	1.43	NA	NA
12/2/2008	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.3	NA	NA	NA	ND(<1)	NA	NA
3/18/2009	NA	NA	NA	ND(<1)	NA	NA	NA	NA	3.53	NA	NA	NA	1.48	NA	NA
6/10/2009	NA	NA	NA	2.5	NA	NA	NA	NA	2.6	NA	NA	NA	2.3	NA	NA
9/16/2009	NA	NA	NA	ND(<2)	NA	NA	NA	NA	4	NA	NA	NA	ND(<2)	NA	NA
12/8/2009	NA	NA	NA	ND(<2)	NA	NA	NA	NA	3.8	NA	NA	NA	3.7	NA	NA
3/29/2010	NA	NA	NA	ND(<2.0)	NA	NA	NA	NA	ND(<2.0)	NA	NA	NA	2.5	NA	NA
6/23/2010	NA	NA	NA	7.1	NA	NA	NA	NA	6.8	NA	NA	NA	ND(<2.0)	NA	NA
9/14/2010	NA	NA	NA	ND(<2.0)	NA	NA	NA	NA	3.1*	NA	NA	NA	ND(<2.0)	NA	NA
12/7/2010	NA	NA	NA	ND(<2)	NA	NA	NA	NA	ND(<2)	NA	NA	NA	ND(<10)	NA	NA
3/3/2011	NA	NA	NA	2.4	NA	NA	NA	NA	2.5	NA	NA	NA	ND(<10)	NA	NA
6/20/2011	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<20)	NA	NA
6/20/2011 (Dup.)	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<20)	NA	NA
9/27/2011	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<20)	NA	NA
12/5/2011	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<20)	NA	NA
3/21/2012	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<10)	NA	NA
6/25/2012	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<10)	NA	NA
6/25/2012 (Dup.)	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<10)	NA	NA
9/18/2012	NA	NA	NA	ND(<2)	NA	NA	NA	NA	ND(<15)	NA	NA	NA	ND(<10)	NA	NA
11/20/2012	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<10)	NA	NA
11/21/2012 (Dup.)	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<10)	NA	NA
2/19/2013	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<10)	NA	NA
4/22/2013	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<10)	NA	NA
7/31/2013	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<10)	NA	NA
7/31/2013 (dup.)	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<10)	NA	NA
11/25/2013	NA	NA	NA	ND(<2)	NA	NA	NA	NA	ND(<15)	NA	NA	NA	ND(<10)	NA	NA
3/25/2014	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<20)	NA	NA
6/11/2014	ND(<2)	NA	82,000	ND(<2)	ND(<200)	ND(<2)	67,000	ND(<2)	ND(<15)	NA	ND(<5)	52,000	ND(<10)	ND(<20)	ND(<0.2)
8/21/2014	ND(<2)	NA	74,000	ND(<2)	ND(<200)	ND(<2)	61,000	39	ND(<15)	NA	ND(<5)	ND(<50,000)	ND(<10)	ND(<20)	ND(<0.2)
11/21/2014	ND(<2)	NA	66,000	ND(<2)	ND(<200)	ND(<2)	53,000	14	ND(<15)	NA	ND(<5)	ND(<50,000)	ND(<10)	ND(<20)	ND(<0.2)
2/18/2015	ND(<2)	NA	78,000	ND(<2)	ND(<200)	ND(<2)	63,000	ND(<2)	ND(<15)	NA	ND(<5)	50,000	ND(<20)	ND(<35)	ND(<0.2)
5/28/2015	ND(<2)	NA	83,000	ND(<2)	ND(<200)	ND(<2)	68,000	ND(<10)	ND(<15)	NA	ND(<5)	54,000	ND(<20)	ND(<35)	ND(<0.2)

**Table 4. Groundwater Dissolved Metals Analytical Results - HF Sinclair PSR SDF**

Well ID	Antimony	Arsenic	Calcium	Chromium	Iron	Lead	Magnesium	Manganese	Nickel	Potassium	Selenium	Sodium	Vanadium	Zinc	Mercury
units:	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
<b>Groundwater Quality Standards: WAC 173-200-040</b>	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<b>MTCA Method B Cleanup Level:</b>	6.4	0.058	--	--	11,000	--	--	750	320	--	80	--	80	4,800	--
<b>Well 113 (Downgradient)</b>															
9/1/2015	ND(<2)	NA	76,000	ND(<2)	ND(<200)	ND(<2)	61,000	ND(<10)	ND(<15)	NA	ND(<5)	ND(<500,000)	ND(<20)	ND(<35)	ND(<0.2)
9/1/2015 (dup.)	ND(<2)	NA	77,000	ND(<2)	ND(<200)	ND(<2)	63,000	ND(<10)	ND(<15)	NA	ND(<5)	ND(<500,000)	ND(<20)	ND(<35)	ND(<0.2)
10/28/2015	ND(<2)	NA	68,000	ND(<2)	ND(<200)	ND(<2)	61,000	ND(<10)	ND(<15)	NA	ND(<5)	50,000	ND(<20)	ND(<35)	ND(<0.2)
2/22/2016	ND(<2)	NA	84,000	ND(<2)	ND(<200)	ND(<2)	66,000	ND(<10)	ND(<15)	NA	ND(<5)	52,000	ND(<20)	ND(<35)	ND(<0.2)
5/11/2016	ND(<2)	NA	79,000	ND(<2)	ND(<200)	ND(<2)	64,000	ND(<10)	ND(<15)	NA	ND(<5)	53,000	ND(<20)	ND(<35)	ND(<0.2)
8/9/2016	SA	NA	82,000	SA	SA	SA	68,000	ND(<10)	SA	NA	SA	55,000	SA	SA	SA
8/9/2016 (dup.)	NA	NA	80,000	NA	ND(<200)	NA	66,000	ND(<10)	NA	NA	NA	54,000	NA	NA	ND(<0.2)
11/10/2016	ND(<2)	NA	76,000	ND(<2)	ND(<200)	ND(<2)	63,000	ND(<10)	ND(<15)	NA	ND(<5)	51,000	ND(<20)	ND(<35)	ND(<0.2)
11/10/16 (dup.)	ND(<2)	NA	77,000	ND(<2)	ND(<200)	ND(<2)	64,000	ND(<10)	ND(<15)	NA	ND(<5)	51,000	ND(<20)	ND(<35)	ND(<0.2)
2/2/2017	SA	NA	81,000	SA	SA	SA	64,000	ND(<10)	SA	NA	SA	51,000	SA	SA	SA
5/10/2017	ND(<2)	NA	85,000	ND(<2)	ND(<500)	1.5	71,000	ND(<10)	ND(<15)	NA	ND(<40)	56,000	ND(<20)	ND(<35)	ND(<0.3)
8/9/2017	SA	NA	76,000	SA	SA	SA	62,000	SA	SA	NA	SA	55,000	SA	SA	SA
11/7/2017	ND(<60)	NA	72,000	ND(<25)	ND(<500)	ND(<30)	60,000	ND(<20)	ND(<20)	NA	ND(<100)	52,000	ND(<30)	ND(<40)	ND(<0.3)
11/7/17 (dup.)	ND(<60)	NA	73,000	ND(<25)	ND(<500)	ND(<30)	61,000	ND(<20)	ND(<20)	NA	ND(<100)	53,000	ND(<30)	ND(<40)	ND(<0.3)
2/21/2018	SA	NA	79,000	SA	SA	SA	62,000	SA	SA	NA	SA	52,000	SA	SA	SA
4/11/2018	ND(<0.4)	NA	72,000	ND(<0.4)	ND(<500)	ND(<0.8)	56,000	ND(<2)	ND(<3)	NA	ND(<8)	48,000	ND(<4)	ND(<7)	ND(<0.3)
9/7/2018	SA	NA	77,000	SA	SA	SA	68,000	SA	SA	NA	SA	53,000	SA	SA	SA
11/6/2018	ND(<0.4)	NA	66,000	ND(<0.4)	ND(<500)	ND(<0.8)	60,000	4.7	ND(<3)	NA	ND(<8)	48,000	ND(<4)	ND(<7)	ND(<0.3)
11/6/2018 (dup.)	ND(<0.4)	NA	67,000	0.97	ND(<500)	ND(<0.8)	61,000	4.6	ND(<3)	NA	ND(<8)	48,000	ND(<4)	ND(<7)	ND(<0.3)
2/25/2019	SA	NA	82,000	SA	SA	SA	65,000	ND(<2)	SA	NA	SA	53,000	SA	SA	SA
2/25/2019 (dup.)	SA	NA	69,000	SA	SA	SA	49,000	ND(<2)	SA	NA	SA	39,000	SA	SA	SA
5/21/2019	ND(<0.4)	NA	79,000	ND(<0.4)	ND(<500)	ND(<0.8)	64,000	24	ND(<3)	NA	ND(<8)	51,000	ND(<4)	ND(<7)	ND(<0.3)
9/3/2019	SA	NA	77,000	SA	ND(<500)	SA	66,000	ND(<2)	SA	NA	SA	52,000	SA	SA	SA
9/3/2019 (dup.)	SA	NA	95,000	SA	ND(<500)	SA	69,000	ND(<2)	SA	NA	SA	54,000	SA	SA	SA
11/13/2019	ND(<0.4)	NA	79,000	ND(<0.4)	ND(<500)	ND(<0.8)	66,000	3.2	ND(<3)	NA	ND(<8)	54,000	ND(<4)	ND(<7)	ND(<0.3)
2/12/2020	SA	NA	79,000	SA	SA	ND(<0.8)	60,000	ND(<2)	SA	NA	SA	47,000	SA	SA	SA
4/29/2020	ND(<0.8)	NA	83,000	ND(<0.8)	ND(<500)	ND(<0.8)	68,000	ND(<2)	ND(<3)	NA	ND(<8)	54,000	ND(<4)	ND(<7)	ND(<0.3)
8/5/2020	SA	NA	78,000	SA	SA	ND(<0.8)	67,000	ND(<2)	SA	NA	SA	53,000	SA	SA	SA
11/3/2020	ND(<0.8)	NA	79,000	ND(<0.8)	ND(<500)	ND(<0.8)	65,000	32	ND(<3)	NA	ND(<8)	53,000	ND(<4)	ND(<7)	ND(<0.3)
2/10/2021	SA	NA	81,000	SA	SA	SA	67,000	15	SA	NA	SA	52,000	SA	SA	SA
5/25/2021	ND(<0.8)	NA	79,000	ND(<0.8)	ND(<500)	ND(<0.4)	64,000	ND(<2)	ND(<3)	NA	ND(<8)	51,000	ND(<4)	ND(<7)	ND(<0.3)
8/4/2021	SA	NA	81,000	SA	SA	SA	61,000	2.1	SA	NA	SA	54,000	SA	SA	SA
11/9/2021	ND(<0.8)	NA	81,000	ND(<0.8)	ND(<500)	ND(<0.4)	65,000	20	ND(<3)	NA	ND(<8)	47,000	ND(<4)	ND(<7)	ND(<0.3)
11/9/2021 (dup.)	ND(<0.8)	NA	81,000	ND(<0.8)	ND(<500)	ND(<0.4)	66,000	11	ND(<3)	NA	ND(<8)	48,000	ND(<4)	ND(<7)	ND(<0.3)
2/15/2022	SA	NA	76,000	SA	SA	SA	59,000	2	SA	6,500	SA	46,000	SA	SA	SA
4/18/2022	ND(<0.8)	1.2	76,000	ND(<0.8)	ND(<500)	ND(<0.4)	61,000	ND(<2)	ND(<3)	6,700	ND(<8)	46,000	ND(<4)	ND(<7)	ND(<0.3)
4/18/2022 (dup.)	ND(<0.8)	1.2	74,000	ND(<0.8)	ND(<500)	ND(<0.4)	60,000	ND(<2)	ND(<3)	6,700	ND(<8)	45,000	ND(<4)	ND(<7)	ND(<0.3)
8/10/2022	ND(<0.8)	1.8	75,000	ND(<0.8)	ND(<500)	ND(<0.4)	58,000	ND(<2)	ND(<3)	6,600	ND(<8)	48,000	ND(<4)	ND(<7)	ND(<0.3)
11/16/2022	ND(<0.8)	2.5	74,000	ND(<0.8)	ND(<500)	ND(<0.4)	63,000	ND(<2)	ND(<3)	7,300	ND(<8)	54,000	ND(<4)	ND(<7)	ND(<0.3)
2/6/2023	NA	1.5	78,000	ND(<0.8)	ND(<500)	ND(<0.4)	64,000	ND(<2)	ND(<3)	5,600	ND(<8)	47,000	NA	NA	ND(<0.3)
2/6/2023 (dup.)	NA	1.3	78,000	ND(<0.8)	ND(<500)	ND(<0.4)	64,000	ND(<2)	ND(<3)	5,200	ND(<8)	46,000	NA	NA	ND(<0.3)
5/9/2023	NA	1.9	78,000	ND(<0.8)	ND(<500)	ND(<0.4)	63,000	ND(<2)	ND(<3)	8,200	ND(<8)	52,000	NA	NA	ND(<0.3)
8/9/2023	NA	1.7	75,000	ND(<0.8)	ND(<500)	ND(<0.4)	64,000	ND(<2)	ND(<3)	6,600	ND(<8)	47,000	NA	NA	ND(<0.3)
8/9/2023 (dup.)	NA	1.5	76,000	ND(<0.8)	ND(<500)	ND(<0.4)	63,000	ND(<2)	ND(<3)	6,800	ND(<8)	46,000	NA	NA	ND(<0.3)
9/28/2023	NA	NA	NA	5.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
11/8/2023	NA	2.9	70,000	ND(<0.8)	ND(<500)	ND(<0.4)	63,000	ND(<2)	ND(<3)	9,200	ND(<8)	51,000	NA	NA	ND(<0.3)
11/8/2023 (dup.)	NA	2.8	75,000	ND(<0.8)	ND(<500)	ND(<0.4)	66,000	ND(<2)	ND(<3)	9,600	ND(<8)	54,000	NA	NA	ND(<0.3)
<b>Well 127 (Downgradient)</b>															
3/25/1998	NA	NA	NA	ND(<10)	NA	NA	NA	NA	ND(<30)	NA	NA	NA	ND(<20)	NA	NA
6/28/1998	NA	NA	NA	ND(<10)	NA	NA	NA	NA	ND(<30)	NA	NA	NA	ND(<20)	NA	NA

**Table 4. Groundwater Dissolved Metals Analytical Results - HF Sinclair PSR SDF**

Well ID	Antimony	Arsenic	Calcium	Chromium	Iron	Lead	Magnesium	Manganese	Nickel	Potassium	Selenium	Sodium	Vanadium	Zinc	Mercury
units:	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
<b>Groundwater Quality Standards: WAC 173-200-040</b>	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<b>MTCA Method B Cleanup Level:</b>	6.4	0.058	--	--	11,000	--	--	750	320	--	80	--	80	4,800	--
<b>Well 127 (Downgradient)</b>															
9/28/1998	NA	NA	NA	2.9	NA	NA	NA	NA	3.5	NA	NA	NA	4.09	NA	NA
12/28/1998	NA	NA	NA	ND(<1)	NA	NA	NA	NA	3.62	NA	NA	NA	ND(<1)	NA	NA
3/17/1999	NA	NA	NA	ND(<10)	NA	NA	NA	NA	ND(<30)	NA	NA	NA	ND(<200)	NA	NA
6/16/1999	NA	NA	NA	ND(<1)	NA	NA	NA	NA	1.74	NA	NA	NA	ND(<1)	NA	NA
9/14/1999	NA	NA	NA	ND(<1)	NA	NA	NA	NA	4.78	NA	NA	NA	ND(<1)	NA	NA
12/8/1999	NA	NA	NA	ND(<1)	NA	NA	NA	NA	3.57	NA	NA	NA	ND(<1)	NA	NA
3/28/2000	NA	NA	NA	ND(<1)	NA	NA	NA	NA	2.92	NA	NA	NA	ND(<1)	NA	NA
6/20/2000	NA	NA	NA	1.2	NA	NA	NA	NA	26.8	NA	NA	NA	ND(<1)	NA	NA
9/19/2000	NA	NA	NA	ND(<1)	NA	NA	NA	NA	5.47	NA	NA	NA	ND(<1)	NA	NA
12/5/2000	NA	NA	NA	ND(<1)	NA	NA	NA	NA	7.02	NA	NA	NA	ND(<1)	NA	NA
3/14/2001	NA	NA	NA	ND(<1)	NA	NA	NA	NA	4.4	NA	NA	NA	ND(<1)	NA	NA
6/25/2001	NA	NA	NA	ND(<1)	NA	NA	NA	NA	3.9	NA	NA	NA	ND(<1)	NA	NA
9/25/2001	NA	NA	NA	ND(<1)	NA	NA	NA	NA	4.22	NA	NA	NA	ND(<1)	NA	NA
12/4/2001	NA	NA	NA	ND(<1)	NA	NA	NA	NA	6.42	NA	NA	NA	ND(<1)	NA	NA
3/20/2002	NA	NA	NA	ND(<1)	NA	NA	NA	NA	4.41	NA	NA	NA	ND(<1)	NA	NA
6/11/2002	NA	NA	NA	ND(<1)	NA	NA	NA	NA	4.86	NA	NA	NA	ND(<1)	NA	NA
9/4/2002	NA	NA	NA	ND(<1)	NA	NA	NA	NA	5.91	NA	NA	NA	ND(<1)	NA	NA
12/3/2002	NA	NA	NA	ND(<1)	NA	NA	NA	NA	5.12	NA	NA	NA	2.54	NA	NA
3/18/2003	NA	NA	NA	ND(<1)	NA	NA	NA	NA	4.08	NA	NA	NA	ND(<1)	NA	NA
6/24/2003	NA	NA	NA	ND(<1)	NA	NA	NA	NA	4.93	NA	NA	NA	ND(<1)	NA	NA
9/9/2003	NA	NA	NA	ND(<1)	NA	NA	NA	NA	7.45	NA	NA	NA	3.12	NA	NA
12/2/2003	NA	NA	NA	ND(<1)	NA	NA	NA	NA	5.92	NA	NA	NA	1.56	NA	NA
3/17/2004	NA	NA	NA	ND(<1)	NA	NA	NA	NA	4.15	NA	NA	NA	ND(<1)	NA	NA
6/23/2004	NA	NA	NA	ND(<1)	NA	NA	NA	NA	6.06	NA	NA	NA	ND(<1)	NA	NA
9/14/2004	NA	NA	NA	ND(<1)	NA	NA	NA	NA	8.31	NA	NA	NA	ND(<1)	NA	NA
12/7/2004	NA	NA	NA	ND(<1)	NA	NA	NA	NA	5.91	NA	NA	NA	ND(<1)	NA	NA
3/8/2005	NA	NA	NA	ND(<1)	NA	NA	NA	NA	5.19	NA	NA	NA	ND(<1)	NA	NA
6/28/2005	NA	NA	NA	ND(<1)	NA	NA	NA	NA	4.99	NA	NA	NA	ND(<1)	NA	NA
9/13/2005	NA	NA	NA	ND(<1)	NA	NA	NA	NA	5.17	NA	NA	NA	ND(<1)	NA	NA
12/6/2005	NA	NA	NA	1.07	NA	NA	NA	NA	6.51	NA	NA	NA	ND(<1)	NA	NA
4/5/2006	NA	NA	NA	1.04	NA	NA	NA	NA	3.65	NA	NA	NA	ND(<1)	NA	NA
6/13/2006	NA	NA	NA	ND(<1)	NA	NA	NA	NA	5.87	NA	NA	NA	ND(<1)	NA	NA
9/19/2006	NA	NA	NA	ND(<1)	NA	NA	NA	NA	9.49	NA	NA	NA	ND(<1)	NA	NA
12/19/2006	NA	NA	NA	ND(<1)	NA	NA	NA	NA	4.34	NA	NA	NA	ND(<1)	NA	NA
3/21/2007	NA	NA	NA	ND(<1)	NA	NA	NA	NA	2.75	NA	NA	NA	ND(<1)	NA	NA
6/20/2007	NA	NA	NA	ND(<1)	NA	NA	NA	NA	8.43	NA	NA	NA	ND(<1)	NA	NA
9/4/2007	NA	NA	NA	ND(<1)	NA	NA	NA	NA	6.65	NA	NA	NA	ND(<1)	NA	NA
12/4/2007	NA	NA	NA	ND(<1)	NA	NA	NA	NA	3.28	NA	NA	NA	ND(<1)	NA	NA
3/11/2008	NA	NA	NA	ND(<1)	NA	NA	NA	NA	ND(<1)	NA	NA	NA	ND(<1)	NA	NA
6/3/2008	NA	NA	NA	ND(<1)	NA	NA	NA	NA	4.32	NA	NA	NA	ND(<1)	NA	NA
9/9/2008	NA	NA	NA	ND(<1)	NA	NA	NA	NA	8.43	NA	NA	NA	ND(<1)	NA	NA
12/2/2008	NA	NA	NA	ND(<1)	NA	NA	NA	NA	2.06	NA	NA	NA	ND(<1)	NA	NA
3/18/2009	NA	NA	NA	1.04	NA	NA	NA	NA	2.97	NA	NA	NA	ND(<1)	NA	NA
6/10/2009	NA	NA	NA	2.2	NA	NA	NA	NA	5.6	NA	NA	NA	ND(<0.23)	NA	NA
9/16/2009	NA	NA	NA	ND(<2)	NA	NA	NA	NA	10	NA	NA	NA	2.6	NA	NA
12/8/2009	NA	NA	NA	ND(<2)	NA	NA	NA	NA	ND(<2)	NA	NA	NA	2.7	NA	NA
3/29/2010	NA	NA	NA	ND(<2.0)	NA	NA	NA	NA	2.2	NA	NA	NA	ND(<2.0)	NA	NA
6/23/2010	NA	NA	NA	6.7	NA	NA	NA	NA	10	NA	NA	NA	ND(<2.0)	NA	NA
9/14/2010	NA	NA	NA	ND(<2.0)	NA	NA	NA	NA	16*	NA	NA	NA	ND(<2.0)	NA	NA
12/7/2010	NA	NA	NA	ND(<2)	NA	NA	NA	NA	4.6	NA	NA	NA	ND(<10)	NA	NA



**Table 4. Groundwater Dissolved Metals Analytical Results - HF Sinclair PSR SDF**

Well ID	Antimony	Arsenic	Calcium	Chromium	Iron	Lead	Magnesium	Manganese	Nickel	Potassium	Selenium	Sodium	Vanadium	Zinc	Mercury
units:	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
<b>Groundwater Quality Standards: WAC 173-200-040</b>	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<b>MTCA Method B Cleanup Level:</b>	6.4	0.058	--	--	11,000	--	--	750	320	--	80	--	80	4,800	--
<b>Well 127 (Downgradient)</b>															
3/3/2011	NA	NA	NA	ND(<20)	NA	NA	NA	NA	5.7	NA	NA	NA	ND(<10)	NA	NA
3/3/2011 (Dup.)	NA	NA	NA	ND(<20)	NA	NA	NA	NA	4.8	NA	NA	NA	ND(<10)	NA	NA
6/20/2011	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<20)	NA	NA
9/27/2011	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<20)	NA	NA
9/27/2011 (Dup.)	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<20)	NA	NA
12/5/2011	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<20)	NA	NA
3/21/2012	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<10)	NA	NA
6/25/2012	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<10)	NA	NA
9/18/2012	NA	NA	NA	ND(<2)	NA	NA	NA	NA	ND(<15)	NA	NA	NA	ND(<10)	NA	NA
11/20/2012	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<10)	NA	NA
2/19/2013	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<20)	NA	NA
4/22/2013	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<20)	NA	NA
4/22/2013 (dup.)	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<20)	NA	NA
7/31/2013	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<20)	NA	NA
11/25/2013	NA	NA	NA	ND(<2)	NA	NA	NA	NA	ND(<15)	NA	NA	NA	ND(<10)	NA	NA
11/25/2013 (dup.)	NA	NA	NA	ND(<2)	NA	NA	NA	NA	ND(<15)	NA	NA	NA	ND(<10)	NA	NA
3/25/2014	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<20)	NA	NA
3/25/2014 (dup.)	NA	NA	NA	ND(<25)	NA	NA	NA	NA	ND(<20)	NA	NA	NA	ND(<20)	NA	NA
6/11/2014	ND(<2)	NA	110,000	ND(<2)	ND(<200)	ND(<2)	69,000	<b>95</b>	ND(<15)	NA	ND(<5)	ND(<50,000)	ND(<10)	ND(<20)	ND(<0.2)
6/11/2014 (dup.)	ND(<2)	NA	120,000	ND(<2)	ND(<200)	ND(<2)	72,000	<b>100</b>	ND(<15)	NA	ND(<5)	ND(<50,000)	ND(<10)	ND(<20)	ND(<0.2)
8/20/2014	ND(<2)	NA	97,000	ND(<2)	ND(<200)	ND(<2)	61,000	<b>160</b>	ND(<15)	NA	ND(<5)	ND(<50,000)	ND(<10)	ND(<20)	ND(<0.2)
8/20/14 (dup.)	ND(<2)	NA	97,000	ND(<2)	ND(<200)	ND(<2)	62,000	<b>170</b>	ND(<15)	NA	ND(<5)	ND(<50,000)	ND(<10)	ND(<20)	ND(<0.2)
11/20/2014	ND(<60)	NA	94,000	ND(<25)	ND(<500)	ND(<30)	62,000	<b>120</b>	ND(<20)	NA	ND(<100)	42,000	ND(<20)	ND(<40)	ND(<0.2)
2/18/2015	ND(<2)	NA	110,000	ND(<2)	ND(<200)	ND(<2)	65,000	22	ND(<15)	NA	ND(<5)	ND(<50,000)	ND(<20)	ND(<35)	ND(<0.2)
5/28/2015	ND(<2)	NA	97,000	ND(<2)	ND(<200)	ND(<2)	63,000	<b>150</b>	ND(<15)	NA	ND(<5)	ND(<50,000)	ND(<20)	ND(<35)	ND(<0.2)
9/1/2015	ND(<2)	NA	98,000	ND(<2)	ND(<200)	ND(<2)	63,000	<b>190</b>	ND(<15)	NA	ND(<5)	ND(<50,000)	ND(<20)	ND(<35)	ND(<0.2)
10/28/2015	ND(<2)	NA	89,000	ND(<2)	ND(<200)	ND(<2)	60,000	45	ND(<15)	NA	ND(<5)	62,000	ND(<20)	ND(<35)	0.21
2/22/2016	ND(<2)	NA	110,000	ND(<2)	ND(<200)	ND(<2)	67,000	12	ND(<15)	NA	ND(<5)	ND(<50,000)	ND(<20)	ND(<35)	ND(<0.2)
5/11/2016	ND(<2)	NA	79,000	ND(<2)	ND(<200)	ND(<2)	64,000	<b>67</b>	ND(<15)	NA	ND(<5)	53,000	ND(<20)	ND(<35)	ND(<0.2)
8/9/2016	SA	NA	100,000	SA	SA	SA	67,000	<b>200</b>	SA	NA	SA	ND(<50,000)	SA	SA	ND(<0.2)
11/10/2016	ND(<2)	NA	ND(<50,000)	ND(<2)	ND(<200)	ND(<2)	ND(<50,000)	17	ND(<15)	NA	ND(<5)	60,000	ND(<20)	ND(<35)	ND(<0.2)
2/2/2017	SA	NA	70,000	SA	SA	SA	45,000	ND(<20)	SA	NA	SA	44,000	SA	SA	ND(<0.2)
5/10/2017	ND(<2)	NA	110,000	ND(<2)	ND(<500)	ND(<4)	67,000	11	2.1	NA	ND(<40)	46,000	ND(<20)	ND(<35)	ND(<0.3)
8/9/2017	SA	NA	83,000	SA	SA	SA	52,000	<b>220</b>	SA	NA	SA	58,000	SA	SA	ND(<0.3)
8/9/2017 (dup.)	SA	NA	83,000	SA	SA	SA	51,000	<b>220</b>	SA	NA	SA	54,000	SA	SA	ND(<0.3)
11/7/2017	ND(<60)	NA	34,000	ND(<25)	ND(<500)	ND(<30)	21,000	ND(<20)	ND(<20)	NA	ND(<100)	52,000	ND(<30)	ND(<40)	ND(<0.3)
2/21/2018	SA	NA	70,000	SA	SA	SA	44,000	16	SA	NA	SA	45,000	SA	SA	NA
2/21/18 (dup.)	SA	NA	70,000	SA	SA	SA	44,000	16	SA	NA	SA	46,000	SA	SA	NA
4/11/2018	ND(<0.4)	NA	75,000	ND(<0.4)	ND(<500)	ND(<0.8)	45,000	3	ND(<3)	NA	ND(<8)	42,000	ND(<4)	ND(<7)	ND(<0.3)
4/11/2018 (dup.)	ND(<0.4)	NA	75,000	ND(<0.4)	ND(<500)	ND(<0.8)	44,000	3.1	ND(<3)	NA	ND(<8)	41,000	ND(<4)	ND(<7)	ND(<0.3)
9/7/2018	SA	NA	70,000	SA	SA	SA	47,000	12	SA	NA	SA	55,000	SA	SA	SA
9/7/2018 (dup.)	SA	NA	68,000	SA	SA	SA	45,000	12	SA	NA	SA	55,000	SA	SA	SA
11/6/2018	ND(<0.4)	NA	62,000	1	ND(<500)	ND(<0.8)	18,000	ND(<2.0)	ND(<3)	NA	ND(<8)	40,000	ND(<4)	ND(<7)	ND(<0.3)
2/25/2019	SA	NA	80,000	SA	SA	SA	50,000	10	SA	NA	SA	43,000	SA	SA	SA
5/21/2019	12	NA	66,000	14	ND(<500)	12	42,000	30	ND(<3)	NA	ND(<8)	43,000	ND(<4)	ND(<7)	ND(<0.3)
9/3/2019	ND(<0.6)	NA	75,000	SA	ND(<500)	SA	48,000	<b>84</b>	SA	NA	SA	49,000	SA	SA	SA
11/13/2019	ND(<0.4)	NA	38,000	0.41	ND(<500)	ND(<0.8)	24,000	32	ND(<3)	NA	ND(<8)	38,000	ND(<4)	ND(<7)	ND(<0.3)
11/13/2019 (dup.)	ND(<0.4)	NA	44,000	0.41	ND(<500)	ND(<0.8)	28,000	39	ND(<3)	NA	ND(<8)	39,000	ND(<4)	ND(<7)	ND(<0.3)
2/12/2020	ND(<0.8)	NA	69,000	SA	SA	ND(<0.8)	42,000	12	SA	NA	SA	37,000	SA	SA	SA
2/12/20 (dup.)	ND(<0.8)	NA	71,000	SA	SA	ND(<0.8)	44,000	17	SA	NA	SA	38,000	SA	SA	SA

**Table 4. Groundwater Dissolved Metals Analytical Results - HF Sinclair PSR SDF**

Well ID	Antimony	Arsenic	Calcium	Chromium	Iron	Lead	Magnesium	Manganese	Nickel	Potassium	Selenium	Sodium	Vanadium	Zinc	Mercury
units:	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
<b>Groundwater Quality Standards: WAC 173-200-040</b>	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<b>MTCA Method B Cleanup Level:</b>	6.4	0.058	--	--	11,000	--	--	750	320	--	80	--	80	4,800	--
<b>Well 127 (Downgradient)</b>															
4/29/2020	ND(<0.8)	NA	70,000	ND(<0.8)	<i>ND(&lt;500)</i>	ND(<0.8)	44,000	15	ND(<3)	NA	ND(<0.8)	44,000	ND(<4)	ND(<7)	ND(<0.3)
4/29/20 (dup.)	ND(<0.8)	NA	70,000	ND(<0.8)	<i>ND(&lt;500)</i>	ND(<0.8)	44,000	12	ND(<3)	NA	ND(<0.8)	42,000	ND(<4)	ND(<7)	ND(<0.3)
8/5/2020	ND(<0.8)	NA	67,000	ND(<0.8)	SA	ND(<0.8)	44,000	<b>160</b>	SA	NA	SA	44,000	SA	SA	SA
8/5/20 (dup.)	ND(<0.8)	NA	72,000	1	SA	1.3	47,000	<b>170</b>	SA	NA	SA	45,000	SA	SA	SA
11/3/2020	ND(<0.8)	NA	48,000	ND(<0.8)	<i>ND(&lt;500)</i>	ND(<0.8)	31,000	<b>54</b>	5.1	NA	ND(<0.8)	43,000	ND(<4)	ND(<7)	ND(<0.3)
11/3/2020 (dup.)	ND(<0.8)	NA	48,000	ND(<0.8)	<i>ND(&lt;500)</i>	ND(<0.8)	31,000	<b>59</b>	5.1	NA	ND(<0.8)	41,000	ND(<4)	ND(<7)	ND(<0.3)
2/10/2021	ND(<0.8)	NA	81,000	ND(<0.8)	SA	ND(<0.8)	55,000	<b>140</b>	SA	NA	SA	42,000	SA	SA	SA
2/10/21 (dup.)	ND(<0.8)	NA	87,000	ND(<0.8)	SA	ND(<0.8)	58,000	<b>62</b>	SA	NA	SA	42,000	SA	SA	SA
5/25/2021	ND(<0.8)	NA	73,000	ND(<0.8)	ND(<500)	ND(<0.4)	46,000	<b>96</b>	6.3	NA	ND(<8)	42,000	ND(<4)	ND(<7)	ND(<0.3)
5/25/2021 (dup.)	ND(<0.8)	NA	73,000	ND(<0.8)	ND(<500)	ND(<0.4)	47,000	<b>96</b>	6.6	NA	ND(<8)	43,000	ND(<4)	ND(<7)	ND(<0.3)
8/4/2021	ND(<0.8)	NA	83,000	ND(<0.8)	SA	ND(<0.4)	51,000	<b>140</b>	SA	NA	SA	47,000	SA	SA	SA
8/4/2021 (dup.)	ND(<0.8)	NA	83,000	ND(<0.8)	SA	ND(<0.4)	49,000	<b>140</b>	SA	NA	SA	47,000	SA	SA	SA
11/9/2021	ND(<0.8)	NA	67,000	ND(<0.8)	ND(<500)	ND(<0.4)	42,000	<b>56</b>	4.8	NA	ND(<8)	37,000	ND(<4)	ND(<7)	ND(<0.3)
2/15/2022	ND(<0.8)	NA	92,000	ND(<0.8)	SA	ND(<0.4)	58,000	30	3.5	ND(<3,300)	SA	38,000	SA	SA	SA
2/15/2022 (dup.)	ND(<0.8)	NA	90,000	ND(<0.8)	SA	ND(<0.4)	57,000	30	3.4	ND(<3,300)	SA	37,000	SA	SA	SA
4/18/2022	ND(<0.8)	ND(<1)	97,000	ND(<0.8)	ND(<500)	ND(<0.4)	63,000	30	ND(<3)	ND(<3,300)	ND(<8)	36,000	ND(<4)	ND(<7)	ND(<0.3)
8/10/2022	ND(<0.8)	ND(<1)	98,000	ND(<0.8)	ND(<500)	ND(<0.4)	59,000	<b>330</b>	9.1	ND(<3,300)	ND(<8)	41,000	ND(<4)	ND(<7)	ND(<0.3)
8/10/2022 (dup.)	ND(<0.8)	ND(<1)	93,000	ND(<0.8)	ND(<500)	ND(<0.4)	57,000	<b>360</b>	9.9	ND(<3,300)	ND(<8)	41,000	ND(<4)	ND(<7)	ND(<0.3)
11/16/2022	ND(<0.8)	ND(<1)	96,000	ND(<0.8)	ND(<500)	ND(<0.4)	64,000	<b>210</b>	7.3	ND(<3,300)	ND(<8)	45,000	ND(<4)	ND(<7)	ND(<0.3)
11/16/2022 (dup.)	ND(<0.8)	ND(<1)	95,000	ND(<0.8)	ND(<500)	ND(<0.4)	63,000	<b>250</b>	7.1	ND(<3,300)	ND(<8)	45,000	ND(<4)	ND(<7)	ND(<0.3)
2/6/2023	NA	ND(<1)	110,000	ND(<0.8)	ND(<500)	ND(<0.4)	71,000	18	ND(<3)	ND(<3,300)	ND(<8)	40,000	NA	NA	ND(<0.3)
5/9/2023	NA	ND(<1)	120,000	ND(<0.8)	ND(<500)	ND(<0.4)	72,000	20	ND(<3)	3,800	ND(<8)	43,000	NA	NA	ND(<0.3)
5/9/2023 (dup.)	NA	ND(<1)	110,000	ND(<0.8)	ND(<500)	ND(<0.4)	68,000	45	ND(<3)	ND(<3,300)	ND(<8)	42,000	NA	NA	ND(<0.3)
8/9/2023	NA	ND(<1)	100,000	ND(<0.8)	ND(<500)	ND(<0.4)	69,000	ND(<2)	ND(<3)	ND(<3,300)	ND(<8)	41,000	NA	NA	ND(<0.3)
9/28/2023	NA	NA	NA	ND(<0.8)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
9/28/2023 (dup.)	NA	NA	NA	ND(<0.8)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
11/8/2023	NA	ND(<1)	110,000	ND(<0.8)	ND(<500)	ND(<0.4)	71,000	76	4.2	3,700	ND(<8)	44,000	NA	NA	ND(<0.3)

-- indicates there is no quality standard or MTCA B cleanup level for the specific analyte

NA indicates that the specified analyte was Not Analyzed

ND indicates analyte was not detected at level above reporting limit (shown in parentheses)

*Italics* indicates that the laboratory reporting limit was raised to a level exceeding the Groundwater Quality Standards (WAC 173-200-040)

**Bold type** indicates samples that exceed the Water Quality Standards (WAC 173-200-040) or MTCA cleanup level

SA indicates that the analysis occurs on a Semi-Annual basis by permit Part I(C)(5)

**Table 4A. Groundwater Total Metals Analytical Results - HF Sinclair PSR SDF**

Well ID	Antimony	Arsenic	Chromium	Iron	Lead	Magnesium	Manganese	Nickel	Selenium	Vanadium	Zinc	Mercury
units:	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
<b>Groundwater Quality Standards: WAC 173-200-040</b>	--	0.05	50	300	50	--	50	--	10	--	5000	2
<b>MTCA Method B Cleanup Level:</b>	6.4	0.058	--	11,000	--	--	750	320	80	80	4,800	--
<b>Well 47 (Upgradient) &amp; Considered as Background for the Site</b>												
2/15/2022	SA	NA	SA	SA	SA	52,000	13	SA	SA	SA	SA	SA
4/18/2022	ND(<0.8)	<b>1.2</b>	ND(<0.8)	ND(<500)	ND(<0.4)	46,000	<b>150</b>	ND(<3)	ND(<8)	ND(<4)	ND(<7)	ND(<0.3)
8/10/2022	ND(<0.8)	<b>1.6</b>	ND(<0.8)	ND(<500)	ND(<0.4)	43,000	<b>270</b>	ND(<3)	ND(<8)	ND(<4)	ND(<7)	ND(<0.3)
11/16/2022	ND(<0.8)	<b>1.1</b>	ND(<0.8)	ND(<500)	ND(<0.4)	44,000	16 <sup>a,b</sup>	ND(<3)	ND(<8)	ND(<4)	ND(<7)	ND(<0.3)
2/6/2023	NA	<b>1.6</b>	ND(<0.8)	ND(<500)	ND(<0.4)	46,000	<b>61</b>	ND(<3)	ND(<8)	NA	NA	ND(<0.3)
5/9/2023	NA	<b>1.3</b>	ND(<0.8)	ND(<500)	ND(<0.4)	48,000	41	ND(<3)	ND(<8)	NA	NA	ND(<0.3)
8/9/2023	NA	<b>1.2</b>	ND(<0.8)	ND(<500)	ND(<0.4)	50,000	23	ND(<3)	ND(<8)	NA	NA	ND(<0.3)
9/28/2023	NA	NA	ND(<0.8)	NA	NA	NA	NA	NA	NA	NA	NA	NA
11/8/2023	NA	<b>1.2</b>	ND(<0.8)	ND(<500)	ND(<0.4)	49,000	22	ND(<3)	ND(<8)	NA	NA	ND(<0.3)
<b>Well 112 (Downgradient)</b>												
2/15/2022	SA	NA	SA	SA	SA	75,000	16	SA	SA	SA	SA	SA
4/18/2022	ND(<0.8)	<b>1.4</b>	ND(<0.8)	ND(<500)	ND(<0.4)	66,000	11	ND(<3)	ND(<8)	ND(<4)	ND(<7)	ND(<0.3)
8/10/2022	ND(<0.8)	<b>2.1</b>	ND(<0.8)	ND(<500)	ND(<0.4)	63,000	30	ND(<3)	ND(<8)	ND(<4)	ND(<7)	ND(<0.3)
11/16/2022	ND(<0.8)	<b>2</b>	ND(<0.8)	ND(<500)	ND(<0.4)	66,000	49	ND(<3)	ND(<8)	ND(<4)	ND(<7)	ND(<0.3)
2/6/2023	NA	<b>2</b>	ND(<0.8)	ND(<500)	ND(<0.4)	68,000	24	ND(<3)	ND(<8)	NA	NA	ND(<0.3)
5/9/2023	NA	<b>1.3</b>	ND(<0.8)	ND(<500)	ND(<0.4)	69,000	27	ND(<3)	ND(<8)	NA	NA	ND(<0.3)
8/9/2023	NA	<b>1.4</b>	ND(<0.8)	ND(<500)	ND(<0.4)	80,000	17	ND(<3)	ND(<8)	NA	NA	ND(<0.3)
9/28/2023	NA	NA	0.94	NA	NA	NA	NA	NA	NA	NA	NA	NA
11/8/2023	NA	<b>2.1</b>	ND(<0.8)	ND(<500)	ND(<0.4)	72,000	31	ND(<3)	ND(<8)	NA	NA	ND(<0.3)
<b>Well 113 (Downgradient)</b>												
2/15/2022	SA	NA	SA	SA	SA	66,000	ND(<2)	SA	SA	SA	SA	SA
4/18/2022	ND(<0.8)	<b>1.2</b>	ND(<0.8)	ND(<500)	ND(<0.4)	62,000	3.2	ND(<3)	ND(<8)	ND(<4)	ND(<7)	ND(<0.3)
4/18/2022 (dup.)	ND(<0.8)	<b>1.2</b>	ND(<0.8)	ND(<500)	ND(<0.4)	61,000	3.2	ND(<3)	ND(<8)	ND(<4)	ND(<7)	ND(<0.3)
8/10/2022	ND(<0.8)	<b>1.9</b>	ND(<0.8)	ND(<500)	ND(<0.4)	58,000	4.4	ND(<3)	ND(<8)	ND(<4)	ND(<7)	ND(<0.3)
11/16/2022	ND(<0.8)	<b>2.5</b>	ND(<0.8)	ND(<500)	ND(<0.4)	64,000	4.8	ND(<3)	ND(<8)	ND(<4)	ND(<7)	ND(<0.3)
2/6/2023	NA	<b>1.4</b>	ND(<0.8)	ND(<500)	ND(<0.4)	60,000	2.3	ND(<3)	ND(<8)	NA	NA	ND(<0.3)
2/6/2023 (dup.)	NA	<b>1.4</b>	ND(<0.8)	ND(<500)	ND(<0.4)	60,000	ND(<2)	ND(<3)	ND(<8)	NA	NA	ND(<0.3)
5/9/2023	NA	<b>1.8</b>	ND(<0.8)	ND(<500)	ND(<0.4)	63,000	4.3	ND(<3)	ND(<8)	NA	NA	ND(<0.3)
8/9/2023	NA	<b>1.7</b>	0.82	ND(<500)	ND(<0.4)	68,000	12	ND(<3)	ND(<8)	NA	NA	ND(<0.3)
8/9/2023 (dup.)	NA	<b>1.6</b>	1.6	<b>810</b>	ND(<0.4)	70,000	38	ND(<3)	ND(<8)	NA	NA	ND(<0.3)
9/28/2023	NA	NA	0.92	NA	NA	NA	NA	NA	NA	NA	NA	NA
11/8/2023	NA	<b>2.8</b>	ND(<0.8)	ND(<500)	ND(<0.4)	64,000	ND(<2)	ND(<3)	ND(<8)	NA	NA	ND(<0.3)
11/8/2023 (dup.)	NA	<b>2.7</b>	ND(<0.8)	ND(<500)	ND(<0.4)	65,000	4.9	ND(<3)	ND(<8)	NA	NA	ND(<0.3)

**Table 4A. Groundwater Total Metals Analytical Results - HF Sinclair PSR SDF**

Well ID	Antimony	Arsenic	Chromium	Iron	Lead	Magnesium	Manganese	Nickel	Selenium	Vanadium	Zinc	Mercury
units:	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
<b>Groundwater Quality Standards: WAC 173-200-040</b>	--	0.05	50	300	50	--	50	--	10	--	5000	2
<b>MTCA Method B Cleanup Level:</b>	6.4	0.058	--	11,000	--	--	750	320	80	80	4,800	--
<b>Well 127 (Downgradient)</b>												
2/15/2022	ND(<0.8)	NA	ND(<0.8)	SA	ND(<0.4)	66,000	29	ND(<3)	SA	SA	SA	SA
2/15/2022 (dup.)	ND(<0.8)	NA	ND(<0.8)	SA	ND(<0.4)	67,000	34	3.4	SA	SA	SA	SA
4/18/2022	ND(<0.8)	ND(<1)	ND(<0.8)	ND(<500)	ND(<0.4)	63,000	40	ND(<3)	ND(<8)	ND(<4)	ND(<7)	ND(<0.3)
8/10/2022	ND(<0.8)	ND(<1)	ND(<0.8)	ND(<500)	ND(<0.4)	55,000	<b>220</b>	10	ND(<8)	ND(<4)	ND(<7)	ND(<0.3)
8/10/2022 (dup.)	ND(<0.8)	ND(<1)	ND(<0.8)	ND(<500)	ND(<0.4)	60,000	<b>280</b>	11	ND(<8)	ND(<4)	ND(<7)	ND(<0.3)
11/16/2022	ND(<0.8)	ND(<1)	ND(<0.8)	ND(<500)	ND(<0.4)	67,000	<b>170</b>	7.1	ND(<8)	ND(<4)	ND(<7)	ND(<0.3)
11/16/2022 (dup.)	ND(<0.8)	ND(<1)	ND(<0.8)	ND(<500)	ND(<0.4)	65,000	<b>170</b>	6.8	ND(<8)	ND(<4)	ND(<7)	ND(<0.3)
2/6/2023	NA	ND(<1)	ND(<0.8)	ND(<500)	ND(<0.4)	67,000	22	ND(<3)	ND(<8)	NA	NA	ND(<0.3)
5/9/2023	NA	ND(<1)	ND(<0.8)	ND(<500)	ND(<0.4)	71,000	22	ND(<3)	ND(<8)	NA	NA	ND(<0.3)
5/9/2023 (dup.)	NA	ND(<1)	ND(<0.8)	ND(<500)	ND(<0.4)	72,000	22	ND(<3)	ND(<8)	NA	NA	ND(<0.3)
8/9/2023	NA	ND(<1)	1.2	ND(<500)	ND(<0.4)	74,000	11	ND(<3)	ND(<8)	NA	NA	ND(<0.3)
9/28/2023	NA	NA	0.86	NA	NA	NA	NA	NA	NA	NA	NA	NA
9/28/2023 (dup.)	NA	NA	ND(<0.8)	NA	NA	NA	NA	NA	NA	NA	NA	NA
11/8/2023	NA	ND(<1)	ND(<0.8)	ND(<500)	ND(<0.4)	72,000	<b>80</b>	4.3	ND(<8)	NA	NA	ND(<0.3)

-- indicates there is no quality standard or MTCA B cleanup level for the specific analyte

NA indicates that the specified analyte was Not Analyzed

ND indicates analyte was not detected at level above reporting limit (shown in parentheses)

*Italics* indicates that the laboratory reporting limit was raised to a level exceeding the Groundwater Quality Standards (WAC 173-200-040)

**Bold type** indicates samples that exceed the Water Quality Standards (WAC 173-200-040) or MTCA cleanup level

SA indicates that the analysis occurs on a Semi-Annual basis by permit Part I(C)(5)

<sup>a</sup> - MS and/or MSD recovery exceeds control limits

<sup>b</sup> - MS/MSD RPD exceeds control limits

**Table 5. Groundwater Laboratory Chemistry Parameters - HF Sinclair PSR SDF**

Well ID	Alkalinity	Bicarbonate Alkalinity	Total Organic Carbon	Chemical Oxygen Demand	Total Coliform	Nitrite-N	Nitrate-N	Nitrite + Nitrate	Ammonia	Chloride	Sulfate
	units: mg/L	mg/L	mg/L	mg/L	TC/100ml	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
<b>Groundwater Quality Standards: WAC 173-200-040</b>	--	--	--	--	1/100 ml	--	10	--	--	250	250
<b>MTCA Method B Cleanup Level:</b>	--	--	--	--	--	1,600	26,000	--	--	--	--
<b>Well 47 (Upgradient) &amp; Considered as Background for the Site</b>											
6/11/2014	390	390	1.9	ND(<10)	ND(<1)	ND(<0.05)	ND(<0.05)	ND(<0.10)	0.13	13	31
8/20/2014	380	380	2.0	ND(<10)	ND(<1)	ND(<0.05)	ND(<0.05)	ND(<0.10)	ND(<0.10)	15	33
11/10/2014	360	360	2.0	13	ND(<1)	ND(<0.05)	ND(<0.05)	ND(<0.10)	ND(<0.10)	15	30
2/18/2015	410	410	1.7	ND(<10)	ND(<1)	ND(<0.05)	ND(<0.05)	ND(<0.10)	ND(<0.20)	13	32
5/28/2015	390	390	1.7	ND(<10)	ND(<1)	ND(<0.05)	ND(<0.05)	ND(<0.10)	0.22	15	33
9/1/2015	390	390	1.7	ND(<10)	ND(<1)	ND(<0.05)	ND(<0.05)	ND(<0.10)	ND(<0.20)	16	33
10/28/2015	570	570	2.3	ND(<10)	ND(<1)	ND(<0.05)	0.06	ND(<0.10)	ND(<0.20)	30	9.6
10/28/2015 (dup.)	370	370	1.5	ND(<10)	ND(<1)	ND(<0.05)	0.05	ND(<0.10)	ND(<0.20)	16	37
2/22/2016	360	360	2.2	ND(<10)	ND(<1)	ND(<0.05)	0.07	ND(<0.10)	0.26	17	42
5/11/2016	370	370	1.5	ND(<10)	ND(<1)	ND(<0.05)	ND(<0.05)	ND(<0.10)	ND(<0.20)	17	41
5/11/2016 (dup.)	380	380	1.6	ND(<10)	ND(<1)	ND(<0.05)	ND(<0.05)	ND(<0.10)	ND(<0.20)	17	41
8/9/2016	370	370	2.0	ND(<10)	SA	SA	SA	SA	ND(<0.20)	16	39
11/10/2016	370	370	1.8	ND(<10)	<b>53</b>	ND(<0.05)	ND(<0.05)	ND(<0.10)	ND(<0.20)	14	39
2/2/2017	330	330	1.7	SA	ND(<1)	SA	ND(<0.05)	SA	ND(<0.20)	14	38
5/10/2017	370	370	1.8	ND(<10)	ND(<1)	ND(<0.05)	ND(<0.05)	ND(<0.10)	0.13	15	41
5/10/2017 (dup.)	370	370	1.6	ND(<10)	ND(<1)	ND(<0.05)	ND(<0.05)	ND(<0.10)	0.13	15	41
8/9/2017	370	370	2.4	SA	ND(<1.1)	SA	ND(<0.01)	SA	ND(<0.20)	14	42
11/7/2017	350	350	2.4	ND(<10)	ND(<1)	ND(<0.1)	ND(<0.1)	ND(<0.01)	ND(<0.5)	13	41
2/21/2018	360	360	1.6	SA	ND(<1)	SA	SA	SA	ND(<0.5)	15	45
4/11/2018	360	360	2.1	ND(<10)	ND(<1)	ND(<0.1)	ND(<0.1)	0.06	ND(<0.1)	15	47
9/7/2018	360	360	2.6	SA	ND(<1)	SA	SA	SA	ND(<0.5)	13	43
11/6/2018	350	350	1.4	ND(<10)	ND(<1)	ND(<0.1)	0.3	0.01	ND(<0.5)	18	44
2/25/2019	360	360	1.4	SA	ND(<1)	SA	0.38	0.38	ND(<0.5)	15	47
5/21/2019	360	360	1.8	ND(<10)	ND(<1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.5)	14	44
9/3/2019	310	310	ND(<1.0)	SA	ND(<1)	SA	SA	0.05	SA	14	46
11/13/2019	360	360	1.2	ND(<10)	ND(<1)	ND(<0.1)	0.01	0.01	ND(<0.5)	14	49
2/12/2020	360	360	3.2	SA	ND(<1)	SA	0.07	0.07	SA	15	47
4/29/2020	370	370	52	ND(<10)	ND(<1)	ND(<0.005)	0.04	0.04	ND(<0.5)	16	49
8/5/2020	360	360	4.4	SA	<b>1</b>	SA	0.02	0.02	SA	14	48
11/3/2020	360	360	2.9	ND(<10)	<b>&gt;2,419.6</b>	ND(<0.005)	0.02	0.02	ND(<0.5)	14	49

**Table 5. Groundwater Laboratory Chemistry Parameters - HF Sinclair PSR SDF**

Well ID	Alkalinity		Bicarbonate	Total	Chemical	Total	Nitrite-N	Nitrate-N	Nitrite +	Ammonia	Chloride	Sulfate
	units:	mg/L	Alkalinity	Organic	Oxygen	Coliform	mg/L	mg/L	Nitrate	mg/L	mg/L	mg/L
<b>Groundwater Quality Standards: WAC 173-200-040</b>	--	--	--	--	--	1/100 ml	--	10	--	--	250	250
<b>MTCA Method B Cleanup Level:</b>	--	--	--	--	--	--	1,600	26,000	--	--	--	--
<b>Well 47 (Upgradient) &amp; Considered as Background for the Site</b>												
2/10/2021		370	370	3.5	SA	<b>9.6</b>	SA	0.07	0.07	SA	17	50
5/25/2021		350	350	3.6	ND(<10)	<b>149.7</b>	ND(<0.005)	ND(<0.01)	ND(<0.01)	ND(<0.5)	13	55
8/4/2021		360	360	2.1	SA	ND(<1)	SA	ND(<0.1)	ND(<0.01)	SA	17	48
11/9/2021		350	350	1.6	ND(<10)	ND(<1)	ND(<0.005)	0.026	0.026	ND(<0.20)	14	49
2/15/2022		260	260	1.7	SA	ND(<1)	SA	0.11	0.1	SA	14	50
4/18/2022		360	360	1.4	ND(<10)	ND(<1)	ND(<0.005)	0.04	0.04	ND(<0.5)	14	50
8/10/2022		370	370	2.0	ND(<10)	ND(<1)	ND(<0.1)	ND(<0.1)	0.007J	ND(<0.5)	14	52
11/16/2022		360	360	1.8*	ND(<10)	ND(<1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.5)	13	50
2/6/2023		350	350	1.4	ND(<10)	ND(<1)	ND(<0.005)	0.073	0.07	ND(<0.5)	15	55
5/9/2023		350	350	4.9	ND(<10)	ND(<1)	ND(<0.1)	0.03	0.04	ND(<0.5)	15	51
8/9/2023		360	360	4.8	ND(<10)	ND(<1)	ND(<0.005)	0.035	0.04	ND(<0.3)	14	58
11/8/2023		340	340	1.6	ND(<10)	ND(<1)	0.054J	0.0153J	0.02	ND(<0.3)	13	61
<b>Well 112 (Downgradient)</b>												
6/11/2014		560	560	2.7	ND(<10)	ND(<1)	ND(<0.05)	ND(<0.05)	ND(<0.10)	ND(<0.10)	22	ND(<5)
8/20/2014		540	540	1.8	ND(<10)	ND(<1)	ND(<0.05)	ND(<0.05)	ND(<0.10)	0.12	26	4.9
11/10/2014		510	510	3.1	ND(<10)	ND(<1)	ND(<0.05)	ND(<0.05)	ND(<0.10)	ND(<0.10)	26	5.7
11/10/2014(dup.)		530	530	2.5	ND(<10)	ND(<1)	ND(<0.05)	ND(<0.05)	ND(<0.10)	ND(<0.10)	26	3.3
2/18/2015		560	560	2.4	ND(<10)	<b>2</b>	ND(<0.05)	ND(<0.05)	ND(<0.10)	ND(<0.20)	22	4.7
2/18/2015 (dup.)		570	570	2.3	ND(<10)	<b>2</b>	ND(<0.05)	ND(<0.05)	ND(<0.10)	ND(<0.20)	22	4.9
5/28/2015		570	570	3.0	ND(<10)	ND(<1)	ND(<0.05)	ND(<0.05)	ND(<0.10)	ND(<0.20)	27	4.5
5/28/2015 (dup.)		560	560	2.1	ND(<10)	ND(<1)	ND(<0.05)	ND(<0.05)	ND(<0.10)	ND(<0.20)	27	12
9/1/2015		550	550	2.5	ND(<10)	ND(<1)	ND(<0.05)	ND(<0.05)	ND(<0.10)	ND(<0.20)	27	5.3
10/28/2015		370	370	1.7	ND(<10)	ND(<1)	ND(<0.05)	0.05	ND(<0.10)	ND(<0.20)	16	37
2/22/2016		530	530	3.1	ND(<10)	ND(<1)	ND(<0.05)	ND(<0.05)	ND(<0.10)	ND(<0.20)	32	5.3
2/22/2016 (dup.)		520	520	3.1	ND(<10)	ND(<1)	ND(<0.05)	ND(<0.05)	ND(<0.10)	ND(<0.20)	32	5.1
5/11/2016		560	560	2.6	ND(<10)	ND(<1)	ND(<0.05)	ND(<0.05)	ND(<0.10)	ND(<0.20)	33	5.5
8/9/2016		560	560	2.9	SA	ND(<1)	SA	SA	SA	ND(<0.20)	30	5.4
11/10/2016		530	530	2.5	ND(<10)	<b>290</b>	ND(<0.05)	0.07	ND(<0.10)	ND(<0.20)	27	5
2/2/2017		560	560	2.3	SA	ND(<1)	SA	ND(<0.05)	SA	SA	26	4.4



**Table 5. Groundwater Laboratory Chemistry Parameters - HF Sinclair PSR SDF**

Well ID	Alkalinity	Bicarbonate Alkalinity	Total Organic Carbon	Chemical Oxygen Demand	Total Coliform	Nitrite-N	Nitrate-N	Nitrite + Nitrate	Ammonia	Chloride	Sulfate
	units:	mg/L	mg/L	mg/L	mg/L	TC/100ml	mg/L	mg/L	mg/L	mg/L	mg/L
<b>Groundwater Quality Standards: WAC 173-200-040</b>	--	--	--	--	1/100 ml	--	10	--	--	250	250
<b>MTCA Method B Cleanup Level:</b>	--	--	--	--	--	1,600	26,000	--	--	--	--
<b>Well 112 (Downgradient)</b>											
11/8/2023	560	560	2.5	11	ND(<1)	ND(<0.005)	0.0335J	0.03	ND(<0.3)	38	6.7
12/13/2023	NA	NA	NA	NA	NA	NA	NA	NA	NA	39	NA
<b>Well 113 (Downgradient)</b>											
6/11/2014	470	470	2.6	ND(<10)	ND(<1)	ND(<0.05)	ND(<0.05)	ND(<0.10)	ND(<0.1)	30	29
8/21/2014	460	460	2.2	ND(<10)	ND(<1)	ND(<0.05)	ND(<0.05)	ND(<0.10)	ND(<0.1)	35	33
11/10/2014	440	440	2.9	ND(<10)	ND(<1)	ND(<0.05)	ND(<0.05)	ND(<0.10)	ND(<0.1)	35	32
2/18/2015	480	480	2.4	ND(<10)	ND(<1)	ND(<0.05)	ND(<0.05)	ND(<0.10)	ND(<0.2)	31	34
5/28/2015	480	480	2.2	ND(<10)	ND(<1)	ND(<0.05)	ND(<0.05)	ND(<0.10)	ND(<0.2)	34	33
9/1/2015	470	470	2.1	ND(<10)	ND(<1)	ND(<0.05)	ND(<0.05)	ND(<0.10)	ND(<0.2)	35	32
9/1/2015 (dup.)	470	470	2.2	ND(<10)	ND(<1)	ND(<0.05)	ND(<0.05)	ND(<0.10)	ND(<0.2)	35	32
10/28/2015	460	460	2.3	ND(<10)	ND(<1)	ND(<0.05)	0.05	ND(<0.10)	ND(<0.2)	38	37
2/22/2016	450	450	2.6	ND(<10)	ND(<1)	ND(<0.05)	ND(<0.05)	ND(<0.10)	ND(<0.2)	39	43
5/11/2016	450	450	2.2	ND(<10)	ND(<1)	ND(<0.05)	ND(<0.05)	ND(<0.10)	ND(<0.2)	39	41
8/9/2016	470	470	2.6	SA	SA	SA	SA	SA	SA	82	68
8/9/2016 (dup.)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
11/10/2016	450	450	2.1	ND(<10)	<b>20</b>	ND(<0.05)	ND(<0.05)	ND(<0.10)	ND(<0.2)	32	38
11/10/16 (dup.)	460	460	2.1	ND(<10)	<b>18</b>	ND(<0.05)	ND(<0.05)	ND(<0.10)	ND(<0.2)	33	38
2/2/2017	460	460	2.1	SA	ND(<1)	SA	ND(<0.05)	SA	SA	32	39
5/10/2017	440	440	2.2	ND(<10)	ND(<1)	ND(<0.05)	ND(<0.05)	ND(<0.10)	0.11	34	40
8/9/2017	450	450	3.0	SA	ND(<1.1)	SA	0.01	SA	SA	32	38
11/7/2017	450	450	2.7	12	ND(<1)	ND(<0.1)	ND(<0.1)	0.05	ND(<0.5)	32	39
11/7/17 (dup.)	460	460	3.1	ND(<10)	ND(<1)	ND(<0.1)	ND(<0.1)	ND(<0.01)	ND(<0.5)	32	39
2/21/2018	450	450	2.0	SA	ND(<1)	SA	SA	SA	ND(<0.5)	34	42
4/11/2018	440	440	2.3	ND(<10)	ND(<1)	ND(<0.1)	ND(<0.1)	0.01	ND(<0.1)	33	44
9/7/2018	450	450	3.0	SA	ND(<1)	SA	SA	SA	ND(<0.5)	33	41
11/6/2018	450	450	1.5	ND(<10)	<b>10.9</b>	ND(<0.1)	0.29	0.05	ND(<0.5)	39	39
11/6/2018 (dup.)	450	450	1.6	ND(<10)	<b>6.3</b>	ND(<0.1)	0.32	0.04	ND(<0.5)	39	39
2/25/2019	450	450	1.8	ND(<10)	ND(<1)	SA	0.3	0.3	ND(<0.5)	32	43
2/25/2019 (dup.)	450	450	1.6	ND(<10)	ND(<1)	SA	0.42	0.42	ND(<0.5)	33	44



**Table 5. Groundwater Laboratory Chemistry Parameters - HF Sinclair PSR SDF**

Well ID	Alkalinity	Bicarbonate Alkalinity	Total Organic Carbon	Chemical Oxygen Demand	Total Coliform	Nitrite-N	Nitrate-N	Nitrite + Nitrate	Ammonia	Chloride	Sulfate
	units:	mg/L	mg/L	mg/L	mg/L	TC/100ml	mg/L	mg/L	mg/L	mg/L	mg/L
<b>Groundwater Quality Standards: WAC 173-200-040</b>	--	--	--	--	1/100 ml	--	10	--	--	250	250
<b>MTCA Method B Cleanup Level:</b>	--	--	--	--	--	1,600	26,000	--	--	--	--
<b>Well 113 (Downgradient)</b>											
5/21/2019	460	460	2.1	ND(<10)	ND(<1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.5)	31	41
9/3/2019	460	460	ND(<1)	SA	ND(<1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.5)	33	40
9/3/2019 (dup)	560	560	1.0	ND(<10)	ND(<1)	ND(<0.1)	0.04	ND(<0.1)	ND(<0.5)	32	4.6
11/13/2019	460	460	1.8	ND(<10)	ND(<1)	ND(<0.1)	0.04	0.05	ND(<0.5)	32	42
2/12/2020	460	460	3.3	SA	ND(<1)	SA	ND(<0.01)	0.02	SA	33	45
4/29/2020	450	450	66	ND(<10)	<b>24.6</b>	ND(<0.005)	0.008	0.009	ND(<0.5)	35	45
8/5/2020	450	450	5.5	SA	ND(<1)	SA	0.008	0.01	SA	32	42
11/3/2020	460	460	3.2	ND(<10)	<b>122.3</b>	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.5)	32	44
2/10/2021	470	470	4.6	SA	<b>22.8</b>	SA	0.02	0.02	SA	33	46
5/25/2021	450	450	4.1	ND(<10)	ND(<2)	ND(<0.005)	0.007J	0.007J	ND(<0.5)	35	45
8/4/2021	450	450	2.5	SA	ND(<1)	SA	ND(<0.1)	0.01	SA	36	41
11/9/2021	460	460	1.8	ND(<10)	ND(<1)	ND(<0.005)	0.018	0.018	ND(<0.2)	29	43
11/9/2021 (dup)	470	470	1.9	ND(<10)	ND(<1)	ND(<0.005)	ND(<0.005)	ND(<0.01)	ND(<0.2)	31	43
2/15/2022	350	350	1.9	SA	ND(<1)	SA	ND(<0.1)	0.01	SA	29	46
4/18/2022	450	450	1.7	ND(<10)	ND(<1)	ND(<0.005)	0.01	0.01	ND(<0.5)	29	45
4/18/2022 (dup.)	460	460	1.7	ND(<10)	ND(<1)	ND(<0.005)	ND(<0.005)	ND(<0.01)	ND(<0.5)	29	44
8/10/2022	470	470	1.8	ND(<10)	ND(<1)	ND(<0.1)	ND(<0.1)	0.0074J	ND(<0.5)	29	44
11/16/2022	480	480	2.2 <sup>*a</sup>	ND(<10)	ND(<1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.5)	27	42
2/6/2023	450	450	1.7	11	ND(<1)	ND(<0.005)	0.013	0.01	ND(<0.5)	31	49
2/6/2023 (dup.)	450	450	1.7	ND(<10)	ND(<1)	ND(<0.005)	0.014	0.01	ND(<0.5)	31	49
5/9/2023	430	430	5.9	ND(<10)	ND(<1)	ND(<0.1)	0.004	0.01	ND(<0.5)	31	44
8/9/2023	470	470	6.1	ND(<10)	ND(<1)	ND(<0.005)	0.02	0.02	ND(<0.3)	26	55
8/9/2023 (dup.)	480	480	5.9	ND(<10)	ND(<1)	ND(<0.005)	0.02	0.02	ND(<0.3)	26	54
11/8/2023	440	440	2	ND(<10)	ND(<1)	ND(<0.005)	0.0198J	0.02	ND(<0.3)	27	49
11/8/23 (dup.)	440	440	2	ND(<10)	ND(<1) H3	ND(<0.005)	0.0198J	0.02	ND(<0.3)	27	50
<b>Well 127 (Downgradient)</b>											
6/11/2014	530	530	6.5	15	ND(<1)	ND(<0.05)	ND(<0.05)	ND(<0.10)	ND(<0.1)	17	47
8/20/2014	520	520	6.8	17	<b>2</b>	ND(<0.05)	ND(<0.05)	ND(<0.10)	0.11	17	51
8/20/2014 (dup.)	510	510	6.8	17	<b>1</b>	ND(<0.05)	ND(<0.05)	ND(<0.10)	ND(<0.1)	17	52

**Table 5. Groundwater Laboratory Chemistry Parameters - HF Sinclair PSR SDF**

Well ID	Alkalinity	Bicarbonate Alkalinity	Total Organic Carbon	Chemical Oxygen Demand	Total Coliform	Nitrite-N	Nitrate-N	Nitrite + Nitrate	Ammonia	Chloride	Sulfate
	units:	mg/L	mg/L	mg/L	mg/L	TC/100ml	mg/L	mg/L	mg/L	mg/L	mg/L
<b>Groundwater Quality Standards: WAC 173-200-040</b>	--	--	--	--	1/100 ml	--	10	--	--	250	250
<b>MTCA Method B Cleanup Level:</b>	--	--	--	--	--	1,600	26,000	--	--	--	--
<b>Well 127 (Downgradient)</b>											
11/10/2014	490	490	7.1	13	ND(<1)	ND(<0.05)	ND(<0.05)	ND(<0.10)	0.14	18	45
2/18/2015	530	530	6.0	18	<b>1</b>	ND(<0.05)	ND(<0.05)	ND(<0.10)	ND(<0.2)	15	46
5/28/2015	530	530	6.1	13	ND(<1)	ND(<0.05)	ND(<0.05)	ND(<0.10)	ND(<0.2)	18	45
9/1/2015	520	520	6.8	10	<b>9</b>	ND(<0.05)	ND(<0.05)	ND(<0.10)	ND(<0.2)	16	43
10/28/2015	490	490	6.4	ND(<10)	<b>14</b>	ND(<0.05)	2.8	2.8	ND(<0.2)	16	68
2/22/2016	490	490	6.8	13	ND(<1)	ND(<0.05)	0.27	0.27	0.2	22	55
5/11/2016	430	430	7.7	15	ND(<1)	ND(<0.05)	1.7	1.7	ND(<0.2)	20	70
8/9/2016	500	500	8.9	20	ND(<1)	ND(<0.05)	ND(<0.05)	ND(<0.10)	ND(<0.2)	22	40
11/10/2016	190	190	9.6	21	<b>150</b>	ND(<0.05)	7.3	7.3	ND(<0.2)	8.5	90
2/2/2017	340	340	6.7	16	<b>1</b>	ND(<0.05)	1.3	1.3	ND(<0.2)	15	67
5/10/2017	470	470	5.5	14	ND(<1)	ND(<0.05)	0.1	0.1	0.11	20	52
8/9/2017	390	390	9.7	ND(<10)	ND(<1.1)	NA	ND(<0.01)	ND(<0.01)	0.22	18	56
8/9/2017 (dup.)	520	520	9.2	ND(<10)	ND(<1.1)	NA	ND(<0.01)	0.01	ND(<0.2)	21	47
11/7/2017	170	170	12	34	<b>(&gt;1)</b>	ND(<0.1)	2.16	1.72	ND(<0.5)	10	72
2/21/2018	340	340	7.6	29	ND(<1)	ND(<0.1)	0.12	0.12	ND(<0.5)	18	58
2/21/18 (dup.)	380	380	7.2	21	ND(<1)	ND(<0.1)	0.1	0.1	ND(<0.5)	18	57
4/11/2018	380	380	6.7	19	ND(<1)	ND(<0.1)	ND(<0.1)	0.03	ND(<0.1)	19	54
4/11/2018 (dup.)	370	370	6.9	14	ND(<1)	ND(<0.1)	ND(<0.1)	0.03	ND(<0.1)	19	55
9/7/2018	350	350	11	36	ND(<1)	NA	NA	NA	ND(<0.5)	21	58
9/7/2018 (dup.)	350	350	9.5	36	ND(<1)	NA	NA	NA	ND(<0.5)	21	58
11/6/2018	120	120	11	31	<b>435.2</b>	ND(<0.1)	8.78	10.9	ND(<0.5)	17	71
2/25/2019	350	350	16	16	ND(<1)	SA	1.8	1.8	ND(<0.5)	21	61
5/21/2019	350	350	8.9	21	ND(<1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.5)	23	56
9/3/2019	350	350	8.3	27	ND(<1)	ND(<0.1)	ND(<0.1)	0.03	ND(<0.5)	27	58
11/13/2019	270	270	12	27	<b>95.9</b>	ND(<0.1)	0.11	0.11	ND(<0.5)	9	48
11/13/2019 (dup.)	260	260	12	30	<b>79.4</b>	ND(<0.1)	0.05	0.06	ND(<0.5)	9.5	47
2/12/2020	360	360	8.6	13	<b>1</b>	SA	0.02	0.02	SA	19	55
2/12/2020 (dup.)	350	350	8.8	17	<b>1</b>	SA	0.01	0.01	SA	20	53
4/29/2020	350	350	69	16	<b>3</b>	ND(<0.005)	0.008	0.008	ND(<0.5)	24	52
4/29/2020 (dup.)	330	330	69	ND(<10)	<b>22.8</b>	ND(<0.005)	0.01	0.01	ND(<0.5)	24	52

**Table 5. Groundwater Laboratory Chemistry Parameters - HF Sinclair PSR SDF**

Well ID	Alkalinity	Bicarbonate Alkalinity	Total Organic Carbon	Chemical Oxygen Demand	Total Coliform	Nitrite-N	Nitrate-N	Nitrite + Nitrate	Ammonia	Chloride	Sulfate
	units:	mg/L	mg/L	mg/L	mg/L	TC/100ml	mg/L	mg/L	mg/L	mg/L	mg/L
<b>Groundwater Quality Standards: WAC 173-200-040</b>	--	--	--	--	1/100 ml	--	10	--	--	250	250
<b>MTCA Method B Cleanup Level:</b>	--	--	--	--	--	1,600	26,000	--	--	--	--
<b>Well 127 (Downgradient)</b>											
8/5/2020	330	330	14	30	<b>1</b>	SA	0.004	ND(<0.007)	SA	25	52
8/5/2020 (dup.)	330	330	14	28	<b>24.9</b>	SA	ND(<0.005)	ND(<0.007)	SA	25	51
11/3/2020	250	250	11	25	<b>1553.1</b>	0.006	0.18	0.19	ND(<0.5)	16	53
11/3/2020 (dup.)	240	240	11	24	<b>1986.3</b>	ND(<0.005)	0.14	0.14	ND(<0.5)	15	54
2/10/2021	390	390	9.2	18	<b>1</b>	SA	0.01	0.02	SA	27	57
2/10/21 (dup.)	390	390	9	19	ND(<1)	SA	0.01	0.02	SA	27	57
5/25/2021	340	340	13	21	ND(<1)	ND(<0.005)	ND(<0.01)	ND(<0.01)	ND(<0.5)	34	40
5/25/2021 (dup.)	340	340	14	22	ND(<1)	ND(<0.005)	ND(<0.01)	ND(<0.01)	ND(<0.5)	35	34
8/4/2021	390	390	9.4	21	ND(<1)	SA	ND(<0.1)	ND(<0.01)	SA	38	45
8/4/2021 (dup.)	390	390	11	ND(<10)	ND(<1)	SA	ND(<0.1)	ND(<0.01)	SA	40	42
11/9/2021	310	310	10	21	<b>1</b>	0.059	4.42	4.48	ND(<0.2)	27	41
2/15/2022	290	290	6.3	18	<b>1</b>	ND(<0.1)	ND(<0.1)	0.07	SA	32	54
2/15/2022 (dup.)	320	320	6.4	20	ND(<1)	0.33	0.1	0.08	SA	32	54
4/18/2022	490	490	6.2	18	ND(<1)	ND(<0.005)	0.0067	0.0067J	ND(<0.5)	33	53
8/10/2022	490	490	11	26	ND(<1)	ND(<0.1)	ND(<0.1)	ND(<0.01)	ND(<0.5)	35	35
8/10/2022 (dup.)	480	480	10	30	ND(<1)	ND(<0.1)	ND(<0.1)	ND(<0.01)	ND(<0.5)	35	37
11/16/2022	510	510	7.9*	19	<b>2</b>	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.5)	35	47
11/16/2022 (dup.)	500	500	8.3*	20	<b>3.1</b>	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.5)	35	46
2/6/2023	510	510	6.2	21	ND(<1)	ND(<0.005)	ND(<0.005)	ND(<0.01)	ND(<0.5)	38	54
5/9/2023	500	500	12	18	ND(<1)	ND(<0.1)	ND(<0.1)	0.0047J	ND(<0.5)	38	48
5/9/2023 (dup.)	500	500	12	23	ND(<1)	ND(<0.1)	ND(<0.1)	ND(<0.01)	ND(<0.5)	13 <sup>*a</sup>	49 <sup>*a</sup>
6/23/2023	NA	NA	NA	17	NA	NA	NA	NA	NA	21	NA

**Table 5. Groundwater Laboratory Chemistry Parameters - HF Sinclair PSR SDF**

Well ID	Alkalinity	Bicarbonate Alkalinity	Total Organic Carbon	Chemical Oxygen Demand	Total Coliform	Nitrite-N	Nitrate-N	Nitrite + Nitrate	Ammonia	Chloride	Sulfate
units:	mg/L	mg/L	mg/L	mg/L	TC/100ml	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
<b>Groundwater Quality Standards: WAC 173-200-040</b>	--	--	--	--	1/100 ml	--	10	--	--	250	250
<b>MTCA Method B Cleanup Level:</b>	--	--	--	--	--	1,600	26,000	--	--	--	--
<b>Well 127 (Downgradient)</b>											
8/9/2023	540	540	13	18	ND(<1)	ND(<0.005)	0.09	0.09	ND(<0.3)	39	51
9/28/2023	NA	NA	NA	24	NA	NA	NA	NA	NA	39	NA
9/28/2023 (dup.)	NA	NA	NA	19	NA	NA	NA	NA	NA	39	NA
11/8/2023	500	500	7.1	10	ND(<1)	ND(<0.005)	0.17	0.17	ND(<0.3)	37	48
12/13/2023	NA	NA	NA	NA	NA	NA	NA	NA	NA	37	NA

-- indicates there is no quality standard or MTCA B cleanup level for the specific analyte

ND indicates analyte was not detected at level above reporting limit (shown in parentheses)

**Bold type** indicates samples that exceed the Water Quality Standards (WAC 173-200-040) or MTCA cleanup level

*Italics* indicates that the laboratory reporting limit was raised to a level exceeding the Groundwater Quality Standards (WAC 173-200-040)

SA indicates that the analysis occurs on a Semi-Annual basis by permit Part I(C)(5)

NA indicates that the specified analyte was Not Analyzed

J -- The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

\* - Analyses/re-analyses of the samples were performed outside of the analytical hold time.

<sup>a</sup> - MS and/or MSD recovery exceeds control limits.

**Table 6. Groundwater cPAH Analytical Results - HF Sinclair PSR SDF**

Sample ID	Date	EPA-8270	EPA-8270	EPA-8270	EPA-8270	EPA-8270	EPA-8270	EPA-8270	Total
		Benzo[a]pyrene µg/L	Benzo[a]anthracene µg/L	Benzo[b]fluoranthene µg/L	Benzo[k]fluoranthene µg/L	Chrysene µg/L	Dibenz[a,h]anthracene µg/L	Indeno[1,2,3-cd]pyrene µg/L	cPAH Equivalent (TEq) <sup>a</sup> µg/L
<b>Toxicity Equivalency Factor (TEF):</b>		1	0.1	0.1	0.1	0.01	0.1	0.1	--
<b>MTCA Method B Cleanup Level:</b>		0.023	--	--	--	--	--	--	0.1 <sup>b</sup>
<b>W-47</b>	4/18/2022	ND(<0.1)	ND(<0.051)	ND(<0.1)	ND(<0.051)	ND(<0.1)	ND(<0.1)	ND(<0.051)	0.068
	8/10/2022	ND(<0.1)	ND(<0.052)	ND(<0.1)	ND(<0.052)	ND(<0.1)	ND(<0.1)	ND(<0.052)	0.068
	11/16/2022	ND(<0.1)	ND(<0.051)	ND(<0.1)	ND(<0.051)	ND(<0.1)	ND(<0.1)	ND(<0.051)	0.068
	2/6/2023	ND(<0.1)	ND(<0.051)	ND(<0.1)	ND(<0.051)	ND(<0.1)	ND(<0.1)	ND(<0.051)	0.068
	5/9/2023	ND(<0.1)	ND(<0.051)	ND(<0.1)	ND(<0.051)	ND(<0.1)	ND(<0.1)	ND(<0.051)	0.068
	8/9/2023	ND(<0.11)	ND(<0.054)	ND(<0.11)	ND(<0.054)	ND(<0.11)	ND(<0.11)	ND(<0.054)	0.075
	11/8/2023	ND(<0.1)	ND(<0.052)	ND(<0.1)	ND(<0.052)	ND(<0.1)	ND(<0.1)	ND(<0.052)	0.068
<b>W-112</b>	4/18/2022	ND(<0.1)	ND(<0.051)	ND(<0.1)	ND(<0.051)	ND(<0.1)	ND(<0.1)	ND(<0.051)	0.068
	8/10/2022	ND(<0.1)	ND(<0.052)	ND(<0.1)	ND(<0.052)	ND(<0.1)	ND(<0.1)	ND(<0.052)	0.068
	11/16/2022	ND(<0.1)	ND(<0.051)	ND(<0.1)	ND(<0.051)	ND(<0.1)	ND(<0.1)	ND(<0.051)	0.068
	2/6/2023	ND(<0.11)	ND(<0.054)	ND(<0.11)	ND(<0.054)	ND(<0.11)	ND(<0.11)	ND(<0.054)	0.075
	5/9/2023	ND(<0.1)	ND(<0.051)	ND(<0.1)	ND(<0.051)	ND(<0.1)	ND(<0.1)	ND(<0.051)	0.068
	8/9/2023	ND(<0.1)	ND(<0.051)	ND(<0.1)	ND(<0.051)	ND(<0.1)	ND(<0.1)	ND(<0.051)	0.068
	11/8/2023	ND(<0.1)	ND(<0.052)	ND(<0.1)	ND(<0.052)	ND(<0.1)	ND(<0.1)	ND(<0.052)	0.068
<b>W-113</b>	4/18/2022	ND(<0.1)	ND(<0.051)	ND(<0.1)	ND(<0.051)	ND(<0.1)	ND(<0.1)	ND(<0.051)	0.068
	4/18/2022 (dup.)	ND(<0.1)	ND(<0.051)	ND(<0.1)	ND(<0.051)	ND(<0.1)	ND(<0.1)	ND(<0.051)	0.068
	8/10/2022	ND(<0.1)	ND(<0.052)	ND(<0.1)	ND(<0.052)	ND(<0.1)	ND(<0.1)	ND(<0.052)	0.068
	11/16/2022	ND(<0.11)	ND(<0.053)	ND(<0.11)	ND(<0.053)	ND(<0.11)	ND(<0.11)	ND(<0.053)	0.075
	2/6/2023	ND(<0.1)	ND(<0.051)	ND(<0.1)	ND(<0.051)	ND(<0.1)	ND(<0.1)	ND(<0.051)	0.068
	2/6/2023 (dup.)	ND(<0.1)	ND(<0.051)	ND(<0.1)	ND(<0.051)	ND(<0.1)	ND(<0.1)	ND(<0.051)	0.068
	5/9/2023	ND(<0.1)	ND(<0.052)	ND(<0.1)	ND(<0.052)	ND(<0.1)	ND(<0.1)	ND(<0.052)	0.068
	8/9/2023	ND(<0.1)	ND(<0.051)	ND(<0.1)	ND(<0.051)	ND(<0.1)	ND(<0.1)	ND(<0.051)	0.068
	8/9/2023 (dup.)	ND(<0.1)	ND(<0.052)	ND(<0.1)	ND(<0.052)	ND(<0.1)	ND(<0.1)	ND(<0.052)	0.068
	11/8/2023	ND(<0.1)	ND(<0.051)	ND(<0.1)	ND(<0.051)	ND(<0.1)	ND(<0.1)	ND(<0.051)	0.068
	11/8/2023 (dup.)	ND(<0.11)	ND(<0.053)	ND(<0.11)	ND(<0.053)	ND(<0.11)	ND(<0.11)	ND(<0.053)	0.075
<b>W-127</b>	4/18/2022	ND(<0.1)	ND(<0.052)	ND(<0.1)	ND(<0.052)	ND(<0.1)	ND(<0.1)	ND(<0.052)	0.068
	8/10/2022	ND(<0.11)	ND(<0.054)	ND(<0.11)	ND(<0.054)	ND(<0.11)	ND(<0.11)	ND(<0.054)	0.075
	8/10/2022 (dup.)	ND(<0.11)	ND(<0.054)	ND(<0.11)	ND(<0.054)	ND(<0.11)	ND(<0.11)	ND(<0.054)	0.075
	11/16/2022	ND(<0.1)	ND(<0.052)	ND(<0.1)	ND(<0.052)	ND(<0.1)	ND(<0.1)	ND(<0.052)	0.068
	11/16/2022 (dup.)	ND(<0.11)	ND(<0.053)	ND(<0.11)	ND(<0.053)	ND(<0.11)	ND(<0.11)	ND(<0.053)	0.075
	2/6/2023	ND(<0.11)	ND(<0.053)	ND(<0.11)	ND(<0.053)	ND(<0.11)	ND(<0.11)	ND(<0.053)	0.075
	5/9/2023	ND(<0.11)	ND(<0.053)	ND(<0.11)	ND(<0.053)	ND(<0.11)	ND(<0.11)	ND(<0.053)	0.075
	5/9/2023 (dup.)	ND(<0.11)	ND(<0.053)	ND(<0.11)	ND(<0.053)	ND(<0.11)	ND(<0.11)	ND(<0.053)	0.075
	8/9/2023	ND(<0.1)	ND(<0.052)	ND(<0.1)	ND(<0.052)	ND(<0.1)	ND(<0.1)	ND(<0.052)	0.068
	11/8/2023	ND(<0.1)	ND(<0.051)	ND(<0.1)	ND(<0.051)	ND(<0.1)	ND(<0.1)	ND(<0.051)	0.068

TEF - Toxicity Equivalency Factor (WAC 173-340-900 table 708.2)

TEq - Toxicity Equivalency to benzo(a)pyrene, calculated by multiplying result by appropriate TEF.

ND - indicates analyte was not detected at level above reporting limit (shown in parentheses)

For ND values, the TEF was multiplied by one half the reporting limit

a - cPAH level calculated using Toxicity equivalency methodology provided in WAC 173-340-708(8)

b - Method A cleanup level of Benzo(a)pyrene

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**APPENDIX C -  
SKAGIT COUNTY PERMIT DOCUMENTS**

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01/01/2023

Effective Date

12/31/2023

Expiration Date

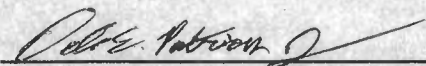
## SOLID WASTE PERMIT

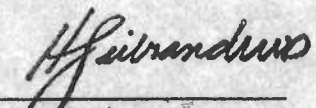
**Business Name** HF SINCLAIR PUGET SOUND REFINING LLC  
**UBI #** 604-777-044  
**Located At** 8505 SOUTH TEXAS ROAD  
ANACORTES, WA 98221  
**Permit Type(s)** LIMITED PURPOSE LANDFILL - CATEGORY 1  
**Operated By** HOLDER, MIKE  
HF SINCLAIR, PUGET SOUND REFINING LLC  
SCHNEIDER, JIM

The permit holder agrees to comply with all ordinances, rules and regulations that apply and is hereby granted permission to conduct the business specified.

This permit shall remain the property of the Health Department and may be suspended by the Health Officer or his or her authorized representative for violation by the holder of any of the ordinances or rules and regulations applicable.

This permit is conditional. The permit conditions are attached.

  
Environmental Health Specialist

  
Health Officer

Skagit County Public Health 700 South 2nd Street, #301 Mount Vernon, WA 98273



# Skagit County Public Health

"Always working for a safer  
and healthier Skagit County"

**Keith Higman, Director**  
**Howard Leibrand, M.D., Health Officer**

## SKAGIT COUNTY PUBLIC HEALTH SOLID WASTE FACILITY PERMIT

**EFFECTIVE DATE:** January 1, 2023      **EXPIRES:** December 31, 2023

**FACILITY TYPE:** WAC 173-350-490, Other methods of solid waste handling and  
WAC 173-350-400, Limited purpose landfill

**FACILITY NAME:** HF Sinclair Puget Sound Refining LLC  
Sludge Disposal Facility

**FACILITY LOCATION:** HF Sinclair Puget Sound Refining  
8505 South Texas Road  
Anacortes, WA 98221  
Facility coordinates: 48.4753 N, 122.5531 W

**FACILITY MAILING ADDRESS:** HF Sinclair Puget Sound Refining  
2828 North Hardwood Suite 1300  
Dallas, TX 75201

**FACILITY OWNER/OPERATOR  
and PHONE NUMBER:** HF Sinclair Puget Sound Refining LLC  
Jim Schneider, Facility Manager 360-293-0868  
Vaishali Bhatia, 214-871-3469  
Valerie Pompa, 214-871-3849

This permit is issued by the Skagit County Public Health (Public Health) as the jurisdictional health department in accordance with the provisions of chapter 70A.205 RCW, chapter 173-350 WAC, and Chapter 12.16 Skagit County Code (SCC). This permit is the property of Public Health and may be suspended or revoked, with the opportunity for appeal, upon violation for any of the applicable statutes, ordinances, regulations, or permit conditions. This permit is non-transferable and must be renewed annually.

This facility shall operate in accordance with a Public Health approved plan of operation. The facility shall not operate without a current approved plan of operation. Any significant deviations or changes to the plan of operation, e.g., a change that presents an environmental risk or requires improvements or conditions to ensure that environmental risks are minimized, must be submitted, in writing, to Public Health for review and approval prior to implementation. The Biosolids Sludge Dewatering Operation, Operation and Maintenance Plan, HollyFrontier Puget Sound Refinery, dated May 24, 2022, is incorporated by reference as part of the terms and conditions of this permit. This facility shall comply with the conditions of this permit and all applicable statutes, ordinances, and regulations. If there are any conflicts between any provision in



the plan of operation documents and the conditions of this permit or any applicable statute, ordinance, or regulation, then the more restrictive regulation shall apply.

**Part I SPECIFIC PERMIT CONDITIONS**

- A. The Wastewater Treatment Plant (WWTP) Sludge Disposal Facility (facility) is a solid waste disposal facility on the HF Sinclair Puget Sound Refinery. The facility is permitted under WAC 173-350-490, Other methods of solid waste handling, primarily following limited purpose landfill standards with specific permit requirements drawn from WAC 173-350-400, Limited purpose landfills, and WAC 173-350-600, Financial assurance requirements.
- B. HF Sinclair Puget Sound Refining (Permittee) was authorized to dispose of wastewater treatment plant sludge in the facility through December 31, 2021. No additional disposal of sludge is authorized.
- C. Any sludge dewatering operations shall occur within an existing, lined location where leachate is kept within the approved WWTP operations or be reviewed and approved by the permitting authority.
- D. The sludge disposal facility is preparing to close and no additional disposal of solid waste is authorized. The Permittee shall follow the Operations and Maintenance Plan for the WWTP Sludge Disposal Facility, dated May 24, 2022, and the conditions of this permit until the Permittee has completed the closure and post-closure plan and received approval from Public Health.
- E. The Permittee submitted a Closure and Post-Closure Plan for this facility. The Permittee provided draft plans, dated June 16, 2022, August 29, 2022, and November 30, 2022. The Washington Department of Ecology (Ecology) and Public Health provided review comments for the closure and post-closure plan on June 24, 2022. The Permittee responded to those comments on July 28, 2022, and an updated draft closure and post-closure plan was submitted on September 9, 2022. Ecology and Public Health provided comments on September 28, 2022, and the Permittee responded on October 21, 2022. Ecology and Public Health provided comments on November 2, 2022. The updated draft closure and post-closure plan includes the following workplans or sampling and analysis plans as appendices:
1. Borrow Area Soil Sampling and Analysis Plan
  2. Well W-113 replacement workplan
  3. Groundwater Sampling and Analysis Plan
  4. Leachate Sampling and Analysis Plan
  5. Settlement Monitoring Sampling and Analysis Plan
  6. Landfill Gas Sampling and Analysis Plan
- On December 21, 2022, Public Health and Ecology are provided review comments on the November 30, 2022, revision of the Closure and Post-Closure Plan.
- F. The Closure and Post-Closure Plan and regulatory comments are incorporated by reference into this permit. Once Public Health has given final approval to the closure and post closure plan, the Permittee will follow the approved plan.

G. Minimum Standards for Operation, Maintenance and Performance

1. Drainage and runoff.  
Runoff from the sludge disposal facility shall be diverted into the catch basin/collection sump and routed back to the WWTP. Any leachate produced from the sludge must be disposed of into the WWTP. Leachate cannot be disposed of via the stormwater system. The facility stormwater system must be maintained and shall not contaminate surface waters at or adjacent to the facility site.
2. No sludge shall be disposed of within the land disposal site. Sludge handling shall be confined to the sludge dewatering and loading areas until the sludge can be transported to the approved permitted disposal facility. Any leachate from the sludge must be collected and routed back into the WWTP for further processing.
3. Any processed and dewatered sludge that shall be disposed of outside of the approved solid waste disposal facility is still considered a solid waste and must be disposed of at a solid waste facility that is permitted under and meets the requirements of Chapter 173-350 WAC, Solid waste handling standards; Chapter 173-351 WAC, Criteria for municipal solid waste landfills; or as otherwise specifically permitted in writing by Public Health. The sludge does not meet the standards of classification for regulation under Chapter 173-308 WAC, Biosolids management, because the sludge is generated during the treatment of industrial wastewater.

No sludge will be placed at another on-site location unless the Permittee obtains written approval from Public Health prior to placing the sludge at another on-site or off-site location.

4. The manager or other designated personnel shall inspect the facility to prevent malfunctions and deterioration, operational errors and discharges that may cause or lead to the release of wastes to the environment or pose a threat to human health. These inspections shall be conducted as detailed in the operation and maintenance manual or as necessary to identify and correct problems before they harm human health or the environment.

Inspection logs or summaries shall be kept which includes at least: the date and time of inspection; the printed name and handwritten signature of the inspector; a notation of status and observations made encompassing at a minimum; and, the date and nature of any repairs or corrective actions. The inspection logs shall be kept for at least 5 years from the date of inspection. Inspection records shall be available to Public Health upon request.

5. Groundwater monitoring and reporting shall be performed in accordance with the Public Health-approved Closure and Post-Closure Plan, as amended by subsequent variance requests and approvals. Until superseded by the approved Closure and Post-Closure Plan, the groundwater monitoring system should evaluate the following parameters:
  - a. pH, specific conductance, temperature, and static water level.
  - b. Total dissolved solids and chloride.

- c. Alkalinity and bicarbonate.
- d. Nitrate, nitrite, nitrite + nitrate, ammonia, and sulfate.
- e. Chemical oxygen demand.
- f. Total organic carbon.
- g. Total arsenic, iron, magnesium, and manganese.
- h. Dissolved arsenic, iron, magnesium, manganese, calcium, potassium, and sodium.
- i. Total chromium, lead, mercury, nickel, and selenium.
- j. Dissolved chromium, lead, mercury, nickel, and selenium.
- k. Benzene, toluene, ethylbenzene, and xylenes.
- l. Total petroleum hydrocarbons (NWTPH-Gx and NWTPH-Dx).
- m. Carcinogenic polycyclic aromatic hydrocarbons.
- n. Total coliform.

Total and dissolved arsenic has been added to assist in evaluating any groundwater impacts as the facility moves through the closure process. Please use method detection levels low enough to be below the Chapter 173-200-040 WAC criteria of 0.05 ug/L. Carcinogenic polycyclic aromatic hydrocarbons have been added since these compounds are indicator hazardous substances for diesel and heavy oils.

Total and dissolved antimony, vanadium, and zinc have been removed to align with the leachate parameters required by Chapter 173-350-500 WAC. Per Closure and Post-Closure Plan regulatory comments from December 21, 2022, include in future groundwater monitoring events any RCRA-8 metals detected in leachate that are in exceedance of Chapter 173-200-040 or MTCA groundwater standard per WAC 173-350-500(4)(ii).

Groundwater quality will be determined at each monitoring well quarterly during the closure and post-closure periods of the sludge disposal facility. If a parameter has been below the groundwater enforcement level, or statistically equivalent to the background groundwater quality, (whichever is more restrictive) for eight or more consecutive quarters, the Permittee may request to decrease monitoring frequency to semiannual analysis by submitting a variance request and receiving approval by Public Health. Any parameter that is monitored semiannually that exceeds its water quality standards, or statistically different from the background groundwater quality, will revert to quarterly monitoring. For the purpose of the sludge disposal facility, monitoring well MW-47 is considered to be representative of background water quality. The monitoring results will be submitted in an annual report (see Part I.F below).

**Notification of an Exceedance of a Performance Standard (WAC 173-350 Landfills)**

Per Chapter 173-350-500(5)(b) If statistical analyses determine a significant increase over background:

(i) The owner or operator must:

(A) Notify the jurisdictional health department and the department of this finding within thirty days of receipt of the sampling data. The notification must indicate what parameters or constituents have shown statistically significant increases

(B) Within thirty days, resample parameter(s) showing statistically significant increase(s) in the monitoring well(s) where the statistically significant increase has occurred, and  
(C) Establish a groundwater protection standard based on the groundwater quality criteria of chapter 173-200 WAC, Water quality standards for groundwaters of the state of Washington. If the back-ground concentration level established in the facility's monitoring record for a constituent is greater than the numeric criterion for the constituent in chapter 173-200 WAC, Water quality standards for groundwaters of the state of Washington, the owner or operator must use the background concentration as the protection standard.

#### H. Reporting Requirements

All reports shall be forwarded directly to:

Skagit County Public Health  
Environmental Public Health Division  
700 South 2<sup>nd</sup> Street, Room 301  
Mount Vernon, WA 98273, and

Washington Department of Ecology  
Northwest Regional Office  
Solid Waste Management Program  
PO Box 330316  
Shoreline, WA 98133-9716

The Permittee shall prepare and submit the annual report to Public Health and Ecology by April 1<sup>st</sup> covering the previous calendar year. The annual report shall cover facility maintenance and monitoring activities during the previous calendar year and must include, at a minimum, the following information:

1. Sludge
  - a. Describe sludge generation from the WWTP, onsite handling, and offsite disposal.
  - b. Detail the total amount of sludge handled at the WWTP during the report year.
  - c. Detail the quantity and specific disposal facility location of sludge removed from the WWTP and disposed at an off-site facility.
  - d. Detail the total amount of sludge remaining at the WWTP at the end of the reporting year.
  
2. Groundwater
  - a. Tabulated results of laboratory analyses and field measurements.
  - b. Identification of parameters exceeding water quality standards established in WAC 173-200.
  - c. Groundwater elevation measurements and groundwater elevation contour maps for each sampling event.
  - d. Estimated groundwater flow velocity.
  - e. A report on the groundwater monitoring activities including a discussion of the analytical results.
  - f. Statistical analysis including the following evaluations:
    - Intrawell analysis including: time series plots, Mann-Kendall test.

- Interwell analysis including: box plots, Wilcoxon Rank-Sum test, and prediction limits.
  - g. Stiff and piper diagrams.
  - h. Cation-anion balance.
  - i. Deviations from the environmental procedures and/or groundwater sampling and analysis plan.
  - j. Brief description of any significant activities including site maintenance and repair activities conducted on the site during the monitoring year.
  - k. For each groundwater sampling event, validated analytical results must be submitted to Ecology's Environmental Information Management (EIM) database within 60 days of the receipt of the analytical results.
  - l. Included field data sheets and laboratory analytical reports (as appendices in electronic and on CD in hard copy).
3. Financial Assurance
- a. Provide annual update closure and post-closure costs in accordance with WAC 173-350-600(4) and (5).
  - b. Provide financial assurance using allowable instrument in WAC 173-350-600.

**G. Compliance Schedule**

- 1. By April 1, 2023, the Permittee shall submit annual report describing facility maintenance and monitoring activities.

Once Public Health has approved the closure and post closure plan and sampling and analysis plans, the Permittee shall begin implementation of the Public Health approved plans and specifications according to implementation schedules approved by Public Health.

Ongoing monitoring, maintenance and reporting will continue for the former sludge disposal facility per the plans of operation, closure and post-closure plan, and the specific permit conditions included in the solid waste permit issued by Public Health for 2023.

**Part II GENERAL PERMIT CONDITIONS**

- A. All conditions of this permit shall be binding upon the Permittee, and the Permittee shall be responsible for all acts or omissions of its contractors and agents.
- B. The Permittee shall notify and request approval of Public Health in advance and in writing, of any proposed alterations or additions to the permitted facility or changes in solid waste handling practices or operations.
- C. Facility operations and maintenance shall be conducted in compliance with Chapter 173-350 WAC; Chapter 12.16 SCC; other applicable federal, state, and local regulations; and the conditions of this permit. In the event of conflict between state law or regulation and local ordinances and policies, the more stringent requirement shall apply.
- D. The Permittee shall allow any duly authorized officer, employee, or representative of the Public Health Officer of Skagit County, Skagit County, or the Washington Department of Ecology to

inspect, at any reasonable time, the site, facilities, structures, records, and equipment required or regulated under the terms and conditions of this permit, regardless of prior knowledge of the inspection. Public Health reserves the right to request sampling and analysis of any wastes or materials at the site. The Permittee shall bear the analysis cost of any samples requested by Public Health.

- E. The site shall be operated in a manner to prevent the contamination of groundwater, surface water, air, land, and adjacent properties.
- F. The Permittee shall notify Public Health within 24 hours of any spill, releases, contaminations, or threats to human health or the environment or discharges or incidents of non-compliance at the facility, while immediately taking all necessary measures to protect human health and the environment.
- G. The Permittee shall notify Public Health within 48 hours of receipt of any environmental or health complaint regarding the facility. The Permittee shall inform Public Health how it intends to respond to the complaint.
- H. Access, entry and/or disposal at the site shall be controlled and restricted, by means of a fence and gate, or other means approved by Public Health and as outlined in the approved Plan of Operation for the facility in a manner that prevents unauthorized public access and dumping.
- I. This permit is subject to suspension or revocation if Public Health finds that the facility is being operated in violation of Chapter 70A.205, Chapter 173-350 WAC, or Chapter 12.16 SCC, subject to the appeals process outlined in Chapter 173-350 WAC. Public Health may suspend or revoke this permit if Public Health finds any of the following:
  - The Permittee fails to adhere to the terms of this permit and the approved Plan of Operation.
  - Operating personnel are unfamiliar with or are not following the terms and conditions of this permit, or any other required and approved plan.
  - Methods of solid waste handling or the quantity or character of the solid waste has changed without the required prior approval from Public Health.
  - The Permittee fails to meet all applicable regulations.
  - The Permittee failed to provide necessary and pertinent information that could be deemed pertinent to the issuance of the permit or that might adversely affect the operation of the facility in an accurate and complete form during the permitting process.
- J. This permit or a copy thereof, including the Plan of Operation, shall be displayed where operating personnel can readily refer to the documents and shall be produced during an on-site inspection upon the request of an inspector from Public Health or the Washington Department of Ecology.
- K. Terms pertaining to solid waste used in this permit shall be defined per Chapter 173-350 WAC and the Chapter 12.16 SCC.
- L. Nothing in this permit shall be construed as excusing the Permittee from compliance with any applicable federal, state, or local statute, ordinance, or regulation.

M. The facility shall conform with all applicable requirements of the Skagit County Comprehensive Solid Waste Management Plan.

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**APPENDIX D -  
2023 GROUNDWATER ANALYTICAL DATA**

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 **ANALYTICAL REPORT****PREPARED FOR**

Attn: Eric Libolt  
Whatcom Environmental Services Inc.  
228 East Champion Street #101  
Bellingham, Washington 98225

Generated 2/22/2023 3:00:34 PM

**JOB DESCRIPTION**

2023 SDF Sampling  
SDG NUMBER HF Sinclair Puget Sound Refining LLC

**JOB NUMBER**

580-123226-1

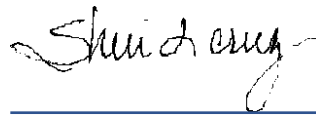
## Job Notes

This report is issued solely for the use of the person or company to whom it is addressed. Any use, copying or disclosure other than by the intended recipient is unauthorized. If you have received this report in error, please notify the sender and destroy this report immediately. This report shall not be reproduced except in full, without prior express written approval by the laboratory.

The data in the report relate to the field sample(s) as received by the laboratory and associated QC. All results have been reviewed and have been found to be compliant with laboratory and accreditation requirements, with the exception of the noted deviation(s). For questions, please contact the Project Manager.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Northwest, LLC Project Manager.

## Authorization



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Authorized for release by  
Sheri Cruz, Project Manager I  
[Sheri.Cruz@et.eurofinsus.com](mailto:Sheri.Cruz@et.eurofinsus.com)  
(253)922-2310



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# Case Narrative

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-123226-1  
SDG: HF Sinclair Puget Sound Refining LLC

**Job ID: 580-123226-1**

**Laboratory: Eurofins Seattle**

## Narrative

### Job Narrative 580-123226-1

#### Comments

No additional comments.

#### Receipt

The samples were received on 2/8/2023 10:00 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperatures of the 3 coolers at receipt time were 0.3° C, 0.9° C and 1.1° C.

#### GC/MS VOA

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

#### GC/MS Semi VOA

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

#### GC Semi VOA

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

#### Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

#### General Chemistry

Method SM 2320B: The alkalinity of the following sample cannot be determined because the pH has to be at least 4.5. SDF-FEB-1-020623 (580-123226-6)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### Organic Prep

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

#### VOA Prep

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

# Definitions/Glossary

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-123226-1  
SDG: HF Sinclair Puget Sound Refining LLC

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

# Client Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-123226-1  
SDG: HF Sinclair Puget Sound Refining LLC

**Client Sample ID: W-47-020623**

**Lab Sample ID: 580-123226-1**

**Date Collected: 02/06/23 14:50**

**Matrix: Water**

**Date Received: 02/08/23 10:00**

## Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L			02/15/23 23:05	1
Toluene	ND		1.0		ug/L			02/15/23 23:05	1
Ethylbenzene	ND		1.0		ug/L			02/15/23 23:05	1
m-Xylene & p-Xylene	ND		2.0		ug/L			02/15/23 23:05	1
o-Xylene	ND		1.0		ug/L			02/15/23 23:05	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	100		80 - 120		02/15/23 23:05	1
4-Bromofluorobenzene (Surr)	90		80 - 120		02/15/23 23:05	1
Dibromofluoromethane (Surr)	100		80 - 120		02/15/23 23:05	1
1,2-Dichloroethane-d4 (Surr)	105		80 - 120		02/15/23 23:05	1

## Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.050		mg/L			02/09/23 23:53	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	94		77 - 123		02/09/23 23:53	1

## Method: SW846 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.051		ug/L		02/13/23 09:55	02/14/23 17:22	1
Chrysene	ND		0.10		ug/L		02/13/23 09:55	02/14/23 17:22	1
Benzo[a]pyrene	ND		0.10		ug/L		02/13/23 09:55	02/14/23 17:22	1
Indeno[1,2,3-cd]pyrene	ND		0.051		ug/L		02/13/23 09:55	02/14/23 17:22	1
Dibenz(a,h)anthracene	ND		0.10		ug/L		02/13/23 09:55	02/14/23 17:22	1
Benzo[b]fluoranthene	ND		0.10		ug/L		02/13/23 09:55	02/14/23 17:22	1
Benzo[k]fluoranthene	ND		0.051		ug/L		02/13/23 09:55	02/14/23 17:22	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Terphenyl-d14	88		29 - 150	02/13/23 09:55	02/14/23 17:22	1

## Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11		mg/L		02/15/23 10:15	02/16/23 16:44	1
Motor Oil (>C24-C36)	ND		0.36		mg/L		02/15/23 10:15	02/16/23 16:44	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	60		50 - 150	02/15/23 10:15	02/16/23 16:44	1

## Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11		mg/L		02/15/23 10:15	02/16/23 16:44	1
Motor Oil (>C24-C36)	ND		0.36		mg/L		02/15/23 10:15	02/16/23 16:44	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	68		50 - 150	02/15/23 10:15	02/16/23 16:44	1

## Method: 40CFR136A 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.50		mg/L		02/09/23 17:51	02/10/23 19:30	1
Magnesium	46		0.50		mg/L		02/09/23 17:51	02/10/23 19:30	1

Eurofins Seattle

# Client Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-123226-1  
SDG: HF Sinclair Puget Sound Refining LLC

**Client Sample ID: W-47-020623**

**Lab Sample ID: 580-123226-1**

Date Collected: 02/06/23 14:50

Matrix: Water

Date Received: 02/08/23 10:00

**Method: 40CFR136A 200.7 Rev 4.4 - Metals (ICP) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	66		0.50		mg/L		02/17/23 17:36	02/20/23 18:41	1
Iron	ND		0.50		mg/L		02/17/23 17:36	02/20/23 18:41	1
Magnesium	48		0.50		mg/L		02/17/23 17:36	02/20/23 18:41	1
Potassium	5.6		3.3		mg/L		02/17/23 17:36	02/20/23 18:41	1
Sodium	35		0.50		mg/L		02/17/23 17:36	02/20/23 18:41	1

**Method: EPA 200.8 - Metals (ICP/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0016		0.0010		mg/L		02/09/23 17:51	02/15/23 22:59	1
Lead	ND		0.00040		mg/L		02/09/23 17:51	02/15/23 22:59	1
Chromium	ND		0.00080		mg/L		02/09/23 17:51	02/15/23 22:59	1
Manganese	0.061		0.0020		mg/L		02/09/23 17:51	02/15/23 22:59	1
Nickel	ND		0.0030		mg/L		02/09/23 17:51	02/15/23 22:59	1
Selenium	ND		0.0080		mg/L		02/09/23 17:51	02/15/23 22:59	1

**Method: EPA 200.8 - Metals (ICP/MS) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0016		0.0010		mg/L		02/17/23 17:36	02/20/23 15:07	1
Chromium	ND		0.00080		mg/L		02/17/23 17:36	02/20/23 15:07	1
Lead	ND		0.00040		mg/L		02/17/23 17:36	02/20/23 15:07	1
Manganese	0.058		0.0020		mg/L		02/17/23 17:36	02/20/23 15:07	1
Nickel	ND		0.0030		mg/L		02/17/23 17:36	02/20/23 15:07	1
Selenium	ND		0.0080		mg/L		02/17/23 17:36	02/20/23 15:07	1

**Method: SW846 7470A - Mercury (CVAA)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		02/10/23 11:20	02/13/23 14:32	1

**Method: SW846 7470A - Mercury (CVAA) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		02/10/23 11:20	02/13/23 14:49	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	15		1.5		mg/L			02/21/23 01:01	1
Sulfate (EPA 300.0)	55		1.5		mg/L			02/21/23 01:01	1
Ammonia (EPA 350.1)	ND		0.50		mg/L		02/18/23 16:22	02/19/23 17:22	1
Total Organic Carbon (SM 5310C-2011)	1.4		1.0		mg/L			02/15/23 04:10	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity (SM 2320B)	350		7.0		mg/L			02/16/23 18:34	1
Bicarbonate Alkalinity as CaCO3 (SM 2320B)	350		7.0		mg/L			02/16/23 18:34	1
Chemical Oxygen Demand (SM 5220D)	ND		10		mg/L		02/18/23 18:06	02/19/23 16:57	1

# Client Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-123226-1  
SDG: HF Sinclair Puget Sound Refining LLC

**Client Sample ID: W-112-020623**

**Lab Sample ID: 580-123226-2**

**Date Collected: 02/06/23 11:20**

**Matrix: Water**

**Date Received: 02/08/23 10:00**

## Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L			02/15/23 23:29	1
Toluene	ND		1.0		ug/L			02/15/23 23:29	1
Ethylbenzene	ND		1.0		ug/L			02/15/23 23:29	1
m-Xylene & p-Xylene	ND		2.0		ug/L			02/15/23 23:29	1
o-Xylene	ND		1.0		ug/L			02/15/23 23:29	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	100		80 - 120		02/15/23 23:29	1
4-Bromofluorobenzene (Surr)	88		80 - 120		02/15/23 23:29	1
Dibromofluoromethane (Surr)	97		80 - 120		02/15/23 23:29	1
1,2-Dichloroethane-d4 (Surr)	107		80 - 120		02/15/23 23:29	1

## Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.050		mg/L			02/10/23 00:17	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	92		77 - 123		02/10/23 00:17	1

## Method: SW846 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.054		ug/L		02/13/23 09:55	02/14/23 17:46	1
Chrysene	ND		0.11		ug/L		02/13/23 09:55	02/14/23 17:46	1
Benzo[a]pyrene	ND		0.11		ug/L		02/13/23 09:55	02/14/23 17:46	1
Indeno[1,2,3-cd]pyrene	ND		0.054		ug/L		02/13/23 09:55	02/14/23 17:46	1
Dibenz(a,h)anthracene	ND		0.11		ug/L		02/13/23 09:55	02/14/23 17:46	1
Benzo[b]fluoranthene	ND		0.11		ug/L		02/13/23 09:55	02/14/23 17:46	1
Benzo[k]fluoranthene	ND		0.054		ug/L		02/13/23 09:55	02/14/23 17:46	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Terphenyl-d14	66		29 - 150	02/13/23 09:55	02/14/23 17:46	1

## Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11		mg/L		02/15/23 10:15	02/16/23 17:03	1
Motor Oil (>C24-C36)	ND		0.36		mg/L		02/15/23 10:15	02/16/23 17:03	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	66		50 - 150	02/15/23 10:15	02/16/23 17:03	1

## Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11		mg/L		02/15/23 10:15	02/16/23 17:03	1
Motor Oil (>C24-C36)	ND		0.36		mg/L		02/15/23 10:15	02/16/23 17:03	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	75		50 - 150	02/15/23 10:15	02/16/23 17:03	1

## Method: 40CFR136A 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.50		mg/L		02/09/23 17:51	02/10/23 19:34	1
Magnesium	68		0.50		mg/L		02/09/23 17:51	02/10/23 19:34	1

Eurofins Seattle



# Client Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-123226-1  
SDG: HF Sinclair Puget Sound Refining LLC

**Client Sample ID: W-112-020623**

**Lab Sample ID: 580-123226-2**

Date Collected: 02/06/23 11:20

Matrix: Water

Date Received: 02/08/23 10:00

**Method: 40CFR136A 200.7 Rev 4.4 - Metals (ICP) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	96		0.50		mg/L		02/17/23 17:36	02/20/23 18:44	1
Iron	ND		0.50		mg/L		02/17/23 17:36	02/20/23 18:44	1
Magnesium	71		0.50		mg/L		02/17/23 17:36	02/20/23 18:44	1
Potassium	7.5		3.3		mg/L		02/17/23 17:36	02/20/23 18:44	1
Sodium	52		0.50		mg/L		02/17/23 17:36	02/20/23 18:44	1

**Method: EPA 200.8 - Metals (ICP/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0020		0.0010		mg/L		02/09/23 17:51	02/15/23 23:01	1
Lead	ND		0.00040		mg/L		02/09/23 17:51	02/15/23 23:01	1
Chromium	ND		0.00080		mg/L		02/09/23 17:51	02/15/23 23:01	1
Manganese	0.024		0.0020		mg/L		02/09/23 17:51	02/15/23 23:01	1
Nickel	ND		0.0030		mg/L		02/09/23 17:51	02/15/23 23:01	1
Selenium	ND		0.0080		mg/L		02/09/23 17:51	02/15/23 23:01	1

**Method: EPA 200.8 - Metals (ICP/MS) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0019		0.0010		mg/L		02/17/23 17:36	02/20/23 15:10	1
Chromium	ND		0.00080		mg/L		02/17/23 17:36	02/20/23 15:10	1
Lead	ND		0.00040		mg/L		02/17/23 17:36	02/20/23 15:10	1
Manganese	0.0031		0.0020		mg/L		02/17/23 17:36	02/20/23 15:10	1
Nickel	ND		0.0030		mg/L		02/17/23 17:36	02/20/23 15:10	1
Selenium	ND		0.0080		mg/L		02/17/23 17:36	02/20/23 15:10	1

**Method: SW846 7470A - Mercury (CVAA)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		02/10/23 11:20	02/13/23 14:30	1

**Method: SW846 7470A - Mercury (CVAA) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		02/10/23 11:20	02/13/23 14:47	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	38		1.5		mg/L			02/21/23 01:13	1
Sulfate (EPA 300.0)	5.0		1.5		mg/L			02/21/23 01:13	1
Ammonia (EPA 350.1)	ND		0.50		mg/L		02/18/23 16:22	02/19/23 17:22	1
Total Organic Carbon (SM 5310C-2011)	1.9		1.0		mg/L			02/15/23 04:25	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity (SM 2320B)	560		7.0		mg/L			02/16/23 18:35	1
Bicarbonate Alkalinity as CaCO3 (SM 2320B)	560		7.0		mg/L			02/16/23 18:35	1
Chemical Oxygen Demand (SM 5220D)	11		10		mg/L		02/18/23 18:06	02/19/23 16:57	1

# Client Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-123226-1  
SDG: HF Sinclair Puget Sound Refining LLC

**Client Sample ID: W-113-020623**

**Lab Sample ID: 580-123226-3**

**Date Collected: 02/06/23 11:55**

**Matrix: Water**

**Date Received: 02/08/23 10:00**

### Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L			02/15/23 23:54	1
Toluene	ND		1.0		ug/L			02/15/23 23:54	1
Ethylbenzene	ND		1.0		ug/L			02/15/23 23:54	1
m-Xylene & p-Xylene	ND		2.0		ug/L			02/15/23 23:54	1
o-Xylene	ND		1.0		ug/L			02/15/23 23:54	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	98		80 - 120		02/15/23 23:54	1
4-Bromofluorobenzene (Surr)	89		80 - 120		02/15/23 23:54	1
Dibromofluoromethane (Surr)	98		80 - 120		02/15/23 23:54	1
1,2-Dichloroethane-d4 (Surr)	104		80 - 120		02/15/23 23:54	1

### Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.050		mg/L			02/10/23 00:42	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	95		77 - 123		02/10/23 00:42	1

### Method: SW846 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.051		ug/L		02/13/23 09:55	02/14/23 18:10	1
Chrysene	ND		0.10		ug/L		02/13/23 09:55	02/14/23 18:10	1
Benzo[a]pyrene	ND		0.10		ug/L		02/13/23 09:55	02/14/23 18:10	1
Indeno[1,2,3-cd]pyrene	ND		0.051		ug/L		02/13/23 09:55	02/14/23 18:10	1
Dibenz(a,h)anthracene	ND		0.10		ug/L		02/13/23 09:55	02/14/23 18:10	1
Benzo[b]fluoranthene	ND		0.10		ug/L		02/13/23 09:55	02/14/23 18:10	1
Benzo[k]fluoranthene	ND		0.051		ug/L		02/13/23 09:55	02/14/23 18:10	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Terphenyl-d14	76		29 - 150	02/13/23 09:55	02/14/23 18:10	1

### Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11		mg/L		02/15/23 10:15	02/16/23 17:22	1
Motor Oil (>C24-C36)	ND		0.36		mg/L		02/15/23 10:15	02/16/23 17:22	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	61		50 - 150	02/15/23 10:15	02/16/23 17:22	1

### Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11		mg/L		02/15/23 10:15	02/16/23 17:22	1
Motor Oil (>C24-C36)	ND		0.36		mg/L		02/15/23 10:15	02/16/23 17:22	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	70		50 - 150	02/15/23 10:15	02/16/23 17:22	1

### Method: 40CFR136A 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.50		mg/L		02/09/23 17:51	02/10/23 19:37	1
Magnesium	60		0.50		mg/L		02/09/23 17:51	02/10/23 19:37	1

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# Client Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-123226-1  
SDG: HF Sinclair Puget Sound Refining LLC

**Client Sample ID: W-113-020623**

**Lab Sample ID: 580-123226-3**

Date Collected: 02/06/23 11:55

Matrix: Water

Date Received: 02/08/23 10:00

### Method: 40CFR136A 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	78		0.50		mg/L		02/17/23 17:36	02/20/23 18:48	1
Iron	ND		0.50		mg/L		02/17/23 17:36	02/20/23 18:48	1
Magnesium	64		0.50		mg/L		02/17/23 17:36	02/20/23 18:48	1
Potassium	5.6		3.3		mg/L		02/17/23 17:36	02/20/23 18:48	1
Sodium	47		0.50		mg/L		02/17/23 17:36	02/20/23 18:48	1

### Method: EPA 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0014		0.0010		mg/L		02/09/23 17:51	02/15/23 23:04	1
Lead	ND		0.00040		mg/L		02/09/23 17:51	02/15/23 23:04	1
Chromium	ND		0.00080		mg/L		02/09/23 17:51	02/15/23 23:04	1
Manganese	0.0023		0.0020		mg/L		02/09/23 17:51	02/15/23 23:04	1
Nickel	ND		0.0030		mg/L		02/09/23 17:51	02/15/23 23:04	1
Selenium	ND		0.0080		mg/L		02/09/23 17:51	02/15/23 23:04	1

### Method: EPA 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0015		0.0010		mg/L		02/17/23 17:36	02/20/23 15:12	1
Chromium	ND		0.00080		mg/L		02/17/23 17:36	02/20/23 15:12	1
Lead	ND		0.00040		mg/L		02/17/23 17:36	02/20/23 15:12	1
Manganese	ND		0.0020		mg/L		02/17/23 17:36	02/20/23 15:12	1
Nickel	ND		0.0030		mg/L		02/17/23 17:36	02/20/23 15:12	1
Selenium	ND		0.0080		mg/L		02/17/23 17:36	02/20/23 15:12	1

### Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		02/10/23 11:20	02/13/23 14:28	1

### Method: SW846 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		02/10/23 11:20	02/13/23 14:45	1

### General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	31		1.5		mg/L			02/21/23 01:24	1
Sulfate (EPA 300.0)	49		1.5		mg/L			02/21/23 01:24	1
Ammonia (EPA 350.1)	ND		0.50		mg/L		02/18/23 16:22	02/19/23 17:22	1
Total Organic Carbon (SM 5310C-2011)	1.7		1.0		mg/L			02/15/23 04:39	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity (SM 2320B)	450		7.0		mg/L			02/16/23 18:35	1
Bicarbonate Alkalinity as CaCO3 (SM 2320B)	450		7.0		mg/L			02/16/23 18:35	1
Chemical Oxygen Demand (SM 5220D)	11		10		mg/L		02/18/23 18:06	02/19/23 16:57	1

# Client Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-123226-1  
SDG: HF Sinclair Puget Sound Refining LLC

**Client Sample ID: W-127-020623**

**Lab Sample ID: 580-123226-4**

**Date Collected: 02/06/23 15:25**

**Matrix: Water**

**Date Received: 02/08/23 10:00**

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L			02/16/23 00:19	1
Toluene	ND		1.0		ug/L			02/16/23 00:19	1
Ethylbenzene	ND		1.0		ug/L			02/16/23 00:19	1
m-Xylene & p-Xylene	ND		2.0		ug/L			02/16/23 00:19	1
o-Xylene	ND		1.0		ug/L			02/16/23 00:19	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	103		80 - 120		02/16/23 00:19	1
4-Bromofluorobenzene (Surr)	90		80 - 120		02/16/23 00:19	1
Dibromofluoromethane (Surr)	99		80 - 120		02/16/23 00:19	1
1,2-Dichloroethane-d4 (Surr)	107		80 - 120		02/16/23 00:19	1

**Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.050		mg/L			02/10/23 01:06	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	95		77 - 123		02/10/23 01:06	1

**Method: SW846 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.053		ug/L		02/13/23 09:55	02/14/23 18:34	1
Chrysene	ND		0.11		ug/L		02/13/23 09:55	02/14/23 18:34	1
Benzo[a]pyrene	ND		0.11		ug/L		02/13/23 09:55	02/14/23 18:34	1
Indeno[1,2,3-cd]pyrene	ND		0.053		ug/L		02/13/23 09:55	02/14/23 18:34	1
Dibenz(a,h)anthracene	ND		0.11		ug/L		02/13/23 09:55	02/14/23 18:34	1
Benzo[b]fluoranthene	ND		0.11		ug/L		02/13/23 09:55	02/14/23 18:34	1
Benzo[k]fluoranthene	ND		0.053		ug/L		02/13/23 09:55	02/14/23 18:34	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Terphenyl-d14	78		29 - 150	02/13/23 09:55	02/14/23 18:34	1

**Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	0.22		0.12		mg/L		02/15/23 10:15	02/16/23 17:40	1
Motor Oil (>C24-C36)	0.38		0.37		mg/L		02/15/23 10:15	02/16/23 17:40	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	63		50 - 150	02/15/23 10:15	02/16/23 17:40	1

**Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.12		mg/L		02/15/23 10:15	02/16/23 17:40	1
Motor Oil (>C24-C36)	ND		0.37		mg/L		02/15/23 10:15	02/16/23 17:40	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	71		50 - 150	02/15/23 10:15	02/16/23 17:40	1

**Method: 40CFR136A 200.7 Rev 4.4 - Metals (ICP)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.50		mg/L		02/09/23 17:51	02/10/23 19:41	1
Magnesium	67		0.50		mg/L		02/09/23 17:51	02/10/23 19:41	1

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# Client Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-123226-1  
SDG: HF Sinclair Puget Sound Refining LLC

**Client Sample ID: W-127-020623**

**Lab Sample ID: 580-123226-4**

Date Collected: 02/06/23 15:25

Matrix: Water

Date Received: 02/08/23 10:00

**Method: 40CFR136A 200.7 Rev 4.4 - Metals (ICP) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	110		0.50		mg/L		02/17/23 17:36	02/20/23 18:51	1
Iron	ND		0.50		mg/L		02/17/23 17:36	02/20/23 18:51	1
Magnesium	71		0.50		mg/L		02/17/23 17:36	02/20/23 18:51	1
Potassium	ND		3.3		mg/L		02/17/23 17:36	02/20/23 18:51	1
Sodium	40		0.50		mg/L		02/17/23 17:36	02/20/23 18:51	1

**Method: EPA 200.8 - Metals (ICP/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0010		mg/L		02/09/23 17:51	02/15/23 23:06	1
Lead	ND		0.00040		mg/L		02/09/23 17:51	02/15/23 23:06	1
Chromium	ND		0.00080		mg/L		02/09/23 17:51	02/15/23 23:06	1
Manganese	0.022		0.0020		mg/L		02/09/23 17:51	02/15/23 23:06	1
Nickel	ND		0.0030		mg/L		02/09/23 17:51	02/15/23 23:06	1
Selenium	ND		0.0080		mg/L		02/09/23 17:51	02/15/23 23:06	1

**Method: EPA 200.8 - Metals (ICP/MS) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0010		mg/L		02/17/23 17:36	02/20/23 15:14	1
Chromium	ND		0.00080		mg/L		02/17/23 17:36	02/20/23 15:14	1
Lead	ND		0.00040		mg/L		02/17/23 17:36	02/20/23 15:14	1
Manganese	0.018		0.0020		mg/L		02/17/23 17:36	02/20/23 15:14	1
Nickel	ND		0.0030		mg/L		02/17/23 17:36	02/20/23 15:14	1
Selenium	ND		0.0080		mg/L		02/17/23 17:36	02/20/23 15:14	1

**Method: SW846 7470A - Mercury (CVAA)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		02/10/23 11:20	02/13/23 14:26	1

**Method: SW846 7470A - Mercury (CVAA) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		02/10/23 11:20	02/13/23 14:43	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	38		1.5		mg/L			02/21/23 01:36	1
Sulfate (EPA 300.0)	54		1.5		mg/L			02/21/23 01:36	1
Ammonia (EPA 350.1)	ND		0.50		mg/L		02/18/23 16:22	02/19/23 17:22	1
Total Organic Carbon (SM 5310C-2011)	6.2		1.0		mg/L			02/15/23 07:07	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity (SM 2320B)	510		7.0		mg/L			02/16/23 18:35	1
Bicarbonate Alkalinity as CaCO3 (SM 2320B)	510		7.0		mg/L			02/16/23 18:35	1
Chemical Oxygen Demand (SM 5220D)	21		10		mg/L		02/18/23 18:39	02/19/23 16:57	1

# Client Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-123226-1  
SDG: HF Sinclair Puget Sound Refining LLC

**Client Sample ID: SDF-DUP-1-020623**

**Lab Sample ID: 580-123226-5**

Date Collected: 02/06/23 09:50

Matrix: Water

Date Received: 02/08/23 10:00

## Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L			02/16/23 00:43	1
Toluene	ND		1.0		ug/L			02/16/23 00:43	1
Ethylbenzene	ND		1.0		ug/L			02/16/23 00:43	1
m-Xylene & p-Xylene	ND		2.0		ug/L			02/16/23 00:43	1
o-Xylene	ND		1.0		ug/L			02/16/23 00:43	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	102		80 - 120		02/16/23 00:43	1
4-Bromofluorobenzene (Surr)	91		80 - 120		02/16/23 00:43	1
Dibromofluoromethane (Surr)	100		80 - 120		02/16/23 00:43	1
1,2-Dichloroethane-d4 (Surr)	107		80 - 120		02/16/23 00:43	1

## Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.050		mg/L			02/10/23 01:30	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	93		77 - 123		02/10/23 01:30	1

## Method: SW846 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.051		ug/L		02/13/23 09:55	02/14/23 18:58	1
Chrysene	ND		0.10		ug/L		02/13/23 09:55	02/14/23 18:58	1
Benzo[a]pyrene	ND		0.10		ug/L		02/13/23 09:55	02/14/23 18:58	1
Indeno[1,2,3-cd]pyrene	ND		0.051		ug/L		02/13/23 09:55	02/14/23 18:58	1
Dibenz(a,h)anthracene	ND		0.10		ug/L		02/13/23 09:55	02/14/23 18:58	1
Benzo[b]fluoranthene	ND		0.10		ug/L		02/13/23 09:55	02/14/23 18:58	1
Benzo[k]fluoranthene	ND		0.051		ug/L		02/13/23 09:55	02/14/23 18:58	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Terphenyl-d14	90		29 - 150	02/13/23 09:55	02/14/23 18:58	1

## Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11		mg/L		02/15/23 10:15	02/16/23 17:59	1
Motor Oil (>C24-C36)	ND		0.36		mg/L		02/15/23 10:15	02/16/23 17:59	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	64		50 - 150	02/15/23 10:15	02/16/23 17:59	1

## Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11		mg/L		02/15/23 10:15	02/16/23 17:59	1
Motor Oil (>C24-C36)	ND		0.36		mg/L		02/15/23 10:15	02/16/23 17:59	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	70		50 - 150	02/15/23 10:15	02/16/23 17:59	1

## Method: 40CFR136A 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.50		mg/L		02/09/23 17:51	02/10/23 19:45	1
Magnesium	60		0.50		mg/L		02/09/23 17:51	02/10/23 19:45	1

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# Client Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-123226-1  
SDG: HF Sinclair Puget Sound Refining LLC

**Client Sample ID: SDF-DUP-1-020623**

**Lab Sample ID: 580-123226-5**

Date Collected: 02/06/23 09:50

Matrix: Water

Date Received: 02/08/23 10:00

**Method: 40CFR136A 200.7 Rev 4.4 - Metals (ICP) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	78		0.50		mg/L		02/17/23 17:36	02/20/23 18:55	1
Iron	ND		0.50		mg/L		02/17/23 17:36	02/20/23 18:55	1
Magnesium	64		0.50		mg/L		02/17/23 17:36	02/20/23 18:55	1
Potassium	5.2		3.3		mg/L		02/17/23 17:36	02/20/23 18:55	1
Sodium	46		0.50		mg/L		02/17/23 17:36	02/20/23 18:55	1

**Method: EPA 200.8 - Metals (ICP/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0014		0.0010		mg/L		02/09/23 17:51	02/15/23 23:08	1
Lead	ND		0.00040		mg/L		02/09/23 17:51	02/15/23 23:08	1
Chromium	ND		0.00080		mg/L		02/09/23 17:51	02/15/23 23:08	1
Manganese	ND		0.0020		mg/L		02/09/23 17:51	02/15/23 23:08	1
Nickel	ND		0.0030		mg/L		02/09/23 17:51	02/15/23 23:08	1
Selenium	ND		0.0080		mg/L		02/09/23 17:51	02/15/23 23:08	1

**Method: EPA 200.8 - Metals (ICP/MS) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0013		0.0010		mg/L		02/17/23 17:36	02/20/23 15:17	1
Chromium	ND		0.00080		mg/L		02/17/23 17:36	02/20/23 15:17	1
Lead	ND		0.00040		mg/L		02/17/23 17:36	02/20/23 15:17	1
Manganese	ND		0.0020		mg/L		02/17/23 17:36	02/20/23 15:17	1
Nickel	ND		0.0030		mg/L		02/17/23 17:36	02/20/23 15:17	1
Selenium	ND		0.0080		mg/L		02/17/23 17:36	02/20/23 15:17	1

**Method: SW846 7470A - Mercury (CVAA)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		02/10/23 11:20	02/13/23 14:24	1

**Method: SW846 7470A - Mercury (CVAA) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		02/10/23 11:20	02/13/23 14:37	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	31		1.5		mg/L			02/21/23 01:48	1
Sulfate (EPA 300.0)	49		1.5		mg/L			02/21/23 01:48	1
Ammonia (EPA 350.1)	ND		0.50		mg/L		02/18/23 16:22	02/19/23 17:22	1
Total Organic Carbon (SM 5310C-2011)	1.7		1.0		mg/L			02/15/23 07:21	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity (SM 2320B)	450		7.0		mg/L			02/16/23 18:35	1
Bicarbonate Alkalinity as CaCO3 (SM 2320B)	450		7.0		mg/L			02/16/23 18:35	1
Chemical Oxygen Demand (SM 5220D)	ND		10		mg/L		02/18/23 18:39	02/19/23 16:57	1

# Client Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-123226-1  
SDG: HF Sinclair Puget Sound Refining LLC

**Client Sample ID: SDF-FEB-1-020623**

**Lab Sample ID: 580-123226-6**

Date Collected: 02/06/23 09:00

Matrix: Water

Date Received: 02/08/23 10:00

### Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L			02/16/23 01:07	1
Toluene	ND		1.0		ug/L			02/16/23 01:07	1
Ethylbenzene	ND		1.0		ug/L			02/16/23 01:07	1
m-Xylene & p-Xylene	ND		2.0		ug/L			02/16/23 01:07	1
o-Xylene	ND		1.0		ug/L			02/16/23 01:07	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		80 - 120		02/16/23 01:07	1
4-Bromofluorobenzene (Surr)	88		80 - 120		02/16/23 01:07	1
Dibromofluoromethane (Surr)	103		80 - 120		02/16/23 01:07	1
1,2-Dichloroethane-d4 (Surr)	109		80 - 120		02/16/23 01:07	1

### Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.050		mg/L			02/10/23 01:55	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	95		77 - 123		02/10/23 01:55	1

### Method: SW846 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.051		ug/L		02/13/23 09:55	02/14/23 19:22	1
Chrysene	ND		0.10		ug/L		02/13/23 09:55	02/14/23 19:22	1
Benzo[a]pyrene	ND		0.10		ug/L		02/13/23 09:55	02/14/23 19:22	1
Indeno[1,2,3-cd]pyrene	ND		0.051		ug/L		02/13/23 09:55	02/14/23 19:22	1
Dibenz(a,h)anthracene	ND		0.10		ug/L		02/13/23 09:55	02/14/23 19:22	1
Benzo[b]fluoranthene	ND		0.10		ug/L		02/13/23 09:55	02/14/23 19:22	1
Benzo[k]fluoranthene	ND		0.051		ug/L		02/13/23 09:55	02/14/23 19:22	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Terphenyl-d14	80		29 - 150	02/13/23 09:55	02/14/23 19:22	1

### Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11		mg/L		02/15/23 10:15	02/16/23 18:18	1
Motor Oil (>C24-C36)	ND		0.36		mg/L		02/15/23 10:15	02/16/23 18:18	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	56		50 - 150	02/15/23 10:15	02/16/23 18:18	1

### Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11		mg/L		02/15/23 10:15	02/16/23 18:18	1
Motor Oil (>C24-C36)	ND		0.36		mg/L		02/15/23 10:15	02/16/23 18:18	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	60		50 - 150	02/15/23 10:15	02/16/23 18:18	1

### Method: 40CFR136A 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.50		mg/L		02/09/23 17:51	02/10/23 19:48	1
Magnesium	ND		0.50		mg/L		02/09/23 17:51	02/10/23 19:48	1

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# Client Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-123226-1  
SDG: HF Sinclair Puget Sound Refining LLC

**Client Sample ID: SDF-FEB-1-020623**

**Lab Sample ID: 580-123226-6**

Date Collected: 02/06/23 09:00

Matrix: Water

Date Received: 02/08/23 10:00

**Method: 40CFR136A 200.7 Rev 4.4 - Metals (ICP) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	ND		0.50		mg/L		02/17/23 17:36	02/20/23 18:58	1
Iron	ND		0.50		mg/L		02/17/23 17:36	02/20/23 18:58	1
Magnesium	ND		0.50		mg/L		02/17/23 17:36	02/20/23 18:58	1
Potassium	ND		3.3		mg/L		02/17/23 17:36	02/20/23 18:58	1
Sodium	ND		0.50		mg/L		02/17/23 17:36	02/20/23 18:58	1

**Method: EPA 200.8 - Metals (ICP/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0010		mg/L		02/09/23 17:51	02/15/23 23:11	1
Lead	ND		0.00040		mg/L		02/09/23 17:51	02/15/23 23:11	1
Chromium	ND		0.00080		mg/L		02/09/23 17:51	02/15/23 23:11	1
Manganese	ND		0.0020		mg/L		02/09/23 17:51	02/15/23 23:11	1
Nickel	ND		0.0030		mg/L		02/09/23 17:51	02/15/23 23:11	1
Selenium	ND		0.0080		mg/L		02/09/23 17:51	02/15/23 23:11	1

**Method: EPA 200.8 - Metals (ICP/MS) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0010		mg/L		02/17/23 17:36	02/20/23 15:19	1
Chromium	ND		0.00080		mg/L		02/17/23 17:36	02/20/23 15:19	1
Lead	ND		0.00040		mg/L		02/17/23 17:36	02/20/23 15:19	1
Manganese	ND		0.0020		mg/L		02/17/23 17:36	02/20/23 15:19	1
Nickel	ND		0.0030		mg/L		02/17/23 17:36	02/20/23 15:19	1
Selenium	ND		0.0080		mg/L		02/17/23 17:36	02/20/23 15:19	1

**Method: SW846 7470A - Mercury (CVAA)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		02/10/23 11:20	02/13/23 14:22	1

**Method: SW846 7470A - Mercury (CVAA) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		02/10/23 11:20	02/13/23 14:35	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	ND		1.5		mg/L			02/21/23 01:59	1
Sulfate (EPA 300.0)	ND		1.5		mg/L			02/21/23 01:59	1
Ammonia (EPA 350.1)	ND		0.50		mg/L		02/18/23 16:22	02/19/23 17:22	1
Total Organic Carbon (SM 5310C-2011)	ND		1.0		mg/L			02/15/23 07:36	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity (SM 2320B)	ND		7.0		mg/L			02/16/23 18:35	1
Bicarbonate Alkalinity as CaCO3 (SM 2320B)	ND		7.0		mg/L			02/16/23 18:35	1
Chemical Oxygen Demand (SM 5220D)	ND		10		mg/L		02/18/23 18:39	02/19/23 16:57	1

# Client Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-123226-1  
SDG: HF Sinclair Puget Sound Refining LLC

**Client Sample ID: Trip Blank**

**Lab Sample ID: 580-123226-7**

Date Collected: 02/06/23 00:01

Matrix: Water

Date Received: 02/08/23 10:00

## Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L			02/16/23 01:32	1
Toluene	ND		1.0		ug/L			02/16/23 01:32	1
Ethylbenzene	ND		1.0		ug/L			02/16/23 01:32	1
m-Xylene & p-Xylene	ND		2.0		ug/L			02/16/23 01:32	1
o-Xylene	ND		1.0		ug/L			02/16/23 01:32	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		80 - 120		02/16/23 01:32	1
4-Bromofluorobenzene (Surr)	87		80 - 120		02/16/23 01:32	1
Dibromofluoromethane (Surr)	101		80 - 120		02/16/23 01:32	1
1,2-Dichloroethane-d4 (Surr)	109		80 - 120		02/16/23 01:32	1

## Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.050		mg/L			02/10/23 02:19	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	93		77 - 123		02/10/23 02:19	1

# QC Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-123226-1  
SDG: HF Sinclair Puget Sound Refining LLC

## Method: 8260D - Volatile Organic Compounds by GC/MS

**Lab Sample ID: MB 580-418023/6**  
**Matrix: Water**  
**Analysis Batch: 418023**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L			02/15/23 18:37	1
Toluene	ND		1.0		ug/L			02/15/23 18:37	1
Ethylbenzene	ND		1.0		ug/L			02/15/23 18:37	1
m-Xylene & p-Xylene	ND		2.0		ug/L			02/15/23 18:37	1
o-Xylene	ND		1.0		ug/L			02/15/23 18:37	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
<i>Toluene-d8 (Surr)</i>	102		80 - 120		02/15/23 18:37	1
<i>4-Bromofluorobenzene (Surr)</i>	92		80 - 120		02/15/23 18:37	1
<i>Dibromofluoromethane (Surr)</i>	99		80 - 120		02/15/23 18:37	1
<i>1,2-Dichloroethane-d4 (Surr)</i>	110		80 - 120		02/15/23 18:37	1

**Lab Sample ID: LCS 580-418023/7**  
**Matrix: Water**  
**Analysis Batch: 418023**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Benzene	10.0	9.99		ug/L		100	80 - 122
Toluene	10.0	9.97		ug/L		100	80 - 120
Ethylbenzene	10.0	10.0		ug/L		100	80 - 120
m-Xylene & p-Xylene	10.0	10.1		ug/L		101	80 - 120
o-Xylene	10.0	10.1		ug/L		101	80 - 120

Surrogate	LCS %Recovery	LCS Qualifier	Limits
<i>Toluene-d8 (Surr)</i>	102		80 - 120
<i>4-Bromofluorobenzene (Surr)</i>	102		80 - 120
<i>Dibromofluoromethane (Surr)</i>	96		80 - 120
<i>1,2-Dichloroethane-d4 (Surr)</i>	102		80 - 120

**Lab Sample ID: LCSD 580-418023/8**  
**Matrix: Water**  
**Analysis Batch: 418023**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Benzene	10.0	10.1		ug/L		101	80 - 122	1	14
Toluene	10.0	10.0		ug/L		100	80 - 120	1	13
Ethylbenzene	10.0	10.1		ug/L		101	80 - 120	1	14
m-Xylene & p-Xylene	10.0	10.0		ug/L		100	80 - 120	1	14
o-Xylene	10.0	10.1		ug/L		101	80 - 120	0	16

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
<i>Toluene-d8 (Surr)</i>	101		80 - 120
<i>4-Bromofluorobenzene (Surr)</i>	105		80 - 120
<i>Dibromofluoromethane (Surr)</i>	99		80 - 120
<i>1,2-Dichloroethane-d4 (Surr)</i>	102		80 - 120

# QC Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-123226-1  
SDG: HF Sinclair Puget Sound Refining LLC

## Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

**Lab Sample ID: MB 580-417555/4**  
**Matrix: Water**  
**Analysis Batch: 417555**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.050		mg/L			02/09/23 22:40	1
Surrogate	MB %Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	100		77 - 123					02/09/23 22:40	1

**Lab Sample ID: LCS 580-417555/5**  
**Matrix: Water**  
**Analysis Batch: 417555**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Gasoline	1.00	0.968		mg/L		97	55 - 148
Surrogate	LCS %Recovery	LCS Qualifier	Limits				
4-Bromofluorobenzene (Surr)	100		77 - 123				

**Lab Sample ID: LCSD 580-417555/6**  
**Matrix: Water**  
**Analysis Batch: 417555**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Gasoline	1.00	0.965		mg/L		97	55 - 148	0	10
Surrogate	LCSD %Recovery	LCSD Qualifier	Limits						
4-Bromofluorobenzene (Surr)	99		77 - 123						

## Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

**Lab Sample ID: MB 580-417737/1-A**  
**Matrix: Water**  
**Analysis Batch: 417928**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 417737**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.050		ug/L		02/13/23 09:55	02/14/23 16:09	1
Chrysene	ND		0.10		ug/L		02/13/23 09:55	02/14/23 16:09	1
Benzo[a]pyrene	ND		0.10		ug/L		02/13/23 09:55	02/14/23 16:09	1
Indeno[1,2,3-cd]pyrene	ND		0.050		ug/L		02/13/23 09:55	02/14/23 16:09	1
Dibenz(a,h)anthracene	ND		0.10		ug/L		02/13/23 09:55	02/14/23 16:09	1
Benzo[b]fluoranthene	ND		0.10		ug/L		02/13/23 09:55	02/14/23 16:09	1
Benzo[k]fluoranthene	ND		0.050		ug/L		02/13/23 09:55	02/14/23 16:09	1
Surrogate	MB %Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	70		29 - 150				02/13/23 09:55	02/14/23 16:09	1

# QC Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-123226-1  
SDG: HF Sinclair Puget Sound Refining LLC

## Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM) (Continued)

**Lab Sample ID: LCS 580-417737/2-A**  
**Matrix: Water**  
**Analysis Batch: 417928**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 417737**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Benzo[a]anthracene	8.00	6.31		ug/L		79	55 - 123
Chrysene	8.00	5.34		ug/L		67	47 - 120
Benzo[a]pyrene	8.00	5.91		ug/L		74	51 - 120
Indeno[1,2,3-cd]pyrene	8.00	6.24		ug/L		78	45 - 123
Dibenz(a,h)anthracene	8.00	6.61		ug/L		83	54 - 123
Benzo[b]fluoranthene	8.00	6.11		ug/L		76	43 - 120
Benzo[k]fluoranthene	8.00	5.60		ug/L		70	41 - 121

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Terphenyl-d14	75		29 - 150

**Lab Sample ID: LCSD 580-417737/3-A**  
**Matrix: Water**  
**Analysis Batch: 417928**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 417737**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzo[a]anthracene	8.00	5.93		ug/L		74	55 - 123	6	31
Chrysene	8.00	5.05		ug/L		63	47 - 120	6	30
Benzo[a]pyrene	8.00	5.67		ug/L		71	51 - 120	4	31
Indeno[1,2,3-cd]pyrene	8.00	5.92		ug/L		74	45 - 123	5	35
Dibenz(a,h)anthracene	8.00	6.32		ug/L		79	54 - 123	5	35
Benzo[b]fluoranthene	8.00	5.75		ug/L		72	43 - 120	6	35
Benzo[k]fluoranthene	8.00	5.31		ug/L		66	41 - 121	5	35

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
Terphenyl-d14	69		29 - 150

## Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

**Lab Sample ID: MB 580-417982/1-A**  
**Matrix: Water**  
**Analysis Batch: 418161**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 417982**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11		mg/L		02/15/23 10:15	02/16/23 15:48	1
Motor Oil (>C24-C36)	ND		0.35		mg/L		02/15/23 10:15	02/16/23 15:48	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	64		50 - 150	02/15/23 10:15	02/16/23 15:48	1

**Lab Sample ID: LCS 580-417982/2-A**  
**Matrix: Water**  
**Analysis Batch: 418161**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 417982**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
#2 Diesel (C10-C24)	4.00	3.16		mg/L		79	50 - 120
Motor Oil (>C24-C36)	4.00	3.34		mg/L		84	64 - 120

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# QC Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-123226-1  
SDG: HF Sinclair Puget Sound Refining LLC

## Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC) (Continued)

**Lab Sample ID: LCS 580-417982/2-A**  
**Matrix: Water**  
**Analysis Batch: 418161**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 417982**

Surrogate	LCS %Recovery	LCS Qualifier	Limits
<i>o</i> -Terphenyl	85		50 - 150

**Lab Sample ID: LCSD 580-417982/3-A**  
**Matrix: Water**  
**Analysis Batch: 418161**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 417982**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec		RPD	Limit
							Limits	RPD		
#2 Diesel (C10-C24)	4.00	3.16		mg/L		79	50 - 120	0		26
Motor Oil (>C24-C36)	4.00	3.36		mg/L		84	64 - 120	1		24

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
<i>o</i> -Terphenyl	83		50 - 150

## Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

**Lab Sample ID: MB 580-417982/1-B**  
**Matrix: Water**  
**Analysis Batch: 418164**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 417982**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared		Analyzed		Dil Fac
							Time	Time	Time	Time	
#2 Diesel (C10-C24)	ND		0.11		mg/L		02/15/23 10:15	02/16/23 15:48	02/16/23 15:48	1	
Motor Oil (>C24-C36)	ND		0.35		mg/L		02/15/23 10:15	02/16/23 15:48	02/16/23 15:48	1	

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared		Analyzed		Dil Fac
<i>o</i> -Terphenyl	76		50 - 150	02/15/23 10:15	02/16/23 15:48	02/16/23 15:48	02/16/23 15:48	1

**Lab Sample ID: LCS 580-417982/2-B**  
**Matrix: Water**  
**Analysis Batch: 418164**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 417982**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec		RPD	Limit
							Limits	RPD		
#2 Diesel (C10-C24)	4.00	3.69		mg/L		92	50 - 120			26
Motor Oil (>C24-C36)	4.00	3.97		mg/L		99	64 - 120			24

Surrogate	LCS %Recovery	LCS Qualifier	Limits
<i>o</i> -Terphenyl	102		50 - 150

**Lab Sample ID: LCSD 580-417982/3-B**  
**Matrix: Water**  
**Analysis Batch: 418164**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 417982**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec		RPD	Limit
							Limits	RPD		
#2 Diesel (C10-C24)	4.00	3.72		mg/L		93	50 - 120	1		26
Motor Oil (>C24-C36)	4.00	4.01		mg/L		100	64 - 120	1		24

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
<i>o</i> -Terphenyl	99		50 - 150

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# QC Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-123226-1  
SDG: HF Sinclair Puget Sound Refining LLC

## Method: 200.7 Rev 4.4 - Metals (ICP)

**Lab Sample ID: MB 580-417592/22-A**  
**Matrix: Water**  
**Analysis Batch: 417759**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 417592**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.50		mg/L		02/09/23 17:51	02/10/23 18:43	1
Magnesium	ND		0.50		mg/L		02/09/23 17:51	02/10/23 18:43	1

**Lab Sample ID: LCS 580-417592/23-A**  
**Matrix: Water**  
**Analysis Batch: 417759**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 417592**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Iron	20.0	21.8		mg/L		109	85 - 115
Magnesium	20.0	20.1		mg/L		100	85 - 115

**Lab Sample ID: LCSD 580-417592/24-A**  
**Matrix: Water**  
**Analysis Batch: 417759**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 417592**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Iron	20.0	21.7		mg/L		109	85 - 115	0	20
Magnesium	20.0	20.1		mg/L		100	85 - 115	0	20

**Lab Sample ID: MB 580-418320/11-A**  
**Matrix: Water**  
**Analysis Batch: 418484**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 418320**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	ND		0.50		mg/L		02/17/23 17:36	02/20/23 18:03	1
Iron	ND		0.50		mg/L		02/17/23 17:36	02/20/23 18:03	1
Magnesium	ND		0.50		mg/L		02/17/23 17:36	02/20/23 18:03	1
Potassium	ND		3.3		mg/L		02/17/23 17:36	02/20/23 18:03	1
Sodium	ND		0.50		mg/L		02/17/23 17:36	02/20/23 18:03	1

**Lab Sample ID: LCS 580-418320/12-A**  
**Matrix: Water**  
**Analysis Batch: 418484**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 418320**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Calcium	20.0	20.0		mg/L		100	85 - 115
Iron	20.0	22.2		mg/L		111	85 - 115
Magnesium	20.0	20.7		mg/L		104	85 - 115
Potassium	20.0	19.6		mg/L		98	85 - 115
Sodium	20.0	19.4		mg/L		97	85 - 115

**Lab Sample ID: LCSD 580-418320/13-A**  
**Matrix: Water**  
**Analysis Batch: 418484**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 418320**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Calcium	20.0	19.9		mg/L		99	85 - 115	0	20
Iron	20.0	22.0		mg/L		110	85 - 115	1	20
Magnesium	20.0	20.7		mg/L		104	85 - 115	0	20
Potassium	20.0	19.4		mg/L		97	85 - 115	1	20

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# QC Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: 2023 SDF Sampling

Job ID: 580-123226-1  
 SDG: HF Sinclair Puget Sound Refining LLC

## Method: 200.7 Rev 4.4 - Metals (ICP) (Continued)

**Lab Sample ID: LCSD 580-418320/13-A**  
**Matrix: Water**  
**Analysis Batch: 418484**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 418320**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Sodium	20.0	19.3		mg/L		97	85 - 115	0	20

## Method: 200.8 - Metals (ICP/MS)

**Lab Sample ID: MB 580-417592/22-A**  
**Matrix: Water**  
**Analysis Batch: 418151**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 417592**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0010		mg/L		02/09/23 17:51	02/15/23 22:18	1
Chromium	ND		0.00080		mg/L		02/09/23 17:51	02/15/23 22:18	1
Lead	ND		0.00040		mg/L		02/09/23 17:51	02/15/23 22:18	1
Manganese	ND		0.0020		mg/L		02/09/23 17:51	02/15/23 22:18	1
Nickel	ND		0.0030		mg/L		02/09/23 17:51	02/15/23 22:18	1
Selenium	ND		0.0080		mg/L		02/09/23 17:51	02/15/23 22:18	1

**Lab Sample ID: LCS 580-417592/23-A**  
**Matrix: Water**  
**Analysis Batch: 418151**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 417592**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	1.00	1.07		mg/L		107	85 - 115
Chromium	1.00	1.04		mg/L		104	85 - 115
Lead	1.00	1.05		mg/L		105	85 - 115
Manganese	1.00	1.01		mg/L		101	85 - 115
Nickel	1.00	1.07		mg/L		107	85 - 115
Selenium	1.00	1.05		mg/L		105	85 - 115

**Lab Sample ID: LCSD 580-417592/24-A**  
**Matrix: Water**  
**Analysis Batch: 418151**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 417592**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Arsenic	1.00	1.04		mg/L		104	85 - 115	3	20
Chromium	1.00	1.04		mg/L		104	85 - 115	1	20
Lead	1.00	1.04		mg/L		104	85 - 115	1	20
Manganese	1.00	1.01		mg/L		101	85 - 115	0	20
Nickel	1.00	1.04		mg/L		104	85 - 115	3	20
Selenium	1.00	1.02		mg/L		102	85 - 115	3	20

**Lab Sample ID: MB 580-418320/11-A**  
**Matrix: Water**  
**Analysis Batch: 418478**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 418320**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0010		mg/L		02/17/23 17:36	02/20/23 14:38	1
Chromium	ND		0.00080		mg/L		02/17/23 17:36	02/20/23 14:38	1
Lead	ND		0.00040		mg/L		02/17/23 17:36	02/20/23 14:38	1
Manganese	ND		0.0020		mg/L		02/17/23 17:36	02/20/23 14:38	1
Nickel	ND		0.0030		mg/L		02/17/23 17:36	02/20/23 14:38	1

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# QC Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: 2023 SDF Sampling

Job ID: 580-123226-1  
 SDG: HF Sinclair Puget Sound Refining LLC

## Method: 200.8 - Metals (ICP/MS) (Continued)

**Lab Sample ID: MB 580-418320/11-A**  
**Matrix: Water**  
**Analysis Batch: 418478**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 418320**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Selenium	ND		0.0080		mg/L		02/17/23 17:36	02/20/23 14:38	1

**Lab Sample ID: LCS 580-418320/12-A**  
**Matrix: Water**  
**Analysis Batch: 418478**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 418320**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	1.00	1.07		mg/L		107	85 - 115
Chromium	1.00	1.05		mg/L		105	85 - 115
Lead	1.00	1.05		mg/L		105	85 - 115
Manganese	1.00	1.02		mg/L		102	85 - 115
Nickel	1.00	1.11		mg/L		111	85 - 115
Selenium	1.00	1.06		mg/L		106	85 - 115

**Lab Sample ID: LCSD 580-418320/13-A**  
**Matrix: Water**  
**Analysis Batch: 418478**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 418320**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Arsenic	1.00	1.09		mg/L		109	85 - 115	1	20
Chromium	1.00	1.07		mg/L		107	85 - 115	2	20
Lead	1.00	1.05		mg/L		105	85 - 115	0	20
Manganese	1.00	1.04		mg/L		104	85 - 115	2	20
Nickel	1.00	1.11		mg/L		111	85 - 115	1	20
Selenium	1.00	1.06		mg/L		106	85 - 115	0	20

## Method: 7470A - Mercury (CVAA)

**Lab Sample ID: MB 580-417636/22-A**  
**Matrix: Water**  
**Analysis Batch: 417872**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 417636**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		02/10/23 11:20	02/13/23 13:52	1

**Lab Sample ID: LCS 580-417636/23-A**  
**Matrix: Water**  
**Analysis Batch: 417872**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 417636**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.00200	0.00208		mg/L		104	80 - 120

**Lab Sample ID: LCSD 580-417636/24-A**  
**Matrix: Water**  
**Analysis Batch: 417872**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 417636**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury	0.00200	0.00205		mg/L		102	80 - 120	1	20

# QC Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-123226-1  
SDG: HF Sinclair Puget Sound Refining LLC

## Method: 300.0 - Anions, Ion Chromatography

**Lab Sample ID: MB 580-418483/3**  
**Matrix: Water**  
**Analysis Batch: 418483**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.5		mg/L			02/20/23 19:57	1
Sulfate	ND		1.5		mg/L			02/20/23 19:57	1

**Lab Sample ID: LCS 580-418483/4**  
**Matrix: Water**  
**Analysis Batch: 418483**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	50.0	53.2		mg/L		106	90 - 110
Sulfate	50.0	53.6		mg/L		107	90 - 110

**Lab Sample ID: LCSD 580-418483/5**  
**Matrix: Water**  
**Analysis Batch: 418483**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	50.0	53.2		mg/L		106	90 - 110	0	15
Sulfate	50.0	53.5		mg/L		107	90 - 110	0	15

## Method: 350.1 - Nitrogen, Ammonia

**Lab Sample ID: MB 580-418337/1-A**  
**Matrix: Water**  
**Analysis Batch: 418341**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 418337**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	ND		0.50		mg/L		02/18/23 16:22	02/19/23 17:22	1

**Lab Sample ID: LCS 580-418337/2-A**  
**Matrix: Water**  
**Analysis Batch: 418341**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 418337**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Ammonia	2.00	1.85		mg/L		93	90 - 110

## Method: 5310C-2011 - Total Organic Carbon/Persulfate - Ultrav

**Lab Sample ID: MB 410-344727/36**  
**Matrix: Water**  
**Analysis Batch: 344727**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	ND		1.0		mg/L			02/14/23 21:19	1

**Lab Sample ID: MB 410-344727/6**  
**Matrix: Water**  
**Analysis Batch: 344727**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	ND		1.0		mg/L			02/14/23 13:59	1

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# QC Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-123226-1  
SDG: HF Sinclair Puget Sound Refining LLC

## Method: 5310C-2011 - Total Organic Carbon/Persulfate - Ultrav (Continued)

**Lab Sample ID: MB 410-344727/68**  
**Matrix: Water**  
**Analysis Batch: 344727**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	ND		1.0		mg/L			02/15/23 05:09	1

**Lab Sample ID: LCS 410-344727/35**  
**Matrix: Water**  
**Analysis Batch: 344727**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Organic Carbon	25.0	25.4		mg/L		102	91 - 113

**Lab Sample ID: LCS 410-344727/67**  
**Matrix: Water**  
**Analysis Batch: 344727**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Organic Carbon	25.0	25.1		mg/L		100	91 - 113

## Method: SM 2320B - Alkalinity

**Lab Sample ID: LCS 580-418225/2**  
**Matrix: Water**  
**Analysis Batch: 418225**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Alkalinity	100	91.6		mg/L		92	85 - 115

**Lab Sample ID: LCSD 580-418225/3**  
**Matrix: Water**  
**Analysis Batch: 418225**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Alkalinity	100	96.0		mg/L		96	85 - 115	5	20

## Method: SM 5220D - COD

**Lab Sample ID: MB 580-418338/3-A**  
**Matrix: Water**  
**Analysis Batch: 418340**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 418338**

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chemical Oxygen Demand	ND		10		mg/L		02/18/23 18:06	02/19/23 16:57	1

**Lab Sample ID: LCS 580-418338/4-A**  
**Matrix: Water**  
**Analysis Batch: 418340**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 418338**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chemical Oxygen Demand	75.0	73.9		mg/L		99	80 - 120

# QC Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: 2023 SDF Sampling

Job ID: 580-123226-1  
 SDG: HF Sinclair Puget Sound Refining LLC

## Method: SM 5220D - COD (Continued)

Lab Sample ID: LCSD 580-418338/5-A  
 Matrix: Water  
 Analysis Batch: 418340

Client Sample ID: Lab Control Sample Dup  
 Prep Type: Total/NA  
 Prep Batch: 418338

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chemical Oxygen Demand	75.0	76.2		mg/L		102	80 - 120	3	20

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12

# Lab Chronicle

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-123226-1  
SDG: HF Sinclair Puget Sound Refining LLC

**Client Sample ID: W-47-020623**

**Lab Sample ID: 580-123226-1**

**Date Collected: 02/06/23 14:50**

**Matrix: Water**

**Date Received: 02/08/23 10:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	418023	JSM	EET SEA	02/15/23 23:05
Total/NA	Analysis	NWTPH-Gx		1	417555	JSM	EET SEA	02/09/23 23:53
Total/NA	Prep	3510C			417737	TGO	EET SEA	02/13/23 09:55
Total/NA	Analysis	8270E SIM		1	417928	TL1	EET SEA	02/14/23 17:22
Total/NA	Prep	3510C			417982	TGO	EET SEA	02/15/23 10:15
Total/NA	Analysis	NWTPH-Dx		1	418161	KLW	EET SEA	02/16/23 16:44
Total/NA	Prep	3510C			417982	TGO	EET SEA	02/15/23 10:15
Total/NA	Cleanup	3630C			417983	TGO	EET SEA	02/15/23 10:31
Total/NA	Analysis	NWTPH-Dx		1	418164	KLW	EET SEA	02/16/23 16:44
Dissolved	Prep	200.7			418320	DLV	EET SEA	02/17/23 17:36
Dissolved	Analysis	200.7 Rev 4.4		1	418484	JLS	EET SEA	02/20/23 18:41
Total/NA	Prep	200.8			417592	DLV	EET SEA	02/09/23 17:51
Total/NA	Analysis	200.7 Rev 4.4		1	417759	JLS	EET SEA	02/10/23 19:30
Dissolved	Prep	200.7			418320	DLV	EET SEA	02/17/23 17:36
Dissolved	Analysis	200.8		1	418478	FCW	EET SEA	02/20/23 15:07
Total/NA	Prep	200.8			417592	DLV	EET SEA	02/09/23 17:51
Total/NA	Analysis	200.8		1	418151	FCW	EET SEA	02/15/23 22:59
Dissolved	Prep	7470A			417636	CA	EET SEA	02/10/23 11:20
Dissolved	Analysis	7470A		1	417872	CA	EET SEA	02/13/23 14:49
Total/NA	Prep	7470A			417636	CA	EET SEA	02/10/23 11:20
Total/NA	Analysis	7470A		1	417872	CA	EET SEA	02/13/23 14:32
Total/NA	Analysis	300.0		1	418483	JHR	EET SEA	02/21/23 01:01
Total/NA	Prep	Distill/Ammonia			418337	FCG	EET SEA	02/18/23 16:22
Total/NA	Analysis	350.1		1	418341	FCG	EET SEA	02/19/23 17:22
Total/NA	Analysis	5310C-2011		1	344727	P684	ELLE	02/15/23 04:10
Total/NA	Analysis	SM 2320B		1	418225	MLT	EET SEA	02/16/23 18:34
Total/NA	Prep	SM 5220			418338	MLT	EET SEA	02/18/23 18:06
Total/NA	Analysis	SM 5220D		1	418340	FCG	EET SEA	02/19/23 16:57

**Client Sample ID: W-112-020623**

**Lab Sample ID: 580-123226-2**

**Date Collected: 02/06/23 11:20**

**Matrix: Water**

**Date Received: 02/08/23 10:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	418023	JSM	EET SEA	02/15/23 23:29
Total/NA	Analysis	NWTPH-Gx		1	417555	JSM	EET SEA	02/10/23 00:17
Total/NA	Prep	3510C			417737	TGO	EET SEA	02/13/23 09:55
Total/NA	Analysis	8270E SIM		1	417928	TL1	EET SEA	02/14/23 17:46
Total/NA	Prep	3510C			417982	TGO	EET SEA	02/15/23 10:15
Total/NA	Analysis	NWTPH-Dx		1	418161	KLW	EET SEA	02/16/23 17:03
Total/NA	Prep	3510C			417982	TGO	EET SEA	02/15/23 10:15
Total/NA	Cleanup	3630C			417983	TGO	EET SEA	02/15/23 10:31
Total/NA	Analysis	NWTPH-Dx		1	418164	KLW	EET SEA	02/16/23 17:03

# Lab Chronicle

Client: Whatcom Environmental Services Inc.  
 Project/Site: 2023 SDF Sampling

Job ID: 580-123226-1  
 SDG: HF Sinclair Puget Sound Refining LLC

**Client Sample ID: W-112-020623**

**Lab Sample ID: 580-123226-2**

**Date Collected: 02/06/23 11:20**

**Matrix: Water**

**Date Received: 02/08/23 10:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Dissolved	Prep	200.8			418320	DLV	EET SEA	02/17/23 17:36
Dissolved	Analysis	200.7 Rev 4.4		1	418484	JLS	EET SEA	02/20/23 18:44
Total/NA	Prep	200.8			417592	DLV	EET SEA	02/09/23 17:51
Total/NA	Analysis	200.7 Rev 4.4		1	417759	JLS	EET SEA	02/10/23 19:34
Dissolved	Prep	200.8			418320	DLV	EET SEA	02/17/23 17:36
Dissolved	Analysis	200.8		1	418478	FCW	EET SEA	02/20/23 15:10
Total/NA	Prep	200.8			417592	DLV	EET SEA	02/09/23 17:51
Total/NA	Analysis	200.8		1	418151	FCW	EET SEA	02/15/23 23:01
Dissolved	Prep	7470A			417636	CA	EET SEA	02/10/23 11:20
Dissolved	Analysis	7470A		1	417872	CA	EET SEA	02/13/23 14:47
Total/NA	Prep	7470A			417636	CA	EET SEA	02/10/23 11:20
Total/NA	Analysis	7470A		1	417872	CA	EET SEA	02/13/23 14:30
Total/NA	Analysis	300.0		1	418483	JHR	EET SEA	02/21/23 01:13
Total/NA	Prep	Distill/Ammonia			418337	FCG	EET SEA	02/18/23 16:22
Total/NA	Analysis	350.1		1	418341	FCG	EET SEA	02/19/23 17:22
Total/NA	Analysis	5310C-2011		1	344727	P684	ELLE	02/15/23 04:25
Total/NA	Analysis	SM 2320B		1	418225	MLT	EET SEA	02/16/23 18:35
Total/NA	Prep	SM 5220			418338	MLT	EET SEA	02/18/23 18:06
Total/NA	Analysis	SM 5220D		1	418340	FCG	EET SEA	02/19/23 16:57

**Client Sample ID: W-113-020623**

**Lab Sample ID: 580-123226-3**

**Date Collected: 02/06/23 11:55**

**Matrix: Water**

**Date Received: 02/08/23 10:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	418023	JSM	EET SEA	02/15/23 23:54
Total/NA	Analysis	NWTPH-Gx		1	417555	JSM	EET SEA	02/10/23 00:42
Total/NA	Prep	3510C			417737	TGO	EET SEA	02/13/23 09:55
Total/NA	Analysis	8270E SIM		1	417928	TL1	EET SEA	02/14/23 18:10
Total/NA	Prep	3510C			417982	TGO	EET SEA	02/15/23 10:15
Total/NA	Analysis	NWTPH-Dx		1	418161	KLW	EET SEA	02/16/23 17:22
Total/NA	Prep	3510C			417982	TGO	EET SEA	02/15/23 10:15
Total/NA	Cleanup	3630C			417983	TGO	EET SEA	02/15/23 10:31
Total/NA	Analysis	NWTPH-Dx		1	418164	KLW	EET SEA	02/16/23 17:22
Dissolved	Prep	200.8			418320	DLV	EET SEA	02/17/23 17:36
Dissolved	Analysis	200.7 Rev 4.4		1	418484	JLS	EET SEA	02/20/23 18:48
Total/NA	Prep	200.8			417592	DLV	EET SEA	02/09/23 17:51
Total/NA	Analysis	200.7 Rev 4.4		1	417759	JLS	EET SEA	02/10/23 19:37
Dissolved	Prep	200.8			418320	DLV	EET SEA	02/17/23 17:36
Dissolved	Analysis	200.8		1	418478	FCW	EET SEA	02/20/23 15:12
Total/NA	Prep	200.8			417592	DLV	EET SEA	02/09/23 17:51
Total/NA	Analysis	200.8		1	418151	FCW	EET SEA	02/15/23 23:04
Dissolved	Prep	7470A			417636	CA	EET SEA	02/10/23 11:20
Dissolved	Analysis	7470A		1	417872	CA	EET SEA	02/13/23 14:45

# Lab Chronicle

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-123226-1  
SDG: HF Sinclair Puget Sound Refining LLC

**Client Sample ID: W-113-020623**

**Lab Sample ID: 580-123226-3**

**Date Collected: 02/06/23 11:55**

**Matrix: Water**

**Date Received: 02/08/23 10:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	7470A			417636	CA	EET SEA	02/10/23 11:20
Total/NA	Analysis	7470A		1	417872	CA	EET SEA	02/13/23 14:28
Total/NA	Analysis	300.0		1	418483	JHR	EET SEA	02/21/23 01:24
Total/NA	Prep	Distill/Ammonia			418337	FCG	EET SEA	02/18/23 16:22
Total/NA	Analysis	350.1		1	418341	FCG	EET SEA	02/19/23 17:22
Total/NA	Analysis	5310C-2011		1	344727	P684	ELLE	02/15/23 04:39
Total/NA	Analysis	SM 2320B		1	418225	MLT	EET SEA	02/16/23 18:35
Total/NA	Prep	SM 5220			418338	MLT	EET SEA	02/18/23 18:06
Total/NA	Analysis	SM 5220D		1	418340	FCG	EET SEA	02/19/23 16:57

**Client Sample ID: W-127-020623**

**Lab Sample ID: 580-123226-4**

**Date Collected: 02/06/23 15:25**

**Matrix: Water**

**Date Received: 02/08/23 10:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	418023	JSM	EET SEA	02/16/23 00:19
Total/NA	Analysis	NWTPH-Gx		1	417555	JSM	EET SEA	02/10/23 01:06
Total/NA	Prep	3510C			417737	TGO	EET SEA	02/13/23 09:55
Total/NA	Analysis	8270E SIM		1	417928	TL1	EET SEA	02/14/23 18:34
Total/NA	Prep	3510C			417982	TGO	EET SEA	02/15/23 10:15
Total/NA	Analysis	NWTPH-Dx		1	418161	KLW	EET SEA	02/16/23 17:40
Total/NA	Prep	3510C			417982	TGO	EET SEA	02/15/23 10:15
Total/NA	Cleanup	3630C			417983	TGO	EET SEA	02/15/23 10:31
Total/NA	Analysis	NWTPH-Dx		1	418164	KLW	EET SEA	02/16/23 17:40
Dissolved	Prep	200.8			418320	DLV	EET SEA	02/17/23 17:36
Dissolved	Analysis	200.7 Rev 4.4		1	418484	JLS	EET SEA	02/20/23 18:51
Total/NA	Prep	200.8			417592	DLV	EET SEA	02/09/23 17:51
Total/NA	Analysis	200.7 Rev 4.4		1	417759	JLS	EET SEA	02/10/23 19:41
Dissolved	Prep	200.8			418320	DLV	EET SEA	02/17/23 17:36
Dissolved	Analysis	200.8		1	418478	FCW	EET SEA	02/20/23 15:14
Total/NA	Prep	200.8			417592	DLV	EET SEA	02/09/23 17:51
Total/NA	Analysis	200.8		1	418151	FCW	EET SEA	02/15/23 23:06
Dissolved	Prep	7470A			417636	CA	EET SEA	02/10/23 11:20
Dissolved	Analysis	7470A		1	417872	CA	EET SEA	02/13/23 14:43
Total/NA	Prep	7470A			417636	CA	EET SEA	02/10/23 11:20
Total/NA	Analysis	7470A		1	417872	CA	EET SEA	02/13/23 14:26
Total/NA	Analysis	300.0		1	418483	JHR	EET SEA	02/21/23 01:36
Total/NA	Prep	Distill/Ammonia			418337	FCG	EET SEA	02/18/23 16:22
Total/NA	Analysis	350.1		1	418341	FCG	EET SEA	02/19/23 17:22
Total/NA	Analysis	5310C-2011		1	344727	P684	ELLE	02/15/23 07:07
Total/NA	Analysis	SM 2320B		1	418225	MLT	EET SEA	02/16/23 18:35
Total/NA	Prep	SM 5220			418338	MLT	EET SEA	02/18/23 18:39
Total/NA	Analysis	SM 5220D		1	418340	FCG	EET SEA	02/19/23 16:57

# Lab Chronicle

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-123226-1  
SDG: HF Sinclair Puget Sound Refining LLC

**Client Sample ID: SDF-DUP-1-020623**

**Lab Sample ID: 580-123226-5**

**Date Collected: 02/06/23 09:50**

**Matrix: Water**

**Date Received: 02/08/23 10:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	418023	JSM	EET SEA	02/16/23 00:43
Total/NA	Analysis	NWTPH-Gx		1	417555	JSM	EET SEA	02/10/23 01:30
Total/NA	Prep	3510C			417737	TGO	EET SEA	02/13/23 09:55
Total/NA	Analysis	8270E SIM		1	417928	TL1	EET SEA	02/14/23 18:58
Total/NA	Prep	3510C			417982	TGO	EET SEA	02/15/23 10:15
Total/NA	Analysis	NWTPH-Dx		1	418161	KLW	EET SEA	02/16/23 17:59
Total/NA	Prep	3510C			417982	TGO	EET SEA	02/15/23 10:15
Total/NA	Cleanup	3630C			417983	TGO	EET SEA	02/15/23 10:31
Total/NA	Analysis	NWTPH-Dx		1	418164	KLW	EET SEA	02/16/23 17:59
Dissolved	Prep	200.8			418320	DLV	EET SEA	02/17/23 17:36
Dissolved	Analysis	200.7 Rev 4.4		1	418484	JLS	EET SEA	02/20/23 18:55
Total/NA	Prep	200.8			417592	DLV	EET SEA	02/09/23 17:51
Total/NA	Analysis	200.7 Rev 4.4		1	417759	JLS	EET SEA	02/10/23 19:45
Dissolved	Prep	200.8			418320	DLV	EET SEA	02/17/23 17:36
Dissolved	Analysis	200.8		1	418478	FCW	EET SEA	02/20/23 15:17
Total/NA	Prep	200.8			417592	DLV	EET SEA	02/09/23 17:51
Total/NA	Analysis	200.8		1	418151	FCW	EET SEA	02/15/23 23:08
Dissolved	Prep	7470A			417636	CA	EET SEA	02/10/23 11:20
Dissolved	Analysis	7470A		1	417872	CA	EET SEA	02/13/23 14:37
Total/NA	Prep	7470A			417636	CA	EET SEA	02/10/23 11:20
Total/NA	Analysis	7470A		1	417872	CA	EET SEA	02/13/23 14:24
Total/NA	Analysis	300.0		1	418483	JHR	EET SEA	02/21/23 01:48
Total/NA	Prep	Distill/Ammonia			418337	FCG	EET SEA	02/18/23 16:22
Total/NA	Analysis	350.1		1	418341	FCG	EET SEA	02/19/23 17:22
Total/NA	Analysis	5310C-2011		1	344727	P684	ELLE	02/15/23 07:21
Total/NA	Analysis	SM 2320B		1	418225	MLT	EET SEA	02/16/23 18:35
Total/NA	Prep	SM 5220			418338	MLT	EET SEA	02/18/23 18:39
Total/NA	Analysis	SM 5220D		1	418340	FCG	EET SEA	02/19/23 16:57

**Client Sample ID: SDF-FEB-1-020623**

**Lab Sample ID: 580-123226-6**

**Date Collected: 02/06/23 09:00**

**Matrix: Water**

**Date Received: 02/08/23 10:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	418023	JSM	EET SEA	02/16/23 01:07
Total/NA	Analysis	NWTPH-Gx		1	417555	JSM	EET SEA	02/10/23 01:55
Total/NA	Prep	3510C			417737	TGO	EET SEA	02/13/23 09:55
Total/NA	Analysis	8270E SIM		1	417928	TL1	EET SEA	02/14/23 19:22
Total/NA	Prep	3510C			417982	TGO	EET SEA	02/15/23 10:15
Total/NA	Analysis	NWTPH-Dx		1	418161	KLW	EET SEA	02/16/23 18:18
Total/NA	Prep	3510C			417982	TGO	EET SEA	02/15/23 10:15
Total/NA	Cleanup	3630C			417983	TGO	EET SEA	02/15/23 10:31
Total/NA	Analysis	NWTPH-Dx		1	418164	KLW	EET SEA	02/16/23 18:18



# Lab Chronicle

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-123226-1  
SDG: HF Sinclair Puget Sound Refining LLC

**Client Sample ID: SDF-FEB-1-020623**

**Lab Sample ID: 580-123226-6**

**Date Collected: 02/06/23 09:00**

**Matrix: Water**

**Date Received: 02/08/23 10:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Dissolved	Prep	200.8			418320	DLV	EET SEA	02/17/23 17:36
Dissolved	Analysis	200.7 Rev 4.4		1	418484	JLS	EET SEA	02/20/23 18:58
Total/NA	Prep	200.8			417592	DLV	EET SEA	02/09/23 17:51
Total/NA	Analysis	200.7 Rev 4.4		1	417759	JLS	EET SEA	02/10/23 19:48
Dissolved	Prep	200.8			418320	DLV	EET SEA	02/17/23 17:36
Dissolved	Analysis	200.8		1	418478	FCW	EET SEA	02/20/23 15:19
Total/NA	Prep	200.8			417592	DLV	EET SEA	02/09/23 17:51
Total/NA	Analysis	200.8		1	418151	FCW	EET SEA	02/15/23 23:11
Dissolved	Prep	7470A			417636	CA	EET SEA	02/10/23 11:20
Dissolved	Analysis	7470A		1	417872	CA	EET SEA	02/13/23 14:35
Total/NA	Prep	7470A			417636	CA	EET SEA	02/10/23 11:20
Total/NA	Analysis	7470A		1	417872	CA	EET SEA	02/13/23 14:22
Total/NA	Analysis	300.0		1	418483	JHR	EET SEA	02/21/23 01:59
Total/NA	Prep	Distill/Ammonia			418337	FCG	EET SEA	02/18/23 16:22
Total/NA	Analysis	350.1		1	418341	FCG	EET SEA	02/19/23 17:22
Total/NA	Analysis	5310C-2011		1	344727	P684	ELLE	02/15/23 07:36
Total/NA	Analysis	SM 2320B		1	418225	MLT	EET SEA	02/16/23 18:35
Total/NA	Prep	SM 5220			418338	MLT	EET SEA	02/18/23 18:39
Total/NA	Analysis	SM 5220D		1	418340	FCG	EET SEA	02/19/23 16:57

**Client Sample ID: Trip Blank**

**Lab Sample ID: 580-123226-7**

**Date Collected: 02/06/23 00:01**

**Matrix: Water**

**Date Received: 02/08/23 10:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	418023	JSM	EET SEA	02/16/23 01:32
Total/NA	Analysis	NWTPH-Gx		1	417555	JSM	EET SEA	02/10/23 02:19

**Laboratory References:**

EET SEA = Eurofins Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310

ELLE = Eurofins Lancaster Laboratories Environment Testing, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300

# Accreditation/Certification Summary

Client: Whatcom Environmental Services Inc.  
 Project/Site: 2023 SDF Sampling

Job ID: 580-123226-1  
 SDG: HF Sinclair Puget Sound Refining LLC

## Laboratory: Eurofins Seattle

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Washington	State	C788	07-13-23

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
200.7 Rev 4.4	200.7	Water	Calcium
200.7 Rev 4.4	200.7	Water	Iron
200.7 Rev 4.4	200.7	Water	Magnesium
200.7 Rev 4.4	200.7	Water	Potassium
200.7 Rev 4.4	200.7	Water	Sodium
200.7 Rev 4.4	200.8	Water	Calcium
200.7 Rev 4.4	200.8	Water	Iron
200.7 Rev 4.4	200.8	Water	Magnesium
200.7 Rev 4.4	200.8	Water	Potassium
200.7 Rev 4.4	200.8	Water	Sodium
200.8	200.7	Water	Arsenic
200.8	200.7	Water	Chromium
200.8	200.7	Water	Lead
200.8	200.7	Water	Manganese
200.8	200.7	Water	Nickel
200.8	200.7	Water	Selenium
200.8	200.8	Water	Arsenic
200.8	200.8	Water	Chromium
200.8	200.8	Water	Lead
200.8	200.8	Water	Manganese
200.8	200.8	Water	Nickel
200.8	200.8	Water	Selenium
300.0		Water	Chloride
300.0		Water	Sulfate
SM 2320B		Water	Alkalinity
SM 2320B		Water	Bicarbonate Alkalinity as CaCO3

## Laboratory: Eurofins Lancaster Laboratories Environment Testing, LLC

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
A2LA	Dept. of Defense ELAP	0001.01	11-30-24
A2LA	ISO/IEC 17025	0001.01	11-30-24
Alaska	State	PA00009	06-30-23
Alaska (UST)	State	17-027	02-28-23
Arizona	State	AZ0780	03-11-23
Arkansas DEQ	State	88-00660	08-09-23
California	State	2792	11-30-22 *
Colorado	State	PA00009	06-30-23
Connecticut	State	PH-0746	06-30-23
Delaware (DW)	State	N/A	01-31-24
Florida	NELAP	E87997	07-02-23
Georgia (DW)	State	C048	01-31-24
Hawaii	State	N/A	01-31-24
Iowa	State	361	03-01-24
Kansas	NELAP	E-10151	10-31-23

\* Accreditation/Certification renewal pending - accreditation/certification considered valid.

# Accreditation/Certification Summary

Client: Whatcom Environmental Services Inc.  
 Project/Site: 2023 SDF Sampling

Job ID: 580-123226-1  
 SDG: HF Sinclair Puget Sound Refining LLC

## Laboratory: Eurofins Lancaster Laboratories Environment Testing, LLC (Continued)

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Kentucky (DW)	State	KY90088	12-31-23
Kentucky (UST)	State	0001.01	11-30-24
Kentucky (WW)	State	KY90088	12-31-23
Louisiana (All)	NELAP	02055	06-30-23
Maine	State	2019012	03-12-23
Maryland	State	100	06-30-23
Massachusetts	State	M-PA009	06-30-23
Michigan	State	9930	01-31-24
Minnesota	NELAP	042-999-487	12-31-23
Mississippi	State	023	01-31-24
Missouri	State	450	01-31-25
Montana (DW)	State	0098	01-01-24
Nebraska	State	NE-OS-32-17	01-31-24
New Hampshire	NELAP	2730	01-10-24
New Jersey	NELAP	PA011	06-30-23
New York	NELAP	10670	04-01-23
North Carolina (DW)	State	42705	07-31-23
North Carolina (WW/SW)	State	521	12-31-23
North Dakota	State	R-205	01-31-23 *
Oklahoma	NELAP	R-205	08-31-23
Oregon	NELAP	PA200001	09-11-23
PALA	Canada	1978	09-16-24
Pennsylvania	NELAP	36-00037	01-31-24
Rhode Island	State	LAO00338	12-31-23
South Carolina	State	89002	01-31-23 *
Tennessee	State	02838	01-31-24
Texas	NELAP	T104704194-22-45	08-31-23
USDA	US Federal Programs	525-22-298-19481	10-25-25
Vermont	State	VT - 36037	10-28-23
Virginia	NELAP	460182	06-14-23
Washington	State	C457	04-11-23
West Virginia (DW)	State	9906 C	12-31-23
West Virginia DEP	State	055	07-31-23
Wyoming	State	8TMS-L	01-31-24
Wyoming (UST)	A2LA	0001.01	11-30-24

\* Accreditation/Certification renewal pending - accreditation/certification considered valid.

# Sample Summary

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-123226-1  
SDG: HF Sinclair Puget Sound Refining LLC

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-123226-1	W-47-020623	Water	02/06/23 14:50	02/08/23 10:00
580-123226-2	W-112-020623	Water	02/06/23 11:20	02/08/23 10:00
580-123226-3	W-113-020623	Water	02/06/23 11:55	02/08/23 10:00
580-123226-4	W-127-020623	Water	02/06/23 15:25	02/08/23 10:00
580-123226-5	SDF-DUP-1-020623	Water	02/06/23 09:50	02/08/23 10:00
580-123226-6	SDF-FEB-1-020623	Water	02/06/23 09:00	02/08/23 10:00
580-123226-7	Trip Blank	Water	02/06/23 00:01	02/08/23 10:00

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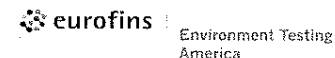
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**Eurofins ET Northwest- Seattle**

5755 8th Street East  
Tacoma, WA 98424  
Phone (253) 922-2310 Phone (425) 420-9210

**Chain of Custody Record**



<b>Client Information</b>		Sampler: Ava Gempler		Lab PM: Cruz, Sheri L		Carrier Tracking No(s): FedEx		COC No: 580-44411-14188.2																																							
Client Contact: Eric Libolt		Phone: 360-752-9571		E-Mail: Sheri.Cruz@et.eurofinsus.com		State of Origin: Washington		Page: Page 1 of 1																																							
Company: Whatcom Environmental Services Inc.		PWSID:		<b>Analysis Requested</b>						Job #:																																					
Address: 228 East Champion Street #101		Due Date Requested:		<table border="1"> <tr> <td>Field Filtered Sample (Yes or No)</td> <td>Perform MS/MSD (Yes or No)</td> <td>2320B Alkalinity and bicarbonate</td> <td>350.1 Ammonia</td> <td>SM5310_TOC_B -TOC</td> <td>522DD - COD</td> <td>NWTPH_Dx - Northwest - DROIRRO (without silica gel)</td> <td>NWTPH_Dx - Northwest - DROIRRO with silica gel</td> <td>NDTPH-Gx</td> <td>300.0 Chloride and Sulfate</td> <td>Dissolved 200.7 - (FF) -Ca, Fe, Mg, Na, K</td> <td>Dissolved 200.8 - (FF) - As, Cr, Pb, Mn, Ni, Se</td> <td>Dissolved 7470_Mercury</td> <td>Total Fe, Mg</td> <td>Total As, Cr, Pb, Mn, Ni, Se</td> <td>Total Mercury</td> <td>cPAHs (carcinogenic polycyclic aromatic hydrocarbons)</td> <td>8260D - BTEX</td> <td>Total Number of containers</td> </tr> </table>						Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	2320B Alkalinity and bicarbonate	350.1 Ammonia	SM5310_TOC_B -TOC	522DD - COD	NWTPH_Dx - Northwest - DROIRRO (without silica gel)	NWTPH_Dx - Northwest - DROIRRO with silica gel	NDTPH-Gx	300.0 Chloride and Sulfate	Dissolved 200.7 - (FF) -Ca, Fe, Mg, Na, K	Dissolved 200.8 - (FF) - As, Cr, Pb, Mn, Ni, Se	Dissolved 7470_Mercury	Total Fe, Mg	Total As, Cr, Pb, Mn, Ni, Se	Total Mercury	cPAHs (carcinogenic polycyclic aromatic hydrocarbons)	8260D - BTEX	Total Number of containers	Preservation Codes: A - HCL M - Hexane B - NaOH N - None C - Zn Acetate O - AsNaO2 D - Nitric Acid P - Na2O4S E - NaHSO4 Q - Na2SO3 F - MeOH R - Na2S2O3 G - Amchlor S - H2SO4 H - Ascorbic Acid T - TSP Dodecahydrate I - Ice U - Acetone J - DI Water V - MCAA K - EDTA W - pH 4-5 L - EDA Z - other (specify)																		
Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	2320B Alkalinity and bicarbonate	350.1 Ammonia							SM5310_TOC_B -TOC	522DD - COD	NWTPH_Dx - Northwest - DROIRRO (without silica gel)	NWTPH_Dx - Northwest - DROIRRO with silica gel	NDTPH-Gx	300.0 Chloride and Sulfate	Dissolved 200.7 - (FF) -Ca, Fe, Mg, Na, K	Dissolved 200.8 - (FF) - As, Cr, Pb, Mn, Ni, Se	Dissolved 7470_Mercury	Total Fe, Mg	Total As, Cr, Pb, Mn, Ni, Se	Total Mercury	cPAHs (carcinogenic polycyclic aromatic hydrocarbons)	8260D - BTEX	Total Number of containers																							
City: Bellingham		TAT Requested (days): 10 BD								Compliance Project: <input type="checkbox"/> Yes <input type="checkbox"/> No		PO #:		Bill to WES		WO #:		Project #:		SSOW#:		Project Name: 2023 SDF Sampling		Site: HF Sinclair Puget Sound Refining LLC																							
State, Zip: WA, 98225		Compliance Project: <input type="checkbox"/> Yes <input type="checkbox"/> No								PO #:		Bill to WES		WO #:		Project #:		SSOW#:		Project Name: 2023 SDF Sampling		Site: HF Sinclair Puget Sound Refining LLC		Sample Identification																							
Phone: 360-752-9571		Compliance Project: <input type="checkbox"/> Yes <input type="checkbox"/> No								PO #:		Bill to WES		WO #:		Project #:		SSOW#:		Project Name: 2023 SDF Sampling		Site: HF Sinclair Puget Sound Refining LLC		Sample Identification																							
Email: elibolt@whatcom-es.com		Compliance Project: <input type="checkbox"/> Yes <input type="checkbox"/> No		PO #:		Bill to WES		WO #:		Project #:		SSOW#:		Project Name: 2023 SDF Sampling		Site: HF Sinclair Puget Sound Refining LLC		Sample Identification																													
Project Name: 2023 SDF Sampling		Compliance Project: <input type="checkbox"/> Yes <input type="checkbox"/> No		PO #:		Bill to WES		WO #:		Project #:		SSOW#:		Project Name: 2023 SDF Sampling		Site: HF Sinclair Puget Sound Refining LLC		Sample Identification																													
Site: HF Sinclair Puget Sound Refining LLC		Compliance Project: <input type="checkbox"/> Yes <input type="checkbox"/> No		PO #:		Bill to WES		WO #:		Project #:		SSOW#:		Project Name: 2023 SDF Sampling		Site: HF Sinclair Puget Sound Refining LLC		Sample Identification																													
Sample Identification		Sample Date		Sample Time		Sample Type (C=comp, G=grab)		Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)		Field Filtered Sample (Yes or No)		Perform MS/MSD (Yes or No)		2320B Alkalinity and bicarbonate		350.1 Ammonia		SM5310_TOC_B -TOC		522DD - COD		NWTPH_Dx - Northwest - DROIRRO (without silica gel)		NWTPH_Dx - Northwest - DROIRRO with silica gel		NDTPH-Gx		300.0 Chloride and Sulfate		Dissolved 200.7 - (FF) -Ca, Fe, Mg, Na, K		Dissolved 200.8 - (FF) - As, Cr, Pb, Mn, Ni, Se		Dissolved 7470_Mercury		Total Fe, Mg		Total As, Cr, Pb, Mn, Ni, Se		Total Mercury		cPAHs (carcinogenic polycyclic aromatic hydrocarbons)		8260D - BTEX		Total Number of containers	
W-47-020623		2/6/23		14:50		G		Water		x		x		x		x		x		x		x		x		x		x		x		x		x		x		x		x		16					
W-112-020623		2/6/23		11:20		G		Water		x		x		x		x		x		x		x		x		x		x		x		x		x		x		x		16							
W-113-020623		2/6/23		11:55		G		Water		x		x		x		x		x		x		x		x		x		x		x		x		x		x		x		16		Please email results to Ava Gempler at agempler@whatcom-es.com and Eric Libolt at elibolt@whatcom-es.com					
W-127-020623		2/6/23		15:25		G		Water		x		x		x		x		x		x		x		x		x		x		x		x		x		x		16									
SDF-DUP-1-020623		2/6/23		9:50		G		Water		x		x		x		x		x		x		x		x		x		x		x		x		x		x		16									
SDF-FEB-1-020623		2/6/23		9:00		G		Water		x		x		x		x		x		x		x		x		x		x		x		x		x		x		16		There is one nitric poly bottle field filtered for dissolved analytes, and one nitric poly not field filtered for total analytes.							
Trip Blanks		Filled At Lab						Water																														6		will require the CIM file (CEDD) in addition to the report.							
Possible Hazard Identification		Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)																																													
<input checked="" type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological		<input type="checkbox"/> Return To Client <input checked="" type="checkbox"/> Disposal By Lab		Archive For _____ Months																																											
Deliverable Requested: I, II, III, IV, Other (specify)		Special Instructions/QC Requirements:																																													
Empty Kit Relinquished by:		Date:		Time:		Method of Shipment:																																									
Relinquished by: Ava Gempler		Date/Time: 2/7/23, 10:15am		Company: WES		Received by:		Date/Time: 2/8/23, 1000		Company: EETA																																					
Relinquished by:		Date/Time:		Company:		Received by:		Date/Time:		Company:																																					
Relinquished by:		Date/Time:		Company:		Received by:		Date/Time:		Company:																																					
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No.:																																													
		580-123226 Chain of Custody																																													

WES 2/8/23 1000

Therm. ID: A3 Cor: 03 ° Unc: 0.2 °  
Cooler Dsc: 113 FedEx: PO  
Packing: Bub UPS: \_\_\_\_\_  
Cust. Seal: Yes X No \_\_\_\_\_ Lab Cour: \_\_\_\_\_  
Blue Ice Wet Dry, None \_\_\_\_\_ Other: \_\_\_\_\_

Therm. ID: A3 Cor: 0.1 ° Unc: 0.8 °  
Cooler Dsc: 213 FedEx: \_\_\_\_\_  
Packing: Bub UPS: \_\_\_\_\_  
Cust. Seal: Yes X No \_\_\_\_\_ Lab Cour: \_\_\_\_\_  
Blue Ice Wet Dry, None \_\_\_\_\_ Other: \_\_\_\_\_

Therm. ID: A3 Cor: Y9 Unc: 1.0 °  
Cooler Dsc: 213 FedEx: \_\_\_\_\_  
Packing: Bub UPS: \_\_\_\_\_  
Cust. Seal: Yes X No \_\_\_\_\_ Lab Cour: \_\_\_\_\_  
Blue Ice Wet Dry, None \_\_\_\_\_ Other: \_\_\_\_\_

## Login Sample Receipt Checklist

Client: Whatcom Environmental Services Inc.

Job Number: 580-123226-1  
SDG Number: HF Sinclair Puget Sound Refining LLC

**Login Number: 123226**

**List Number: 1**

**Creator: Presley, Kim A**

**List Source: Eurofins Seattle**

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

## Login Sample Receipt Checklist

Client: Whatcom Environmental Services Inc.

Job Number: 580-123226-1

SDG Number: HF Sinclair Puget Sound Refining LLC

**Login Number: 123226**

**List Source: Eurofins Lancaster Laboratories Environment Testing, LLC**

**List Number: 2**

**List Creation: 02/10/23 04:04 PM**

**Creator: Ballard, Megan**

Question	Answer	Comment
The cooler's custody seal is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable (<math>\leq 6^{\circ}\text{C}</math>, not frozen).	True	
Cooler Temperature is recorded.	True	
WV: Container Temperature is acceptable (<math>\leq 6^{\circ}\text{C}</math>, not frozen).	N/A	
WV: Container Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the containers received and the COC.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses.	True	
Is the Field Sampler's name present on COC?	False	Received project as a subcontract.
Sample custody seals are intact.	N/A	
VOA sample vials do not have headspace >6mm in diameter (none, if from WV)?	N/A	



## Emily Wengrowski

---

**From:** Ava Gempler <agempler@whatcom-es.com>  
**Sent:** Thursday, February 9, 2023 11:04 AM  
**To:** Emily Wengrowski  
**Subject:** Re: Eurofins Environment Testing Northwest, LLC Sample Login Confirmation files from 580-123226 2023 SDF Sampling

You don't often get email from agempler@whatcom-es.com. [Learn why this is important](#)

EXTERNAL EMAIL\*

Hi Emily,

Total and dissolved Sb, V, and Zn are no longer required for this sampling and were not on the COC for this sampling event. Would you please be able to send me a revised Sample Login Acknowledgement, and remove those three analytes for all of the samples?

Thanks!

*Ava Gempler*

Whatcom Environmental Services  
228 E. Champion St. #101  
Bellingham, WA 98225  
360-752-9571  
[www.whatcom-es.com](http://www.whatcom-es.com)



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**From:** Emily Wengrowski <emily.wengrowski@et.eurofinsus.com>  
**Sent:** Wednesday, February 8, 2023 4:00 PM  
**To:** Ava Gempler <agempler@whatcom-es.com>; Eric Libolt <elibolt@whatcom-es.com>; Gautam Kini <gautam.kini@hollyfrontier.com>; Jim Schneider <jim.schneider@hfsinclair.com>; Thom Davis <tdavis@whatcom-es.com>  
**Subject:** Eurofins Environment Testing Northwest, LLC Sample Login Confirmation files from 580-123226 2023 SDF Sampling

Hello,

Attached, please find the Sample Confirmation files for job 580-123226; 2023 SDF Sampling

Receipt

The samples were received on 2/8/2023 10:00 AM. Unless otherwise noted below, the samples arrived in good

condition, and where required, properly preserved and on ice. The temperatures of the 3 coolers at receipt time were 0.3° C, 0.9° C and 1.1° C.

Please feel free to contact me or your PM, Sheri Cruz, if you have any questions.

Thank you.

**Emily E Wengrowski**  
Project Manager Assistant

Eurofins Seattle

E-mail: [emily.wengrowski@et.eurofinsus.com](mailto:emily.wengrowski@et.eurofinsus.com)  
[www.eurofinsus.com/env](http://www.eurofinsus.com/env)



Reference: [580-466715]  
Attachments: 2

> > [Bank information has changed, please refer to remittance information on invoice.](#) < <

\* WARNING - EXTERNAL: This email originated from outside of Eurofins Environment Testing America. Do not click any links or open any attachments unless you trust the sender and know that the content is safe!



Burlington, WA *Corporate Laboratory (a)*  
1620 S Walnut St - Burlington, WA 98233 - 800.755.9295 • 360.757.1400  
Bellingham, WA *Microbiology (b)*  
805 Orchard Dr Ste 4 - Bellingham, WA 98225 - 360.715.1212

Portland, OR *Microbiology/Chemistry (c)*  
9725 SW Commerce Cr Ste A2 - Wilsonville, OR 97070 - 503.682.7802  
Corvallis, OR *Microbiology/Chemistry (d)*  
1100 NE Circle Blvd, Ste 130 - Corvallis, OR 97330 - 541.753.4946  
Bend, OR *Microbiology (e)*  
20332 Empire Blvd Ste 4 - Bend, OR 97701 - 541.639.8425

February 10, 2023

Page 1 of 1

Mr. Eric Libolt  
Whatcom Environmental Services  
228 E Champion #101  
Bellingham, WA 98225  
RE: 23-03427 - 2023 SDF Groundwater Sampling

Dear Mr. Eric Libolt,

Your project: 2023 SDF Groundwater Sampling, was received on Monday February 06, 2023.

All samples were analyzed within the accepted holding times and were appropriately preserved and analyzed according to approved analytical protocols, unless noted in the data or QC reports. The quality control data was within laboratory acceptance limits, unless specified in the data or QC reports.

If you have questions phone us at 800 755-9295.

Respectfully

A handwritten signature in blue ink that reads "Lawrence J Henderson". The signature is fluid and cursive, with a long, sweeping tail on the final letter.

Lawrence J Henderson, PhD  
Director of Laboratories, Vice President

Enclosures: Data Report  
QC Reports  
Chain of Custody



Burlington, WA Corporate Laboratory (a)  
1620 S Walnut St - Burlington, WA 98233 - 800.755.9295 • 360.757.1400  
Bellingham, WA Microbiology (b)  
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Portland, OR Microbiology/Chemistry (c)  
9725 SW Commerce Cr Ste A2 - Wilsonville, OR 97070 - 503.682.7802  
Corvallis, OR Microbiology/Chemistry (d)  
1100 NE Circle Blvd, Ste 130 - Corvallis, OR 97330 - 541.753.4946  
Bend, OR Microbiology (e)  
20332 Empire Blvd Ste 4 - Bend, OR 97701 - 541.639.8425

# Data Report

Client Name: Whatcom Environmental Services  
228 E Champion #101  
Bellingham, WA 98225

Reference Number: **23-03427**  
Project: 2023 SDF Groundwater  
Sampling

Report Date: 2/10/23

Date Received: 2/6/23

Approved by: ljh,mlp

Authorized by:

Lawrence J Henderson, PhD  
Director of Laboratories, Vice President

Sample Description: W-47-020623 HF Sinclair PSR								Matrix W	Sample Date: 2/6/23 2:50 pm			
Lab Number: 6752		Sample Comment:						Collected By: Ava Gempler (Wes)				
CAS ID#	Parameter	Result	PQL	MDL	Units	DF	Method	Lab	Analyzed	Analyst	Batch	Comment

14797-55-8	NITRATE-N	0.073	0.005	0.0032	mg/L	1.0	SM4500-NO3 F	a	2/7/23	TJB	NO3NO2_230207A	
14797-65-0	NITRITE-N	ND	0.005	0.0022	mg/L	1.0	SM4500-NO3 F	a	2/7/23	TJB	NO3NO2_230207A	
E-10128	TOTAL NITRATE+NITRITE as N	0.07	0.01	0.0042	mg/L	1.0	SM4500-NO3 F	a	2/7/23	TJB	NO3NO2_230207A	
Coli-To-t	TOTAL COLIFORM	<1	1		MPN/100mL	1.0	SM9223 B.2.b/Colilert-18	b	2/8/23	RML	QT_230207	
68583-22-2	E. Coli	<1	1		MPN/100mL	1.0	SM9223 B.2.b/Colilert-18	b	2/8/23	RML	QT_230207	

Sample Description: W-112-020623 HF Sinclair PSR								Matrix W	Sample Date: 2/6/23 11:20 am			
Lab Number: 6753		Sample Comment:						Collected By: Ava Gempler (Wes)				
CAS ID#	Parameter	Result	PQL	MDL	Units	DF	Method	Lab	Analyzed	Analyst	Batch	Comment

14797-55-8	NITRATE-N	0.019	0.005	0.0032	mg/L	1.0	SM4500-NO3 F	a	2/7/23	TJB	NO3NO2_230207A	
14797-65-0	NITRITE-N	ND	0.005	0.0022	mg/L	1.0	SM4500-NO3 F	a	2/7/23	TJB	NO3NO2_230207A	
E-10128	TOTAL NITRATE+NITRITE as N	0.02	0.01	0.0042	mg/L	1.0	SM4500-NO3 F	a	2/7/23	TJB	NO3NO2_230207A	
Coli-To-t	TOTAL COLIFORM	<1	1		MPN/100mL	1.0	SM9223 B.2.b/Colilert-18	b	2/8/23	RML	QT_230207	
68583-22-2	E. Coli	<1	1		MPN/100mL	1.0	SM9223 B.2.b/Colilert-18	b	2/8/23	RML	QT_230207	

Sample Description: W-113-020623 HF Sinclair PSR								Matrix W	Sample Date: 2/6/23 11:55 am			
Lab Number: 6754		Sample Comment:						Collected By: Ava Gempler (Wes)				
CAS ID#	Parameter	Result	PQL	MDL	Units	DF	Method	Lab	Analyzed	Analyst	Batch	Comment

14797-55-8	NITRATE-N	0.013	0.005	0.0032	mg/L	1.0	SM4500-NO3 F	a	2/7/23	TJB	NO3NO2_230207A	
14797-65-0	NITRITE-N	ND	0.005	0.0022	mg/L	1.0	SM4500-NO3 F	a	2/7/23	TJB	NO3NO2_230207A	
E-10128	TOTAL NITRATE+NITRITE as N	0.01	0.01	0.0042	mg/L	1.0	SM4500-NO3 F	a	2/7/23	TJB	NO3NO2_230207A	
Coli-To-t	TOTAL COLIFORM	<1	1		MPN/100mL	1.0	SM9223 B.2.b/Colilert-18	b	2/8/23	RML	QT_230207	
68583-22-2	E. Coli	<1	1		MPN/100mL	1.0	SM9223 B.2.b/Colilert-18	b	2/8/23	RML	QT_230207	

Notes:

ND = Not detected above the listed practical quantitation limit (PQL) or not above the Method Detection Limit (MDL), if requested.  
PQL = Practical Quantitation Limit is the lowest level that can be achieved within specified limits of precision and accuracy during routine laboratory operating conditions.  
D.F. - Dilution Factor

If you have any questions concerning this report contact us at the above phone number.

# Data Report

Sample Description: W-127-020623 HF Sinclair PSR								Matrix W	Sample Date: 2/6/23 3:25 pm			
Lab Number: 6755		Sample Comment:						Collected By: Ava Gempler (Wes)				

CAS ID#	Parameter	Result	PQL	MDL	Units	DF	Method	Lab	Analyzed	Analyst	Batch	Comment
14797-55-8	NITRATE-N	ND	0.005	0.0032	mg/L	1.0	SM4500-NO3 F	a	2/7/23	TJB	NO3NO2_230207A	
14797-65-0	NITRITE-N	ND	0.005	0.0022	mg/L	1.0	SM4500-NO3 F	a	2/7/23	TJB	NO3NO2_230207A	
E-10128	TOTAL NITRATE+NITRITE as N	ND	0.01	0.0042	mg/L	1.0	SM4500-NO3 F	a	2/7/23	TJB	NO3NO2_230207A	
Coli-To-t	TOTAL COLIFORM	<1	1		MPN/100mL	1.0	SM9223 B.2.b/Colilert-18	b	2/8/23	RML	QT_230207	
68583-22-2	E. Coli	<1	1		MPN/100mL	1.0	SM9223 B.2.b/Colilert-18	b	2/8/23	RML	QT_230207	

Sample Description: SDF-FEB-1-020623 HF Sinclair PSR								Matrix W	Sample Date: 2/6/23 9:50 am			
Lab Number: 6756		Sample Comment:						Collected By: Ava Gempler (Wes)				

CAS ID#	Parameter	Result	PQL	MDL	Units	DF	Method	Lab	Analyzed	Analyst	Batch	Comment
14797-55-8	NITRATE-N	0.018	0.005	0.0032	mg/L	1.0	SM4500-NO3 F	a	2/7/23	TJB	NO3NO2_230207A	
14797-65-0	NITRITE-N	ND	0.005	0.0022	mg/L	1.0	SM4500-NO3 F	a	2/7/23	TJB	NO3NO2_230207A	
E-10128	TOTAL NITRATE+NITRITE as N	0.02	0.01	0.0042	mg/L	1.0	SM4500-NO3 F	a	2/7/23	TJB	NO3NO2_230207A	
Coli-To-t	TOTAL COLIFORM	<1	1		MPN/100mL	1.0	SM9223 B.2.b/Colilert-18	b	2/8/23	RML	QT_230207	
68583-22-2	E. Coli	<1	1		MPN/100mL	1.0	SM9223 B.2.b/Colilert-18	b	2/8/23	RML	QT_230207	

Sample Description: SDF-DUP-1-020623 HF Sinclair PSR								Matrix W	Sample Date: 2/6/23 9:00 am			
Lab Number: 6757		Sample Comment:						Collected By: Ava Gempler (Wes)				

CAS ID#	Parameter	Result	PQL	MDL	Units	DF	Method	Lab	Analyzed	Analyst	Batch	Comment
14797-55-8	NITRATE-N	0.014	0.005	0.0032	mg/L	1.0	SM4500-NO3 F	a	2/7/23	TJB	NO3NO2_230207A	
14797-65-0	NITRITE-N	ND	0.005	0.0022	mg/L	1.0	SM4500-NO3 F	a	2/7/23	TJB	NO3NO2_230207A	
E-10128	TOTAL NITRATE+NITRITE as N	0.01	0.01	0.0042	mg/L	1.0	SM4500-NO3 F	a	2/7/23	TJB	NO3NO2_230207A	
Coli-To-t	TOTAL COLIFORM	<1	1		MPN/100mL	1.0	SM9223 B.2.b/Colilert-18	b	2/8/23	RML	QT_230207	
68583-22-2	E. Coli	<1	1		MPN/100mL	1.0	SM9223 B.2.b/Colilert-18	b	2/8/23	RML	QT_230207	

Notes:

ND = Not detected above the listed practical quantitation limit (PQL) or not above the Method Detection Limit (MDL), if requested.  
 PQL = Practical Quantitation Limit is the lowest level that can be achieved within specified limits of precision and accuracy during routine laboratory operating conditions.  
 D.F. - Dilution Factor



## SAMPLE INDEPENDENT QUALITY CONTROL REPORT

Reference Number: **23-03427**

Report Date: 02/10/23

Batch	Analyte	Result	True Value	Units	Method	% Recovery	Limits*	QC Qualifier	QC Type	Comment
<b>Calibration Check</b>										
NO3NO2_230207	0 NITRATE-N	0.51	0.50	mg/L	SM4500-NO3 F	102	90-110		CAL	
	0 NITRITE-N	0.50	0.50	mg/L	SM4500-NO3 F	100	90-110		CAL	
	0 TOTAL NITRATE+NITRITE as N	1.01	1.00	mg/L	SM4500-NO3 F	101	90-110		CAL	
<b>Laboratory Fortified Blank</b>										
NO3NO2_230207	0 NITRATE-N	1.88	2.00	mg/L	SM4500-NO3 F	94	90-110		LFB	
	0 NITRITE-N	2.00	2.00	mg/L	SM4500-NO3 F	100	90-110		LFB	
<b>Laboratory Reagent Blank</b>										
NO3NO2_230207	0 NITRATE-N	ND		mg/L	SM4500-NO3 F		0-0		LRB	
	0 NITRITE-N	ND		mg/L	SM4500-NO3 F		0-0		LRB	
	0 TOTAL NITRATE+NITRITE as N	ND		mg/L	SM4500-NO3 F		0-0		LRB	
<b>Method Blank</b>										
NO3NO2_230207	0 NITRATE-N	ND		mg/L	SM4500-NO3 F		0-0		MB	
	0 NITRITE-N	ND		mg/L	SM4500-NO3 F		0-0		MB	
	0 TOTAL NITRATE+NITRITE as N	ND		mg/L	SM4500-NO3 F		0-0		MB	
<b>Quality Control Sample</b>										
NO3NO2_230207	0 NITRATE-N	1.03	1.00	mg/L	SM4500-NO3 F	103	90-110		QCS	
	0 NITRITE-N	0.96	1.00	mg/L	SM4500-NO3 F	96	90-110		QCS	
	0 TOTAL NITRATE+NITRITE as N	1.99	2.00	mg/L	SM4500-NO3 F	100	90-110		QCS	

\*Notation:

% Recovery = (Result of Analysis)/(True Value) \* 100

NA = Indicates % Recovery could not be calculated.

Limits are intended for water matrices only. These criteria are for guidance only when reported with soils/solids.

FORM: QCIndependent4.rpt



**SAMPLE DEPENDENT  
QUALITY CONTROL REPORT**  
Duplicate, Matrix Spike/Matrix Spike Duplicate and Confirmation Result Report

**Duplicate**

Batch	Sample	Analyte	Result	Duplicate Result	Units	%RPD	Limits	QC Qualifier	Type	Comments
<b>NO3NO2_230207A</b>										
14797-65-0	6731	NITRITE-N	ND	ND	mg/L	<b>NA</b>	0-20	IEV	DUP	
14797-55-8	6731	NITRATE-N	0.49	0.49	mg/L	<b>0.0</b>	0-20		DUP	

**Laboratory Fortified Matrix (MS)**

Batch/CAS	Sample	Analyte	Result	Spike Result	Duplicate Spike Result	Conc	Units	Percent Recovery		Limits*	%RPD	Limits*	QC		Comments
								MS	MSD				Qualifier	Type	
<b>NO3NO2_230207A</b>															
14797-65-0	6731	NITRITE-N	ND	0.49	0.49	0.50	mg/L	<b>98</b>	<b>98</b>	80-120	<b>0.0</b>	0-20		LFM	
14797-55-8	6731	NITRATE-N	0.49	1.00	0.99	0.50	mg/L	<b>102</b>	<b>100</b>	80-120	<b>2.0</b>	0-20		LFM	

%RPD = Relative Percent Difference

NA = Indicates %RPD could not be calculated

Matrix Spike (MS)/Matrix Spike Duplicate (MSD) analyses are used to determine the accuracy (MS) and precision (MSD) of an analytical method in a given sample matrix. Therefore, the usefulness of this report is limited to samples of similar matrices analyzed in the same analytical batch.

Only Duplicate sample with detections are listed in this report

Limits are intended for water matrices only. These criteria are for guidance only when reported with soils/solids.



## Qualifier Definitions

Reference Number: 23-03427

Report Date: 02/10/23

Qualifier	Definition
IEV	Acceptance criteria do not apply to estimated values

Note: Some qualifier definitions found on this page may pertain to results or QC data which are not printed with this report.



# CHAIN OF CUSTODY / ANALYSIS REQUEST (PLEASE READ SECTIONS)

# 23-03427

6752 - 6757



PAGE 1 OF 1

Report To: Whatcom Environmental Services	Billing Email: Same as Client
Address: 228 E Champion St #101	Bill To: Same as Client/Report To
City: Bellingham State: WA Zip: 98225	Address
Attn: Eric Libolt	City: State: Zip:
Phone: 360-752-9571 Fax: 360-752-9573	Phone: P.O.#:
Report Email: elibolt@whatcom-es.com	Card: VISA M/C Expires:
Project Name: 2023 SDF Groundwater Sampling	Card#:

**FOR LAB USE**

REF#

**CHECK REGULATORY PROGRAM**

Safe Drinking Water Act

Clean Water Act

RCRA / CERCLA

Other

**ANALYTICAL**

**Main Lab (800-755-9295)**  
1620 South Walnut St. Burlington, WA 98233

**Microbiology (888-725-1212)**  
805 W. Orchard Dr. Suite 4 Bellingham, WA 98225

**Portland Lab (503-682-7802)**  
9150 SW Pioneer Ct. Suite W Wilsonville, OR 97070

**Corvallis Lab (541-753-4946)**  
540 SW 3<sup>rd</sup> St. Corvallis, OR 97333

**Bend Lab (541-639-8425)**  
20332 Empire Ave. Suite F4 Bend, OR 97703

**INSTRUCTIONS "PLEASE READ"**

1. Use one line per sample location.
2. Be specific in test requests.
3. List each metal individually.
4. Check off analysis to be performed for each sample location.
5. Enter number of containers.

**Turn Around Time Required**

Standard

Half-Time (50% Surcharge)

Quickest (100% Surcharge) Phone Call Req.

Emergency (Phone Call Required)

**Analysis Requested**

Sample ID	Location	Sample Matrix (See Below)	Grab or Composite	Date	Time	Nitrite-N	Nitrate-N	Nitrite+Nitrate-N	Total Coliform M.P.N. - QuantiTray (SM9223)	Number Of Containers	Special Instruction/ Conditions on Receipt	
1	W-47-020623	HF Sinclair PSR	Ground Water G	02/06/2023	14:50	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2	W-112-020623	HF Sinclair PSR	Ground Water G	02/06/2023	11:20	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3	W-113-020623	HF Sinclair PSR	Ground Water G	02/06/2023	11:55	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Please also email results to: agempler@whatcom-es.com
4	W-127-020623	HF Sinclair PSR	Ground Water G	02/06/2023	15:25	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	will require the EIM file
5	SDF-FEB-1-020623	HF Sinclair PSR	Ground Water G	02/06/2023	9:50	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(EDD) in addition to the report.
6	SDF-DUP-1-020623	HF Sinclair PSR	Ground Water G	02/06/2023	9:00	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
8						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
9						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
10						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Sampled By: Ava Gemppler (WES) Phone: 360-752-9571 Fax: Email: agempler@whatcom-es.com

Sample Receipt requested (Must include FAX or Email)  \* Sample Matrix

W - Water SW - Surface Water WW - Wastewater OL - Oil  
 DW - Drinking Water GW - Ground Water S - Soil Other \_\_\_\_\_

Relinquished By	Date	Time	Received By	Date	Time
Ava Gemppler	2/6/23	4:45pm	Kira Wilkey	2-6-23	1:07

	Yes	No	N/A
Custody Seals Intact	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Sample Temp <u>3.3C</u> Satisfactory	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Evidence Of Cooling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Samples Received Intact	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chain Of Custody & Labels Agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

# CHAIN OF CUSTODY / ANALYSIS REQUEST (PLEASE COMPLETE ALL APPLICABLE SHADED SECTIONS)

Report To: Whatcom Environmental Services	Billing Email: Same as Client
Address: 228 E Champion St #101	Bill To: Same as Client/Report To
City: Bellingham State: WA Zip: 98225	Address
Attn: Eric Libolt	City: State: Zip:
Phone: 360-752-9571 Fax: 360-752-9573	Phone: P.O.#:
Report Email: elibolt@whatcom-es.com	Card: VISA M/C Expires:
Project Name: 2023 SDF Groundwater Sampling	Card#:

**FOR LAB USE**

REF# 23-03427

**CHECK REGULATORY PROGRAM**

Safe Drinking Water Act

Clean Water Act

RCRA / CERCLA

Other

**ANALYTICAL**

**Main Lab (800-755-9295)**  
1620 South Walnut St. Burlington, WA 98233

**Microbiology (888-725-1212)**  
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**Portland Lab (503-682-7802)**  
9150 SW Pioneer Ct. Suite W Wilsonville, OR 97070

**Corvallis Lab (541-753-4946)**  
540 SW 3<sup>rd</sup> St. Corvallis, OR 97333

**Bend Lab (541-639-8425)**  
20332 Empire Ave. Suite F4 Bend, OR 97703

**INSTRUCTIONS "PLEASE READ"**

1. Use one line per sample location.
2. Be specific in test requests.
3. List each metal individually.
4. Check off analysis to be performed for each sample location.
5. Enter number of containers.

Sample ID	Location	Sample Matrix (See Below)	Grab or Composite	Date	Time	Analysis Requested				Total Coliform M.P.N. - QuantiTray (SM 9223)	Number Of Containers	Special Instruction/ Conditions on Receipt			
						Nitrite-N	Nitrate-N	Nitrite+Nitrate-N							
1	W-47-020623	HF Sinclair PSR	Ground Water	G	02/06/2023	14:50	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3	
2	W-112-020623	HF Sinclair PSR	Ground Water	G	02/06/2023	11:20	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3	Please also email results to:
3	W-113-020623	HF Sinclair PSR	Ground Water	G	02/06/2023	11:55	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3	agempler@whatcom-es.com
4	W-127-020623	HF Sinclair PSR	Ground Water	G	02/06/2023	15:25	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3	will require
5	SDF-FEB-1-020623	HF Sinclair PSR	Ground Water	G	02/06/2023	9:50	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3	the EIM file
6	SDF-DUP-1-020623	HF Sinclair PSR	Ground Water	G	02/06/2023	9:00	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3	(EDD) in
7							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		addition to
8							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		the report.
9							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
10							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

**Turn Around Time Required**

Standard

Half-Time (50% Surcharge)

Quickest (100% Surcharge) Phone Call Req.

Emergency (Phone Call Required)

Sampled By: Ava Gempler (WES) Phone: 360-752-9571 Fax: Email: agempler@whatcom-es.com Total Containers

Sample Receipt requested (Must include FAX or Email)

\* Sample Matrix

W - Water SW - Surface Water WW - Wastewater OL - Oil

DW - Drinking Water GW - Ground Water S - Soil Other \_\_\_\_\_

Relinquished By	Date	Time	Received By	Date	Time
Ava Gempler	2/6/23	4:45pm	Kira Wilkey	2-6-23	11:47
			me	2/7/23	11:30

	Yes	No	N/A
Custody Seals Intact	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Sample Temp <u>3.3</u> C Satisfactory	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Evidence Of Cooling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Samples Received Intact	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chain Of Custody & Labels Agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



# ANALYTICAL REPORT

## PREPARED FOR

Attn: Eric Libolt  
Whatcom Environmental Services Inc.  
228 East Champion Street #101  
Bellingham, Washington 98225  
Generated 6/14/2023 7:25:04 PM Revision 1

## JOB DESCRIPTION

2023 SDF Sampling

## JOB NUMBER

580-127156-1

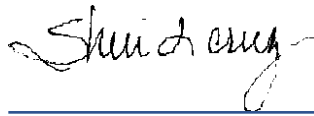
# Eurofins Seattle

## Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Northwest, LLC Project Manager.

## Authorization



Generated  
6/14/2023 7:25:04 PM  
Revision 1

Authorized for release by  
Sheri Cruz, Project Manager I  
[Sheri.Cruz@et.eurofinsus.com](mailto:Sheri.Cruz@et.eurofinsus.com)  
(253)922-2310



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# Case Narrative

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-127156-1

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## Job ID: 580-127156-1

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### Laboratory: Eurofins Seattle

#### Narrative

#### Job Narrative 580-127156-1

Revised report 6/14/23 to check method 300 samples SDF-DUP1-050923 (580-127159-5) and SDF-FEB1-050923 (580-127156-6). These were visually checked and reran to check possibility of the two samples being switched at time of analysis. Reruns have been reported.

#### Receipt

The samples were received on 5/11/2023 9:25 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperatures of the 3 coolers at receipt time were 0.3° C, 2.4° C and 3.5° C.

#### GC/MS VOA

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

#### GC/MS Semi VOA

Method 8270E SIM: The laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) for preparation batch 580-426094 and analytical batch 580-426485 recovered outside control limits for the following analytes: Benzo[a]anthracene, Chrysene, Benzo[a]pyrene, Indeno[1,2,3-cd]pyrene, Dibenz(a,h)anthracene, Benzo[b]fluoranthene and Benzo[k]fluoranthene. These analytes were biased high in the LCS and were not detected in the associated samples; therefore, the data have been reported.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### GC Semi VOA

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

#### Metals

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### General Chemistry

Method SM 5220D: The matrix spike (MS) recovery for preparation batch 580-426585 and analytical batch 580-426596 was outside control limits for one or more analytes. See QC Sample Results for detail. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery is within acceptance limits.

Method 300.0: Samples originally run in AB 425993 with suspected switch of sample 5 and 6. Both samples were rerun alongside original aliquots for confirmation. See raw data for more detail. SDF-DUP-1-050923 (580-127156-5), SDF-FEB-1-050923 (580-127156-6), (580-127156-M-5 MS) and (580-127156-M-5 MSD)

Method 300.0: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for analytical batch 580-428719 were outside control limits for one or more analytes. See QC Sample Results for detail. Sample matrix interference is suspected because the associated laboratory control sample (LCS) recovery is within acceptance limits.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### Organic Prep

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

#### VOA Prep

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

# Definitions/Glossary

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-127156-1

## Qualifiers

### GC/MS Semi VOA

Qualifier	Qualifier Description
*+	LCS and/or LCSD is outside acceptance limits, high biased.

### General Chemistry

Qualifier	Qualifier Description
F1	MS and/or MSD recovery exceeds control limits.
H	Sample was prepped or analyzed beyond the specified holding time. This does not meet regulatory requirements.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
▫	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

# Client Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-127156-1

**Client Sample ID: W-47-050923**

**Lab Sample ID: 580-127156-1**

Date Collected: 05/09/23 15:15

Matrix: Water

Date Received: 05/11/23 09:25

### Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L			05/12/23 17:49	1
Toluene	ND		1.0		ug/L			05/12/23 17:49	1
Ethylbenzene	ND		1.0		ug/L			05/12/23 17:49	1
m-Xylene & p-Xylene	ND		2.0		ug/L			05/12/23 17:49	1
o-Xylene	ND		1.0		ug/L			05/12/23 17:49	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	98		80 - 120		05/12/23 17:49	1
4-Bromofluorobenzene (Surr)	87		80 - 120		05/12/23 17:49	1
Dibromofluoromethane (Surr)	116		80 - 120		05/12/23 17:49	1
1,2-Dichloroethane-d4 (Surr)	116		80 - 120		05/12/23 17:49	1

### Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.050		mg/L			05/12/23 17:49	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	87		77 - 123		05/12/23 17:49	1

### Method: SW846 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND	*+	0.051		ug/L		05/16/23 09:27	05/19/23 12:40	1
Chrysene	ND	*+	0.10		ug/L		05/16/23 09:27	05/19/23 12:40	1
Benzo[a]pyrene	ND	*+	0.10		ug/L		05/16/23 09:27	05/19/23 12:40	1
Indeno[1,2,3-cd]pyrene	ND	*+	0.051		ug/L		05/16/23 09:27	05/19/23 12:40	1
Dibenz(a,h)anthracene	ND	*+	0.10		ug/L		05/16/23 09:27	05/19/23 12:40	1
Benzo[b]fluoranthene	ND	*+	0.10		ug/L		05/16/23 09:27	05/19/23 12:40	1
Benzo[k]fluoranthene	ND	*+	0.051		ug/L		05/16/23 09:27	05/19/23 12:40	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Terphenyl-d14	92		29 - 150	05/16/23 09:27	05/19/23 12:40	1

### Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11		mg/L		05/16/23 09:39	05/16/23 21:03	1
Motor Oil (>C24-C36)	ND		0.36		mg/L		05/16/23 09:39	05/16/23 21:03	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	56		50 - 150	05/16/23 09:39	05/16/23 21:03	1

### Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11		mg/L		05/16/23 09:39	05/16/23 17:33	1
Motor Oil (>C24-C36)	ND		0.36		mg/L		05/16/23 09:39	05/16/23 17:33	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	61		50 - 150	05/16/23 09:39	05/16/23 17:33	1

### Method: EPA 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.50		mg/L		05/17/23 17:03	05/18/23 19:19	1
Magnesium	48		0.50		mg/L		05/17/23 17:03	05/18/23 19:19	1

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# Client Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-127156-1

**Client Sample ID: W-47-050923**

**Lab Sample ID: 580-127156-1**

Date Collected: 05/09/23 15:15

Matrix: Water

Date Received: 05/11/23 09:25

### Method: EPA 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	68		0.50		mg/L		05/18/23 17:04	05/19/23 16:11	1
Iron	ND		0.50		mg/L		05/18/23 17:04	05/19/23 16:11	1
Magnesium	47		0.50		mg/L		05/18/23 17:04	05/19/23 16:11	1
Potassium	6.6		3.3		mg/L		05/18/23 17:04	05/19/23 16:11	1
Sodium	37		0.50		mg/L		05/18/23 17:04	05/19/23 16:11	1

### Method: EPA 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0013		0.0010		mg/L		05/17/23 17:03	05/18/23 15:44	1
Lead	ND		0.00040		mg/L		05/17/23 17:03	05/18/23 15:44	1
Chromium	ND		0.00080		mg/L		05/17/23 17:03	05/18/23 15:44	1
Manganese	0.041		0.0020		mg/L		05/17/23 17:03	05/18/23 15:44	1
Nickel	ND		0.0030		mg/L		05/17/23 17:03	05/18/23 15:44	1
Selenium	ND		0.0080		mg/L		05/17/23 17:03	05/18/23 15:44	1

### Method: EPA 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0013		0.0010		mg/L		05/18/23 17:04	05/19/23 16:23	1
Chromium	ND		0.00080		mg/L		05/18/23 17:04	05/19/23 16:23	1
Lead	ND		0.00040		mg/L		05/18/23 17:04	05/19/23 16:23	1
Manganese	0.020		0.0020		mg/L		05/18/23 17:04	05/19/23 16:23	1
Nickel	ND		0.0030		mg/L		05/18/23 17:04	05/19/23 16:23	1
Selenium	ND		0.0080		mg/L		05/18/23 17:04	05/19/23 16:23	1

### Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		05/18/23 10:03	05/18/23 16:10	1

### Method: SW846 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		05/16/23 11:16	05/16/23 17:47	1

### General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	15		1.5		mg/L			05/12/23 20:31	1
Sulfate (EPA 300.0)	51		1.5		mg/L			05/12/23 20:31	1
Ammonia as N (SM 4500 NH3 G)	ND		0.50		mg/L			05/18/23 22:09	1
Total Organic Carbon (SM 5310C)	4.9		1.5		mg/L			05/17/23 00:11	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity (SM 2320B)	350		7.0		mg/L			05/12/23 20:59	1
Bicarbonate Alkalinity as CaCO3 (SM 2320B)	350		7.0		mg/L			05/12/23 20:59	1
Chemical Oxygen Demand (SM 5220D)	ND	F1	10		mg/L		05/20/23 17:19	05/20/23 23:39	1

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# Client Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-127156-1

**Client Sample ID: W-112-050923**

**Lab Sample ID: 580-127156-2**

**Date Collected: 05/09/23 15:10**

**Matrix: Water**

**Date Received: 05/11/23 09:25**

## Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L			05/12/23 18:14	1
Toluene	ND		1.0		ug/L			05/12/23 18:14	1
Ethylbenzene	ND		1.0		ug/L			05/12/23 18:14	1
m-Xylene & p-Xylene	ND		2.0		ug/L			05/12/23 18:14	1
o-Xylene	ND		1.0		ug/L			05/12/23 18:14	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	98		80 - 120		05/12/23 18:14	1
4-Bromofluorobenzene (Surr)	83		80 - 120		05/12/23 18:14	1
Dibromofluoromethane (Surr)	111		80 - 120		05/12/23 18:14	1
1,2-Dichloroethane-d4 (Surr)	115		80 - 120		05/12/23 18:14	1

## Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.050		mg/L			05/12/23 18:14	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	83		77 - 123		05/12/23 18:14	1

## Method: SW846 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND	*+	0.051		ug/L		05/16/23 09:27	05/19/23 13:00	1
Chrysene	ND	*+	0.10		ug/L		05/16/23 09:27	05/19/23 13:00	1
Benzo[a]pyrene	ND	*+	0.10		ug/L		05/16/23 09:27	05/19/23 13:00	1
Indeno[1,2,3-cd]pyrene	ND	*+	0.051		ug/L		05/16/23 09:27	05/19/23 13:00	1
Dibenz(a,h)anthracene	ND	*+	0.10		ug/L		05/16/23 09:27	05/19/23 13:00	1
Benzo[b]fluoranthene	ND	*+	0.10		ug/L		05/16/23 09:27	05/19/23 13:00	1
Benzo[k]fluoranthene	ND	*+	0.051		ug/L		05/16/23 09:27	05/19/23 13:00	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Terphenyl-d14	90		29 - 150	05/16/23 09:27	05/19/23 13:00	1

## Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11		mg/L		05/16/23 09:39	05/16/23 21:22	1
Motor Oil (>C24-C36)	ND		0.36		mg/L		05/16/23 09:39	05/16/23 21:22	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	54		50 - 150	05/16/23 09:39	05/16/23 21:22	1

## Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11		mg/L		05/16/23 09:39	05/16/23 17:52	1
Motor Oil (>C24-C36)	ND		0.36		mg/L		05/16/23 09:39	05/16/23 17:52	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	57		50 - 150	05/16/23 09:39	05/16/23 17:52	1

## Method: EPA 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.50		mg/L		05/17/23 17:03	05/18/23 19:22	1
Magnesium	69		0.50		mg/L		05/17/23 17:03	05/18/23 19:22	1

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# Client Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-127156-1

**Client Sample ID: W-112-050923**

**Lab Sample ID: 580-127156-2**

Date Collected: 05/09/23 15:10

Matrix: Water

Date Received: 05/11/23 09:25

**Method: EPA 200.7 Rev 4.4 - Metals (ICP) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	99		0.50		mg/L		05/18/23 17:04	05/19/23 16:15	1
Iron	ND		0.50		mg/L		05/18/23 17:04	05/19/23 16:15	1
Magnesium	70		0.50		mg/L		05/18/23 17:04	05/19/23 16:15	1
Potassium	8.1		3.3		mg/L		05/18/23 17:04	05/19/23 16:15	1
Sodium	56		0.50		mg/L		05/18/23 17:04	05/19/23 16:15	1

**Method: EPA 200.8 - Metals (ICP/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0013		0.0010		mg/L		05/17/23 17:03	05/18/23 15:47	1
Lead	ND		0.00040		mg/L		05/17/23 17:03	05/18/23 15:47	1
Chromium	ND		0.00080		mg/L		05/17/23 17:03	05/18/23 15:47	1
Manganese	0.027		0.0020		mg/L		05/17/23 17:03	05/18/23 15:47	1
Nickel	ND		0.0030		mg/L		05/17/23 17:03	05/18/23 15:47	1
Selenium	ND		0.0080		mg/L		05/17/23 17:03	05/18/23 15:47	1

**Method: EPA 200.8 - Metals (ICP/MS) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0015		0.0010		mg/L		05/18/23 17:04	05/19/23 16:26	1
Chromium	ND		0.00080		mg/L		05/18/23 17:04	05/19/23 16:26	1
Lead	ND		0.00040		mg/L		05/18/23 17:04	05/19/23 16:26	1
Manganese	0.0044		0.0020		mg/L		05/18/23 17:04	05/19/23 16:26	1
Nickel	ND		0.0030		mg/L		05/18/23 17:04	05/19/23 16:26	1
Selenium	ND		0.0080		mg/L		05/18/23 17:04	05/19/23 16:26	1

**Method: SW846 7470A - Mercury (CVAA)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		05/18/23 10:03	05/18/23 16:12	1

**Method: SW846 7470A - Mercury (CVAA) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		05/16/23 11:16	05/16/23 17:56	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	39		1.5		mg/L			05/12/23 20:43	1
Sulfate (EPA 300.0)	4.1		1.5		mg/L			05/12/23 20:43	1
Ammonia as N (SM 4500 NH3 G)	ND		0.50		mg/L			05/18/23 22:09	1
Total Organic Carbon (SM 5310C)	6.9		1.5		mg/L			05/17/23 00:29	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity (SM 2320B)	540		7.0		mg/L			05/12/23 20:59	1
Bicarbonate Alkalinity as CaCO3 (SM 2320B)	540		7.0		mg/L			05/12/23 20:59	1
Chemical Oxygen Demand (SM 5220D)	11		10		mg/L		05/20/23 17:19	05/20/23 23:39	1

# Client Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-127156-1

**Client Sample ID: W-113-050923**

**Lab Sample ID: 580-127156-3**

Date Collected: 05/09/23 12:15

Matrix: Water

Date Received: 05/11/23 09:25

## Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L			05/12/23 19:02	1
Toluene	ND		1.0		ug/L			05/12/23 19:02	1
Ethylbenzene	ND		1.0		ug/L			05/12/23 19:02	1
m-Xylene & p-Xylene	ND		2.0		ug/L			05/12/23 19:02	1
o-Xylene	ND		1.0		ug/L			05/12/23 19:02	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	98		80 - 120		05/12/23 19:02	1
4-Bromofluorobenzene (Surr)	86		80 - 120		05/12/23 19:02	1
Dibromofluoromethane (Surr)	103		80 - 120		05/12/23 19:02	1
1,2-Dichloroethane-d4 (Surr)	115		80 - 120		05/12/23 19:02	1

## Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.050		mg/L			05/12/23 19:02	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	86		77 - 123		05/12/23 19:02	1

## Method: SW846 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND	*+	0.052		ug/L		05/16/23 09:27	05/19/23 13:19	1
Chrysene	ND	*+	0.10		ug/L		05/16/23 09:27	05/19/23 13:19	1
Benzo[a]pyrene	ND	*+	0.10		ug/L		05/16/23 09:27	05/19/23 13:19	1
Indeno[1,2,3-cd]pyrene	ND	*+	0.052		ug/L		05/16/23 09:27	05/19/23 13:19	1
Dibenz(a,h)anthracene	ND	*+	0.10		ug/L		05/16/23 09:27	05/19/23 13:19	1
Benzo[b]fluoranthene	ND	*+	0.10		ug/L		05/16/23 09:27	05/19/23 13:19	1
Benzo[k]fluoranthene	ND	*+	0.052		ug/L		05/16/23 09:27	05/19/23 13:19	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Terphenyl-d14	90		29 - 150	05/16/23 09:27	05/19/23 13:19	1

## Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11		mg/L		05/16/23 09:39	05/16/23 21:41	1
Motor Oil (>C24-C36)	ND		0.36		mg/L		05/16/23 09:39	05/16/23 21:41	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	52		50 - 150	05/16/23 09:39	05/16/23 21:41	1

## Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11		mg/L		05/16/23 09:39	05/16/23 18:11	1
Motor Oil (>C24-C36)	ND		0.36		mg/L		05/16/23 09:39	05/16/23 18:11	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	59		50 - 150	05/16/23 09:39	05/16/23 18:11	1

## Method: EPA 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.50		mg/L		05/17/23 17:03	05/18/23 19:25	1
Magnesium	63		0.50		mg/L		05/17/23 17:03	05/18/23 19:25	1

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# Client Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-127156-1

**Client Sample ID: W-113-050923**

**Lab Sample ID: 580-127156-3**

Date Collected: 05/09/23 12:15

Matrix: Water

Date Received: 05/11/23 09:25

**Method: EPA 200.7 Rev 4.4 - Metals (ICP) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	78		0.50		mg/L		05/18/23 17:04	05/19/23 16:18	1
Iron	ND		0.50		mg/L		05/18/23 17:04	05/19/23 16:18	1
Magnesium	63		0.50		mg/L		05/18/23 17:04	05/19/23 16:18	1
Potassium	8.2		3.3		mg/L		05/18/23 17:04	05/19/23 16:18	1
Sodium	52		0.50		mg/L		05/18/23 17:04	05/19/23 16:18	1

**Method: EPA 200.8 - Metals (ICP/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0018		0.0010		mg/L		05/17/23 17:03	05/18/23 15:50	1
Lead	ND		0.00040		mg/L		05/17/23 17:03	05/18/23 15:50	1
Chromium	ND		0.00080		mg/L		05/17/23 17:03	05/18/23 15:50	1
Manganese	0.0043		0.0020		mg/L		05/17/23 17:03	05/18/23 15:50	1
Nickel	ND		0.0030		mg/L		05/17/23 17:03	05/18/23 15:50	1
Selenium	ND		0.0080		mg/L		05/17/23 17:03	05/18/23 15:50	1

**Method: EPA 200.8 - Metals (ICP/MS) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0019		0.0010		mg/L		05/18/23 17:04	05/19/23 16:29	1
Chromium	ND		0.00080		mg/L		05/18/23 17:04	05/19/23 16:29	1
Lead	ND		0.00040		mg/L		05/18/23 17:04	05/19/23 16:29	1
Manganese	ND		0.0020		mg/L		05/18/23 17:04	05/19/23 16:29	1
Nickel	ND		0.0030		mg/L		05/18/23 17:04	05/19/23 16:29	1
Selenium	ND		0.0080		mg/L		05/18/23 17:04	05/19/23 16:29	1

**Method: SW846 7470A - Mercury (CVAA)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		05/18/23 10:03	05/18/23 16:14	1

**Method: SW846 7470A - Mercury (CVAA) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		05/16/23 11:16	05/16/23 17:58	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	31		1.5		mg/L			05/12/23 20:54	1
Sulfate (EPA 300.0)	44		1.5		mg/L			05/12/23 20:54	1
Ammonia as N (SM 4500 NH3 G)	ND		0.50		mg/L			05/18/23 22:09	1
Total Organic Carbon (SM 5310C)	5.9		1.5		mg/L			05/17/23 00:46	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity (SM 2320B)	430		7.0		mg/L			05/12/23 20:59	1
Bicarbonate Alkalinity as CaCO3 (SM 2320B)	430		7.0		mg/L			05/12/23 20:59	1
Chemical Oxygen Demand (SM 5220D)	ND		10		mg/L		05/20/23 17:19	05/20/23 23:39	1

# Client Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-127156-1

**Client Sample ID: W-127-050923**

**Lab Sample ID: 580-127156-4**

Date Collected: 05/09/23 12:00

Matrix: Water

Date Received: 05/11/23 09:25

## Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L			05/12/23 19:26	1
Toluene	ND		1.0		ug/L			05/12/23 19:26	1
Ethylbenzene	ND		1.0		ug/L			05/12/23 19:26	1
m-Xylene & p-Xylene	ND		2.0		ug/L			05/12/23 19:26	1
o-Xylene	ND		1.0		ug/L			05/12/23 19:26	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	99		80 - 120		05/12/23 19:26	1
4-Bromofluorobenzene (Surr)	85		80 - 120		05/12/23 19:26	1
Dibromofluoromethane (Surr)	108		80 - 120		05/12/23 19:26	1
1,2-Dichloroethane-d4 (Surr)	114		80 - 120		05/12/23 19:26	1

## Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.050		mg/L			05/12/23 19:26	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	85		77 - 123		05/12/23 19:26	1

## Method: SW846 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND	*+	0.053		ug/L		05/16/23 09:27	05/19/23 13:39	1
Chrysene	ND	*+	0.11		ug/L		05/16/23 09:27	05/19/23 13:39	1
Benzo[a]pyrene	ND	*+	0.11		ug/L		05/16/23 09:27	05/19/23 13:39	1
Indeno[1,2,3-cd]pyrene	ND	*+	0.053		ug/L		05/16/23 09:27	05/19/23 13:39	1
Dibenz(a,h)anthracene	ND	*+	0.11		ug/L		05/16/23 09:27	05/19/23 13:39	1
Benzo[b]fluoranthene	ND	*+	0.11		ug/L		05/16/23 09:27	05/19/23 13:39	1
Benzo[k]fluoranthene	ND	*+	0.053		ug/L		05/16/23 09:27	05/19/23 13:39	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Terphenyl-d14	91		29 - 150	05/16/23 09:27	05/19/23 13:39	1

## Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	0.20		0.11		mg/L		05/16/23 09:39	05/16/23 22:00	1
Motor Oil (>C24-C36)	ND		0.36		mg/L		05/16/23 09:39	05/16/23 22:00	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	57		50 - 150	05/16/23 09:39	05/16/23 22:00	1

## Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11		mg/L		05/16/23 09:39	05/16/23 18:30	1
Motor Oil (>C24-C36)	ND		0.36		mg/L		05/16/23 09:39	05/16/23 18:30	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	64		50 - 150	05/16/23 09:39	05/16/23 18:30	1

## Method: EPA 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.50		mg/L		05/17/23 17:03	05/18/23 19:29	1
Magnesium	71		0.50		mg/L		05/17/23 17:03	05/18/23 19:29	1

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# Client Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-127156-1

**Client Sample ID: W-127-050923**

**Lab Sample ID: 580-127156-4**

Date Collected: 05/09/23 12:00

Matrix: Water

Date Received: 05/11/23 09:25

**Method: EPA 200.7 Rev 4.4 - Metals (ICP) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	120		0.50		mg/L		05/18/23 17:04	05/19/23 16:21	1
Iron	ND		0.50		mg/L		05/18/23 17:04	05/19/23 16:21	1
Magnesium	72		0.50		mg/L		05/18/23 17:04	05/19/23 16:21	1
Potassium	3.8		3.3		mg/L		05/18/23 17:04	05/19/23 16:21	1
Sodium	43		0.50		mg/L		05/18/23 17:04	05/19/23 16:21	1

**Method: EPA 200.8 - Metals (ICP/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0010		mg/L		05/17/23 17:03	05/18/23 15:52	1
Lead	ND		0.00040		mg/L		05/17/23 17:03	05/18/23 15:52	1
Chromium	ND		0.00080		mg/L		05/17/23 17:03	05/18/23 15:52	1
Manganese	0.022		0.0020		mg/L		05/17/23 17:03	05/18/23 15:52	1
Nickel	ND		0.0030		mg/L		05/17/23 17:03	05/18/23 15:52	1
Selenium	ND		0.0080		mg/L		05/17/23 17:03	05/18/23 15:52	1

**Method: EPA 200.8 - Metals (ICP/MS) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0010		mg/L		05/18/23 17:04	05/19/23 16:31	1
Chromium	ND		0.00080		mg/L		05/18/23 17:04	05/19/23 16:31	1
Lead	ND		0.00040		mg/L		05/18/23 17:04	05/19/23 16:31	1
Manganese	0.020		0.0020		mg/L		05/18/23 17:04	05/19/23 16:31	1
Nickel	ND		0.0030		mg/L		05/18/23 17:04	05/19/23 16:31	1
Selenium	ND		0.0080		mg/L		05/18/23 17:04	05/19/23 16:31	1

**Method: SW846 7470A - Mercury (CVAA)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		05/18/23 10:03	05/18/23 16:16	1

**Method: SW846 7470A - Mercury (CVAA) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		05/16/23 11:16	05/16/23 18:00	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	38		1.5		mg/L			05/12/23 21:06	1
Sulfate (EPA 300.0)	48		1.5		mg/L			05/12/23 21:06	1
Ammonia as N (SM 4500 NH3 G)	ND		0.50		mg/L			05/18/23 22:09	1
Total Organic Carbon (SM 5310C)	12		1.5		mg/L			05/17/23 01:04	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity (SM 2320B)	500		7.0		mg/L			05/12/23 21:00	1
Bicarbonate Alkalinity as CaCO3 (SM 2320B)	500		7.0		mg/L			05/12/23 21:00	1
Chemical Oxygen Demand (SM 5220D)	18		10		mg/L		05/20/23 17:19	05/20/23 23:39	1

# Client Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-127156-1

**Client Sample ID: SDF-DUP-1-050923**

**Lab Sample ID: 580-127156-5**

Date Collected: 05/09/23 09:30

Matrix: Water

Date Received: 05/11/23 09:25

## Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L			05/12/23 19:51	1
Toluene	ND		1.0		ug/L			05/12/23 19:51	1
Ethylbenzene	ND		1.0		ug/L			05/12/23 19:51	1
m-Xylene & p-Xylene	ND		2.0		ug/L			05/12/23 19:51	1
o-Xylene	ND		1.0		ug/L			05/12/23 19:51	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	98		80 - 120		05/12/23 19:51	1
4-Bromofluorobenzene (Surr)	83		80 - 120		05/12/23 19:51	1
Dibromofluoromethane (Surr)	110		80 - 120		05/12/23 19:51	1
1,2-Dichloroethane-d4 (Surr)	108		80 - 120		05/12/23 19:51	1

## Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.050		mg/L			05/12/23 19:51	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	83		77 - 123		05/12/23 19:51	1

## Method: SW846 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND	*+	0.053		ug/L		05/16/23 09:27	05/19/23 13:58	1
Chrysene	ND	*+	0.11		ug/L		05/16/23 09:27	05/19/23 13:58	1
Benzo[a]pyrene	ND	*+	0.11		ug/L		05/16/23 09:27	05/19/23 13:58	1
Indeno[1,2,3-cd]pyrene	ND	*+	0.053		ug/L		05/16/23 09:27	05/19/23 13:58	1
Dibenz(a,h)anthracene	ND	*+	0.11		ug/L		05/16/23 09:27	05/19/23 13:58	1
Benzo[b]fluoranthene	ND	*+	0.11		ug/L		05/16/23 09:27	05/19/23 13:58	1
Benzo[k]fluoranthene	ND	*+	0.053		ug/L		05/16/23 09:27	05/19/23 13:58	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Terphenyl-d14	85		29 - 150	05/16/23 09:27	05/19/23 13:58	1

## Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	0.26		0.12		mg/L		05/16/23 09:39	05/16/23 22:20	1
Motor Oil (>C24-C36)	ND		0.37		mg/L		05/16/23 09:39	05/16/23 22:20	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	59		50 - 150	05/16/23 09:39	05/16/23 22:20	1

## Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.12		mg/L		05/16/23 09:39	05/16/23 18:49	1
Motor Oil (>C24-C36)	ND		0.37		mg/L		05/16/23 09:39	05/16/23 18:49	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	65		50 - 150	05/16/23 09:39	05/16/23 18:49	1

## Method: EPA 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.50		mg/L		05/17/23 17:03	05/18/23 19:12	1
Magnesium	72		0.50		mg/L		05/17/23 17:03	05/18/23 19:12	1

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# Client Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-127156-1

**Client Sample ID: SDF-DUP-1-050923**

**Lab Sample ID: 580-127156-5**

Date Collected: 05/09/23 09:30

Matrix: Water

Date Received: 05/11/23 09:25

**Method: EPA 200.7 Rev 4.4 - Metals (ICP) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	110		0.50		mg/L		05/18/23 17:04	05/19/23 16:31	1
Iron	ND		0.50		mg/L		05/18/23 17:04	05/19/23 16:31	1
Magnesium	68		0.50		mg/L		05/18/23 17:04	05/19/23 16:31	1
Potassium	ND		3.3		mg/L		05/18/23 17:04	05/19/23 16:31	1
Sodium	42		0.50		mg/L		05/18/23 17:04	05/19/23 16:31	1

**Method: EPA 200.8 - Metals (ICP/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0010		mg/L		05/17/23 17:03	05/18/23 15:39	1
Lead	ND		0.00040		mg/L		05/17/23 17:03	05/18/23 15:39	1
Chromium	ND		0.00080		mg/L		05/17/23 17:03	05/18/23 15:39	1
Manganese	0.022		0.0020		mg/L		05/17/23 17:03	05/18/23 15:39	1
Nickel	ND		0.0030		mg/L		05/17/23 17:03	05/18/23 15:39	1
Selenium	ND		0.0080		mg/L		05/17/23 17:03	05/18/23 15:39	1

**Method: EPA 200.8 - Metals (ICP/MS) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0010		mg/L		05/18/23 17:04	05/19/23 16:34	1
Chromium	ND		0.00080		mg/L		05/18/23 17:04	05/19/23 16:34	1
Lead	ND		0.00040		mg/L		05/18/23 17:04	05/19/23 16:34	1
Manganese	0.045		0.0020		mg/L		05/18/23 17:04	05/19/23 16:34	1
Nickel	ND		0.0030		mg/L		05/18/23 17:04	05/19/23 16:34	1
Selenium	ND		0.0080		mg/L		05/18/23 17:04	05/19/23 16:34	1

**Method: SW846 7470A - Mercury (CVAA)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		05/16/23 11:16	05/16/23 18:07	1

**Method: SW846 7470A - Mercury (CVAA) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		05/16/23 11:16	05/16/23 18:02	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	13	H F1	1.5		mg/L			06/12/23 14:21	1
Sulfate (EPA 300.0)	49	H	1.5		mg/L			06/12/23 14:21	1
Ammonia as N (SM 4500 NH3 G)	ND		0.50		mg/L			05/18/23 22:09	1
Total Organic Carbon (SM 5310C)	12		1.5		mg/L			05/17/23 01:21	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity (SM 2320B)	500		7.0		mg/L			05/12/23 21:00	1
Bicarbonate Alkalinity as CaCO3 (SM 2320B)	500		7.0		mg/L			05/12/23 21:00	1
Chemical Oxygen Demand (SM 5220D)	23		10		mg/L		05/20/23 17:19	05/20/23 23:39	1

# Client Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-127156-1

**Client Sample ID: SDF-FEB-1-050923**

**Lab Sample ID: 580-127156-6**

Date Collected: 05/09/23 10:30

Matrix: Water

Date Received: 05/11/23 09:25

## Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L			05/12/23 20:14	1
Toluene	ND		1.0		ug/L			05/12/23 20:14	1
Ethylbenzene	ND		1.0		ug/L			05/12/23 20:14	1
m-Xylene & p-Xylene	ND		2.0		ug/L			05/12/23 20:14	1
o-Xylene	ND		1.0		ug/L			05/12/23 20:14	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	99		80 - 120		05/12/23 20:14	1
4-Bromofluorobenzene (Surr)	88		80 - 120		05/12/23 20:14	1
Dibromofluoromethane (Surr)	110		80 - 120		05/12/23 20:14	1
1,2-Dichloroethane-d4 (Surr)	108		80 - 120		05/12/23 20:14	1

## Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.050		mg/L			05/12/23 20:14	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	88		77 - 123		05/12/23 20:14	1

## Method: SW846 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND	*+	0.052		ug/L		05/16/23 09:27	05/19/23 14:18	1
Chrysene	ND	*+	0.10		ug/L		05/16/23 09:27	05/19/23 14:18	1
Benzo[a]pyrene	ND	*+	0.10		ug/L		05/16/23 09:27	05/19/23 14:18	1
Indeno[1,2,3-cd]pyrene	ND	*+	0.052		ug/L		05/16/23 09:27	05/19/23 14:18	1
Dibenz(a,h)anthracene	ND	*+	0.10		ug/L		05/16/23 09:27	05/19/23 14:18	1
Benzo[b]fluoranthene	ND	*+	0.10		ug/L		05/16/23 09:27	05/19/23 14:18	1
Benzo[k]fluoranthene	ND	*+	0.052		ug/L		05/16/23 09:27	05/19/23 14:18	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Terphenyl-d14	91		29 - 150	05/16/23 09:27	05/19/23 14:18	1

## Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11		mg/L		05/16/23 09:39	05/16/23 22:39	1
Motor Oil (>C24-C36)	ND		0.36		mg/L		05/16/23 09:39	05/16/23 22:39	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	57		50 - 150	05/16/23 09:39	05/16/23 22:39	1

## Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11		mg/L		05/16/23 09:39	05/16/23 19:08	1
Motor Oil (>C24-C36)	ND		0.36		mg/L		05/16/23 09:39	05/16/23 19:08	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	64		50 - 150	05/16/23 09:39	05/16/23 19:08	1

## Method: EPA 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.50		mg/L		05/18/23 17:10	05/19/23 17:22	1
Magnesium	ND		0.50		mg/L		05/18/23 17:10	05/19/23 17:22	1

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# Client Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-127156-1

**Client Sample ID: SDF-FEB-1-050923**

**Lab Sample ID: 580-127156-6**

Date Collected: 05/09/23 10:30

Matrix: Water

Date Received: 05/11/23 09:25

**Method: EPA 200.7 Rev 4.4 - Metals (ICP) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	ND		0.50		mg/L		05/18/23 17:04	05/19/23 16:35	1
Iron	ND		0.50		mg/L		05/18/23 17:04	05/19/23 16:35	1
Magnesium	ND		0.50		mg/L		05/18/23 17:04	05/19/23 16:35	1
Potassium	ND		3.3		mg/L		05/18/23 17:04	05/19/23 16:35	1
Sodium	ND		0.50		mg/L		05/18/23 17:04	05/19/23 16:35	1

**Method: EPA 200.8 - Metals (ICP/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0010		mg/L		05/18/23 17:10	05/19/23 13:53	1
Lead	ND		0.00040		mg/L		05/18/23 17:10	05/19/23 13:53	1
Chromium	ND		0.00080		mg/L		05/18/23 17:10	05/19/23 13:53	1
Manganese	ND		0.0020		mg/L		05/18/23 17:10	05/19/23 13:53	1
Nickel	ND		0.0030		mg/L		05/18/23 17:10	05/19/23 13:53	1
Selenium	ND		0.0080		mg/L		05/18/23 17:10	05/19/23 13:53	1

**Method: EPA 200.8 - Metals (ICP/MS) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0010		mg/L		05/18/23 17:04	05/19/23 16:37	1
Chromium	ND		0.00080		mg/L		05/18/23 17:04	05/19/23 16:37	1
Lead	ND		0.00040		mg/L		05/18/23 17:04	05/19/23 16:37	1
Manganese	ND		0.0020		mg/L		05/18/23 17:04	05/19/23 16:37	1
Nickel	ND		0.0030		mg/L		05/18/23 17:04	05/19/23 16:37	1
Selenium	ND		0.0080		mg/L		05/18/23 17:04	05/19/23 16:37	1

**Method: SW846 7470A - Mercury (CVAA)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		05/16/23 11:16	05/16/23 18:13	1

**Method: SW846 7470A - Mercury (CVAA) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		05/16/23 11:16	05/16/23 18:04	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	ND	H	1.5		mg/L			06/12/23 14:56	1
Sulfate (EPA 300.0)	ND	H	1.5		mg/L			06/12/23 14:56	1
Ammonia as N (SM 4500 NH3 G)	ND		0.50		mg/L			05/18/23 22:09	1
Total Organic Carbon (SM 5310C)	ND		1.5		mg/L			05/17/23 01:39	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Alkalinity (SM 2320B)</b>	<b>8.9</b>		7.0		mg/L			05/12/23 21:00	1
<b>Bicarbonate Alkalinity as CaCO3 (SM 2320B)</b>	<b>8.9</b>		7.0		mg/L			05/12/23 21:00	1
Chemical Oxygen Demand (SM 5220D)	ND		10		mg/L		05/20/23 17:19	05/20/23 23:39	1

# Client Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-127156-1

**Client Sample ID: Trip Blanks**

**Lab Sample ID: 580-127156-7**

Date Collected: 05/09/23 00:01

Matrix: Water

Date Received: 05/11/23 09:25

## Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L			05/12/23 17:01	1
Toluene	ND		1.0		ug/L			05/12/23 17:01	1
Ethylbenzene	ND		1.0		ug/L			05/12/23 17:01	1
m-Xylene & p-Xylene	ND		2.0		ug/L			05/12/23 17:01	1
o-Xylene	ND		1.0		ug/L			05/12/23 17:01	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	93		80 - 120		05/12/23 17:01	1
4-Bromofluorobenzene (Surr)	85		80 - 120		05/12/23 17:01	1
Dibromofluoromethane (Surr)	110		80 - 120		05/12/23 17:01	1
1,2-Dichloroethane-d4 (Surr)	111		80 - 120		05/12/23 17:01	1

## Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.050		mg/L			05/12/23 17:01	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	85		77 - 123		05/12/23 17:01	1

# QC Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-127156-1

## Method: 8260D - Volatile Organic Compounds by GC/MS

**Lab Sample ID: MB 580-425812/6**  
**Matrix: Water**  
**Analysis Batch: 425812**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L			05/12/23 14:36	1
Toluene	ND		1.0		ug/L			05/12/23 14:36	1
Ethylbenzene	ND		1.0		ug/L			05/12/23 14:36	1
m-Xylene & p-Xylene	ND		2.0		ug/L			05/12/23 14:36	1
o-Xylene	ND		1.0		ug/L			05/12/23 14:36	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	104		80 - 120		05/12/23 14:36	1
4-Bromofluorobenzene (Surr)	88		80 - 120		05/12/23 14:36	1
Dibromofluoromethane (Surr)	112		80 - 120		05/12/23 14:36	1
1,2-Dichloroethane-d4 (Surr)	110		80 - 120		05/12/23 14:36	1

**Lab Sample ID: LCS 580-425812/7**  
**Matrix: Water**  
**Analysis Batch: 425812**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Benzene	10.0	10.2		ug/L		102	80 - 122
Toluene	10.0	9.12		ug/L		91	80 - 120
Ethylbenzene	10.0	9.37		ug/L		94	80 - 120
m-Xylene & p-Xylene	10.0	9.22		ug/L		92	80 - 120
o-Xylene	10.0	9.29		ug/L		93	80 - 120

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Toluene-d8 (Surr)	95		80 - 120
4-Bromofluorobenzene (Surr)	91		80 - 120
Dibromofluoromethane (Surr)	99		80 - 120
1,2-Dichloroethane-d4 (Surr)	103		80 - 120

**Lab Sample ID: LCSD 580-425812/8**  
**Matrix: Water**  
**Analysis Batch: 425812**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Benzene	10.0	9.17		ug/L		92	80 - 122	10	14
Toluene	10.0	9.80		ug/L		98	80 - 120	7	13
Ethylbenzene	10.0	9.56		ug/L		96	80 - 120	2	14
m-Xylene & p-Xylene	10.0	9.08		ug/L		91	80 - 120	2	14
o-Xylene	10.0	8.73		ug/L		87	80 - 120	6	16

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
Toluene-d8 (Surr)	101		80 - 120
4-Bromofluorobenzene (Surr)	88		80 - 120
Dibromofluoromethane (Surr)	98		80 - 120
1,2-Dichloroethane-d4 (Surr)	92		80 - 120

# QC Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-127156-1

## Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

**Lab Sample ID: MB 580-425808/6**  
**Matrix: Water**  
**Analysis Batch: 425808**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.050		mg/L			05/12/23 14:36	1
Surrogate	MB %Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	88		77 - 123					05/12/23 14:36	1

**Lab Sample ID: LCS 580-425808/9**  
**Matrix: Water**  
**Analysis Batch: 425808**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Gasoline	1.00	1.02		mg/L		102	55 - 148
Surrogate	LCS %Recovery	LCS Qualifier	Limits				
4-Bromofluorobenzene (Surr)	100		77 - 123				

**Lab Sample ID: LCSD 580-425808/10**  
**Matrix: Water**  
**Analysis Batch: 425808**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Gasoline	1.00	1.02		mg/L		102	55 - 148	0	10
Surrogate	LCSD %Recovery	LCSD Qualifier	Limits						
4-Bromofluorobenzene (Surr)	103		77 - 123						

## Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

**Lab Sample ID: MB 580-426094/1-A**  
**Matrix: Water**  
**Analysis Batch: 426485**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 426094**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.050		ug/L		05/16/23 09:27	05/19/23 10:43	1
Chrysene	ND		0.10		ug/L		05/16/23 09:27	05/19/23 10:43	1
Benzo[a]pyrene	ND		0.10		ug/L		05/16/23 09:27	05/19/23 10:43	1
Indeno[1,2,3-cd]pyrene	ND		0.050		ug/L		05/16/23 09:27	05/19/23 10:43	1
Dibenz(a,h)anthracene	ND		0.10		ug/L		05/16/23 09:27	05/19/23 10:43	1
Benzo[b]fluoranthene	ND		0.10		ug/L		05/16/23 09:27	05/19/23 10:43	1
Benzo[k]fluoranthene	ND		0.050		ug/L		05/16/23 09:27	05/19/23 10:43	1
Surrogate	MB %Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	83		29 - 150				05/16/23 09:27	05/19/23 10:43	1

# QC Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-127156-1

## Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM) (Continued)

**Lab Sample ID: LCS 580-426094/2-A**  
**Matrix: Water**  
**Analysis Batch: 426485**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 426094**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits	
Benzo[a]anthracene	8.00	10.4	*+	ug/L		131	55 - 123	
Chrysene	8.00	11.1	*+	ug/L		138	47 - 120	
Benzo[a]pyrene	8.00	11.3	*+	ug/L		141	51 - 120	
Indeno[1,2,3-cd]pyrene	8.00	11.8	*+	ug/L		148	45 - 123	
Dibenz(a,h)anthracene	8.00	12.8	*+	ug/L		160	54 - 123	
Benzo[b]fluoranthene	8.00	10.9	*+	ug/L		136	43 - 120	
Benzo[k]fluoranthene	8.00	11.6	*+	ug/L		145	41 - 121	
<b>LCS LCS</b>								
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>					
Terphenyl-d14	58		29 - 150					

**Lab Sample ID: LCSD 580-426094/3-A**  
**Matrix: Water**  
**Analysis Batch: 426485**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 426094**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits		RPD Limit	
									RPD	Limit
Benzo[a]anthracene	8.00	11.8	*+	ug/L		147	55 - 123	12	31	
Chrysene	8.00	12.4	*+	ug/L		155	47 - 120	11	30	
Benzo[a]pyrene	8.00	12.7	*+	ug/L		159	51 - 120	12	31	
Indeno[1,2,3-cd]pyrene	8.00	13.7	*+	ug/L		171	45 - 123	14	35	
Dibenz(a,h)anthracene	8.00	14.1	*+	ug/L		177	54 - 123	10	35	
Benzo[b]fluoranthene	8.00	12.1	*+	ug/L		151	43 - 120	10	35	
Benzo[k]fluoranthene	8.00	13.0	*+	ug/L		163	41 - 121	12	35	
<b>LCSD LCSD</b>										
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>							
Terphenyl-d14	56		29 - 150							

## Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

**Lab Sample ID: MB 580-426097/1-A**  
**Matrix: Water**  
**Analysis Batch: 426143**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 426097**

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
#2 Diesel (C10-C24)	ND		0.11		mg/L		05/16/23 09:39	05/16/23 19:47	1
Motor Oil (>C24-C36)	ND		0.35		mg/L		05/16/23 09:39	05/16/23 19:47	1
<b>MB MB</b>									
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>			<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>	
o-Terphenyl	58		50 - 150			05/16/23 09:39	05/16/23 19:47	1	

**Lab Sample ID: LCS 580-426097/2-A**  
**Matrix: Water**  
**Analysis Batch: 426143**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 426097**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits	
#2 Diesel (C10-C24)	4.00	3.08		mg/L		77	50 - 120	
Motor Oil (>C24-C36)	4.00	3.22		mg/L		81	64 - 120	

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# QC Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-127156-1

## Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC) (Continued)

**Lab Sample ID: LCS 580-426097/2-A**  
**Matrix: Water**  
**Analysis Batch: 426143**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 426097**

Surrogate	LCS LCS		Limits
	%Recovery	Qualifier	
<i>o</i> -Terphenyl	77		50 - 150

**Lab Sample ID: LCSD 580-426097/3-A**  
**Matrix: Water**  
**Analysis Batch: 426143**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 426097**

Analyte	Spike Added	LCSD LCSD		Unit	D	%Rec	%Rec		RPD	Limit
		Result	Qualifier				Limits	RPD		
#2 Diesel (C10-C24)	4.00	3.16		mg/L		79	50 - 120	2	26	
Motor Oil (>C24-C36)	4.00	3.28		mg/L		82	64 - 120	2	24	

Surrogate	LCSD LCSD		Limits
	%Recovery	Qualifier	
<i>o</i> -Terphenyl	80		50 - 150

## Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

**Lab Sample ID: MB 580-426097/1-B**  
**Matrix: Water**  
**Analysis Batch: 426143**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 426097**

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
#2 Diesel (C10-C24)	ND		0.11		mg/L		05/16/23 09:39	05/16/23 16:17	1
Motor Oil (>C24-C36)	ND		0.35		mg/L		05/16/23 09:39	05/16/23 16:17	1

Surrogate	MB MB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
<i>o</i> -Terphenyl	62		50 - 150	05/16/23 09:39	05/16/23 16:17	1

**Lab Sample ID: LCS 580-426097/2-B**  
**Matrix: Water**  
**Analysis Batch: 426143**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 426097**

Analyte	Spike Added	LCS LCS		Unit	D	%Rec	%Rec	
		Result	Qualifier				Limits	RPD
#2 Diesel (C10-C24)	4.00	3.51		mg/L		88	50 - 120	
Motor Oil (>C24-C36)	4.00	3.70		mg/L		93	64 - 120	

Surrogate	LCS LCS		Limits
	%Recovery	Qualifier	
<i>o</i> -Terphenyl	89		50 - 150

**Lab Sample ID: LCSD 580-426097/3-B**  
**Matrix: Water**  
**Analysis Batch: 426143**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 426097**

Analyte	Spike Added	LCSD LCSD		Unit	D	%Rec	%Rec		RPD	Limit
		Result	Qualifier				Limits	RPD		
#2 Diesel (C10-C24)	4.00	3.42		mg/L		86	50 - 120	3	26	
Motor Oil (>C24-C36)	4.00	3.61		mg/L		90	64 - 120	2	24	

Surrogate	LCSD LCSD		Limits
	%Recovery	Qualifier	
<i>o</i> -Terphenyl	88		50 - 150

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# QC Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-127156-1

## Method: 200.7 Rev 4.4 - Metals (ICP)

**Lab Sample ID: MB 580-426319/26-A**  
**Matrix: Water**  
**Analysis Batch: 426508**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 426319**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.50		mg/L		05/17/23 17:03	05/18/23 18:28	1
Magnesium	ND		0.50		mg/L		05/17/23 17:03	05/18/23 18:28	1

**Lab Sample ID: LCS 580-426319/27-A**  
**Matrix: Water**  
**Analysis Batch: 426508**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 426319**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Iron	20.0	20.9		mg/L		104	85 - 115
Magnesium	20.0	20.9		mg/L		105	85 - 115

**Lab Sample ID: LCSD 580-426319/28-A**  
**Matrix: Water**  
**Analysis Batch: 426508**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 426319**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Iron	20.0	21.1		mg/L		105	85 - 115	1	20
Magnesium	20.0	21.0		mg/L		105	85 - 115	1	20

**Lab Sample ID: MB 580-426447/26-A**  
**Matrix: Water**  
**Analysis Batch: 426648**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 426447**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	ND		0.50		mg/L		05/18/23 17:04	05/19/23 15:15	1
Iron	ND		0.50		mg/L		05/18/23 17:04	05/19/23 15:15	1
Magnesium	ND		0.50		mg/L		05/18/23 17:04	05/19/23 15:15	1
Potassium	ND		3.3		mg/L		05/18/23 17:04	05/19/23 15:15	1
Sodium	ND		0.50		mg/L		05/18/23 17:04	05/19/23 15:15	1

**Lab Sample ID: LCS 580-426447/27-A**  
**Matrix: Water**  
**Analysis Batch: 426648**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 426447**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Calcium	20.0	19.9		mg/L		100	85 - 115
Iron	20.0	21.2		mg/L		106	85 - 115
Magnesium	20.0	19.9		mg/L		99	85 - 115
Potassium	20.0	19.5		mg/L		98	85 - 115
Sodium	20.0	19.7		mg/L		98	85 - 115

**Lab Sample ID: LCSD 580-426447/28-A**  
**Matrix: Water**  
**Analysis Batch: 426648**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 426447**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Calcium	20.0	20.2		mg/L		101	85 - 115	1	20
Iron	20.0	21.4		mg/L		107	85 - 115	1	20
Magnesium	20.0	20.3		mg/L		101	85 - 115	2	20
Potassium	20.0	19.7		mg/L		99	85 - 115	1	20

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# QC Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-127156-1

## Method: 200.7 Rev 4.4 - Metals (ICP) (Continued)

**Lab Sample ID: LCSD 580-426447/28-A**  
**Matrix: Water**  
**Analysis Batch: 426648**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 426447**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Sodium	20.0	19.9		mg/L		99	85 - 115	1	20

**Lab Sample ID: MB 580-426448/26-A**  
**Matrix: Water**  
**Analysis Batch: 426648**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 426448**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.50		mg/L		05/18/23 17:10	05/19/23 17:13	1
Magnesium	ND		0.50		mg/L		05/18/23 17:10	05/19/23 17:13	1

**Lab Sample ID: LCS 580-426448/27-A**  
**Matrix: Water**  
**Analysis Batch: 426648**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 426448**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Iron	20.0	20.4		mg/L		102	85 - 115
Magnesium	20.0	18.6		mg/L		93	85 - 115

**Lab Sample ID: LCSD 580-426448/28-A**  
**Matrix: Water**  
**Analysis Batch: 426648**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 426448**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Iron	20.0	20.6		mg/L		103	85 - 115	1	20
Magnesium	20.0	18.5		mg/L		92	85 - 115	1	20

**Lab Sample ID: 580-127156-6 MS**  
**Matrix: Water**  
**Analysis Batch: 426648**

**Client Sample ID: SDF-FEB-1-050923**  
**Prep Type: Total/NA**  
**Prep Batch: 426448**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Iron	ND		20.0	20.6		mg/L		103	70 - 130
Magnesium	ND		20.0	18.7		mg/L		94	70 - 130

**Lab Sample ID: 580-127156-6 MSD**  
**Matrix: Water**  
**Analysis Batch: 426648**

**Client Sample ID: SDF-FEB-1-050923**  
**Prep Type: Total/NA**  
**Prep Batch: 426448**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Iron	ND		20.0	20.7		mg/L		104	70 - 130	0	20
Magnesium	ND		20.0	18.9		mg/L		95	70 - 130	1	20

**Lab Sample ID: 580-127156-6 DU**  
**Matrix: Water**  
**Analysis Batch: 426648**

**Client Sample ID: SDF-FEB-1-050923**  
**Prep Type: Total/NA**  
**Prep Batch: 426448**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Iron	ND		ND		mg/L		NC	20
Magnesium	ND		ND		mg/L		NC	20

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# QC Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-127156-1

## Method: 200.8 - Metals (ICP/MS)

**Lab Sample ID: MB 580-426319/26-A**  
**Matrix: Water**  
**Analysis Batch: 426424**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 426319**

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Arsenic	ND		0.0010		mg/L		05/17/23 17:03	05/18/23 14:04	1
Chromium	ND		0.00080		mg/L		05/17/23 17:03	05/18/23 14:04	1
Lead	ND		0.00040		mg/L		05/17/23 17:03	05/18/23 14:04	1
Manganese	ND		0.0020		mg/L		05/17/23 17:03	05/18/23 14:04	1
Nickel	ND		0.0030		mg/L		05/17/23 17:03	05/18/23 14:04	1
Selenium	ND		0.0080		mg/L		05/17/23 17:03	05/18/23 14:04	1

**Lab Sample ID: LCS 580-426319/27-A**  
**Matrix: Water**  
**Analysis Batch: 426424**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 426319**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chromium	1.00	1.05		mg/L		105	85 - 115
Lead	1.00	0.991		mg/L		99	85 - 115
Manganese	1.00	1.01		mg/L		101	85 - 115
Nickel	1.00	1.05		mg/L		105	85 - 115
Selenium	1.00	1.03		mg/L		103	85 - 115

**Lab Sample ID: LCSD 580-426319/28-A**  
**Matrix: Water**  
**Analysis Batch: 426424**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 426319**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	
								RPD	Limit
Arsenic	1.00	0.982		mg/L		98	85 - 115	2	20
Chromium	1.00	1.04		mg/L		104	85 - 115	0	20
Lead	1.00	0.982		mg/L		98	85 - 115	1	20
Manganese	1.00	1.01		mg/L		101	85 - 115	0	20
Nickel	1.00	1.03		mg/L		103	85 - 115	2	20
Selenium	1.00	1.02		mg/L		102	85 - 115	1	20

**Lab Sample ID: MB 580-426447/26-A**  
**Matrix: Water**  
**Analysis Batch: 426622**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 426447**

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Arsenic	ND		0.0010		mg/L		05/18/23 17:04	05/19/23 15:42	1
Chromium	ND		0.00080		mg/L		05/18/23 17:04	05/19/23 15:42	1
Lead	ND		0.00040		mg/L		05/18/23 17:04	05/19/23 15:42	1
Manganese	ND		0.0020		mg/L		05/18/23 17:04	05/19/23 15:42	1
Nickel	ND		0.0030		mg/L		05/18/23 17:04	05/19/23 15:42	1
Selenium	ND		0.0080		mg/L		05/18/23 17:04	05/19/23 15:42	1

**Lab Sample ID: LCS 580-426447/27-A**  
**Matrix: Water**  
**Analysis Batch: 426622**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 426447**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits

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# QC Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-127156-1

## Method: 200.8 - Metals (ICP/MS) (Continued)

**Lab Sample ID: LCS 580-426447/27-A**  
**Matrix: Water**  
**Analysis Batch: 426622**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 426447**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chromium	1.00	1.03		mg/L		103	85 - 115
Lead	1.00	0.985		mg/L		98	85 - 115
Manganese	1.00	1.01		mg/L		101	85 - 115
Nickel	1.00	1.04		mg/L		104	85 - 115
Selenium	1.00	0.971		mg/L		97	85 - 115

**Lab Sample ID: LCSD 580-426447/28-A**  
**Matrix: Water**  
**Analysis Batch: 426622**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 426447**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Arsenic	1.00	0.999		mg/L		100	85 - 115	1	20
Chromium	1.00	1.02		mg/L		102	85 - 115	2	20
Lead	1.00	0.979		mg/L		98	85 - 115	1	20
Manganese	1.00	0.981		mg/L		98	85 - 115	3	20
Nickel	1.00	1.03		mg/L		103	85 - 115	1	20
Selenium	1.00	0.980		mg/L		98	85 - 115	1	20

**Lab Sample ID: MB 580-426448/26-A**  
**Matrix: Water**  
**Analysis Batch: 426642**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 426448**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0010		mg/L		05/18/23 17:10	05/19/23 13:50	1
Chromium	ND		0.00080		mg/L		05/18/23 17:10	05/19/23 13:50	1
Lead	ND		0.00040		mg/L		05/18/23 17:10	05/19/23 13:50	1
Manganese	ND		0.0020		mg/L		05/18/23 17:10	05/19/23 13:50	1
Nickel	ND		0.0030		mg/L		05/18/23 17:10	05/19/23 13:50	1
Selenium	ND		0.0080		mg/L		05/18/23 17:10	05/19/23 13:50	1

**Lab Sample ID: LCS 580-426448/27-A**  
**Matrix: Water**  
**Analysis Batch: 426642**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 426448**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	1.00	1.04		mg/L		104	85 - 115
Chromium	1.00	1.10		mg/L		110	85 - 115
Lead	1.00	1.03		mg/L		103	85 - 115
Manganese	1.00	1.02		mg/L		102	85 - 115
Nickel	1.00	1.10		mg/L		110	85 - 115
Selenium	1.00	1.00		mg/L		100	85 - 115

**Lab Sample ID: LCSD 580-426448/28-A**  
**Matrix: Water**  
**Analysis Batch: 426642**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 426448**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Arsenic	1.00	1.05		mg/L		105	85 - 115	1	20
Chromium	1.00	1.09		mg/L		109	85 - 115	1	20
Lead	1.00	1.05		mg/L		105	85 - 115	2	20

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# QC Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-127156-1

## Method: 200.8 - Metals (ICP/MS) (Continued)

**Lab Sample ID: LCSD 580-426448/28-A**  
**Matrix: Water**  
**Analysis Batch: 426642**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 426448**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Manganese	1.00	1.02		mg/L		102	85 - 115	0	20
Nickel	1.00	1.13		mg/L		113	85 - 115	2	20
Selenium	1.00	1.05		mg/L		105	85 - 115	5	20

**Lab Sample ID: 580-127156-6 MS**  
**Matrix: Water**  
**Analysis Batch: 426642**

**Client Sample ID: SDF-FEB-1-050923**  
**Prep Type: Total/NA**  
**Prep Batch: 426448**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Arsenic	ND		1.00	1.09		mg/L		109	70 - 130		
Chromium	ND		1.00	1.14		mg/L		114	70 - 130		
Lead	ND		1.00	1.08		mg/L		108	70 - 130		
Manganese	ND		1.00	1.06		mg/L		106	70 - 130		
Nickel	ND		1.00	1.15		mg/L		115	70 - 130		
Selenium	ND		1.00	1.05		mg/L		105	70 - 130		

**Lab Sample ID: 580-127156-6 MSD**  
**Matrix: Water**  
**Analysis Batch: 426642**

**Client Sample ID: SDF-FEB-1-050923**  
**Prep Type: Total/NA**  
**Prep Batch: 426448**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Arsenic	ND		1.00	1.02		mg/L		102	70 - 130	6	20
Chromium	ND		1.00	1.09		mg/L		109	70 - 130	5	20
Lead	ND		1.00	1.02		mg/L		102	70 - 130	6	20
Manganese	ND		1.00	1.01		mg/L		101	70 - 130	6	20
Nickel	ND		1.00	1.09		mg/L		109	70 - 130	5	20
Selenium	ND		1.00	1.01		mg/L		101	70 - 130	4	20

**Lab Sample ID: 580-127156-6 DU**  
**Matrix: Water**  
**Analysis Batch: 426642**

**Client Sample ID: SDF-FEB-1-050923**  
**Prep Type: Total/NA**  
**Prep Batch: 426448**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Arsenic	ND		ND		mg/L		NC	20
Chromium	ND		ND		mg/L		NC	20
Lead	ND		ND		mg/L		NC	20
Manganese	ND		ND		mg/L		NC	20
Nickel	ND		ND		mg/L		NC	20
Selenium	ND		ND		mg/L		NC	20

## Method: 7470A - Mercury (CVAA)

**Lab Sample ID: MB 580-426118/25-A**  
**Matrix: Water**  
**Analysis Batch: 426213**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 426118**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		05/16/23 11:16	05/16/23 17:35	1

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# QC Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-127156-1

## Method: 7470A - Mercury (CVAA) (Continued)

**Lab Sample ID: LCS 580-426118/26-A**  
**Matrix: Water**  
**Analysis Batch: 426213**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 426118**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.00200	0.00208		mg/L		104	80 - 120

**Lab Sample ID: LCSD 580-426118/27-A**  
**Matrix: Water**  
**Analysis Batch: 426213**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 426118**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Mercury	0.00200	0.00207		mg/L		103	80 - 120	0	20

**Lab Sample ID: MB 580-426364/22-A**  
**Matrix: Water**  
**Analysis Batch: 426456**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 426364**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		05/18/23 10:03	05/18/23 15:25	1

**Lab Sample ID: LCS 580-426364/23-A**  
**Matrix: Water**  
**Analysis Batch: 426456**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 426364**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.00200	0.00207		mg/L		104	80 - 120

**Lab Sample ID: LCSD 580-426364/24-A**  
**Matrix: Water**  
**Analysis Batch: 426456**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 426364**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Mercury	0.00200	0.00204		mg/L		102	80 - 120	2	20

**Lab Sample ID: 580-127156-1 MS**  
**Matrix: Water**  
**Analysis Batch: 426213**

**Client Sample ID: W-47-050923**  
**Prep Type: Dissolved**  
**Prep Batch: 426118**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	ND		0.00200	0.00191		mg/L		96	80 - 120

**Lab Sample ID: 580-127156-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 426213**

**Client Sample ID: W-47-050923**  
**Prep Type: Dissolved**  
**Prep Batch: 426118**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Mercury	ND		0.00200	0.00185		mg/L		93	80 - 120	3	20

**Lab Sample ID: 580-127156-1 DU**  
**Matrix: Water**  
**Analysis Batch: 426213**

**Client Sample ID: W-47-050923**  
**Prep Type: Dissolved**  
**Prep Batch: 426118**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Mercury	ND		ND		mg/L		NC	20

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# QC Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-127156-1

## Method: 300.0 - Anions, Ion Chromatography

**Lab Sample ID: MB 580-425993/3**  
**Matrix: Water**  
**Analysis Batch: 425993**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.5		mg/L			05/12/23 19:32	1
Sulfate	ND		1.5		mg/L			05/12/23 19:32	1

**Lab Sample ID: LCS 580-425993/4**  
**Matrix: Water**  
**Analysis Batch: 425993**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	50.0	51.9		mg/L		104	90 - 110
Sulfate	50.0	50.7		mg/L		101	90 - 110

**Lab Sample ID: LCSD 580-425993/5**  
**Matrix: Water**  
**Analysis Batch: 425993**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	50.0	51.8		mg/L		104	90 - 110	0	15
Sulfate	50.0	50.7		mg/L		101	90 - 110	0	15

**Lab Sample ID: 580-127156-5 MS**  
**Matrix: Water**  
**Analysis Batch: 425993**

**Client Sample ID: SDF-DUP-1-050923**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	ND		50.0	53.0		mg/L		106	90 - 110
Sulfate	ND		50.0	52.1		mg/L		104	90 - 110

**Lab Sample ID: 580-127156-5 MSD**  
**Matrix: Water**  
**Analysis Batch: 425993**

**Client Sample ID: SDF-DUP-1-050923**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	ND		50.0	53.0		mg/L		106	90 - 110	0	15
Sulfate	ND		50.0	52.1		mg/L		104	90 - 110	0	15

**Lab Sample ID: MB 580-428719/3**  
**Matrix: Water**  
**Analysis Batch: 428719**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.5		mg/L			06/12/23 13:45	1
Sulfate	ND		1.5		mg/L			06/12/23 13:45	1

**Lab Sample ID: LCS 580-428719/4**  
**Matrix: Water**  
**Analysis Batch: 428719**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	50.0	52.5		mg/L		105	90 - 110
Sulfate	50.0	51.2		mg/L		102	90 - 110

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# QC Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-127156-1

## Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: LCSD 580-428719/5  
Matrix: Water  
Analysis Batch: 428719

Client Sample ID: Lab Control Sample Dup  
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	50.0	52.4		mg/L		105	90 - 110	0	15
Sulfate	50.0	51.2		mg/L		102	90 - 110	0	15

Lab Sample ID: 580-127156-5 MS  
Matrix: Water  
Analysis Batch: 428719

Client Sample ID: SDF-DUP-1-050923  
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	13	H F1	50.0	33.6	F1	mg/L		41	90 - 110
Sulfate	49	H	50.0	96.6		mg/L		95	90 - 110

Lab Sample ID: 580-127156-5 MSD  
Matrix: Water  
Analysis Batch: 428719

Client Sample ID: SDF-DUP-1-050923  
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	13	H F1	50.0	33.7	F1	mg/L		41	90 - 110	0	15
Sulfate	49	H	50.0	96.6		mg/L		95	90 - 110	0	15

## Method: SM 2320B - Alkalinity

Lab Sample ID: LCS 580-425883/2  
Matrix: Water  
Analysis Batch: 425883

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Alkalinity	100	92.8		mg/L		93	85 - 115

## Method: SM 4500 NH3 G - Ammonia

Lab Sample ID: MB 580-426469/1  
Matrix: Water  
Analysis Batch: 426469

Client Sample ID: Method Blank  
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia as N	ND		0.50		mg/L			05/18/23 22:09	1

Lab Sample ID: LCS 580-426469/2  
Matrix: Water  
Analysis Batch: 426469

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Ammonia as N	2.00	2.04		mg/L		102	90 - 110



# QC Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-127156-1

## Method: SM 5220D - COD

**Lab Sample ID: MB 580-426585/3-A**  
**Matrix: Water**  
**Analysis Batch: 426596**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 426585**

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chemical Oxygen Demand	ND		10		mg/L		05/20/23 17:19	05/20/23 23:39	1

**Lab Sample ID: LCS 580-426585/4-A**  
**Matrix: Water**  
**Analysis Batch: 426596**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 426585**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chemical Oxygen Demand	75.0	80.7		mg/L		108	80 - 120

**Lab Sample ID: LCSD 580-426585/5-A**  
**Matrix: Water**  
**Analysis Batch: 426596**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 426585**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chemical Oxygen Demand	75.0	76.5		mg/L		102	80 - 120	5	20

**Lab Sample ID: 580-127156-1 MS**  
**Matrix: Water**  
**Analysis Batch: 426596**

**Client Sample ID: W-47-050923**  
**Prep Type: Total/NA**  
**Prep Batch: 426585**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chemical Oxygen Demand	ND	F1	25.0	34.2	F1	mg/L		137	75 - 125

**Lab Sample ID: 580-127156-1 DU**  
**Matrix: Water**  
**Analysis Batch: 426596**

**Client Sample ID: W-47-050923**  
**Prep Type: Total/NA**  
**Prep Batch: 426585**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Chemical Oxygen Demand	ND	F1	ND		mg/L		NC	20

## Method: SM 5310C - TOC

**Lab Sample ID: MB 580-426238/3**  
**Matrix: Water**  
**Analysis Batch: 426238**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	ND		1.5		mg/L			05/16/23 16:38	1

**Lab Sample ID: LCS 580-426238/4**  
**Matrix: Water**  
**Analysis Batch: 426238**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Organic Carbon	10.0	9.93		mg/L		99	85 - 115

# QC Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-127156-1

## Method: SM 5310C - TOC (Continued)

Lab Sample ID: LCSD 580-426238/5  
Matrix: Water  
Analysis Batch: 426238

Client Sample ID: Lab Control Sample Dup  
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Total Organic Carbon	10.0	10.1		mg/L		101	85 - 115	1	20

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11

# Lab Chronicle

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-127156-1

**Client Sample ID: W-47-050923**

**Lab Sample ID: 580-127156-1**

**Date Collected: 05/09/23 15:15**

**Matrix: Water**

**Date Received: 05/11/23 09:25**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	425812	JBT	EET SEA	05/12/23 17:49
Total/NA	Analysis	NWTPH-Gx		1	425808	JBT	EET SEA	05/12/23 17:49
Total/NA	Prep	3510C			426094	TGO	EET SEA	05/16/23 09:27
Total/NA	Analysis	8270E SIM		1	426485	K1K	EET SEA	05/19/23 12:40
Total/NA	Prep	3510C			426097	TGO	EET SEA	05/16/23 09:39
Total/NA	Cleanup	3630C			426098	TGO	EET SEA	05/16/23 09:45
Total/NA	Analysis	NWTPH-Dx		1	426143	KLW	EET SEA	05/16/23 17:33
Total/NA	Prep	3510C			426097	TGO	EET SEA	05/16/23 09:39
Total/NA	Analysis	NWTPH-Dx		1	426143	KLW	EET SEA	05/16/23 21:03
Dissolved	Prep	200.8			426447	TMH	EET SEA	05/18/23 17:04
Dissolved	Analysis	200.7 Rev 4.4		1	426648	JLS	EET SEA	05/19/23 16:11
Total/NA	Prep	200.8			426319	TMH	EET SEA	05/17/23 17:03
Total/NA	Analysis	200.7 Rev 4.4		1	426508	JLS	EET SEA	05/18/23 19:19
Dissolved	Prep	200.8			426447	TMH	EET SEA	05/18/23 17:04
Dissolved	Analysis	200.8		1	426622	FCW	EET SEA	05/19/23 16:23
Total/NA	Prep	200.8			426319	TMH	EET SEA	05/17/23 17:03
Total/NA	Analysis	200.8		1	426472	FCW	EET SEA	05/18/23 15:44
Dissolved	Prep	7470A			426118	JL	EET SEA	05/16/23 11:16
Dissolved	Analysis	7470A		1	426213	JL	EET SEA	05/16/23 17:47
Total/NA	Prep	7470A			426364	DLV	EET SEA	05/18/23 10:03
Total/NA	Analysis	7470A		1	426456	JL	EET SEA	05/18/23 16:10
Total/NA	Analysis	300.0		1	425993	CA	EET SEA	05/12/23 20:31
Total/NA	Analysis	SM 2320B		1	425883	MLT	EET SEA	05/12/23 20:59
Total/NA	Analysis	SM 4500 NH3 G		1	426469	MLT	EET SEA	05/18/23 22:09
Total/NA	Prep	SM 5220			426585	MLT	EET SEA	05/20/23 17:19
Total/NA	Analysis	SM 5220D		1	426596	MLT	EET SEA	05/20/23 23:39
Total/NA	Analysis	SM 5310C		1	426238	AUA	EET SEA	05/17/23 00:11

**Client Sample ID: W-112-050923**

**Lab Sample ID: 580-127156-2**

**Date Collected: 05/09/23 15:10**

**Matrix: Water**

**Date Received: 05/11/23 09:25**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	425812	JBT	EET SEA	05/12/23 18:14
Total/NA	Analysis	NWTPH-Gx		1	425808	JBT	EET SEA	05/12/23 18:14
Total/NA	Prep	3510C			426094	TGO	EET SEA	05/16/23 09:27
Total/NA	Analysis	8270E SIM		1	426485	K1K	EET SEA	05/19/23 13:00
Total/NA	Prep	3510C			426097	TGO	EET SEA	05/16/23 09:39
Total/NA	Cleanup	3630C			426098	TGO	EET SEA	05/16/23 09:45
Total/NA	Analysis	NWTPH-Dx		1	426143	KLW	EET SEA	05/16/23 17:52
Total/NA	Prep	3510C			426097	TGO	EET SEA	05/16/23 09:39
Total/NA	Analysis	NWTPH-Dx		1	426143	KLW	EET SEA	05/16/23 21:22
Dissolved	Prep	200.8			426447	TMH	EET SEA	05/18/23 17:04
Dissolved	Analysis	200.7 Rev 4.4		1	426648	JLS	EET SEA	05/19/23 16:15

Eurofins Seattle

# Lab Chronicle

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-127156-1

**Client Sample ID: W-112-050923**

**Lab Sample ID: 580-127156-2**

**Date Collected: 05/09/23 15:10**

**Matrix: Water**

**Date Received: 05/11/23 09:25**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	200.8			426319	TMH	EET SEA	05/17/23 17:03
Total/NA	Analysis	200.7 Rev 4.4		1	426508	JLS	EET SEA	05/18/23 19:22
Dissolved	Prep	200.8			426447	TMH	EET SEA	05/18/23 17:04
Dissolved	Analysis	200.8		1	426622	FCW	EET SEA	05/19/23 16:26
Total/NA	Prep	200.8			426319	TMH	EET SEA	05/17/23 17:03
Total/NA	Analysis	200.8		1	426472	FCW	EET SEA	05/18/23 15:47
Dissolved	Prep	7470A			426118	JL	EET SEA	05/16/23 11:16
Dissolved	Analysis	7470A		1	426213	JL	EET SEA	05/16/23 17:56
Total/NA	Prep	7470A			426364	DLV	EET SEA	05/18/23 10:03
Total/NA	Analysis	7470A		1	426456	JL	EET SEA	05/18/23 16:12
Total/NA	Analysis	300.0		1	425993	CA	EET SEA	05/12/23 20:43
Total/NA	Analysis	SM 2320B		1	425883	MLT	EET SEA	05/12/23 20:59
Total/NA	Analysis	SM 4500 NH3 G		1	426469	MLT	EET SEA	05/18/23 22:09
Total/NA	Prep	SM 5220			426585	MLT	EET SEA	05/20/23 17:19
Total/NA	Analysis	SM 5220D		1	426596	MLT	EET SEA	05/20/23 23:39
Total/NA	Analysis	SM 5310C		1	426238	AUA	EET SEA	05/17/23 00:29

**Client Sample ID: W-113-050923**

**Lab Sample ID: 580-127156-3**

**Date Collected: 05/09/23 12:15**

**Matrix: Water**

**Date Received: 05/11/23 09:25**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	425812	JBT	EET SEA	05/12/23 19:02
Total/NA	Analysis	NWTPH-Gx		1	425808	JBT	EET SEA	05/12/23 19:02
Total/NA	Prep	3510C			426094	TGO	EET SEA	05/16/23 09:27
Total/NA	Analysis	8270E SIM		1	426485	K1K	EET SEA	05/19/23 13:19
Total/NA	Prep	3510C			426097	TGO	EET SEA	05/16/23 09:39
Total/NA	Cleanup	3630C			426098	TGO	EET SEA	05/16/23 09:45
Total/NA	Analysis	NWTPH-Dx		1	426143	KLW	EET SEA	05/16/23 18:11
Total/NA	Prep	3510C			426097	TGO	EET SEA	05/16/23 09:39
Total/NA	Analysis	NWTPH-Dx		1	426143	KLW	EET SEA	05/16/23 21:41
Dissolved	Prep	200.8			426447	TMH	EET SEA	05/18/23 17:04
Dissolved	Analysis	200.7 Rev 4.4		1	426648	JLS	EET SEA	05/19/23 16:18
Total/NA	Prep	200.8			426319	TMH	EET SEA	05/17/23 17:03
Total/NA	Analysis	200.7 Rev 4.4		1	426508	JLS	EET SEA	05/18/23 19:25
Dissolved	Prep	200.8			426447	TMH	EET SEA	05/18/23 17:04
Dissolved	Analysis	200.8		1	426622	FCW	EET SEA	05/19/23 16:29
Total/NA	Prep	200.8			426319	TMH	EET SEA	05/17/23 17:03
Total/NA	Analysis	200.8		1	426472	FCW	EET SEA	05/18/23 15:50
Dissolved	Prep	7470A			426118	JL	EET SEA	05/16/23 11:16
Dissolved	Analysis	7470A		1	426213	JL	EET SEA	05/16/23 17:58
Total/NA	Prep	7470A			426364	DLV	EET SEA	05/18/23 10:03
Total/NA	Analysis	7470A		1	426456	JL	EET SEA	05/18/23 16:14
Total/NA	Analysis	300.0		1	425993	CA	EET SEA	05/12/23 20:54

# Lab Chronicle

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-127156-1

**Client Sample ID: W-113-050923**

**Lab Sample ID: 580-127156-3**

**Date Collected: 05/09/23 12:15**

**Matrix: Water**

**Date Received: 05/11/23 09:25**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	SM 2320B		1	425883	MLT	EET SEA	05/12/23 20:59
Total/NA	Analysis	SM 4500 NH3 G		1	426469	MLT	EET SEA	05/18/23 22:09
Total/NA	Prep	SM 5220			426585	MLT	EET SEA	05/20/23 17:19
Total/NA	Analysis	SM 5220D		1	426596	MLT	EET SEA	05/20/23 23:39
Total/NA	Analysis	SM 5310C		1	426238	AUA	EET SEA	05/17/23 00:46

**Client Sample ID: W-127-050923**

**Lab Sample ID: 580-127156-4**

**Date Collected: 05/09/23 12:00**

**Matrix: Water**

**Date Received: 05/11/23 09:25**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	425812	JBT	EET SEA	05/12/23 19:26
Total/NA	Analysis	NWTPH-Gx		1	425808	JBT	EET SEA	05/12/23 19:26
Total/NA	Prep	3510C			426094	TGO	EET SEA	05/16/23 09:27
Total/NA	Analysis	8270E SIM		1	426485	K1K	EET SEA	05/19/23 13:39
Total/NA	Prep	3510C			426097	TGO	EET SEA	05/16/23 09:39
Total/NA	Cleanup	3630C			426098	TGO	EET SEA	05/16/23 09:45
Total/NA	Analysis	NWTPH-Dx		1	426143	KLW	EET SEA	05/16/23 18:30
Total/NA	Prep	3510C			426097	TGO	EET SEA	05/16/23 09:39
Total/NA	Analysis	NWTPH-Dx		1	426143	KLW	EET SEA	05/16/23 22:00
Dissolved	Prep	200.8			426447	TMH	EET SEA	05/18/23 17:04
Dissolved	Analysis	200.7 Rev 4.4		1	426648	JLS	EET SEA	05/19/23 16:21
Total/NA	Prep	200.8			426319	TMH	EET SEA	05/17/23 17:03
Total/NA	Analysis	200.7 Rev 4.4		1	426508	JLS	EET SEA	05/18/23 19:29
Dissolved	Prep	200.8			426447	TMH	EET SEA	05/18/23 17:04
Dissolved	Analysis	200.8		1	426622	FCW	EET SEA	05/19/23 16:31
Total/NA	Prep	200.8			426319	TMH	EET SEA	05/17/23 17:03
Total/NA	Analysis	200.8		1	426472	FCW	EET SEA	05/18/23 15:52
Dissolved	Prep	7470A			426118	JL	EET SEA	05/16/23 11:16
Dissolved	Analysis	7470A		1	426213	JL	EET SEA	05/16/23 18:00
Total/NA	Prep	7470A			426364	DLV	EET SEA	05/18/23 10:03
Total/NA	Analysis	7470A		1	426456	JL	EET SEA	05/18/23 16:16
Total/NA	Analysis	300.0		1	425993	CA	EET SEA	05/12/23 21:06
Total/NA	Analysis	SM 2320B		1	425883	MLT	EET SEA	05/12/23 21:00
Total/NA	Analysis	SM 4500 NH3 G		1	426469	MLT	EET SEA	05/18/23 22:09
Total/NA	Prep	SM 5220			426585	MLT	EET SEA	05/20/23 17:19
Total/NA	Analysis	SM 5220D		1	426596	MLT	EET SEA	05/20/23 23:39
Total/NA	Analysis	SM 5310C		1	426238	AUA	EET SEA	05/17/23 01:04

# Lab Chronicle

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-127156-1

**Client Sample ID: SDF-DUP-1-050923**

**Lab Sample ID: 580-127156-5**

**Date Collected: 05/09/23 09:30**

**Matrix: Water**

**Date Received: 05/11/23 09:25**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	425812	JBT	EET SEA	05/12/23 19:51
Total/NA	Analysis	NWTPH-Gx		1	425808	JBT	EET SEA	05/12/23 19:51
Total/NA	Prep	3510C			426094	TGO	EET SEA	05/16/23 09:27
Total/NA	Analysis	8270E SIM		1	426485	K1K	EET SEA	05/19/23 13:58
Total/NA	Prep	3510C			426097	TGO	EET SEA	05/16/23 09:39
Total/NA	Cleanup	3630C			426098	TGO	EET SEA	05/16/23 09:45
Total/NA	Analysis	NWTPH-Dx		1	426143	KLW	EET SEA	05/16/23 18:49
Total/NA	Prep	3510C			426097	TGO	EET SEA	05/16/23 09:39
Total/NA	Analysis	NWTPH-Dx		1	426143	KLW	EET SEA	05/16/23 22:20
Dissolved	Prep	200.8			426447	TMH	EET SEA	05/18/23 17:04
Dissolved	Analysis	200.7 Rev 4.4		1	426648	JLS	EET SEA	05/19/23 16:31
Total/NA	Prep	200.8			426319	TMH	EET SEA	05/17/23 17:03
Total/NA	Analysis	200.7 Rev 4.4		1	426508	JLS	EET SEA	05/18/23 19:12
Dissolved	Prep	200.8			426447	TMH	EET SEA	05/18/23 17:04
Dissolved	Analysis	200.8		1	426622	FCW	EET SEA	05/19/23 16:34
Total/NA	Prep	200.8			426319	TMH	EET SEA	05/17/23 17:03
Total/NA	Analysis	200.8		1	426472	FCW	EET SEA	05/18/23 15:39
Dissolved	Prep	7470A			426118	JL	EET SEA	05/16/23 11:16
Dissolved	Analysis	7470A		1	426213	JL	EET SEA	05/16/23 18:02
Total/NA	Prep	7470A			426118	JL	EET SEA	05/16/23 11:16
Total/NA	Analysis	7470A		1	426213	JL	EET SEA	05/16/23 18:07
Total/NA	Analysis	300.0		1	428719	CA	EET SEA	06/12/23 14:21
Total/NA	Analysis	SM 2320B		1	425883	MLT	EET SEA	05/12/23 21:00
Total/NA	Analysis	SM 4500 NH3 G		1	426469	MLT	EET SEA	05/18/23 22:09
Total/NA	Prep	SM 5220			426585	MLT	EET SEA	05/20/23 17:19
Total/NA	Analysis	SM 5220D		1	426596	MLT	EET SEA	05/20/23 23:39
Total/NA	Analysis	SM 5310C		1	426238	AUA	EET SEA	05/17/23 01:21

**Client Sample ID: SDF-FEB-1-050923**

**Lab Sample ID: 580-127156-6**

**Date Collected: 05/09/23 10:30**

**Matrix: Water**

**Date Received: 05/11/23 09:25**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	425812	JBT	EET SEA	05/12/23 20:14
Total/NA	Analysis	NWTPH-Gx		1	425808	JBT	EET SEA	05/12/23 20:14
Total/NA	Prep	3510C			426094	TGO	EET SEA	05/16/23 09:27
Total/NA	Analysis	8270E SIM		1	426485	K1K	EET SEA	05/19/23 14:18
Total/NA	Prep	3510C			426097	TGO	EET SEA	05/16/23 09:39
Total/NA	Cleanup	3630C			426098	TGO	EET SEA	05/16/23 09:45
Total/NA	Analysis	NWTPH-Dx		1	426143	KLW	EET SEA	05/16/23 19:08
Total/NA	Prep	3510C			426097	TGO	EET SEA	05/16/23 09:39
Total/NA	Analysis	NWTPH-Dx		1	426143	KLW	EET SEA	05/16/23 22:39
Dissolved	Prep	200.8			426447	TMH	EET SEA	05/18/23 17:04
Dissolved	Analysis	200.7 Rev 4.4		1	426648	JLS	EET SEA	05/19/23 16:35

# Lab Chronicle

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-127156-1

**Client Sample ID: SDF-FEB-1-050923**

**Lab Sample ID: 580-127156-6**

**Date Collected: 05/09/23 10:30**

**Matrix: Water**

**Date Received: 05/11/23 09:25**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	200.8			426448	TMH	EET SEA	05/18/23 17:10
Total/NA	Analysis	200.7 Rev 4.4		1	426648	JLS	EET SEA	05/19/23 17:22
Dissolved	Prep	200.8			426447	TMH	EET SEA	05/18/23 17:04
Dissolved	Analysis	200.8		1	426622	FCW	EET SEA	05/19/23 16:37
Total/NA	Prep	200.8			426448	TMH	EET SEA	05/18/23 17:10
Total/NA	Analysis	200.8		1	426642	FCW	EET SEA	05/19/23 13:53
Dissolved	Prep	7470A			426118	JL	EET SEA	05/16/23 11:16
Dissolved	Analysis	7470A		1	426213	JL	EET SEA	05/16/23 18:04
Total/NA	Prep	7470A			426118	JL	EET SEA	05/16/23 11:16
Total/NA	Analysis	7470A		1	426213	JL	EET SEA	05/16/23 18:13
Total/NA	Analysis	300.0		1	428719	CA	EET SEA	06/12/23 14:56
Total/NA	Analysis	SM 2320B		1	425883	MLT	EET SEA	05/12/23 21:00
Total/NA	Analysis	SM 4500 NH3 G		1	426469	MLT	EET SEA	05/18/23 22:09
Total/NA	Prep	SM 5220			426585	MLT	EET SEA	05/20/23 17:19
Total/NA	Analysis	SM 5220D		1	426596	MLT	EET SEA	05/20/23 23:39
Total/NA	Analysis	SM 5310C		1	426238	AUA	EET SEA	05/17/23 01:39

**Client Sample ID: Trip Blanks**

**Lab Sample ID: 580-127156-7**

**Date Collected: 05/09/23 00:01**

**Matrix: Water**

**Date Received: 05/11/23 09:25**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	425812	JBT	EET SEA	05/12/23 17:01
Total/NA	Analysis	NWTPH-Gx		1	425808	JBT	EET SEA	05/12/23 17:01

**Laboratory References:**

EET SEA = Eurofins Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310

# Accreditation/Certification Summary

Client: Whatcom Environmental Services Inc.  
 Project/Site: 2023 SDF Sampling

Job ID: 580-127156-1

## Laboratory: Eurofins Seattle

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Washington	State	C788	07-13-23

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
200.7 Rev 4.4	200.8	Water	Calcium
200.7 Rev 4.4	200.8	Water	Iron
200.7 Rev 4.4	200.8	Water	Magnesium
200.7 Rev 4.4	200.8	Water	Potassium
200.7 Rev 4.4	200.8	Water	Sodium
200.8	200.8	Water	Arsenic
200.8	200.8	Water	Chromium
200.8	200.8	Water	Lead
200.8	200.8	Water	Manganese
200.8	200.8	Water	Nickel
200.8	200.8	Water	Selenium
300.0		Water	Chloride
300.0		Water	Sulfate
SM 2320B		Water	Alkalinity
SM 2320B		Water	Bicarbonate Alkalinity as CaCO3
SM 5310C		Water	Total Organic Carbon



# Sample Summary

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-127156-1

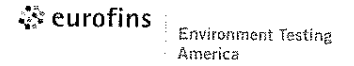
Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-127156-1	W-47-050923	Water	05/09/23 15:15	05/11/23 09:25
580-127156-2	W-112-050923	Water	05/09/23 15:10	05/11/23 09:25
580-127156-3	W-113-050923	Water	05/09/23 12:15	05/11/23 09:25
580-127156-4	W-127-050923	Water	05/09/23 12:00	05/11/23 09:25
580-127156-5	SDF-DUP-1-050923	Water	05/09/23 09:30	05/11/23 09:25
580-127156-6	SDF-FEB-1-050923	Water	05/09/23 10:30	05/11/23 09:25
580-127156-7	Trip Blanks	Water	05/09/23 00:01	05/11/23 09:25



**Eurofins ET Northwest- Seattle**

5755 8th Street East  
Tacoma, WA 98424  
Phone (253) 922-2310 Phone (425) 420-9210

**Chain of Custody Record**



<b>Client Information</b>				Sampler: Ava Gempier		Lab PM: Cruz, Sheri L				Carrier Tracking No(s): FedEx				COC No: 580-44411-14188.2																																									
Client Contact: Eric Libolt				Phone: 360-752-9571		E-Mail: Sheri.Cruz@et.eurofinsus.com				State of Origin: Washington				Page: Page 1 of 1																																									
Company: Whatcom Environmental Services Inc.				PWSID:		<b>Analysis Requested</b>										Job #:																																							
Address: 228 East Champion Street #101				Due Date Requested:		<table border="1"> <tr><td>Field Filtered Sample (Yes or No)</td><td></td></tr> <tr><td>Perform MSMSD (Yes or No)</td><td></td></tr> <tr><td>2320B Alkalinity and Bicarbonate</td><td></td></tr> <tr><td>350.1 Ammonia</td><td></td></tr> <tr><td>SM6310_TOC_B_TOC</td><td></td></tr> <tr><td>52200 - COD</td><td></td></tr> <tr><td>NWTPH_Dx - Northwest - DROIRRO (with silica gel)</td><td></td></tr> <tr><td>NWTPH_Dx - Northwest - DROIRRO with silica gel</td><td></td></tr> <tr><td>NDTPH-GX</td><td></td></tr> <tr><td>300.0 Chloride and Sulfate</td><td></td></tr> <tr><td>Dissolved 200.7 - (FF) - Ca, Fe, Mg, Na, K</td><td></td></tr> <tr><td>Dissolved 200.8 - (FF) - As, Cr, Pb, Mn, Ni, Se</td><td></td></tr> <tr><td>Dissolved 7470_Mercury</td><td></td></tr> <tr><td>Total Fe, Mg</td><td></td></tr> <tr><td>Total As, Cr, Pb, Mn, Ni, Se</td><td></td></tr> <tr><td>Total Mercury</td><td></td></tr> <tr><td>cPAHs (carcinogenic polycyclic aromatic hydrocarbons)</td><td></td></tr> <tr><td>8260D - BTEX</td><td></td></tr> <tr><td>Total Number of Containers</td><td></td></tr> </table>										Field Filtered Sample (Yes or No)		Perform MSMSD (Yes or No)		2320B Alkalinity and Bicarbonate		350.1 Ammonia		SM6310_TOC_B_TOC		52200 - COD		NWTPH_Dx - Northwest - DROIRRO (with silica gel)		NWTPH_Dx - Northwest - DROIRRO with silica gel		NDTPH-GX		300.0 Chloride and Sulfate		Dissolved 200.7 - (FF) - Ca, Fe, Mg, Na, K		Dissolved 200.8 - (FF) - As, Cr, Pb, Mn, Ni, Se		Dissolved 7470_Mercury		Total Fe, Mg		Total As, Cr, Pb, Mn, Ni, Se		Total Mercury		cPAHs (carcinogenic polycyclic aromatic hydrocarbons)		8260D - BTEX		Total Number of Containers		Preservation Codes:	
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City: Bellingham				TAT Requested (days): 10 BD												A - HCL		M - Hexane																																					
State, Zip: WA, 98225				Compliance Project: <input type="checkbox"/> Yes <input type="checkbox"/> No												B - NaOH		N - None																																					
Phone: 360-752-9571				PO #: Bill to WES												C - Zn Acetate		O - AsNaO2																																					
Email: elibolt@whatcom-es.com				WO #:												D - Nitric Acid		P - Na2O4S																																					
Project Name: 2023 SDF Sampling				Project #:												E - NaHSO4		Q - Na2SO3																																					
Site: HF Sinclair Puget Sound Refining LLC				SSOW#:												F - MeOH		R - Na2S2O3																																					
																G - Amchlor		S - H2SO4																																					
																H - Ascorbic Acid		T - TSP Dodecahydrate																																					
																I - Ice		U - Acetone																																					
																J - DI Water		V - MCAA																																					
																K - EDTA		W - pH 4-5																																					
																L - EDA		Z - other (specify)																																					
																Other:																																							

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=wastewater, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MSMSD (Yes or No)	2320B Alkalinity and Bicarbonate	350.1 Ammonia	SM6310_TOC_B_TOC	52200 - COD	NWTPH_Dx - Northwest - DROIRRO (with silica gel)	NWTPH_Dx - Northwest - DROIRRO with silica gel	NDTPH-GX	300.0 Chloride and Sulfate	Dissolved 200.7 - (FF) - Ca, Fe, Mg, Na, K	Dissolved 200.8 - (FF) - As, Cr, Pb, Mn, Ni, Se	Dissolved 7470_Mercury	Total Fe, Mg	Total As, Cr, Pb, Mn, Ni, Se	Total Mercury	cPAHs (carcinogenic polycyclic aromatic hydrocarbons)	8260D - BTEX	Total Number of Containers	Special Instructions/Note:	
W-47-050923	5/9/23	15:15	G	Water	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	17	
W-112-050923	5/9/23	15:10	G	Water	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	17	
W-113-050923	5/9/23	12:15	G	Water	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	17	Please email results to Ava Gempier at <a href="mailto:agempler@whatcom-es.com">agempler@whatcom-es.com</a> and Eric Libolt at <a href="mailto:elibolt@whatcom-es.com">elibolt@whatcom-es.com</a>
W-127-050923	5/9/23	12:00	G	Water	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	17	
SDF-DUP-1-050923	5/9/23	9:30	G	Water	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	17	
SDF-FEB-1-050923	5/9/23	10:30	G	Water	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	17	There is one nitric poly bottle field filtered for dissolved analytes, and one nitric poly not field filtered for total analytes.
Trip Blanks	Filled At Lab			Water										X								X	2		



*will require the EIM file (EPP) in addition to report.*

used if samples are retained longer than 1 month)  
sal By Lab Archive For Months

A2 24/22  
1 R/water / R/w/ST/NOV  
Page 40 of 41  
LAB/water / R/w/ST/NOV  
A2 0.3/0.1  
1 B/water / R/w/ST/NOV

# Login Sample Receipt Checklist

Client: Whatcom Environmental Services Inc.

Job Number: 580-127156-1

**Login Number: 127156**

**List Number: 1**

**Creator: Groves, Elizabeth**

**List Source: Eurofins Seattle**

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



Burlington, WA *Corporate Laboratory (a)*  
1620 S Walnut St - Burlington, WA 98233 - 800.755.9295 • 360.757.1400  
Bellingham, WA *Microbiology (b)*  
805 Orchard Dr Ste 4 - Bellingham, WA 98225 - 360.715.1212

Portland, OR *Microbiology/Chemistry (c)*  
9725 SW Commerce Cr Ste A2 - Wilsonville, OR 97070 - 503.682.7802  
Corvallis, OR *Microbiology/Chemistry (d)*  
1100 NE Circle Blvd, Ste 130 - Corvallis, OR 97330 - 541.753.4946  
Bend, OR *Microbiology (e)*  
20332 Empire Blvd Ste 4 - Bend, OR 97701 - 541.639.8425

May 25, 2023

Page 1 of 1

Mr. Eric Libolt  
Whatcom Environmental Services  
228 E Champion #101  
Bellingham, WA 98225  
RE: 23-13424 - 2023 SDF Sampling

Dear Mr. Eric Libolt,

Your project: 2023 SDF Sampling, was received on Tuesday May 09, 2023.

All samples were analyzed within the accepted holding times and were appropriately preserved and analyzed according to approved analytical protocols, unless noted in the data or QC reports. The quality control data was within laboratory acceptance limits, unless specified in the data or QC reports.

If you have questions phone us at 800 755-9295.

Respectfully

A handwritten signature in blue ink that reads "Lawrence J Henderson". The signature is fluid and cursive, with a long horizontal flourish at the end.

Lawrence J Henderson, PhD  
Director of Laboratories, Vice President

Enclosures: Data Report  
QC Reports  
Chain of Custody



Burlington, WA	Corporate Laboratory (a)	1020 S Walnut St	Burlington, WA 98233	800.755.9295 • 360.757.1400
Bellingham, WA	Microbiology (b)	805 Orchard Dr Ste 4	Bellingham, WA 98225	360.715.1212
Portland, OR	Microbiology/Chemistry (c)	9725 SW Commerce Cr A2	Wilsonville, OR 97170	503.682.7802
Corvallis, OR	Microbiology/Chemistry (d)	540 SW Third Street	Corvallis, OR 97333	541.753.4946
Bend, OR	Microbiology/Chemistry (e)	20332 Empire Ave, Ste F4	Bend, OR 97703	541.639.8425

May 25, 2023

Page 1 of 1

# Case Narrative

Reference: **23-13424**

## Project Notes

	Analytical Method	Notes	Created by
Project Note	SM9223 B.2.b	Coliform samples received over 10 C.	CDD



Burlington, WA Corporate Laboratory (a)  
1620 S Walnut St - Burlington, WA 98233 - 800.755.9295 • 360.757.1400  
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1100 NE Circle Blvd, Ste 130 - Corvallis, OR 97330 - 541.753.4946  
Bend, OR Microbiology (e)  
20332 Empire Blvd Ste 4 - Bend, OR 97701 - 541.639.8425

# Data Report

Client Name: Whatcom Environmental Services  
228 E Champion #101  
Bellingham, WA 98225

Reference Number: **23-13424**  
Project: 2023 SDF Sampling

Report Date: 5/25/23

Date Received: 5/9/23

Approved by: bj,rml,tjb

Authorized by:

Lawrence J Henderson, PhD  
Director of Laboratories, Vice President

Sample Description: W-47-050923 HF Sinclair PSR								Matrix W	Sample Date: 5/9/23 3:15 pm			
Lab Number: 26931		Sample Comment:						Collected By: Ava Gempler				
CAS ID#	Parameter	Result	PQL	MDL	Units	DF	Method	Lab	Analyzed	Analyst	Batch	Comment

14797-55-8	NITRATE-N	0.030	0.100	0.0032	mg/L	1.0	SM4500-NO3 F	a	5/10/23	CJET	NO3NO2_230510B	
14797-65-0	NITRITE-N	ND	0.10	0.0022	mg/L	1.0	SM4500-NO3 F	a	5/10/23	CJET	NO3NO2_230510B	
E-10128	TOTAL NITRATE+NITRITE as N	0.04	0.01	0.0042	mg/L	1.0	SM4500-NO3 F	a	5/12/23	CJET	NO3NO2_230512	
Coli-To-t	TOTAL COLIFORM	<1	1		MPN/100mL	1.0	SM9223 B.2.b/Colilert-18	b	5/11/23	CKK	QT_230510a	
68583-22-2	E. Coli	<1	1		MPN/100mL	1.0	SM9223 B.2.b/Colilert-18	b	5/11/23	CKK	QT_230510a	

Sample Description: W-112-050923 HF Sinclair PSR								Matrix W	Sample Date: 5/9/23 3:10 pm			
Lab Number: 26932		Sample Comment:						Collected By: Ava Gempler				
CAS ID#	Parameter	Result	PQL	MDL	Units	DF	Method	Lab	Analyzed	Analyst	Batch	Comment

14797-55-8	NITRATE-N	0.01	0.100	0.0032	mg/L	1.0	SM4500-NO3 F	a	5/10/23	CJET	NO3NO2_230510B	
14797-65-0	NITRITE-N	ND	0.10	0.0022	mg/L	1.0	SM4500-NO3 F	a	5/10/23	CJET	NO3NO2_230510B	
E-10128	TOTAL NITRATE+NITRITE as N	0.02	0.01	0.0042	mg/L	1.0	SM4500-NO3 F	a	5/12/23	CJET	NO3NO2_230512	
Coli-To-t	TOTAL COLIFORM	<1	1		MPN/100mL	1.0	SM9223 B.2.b/Colilert-18	b	5/11/23	CKK	QT_230510a	
68583-22-2	E. Coli	<1	1		MPN/100mL	1.0	SM9223 B.2.b/Colilert-18	b	5/11/23	CKK	QT_230510a	

Sample Description: W-113-050923 HF Sinclair PSR								Matrix W	Sample Date: 5/9/23 12:15 pm			
Lab Number: 26933		Sample Comment:						Collected By: Ava Gempler				
CAS ID#	Parameter	Result	PQL	MDL	Units	DF	Method	Lab	Analyzed	Analyst	Batch	Comment

14797-55-8	NITRATE-N	0.0040 J	0.100	0.0032	mg/L	1.0	SM4500-NO3 F	a	5/10/23	CJET	NO3NO2_230510B	
14797-65-0	NITRITE-N	ND	0.10	0.0022	mg/L	1.0	SM4500-NO3 F	a	5/10/23	CJET	NO3NO2_230510B	
E-10128	TOTAL NITRATE+NITRITE as N	0.01	0.01	0.0042	mg/L	1.0	SM4500-NO3 F	a	5/12/23	CJET	NO3NO2_230512	
Coli-To-t	TOTAL COLIFORM	<1	1		MPN/100mL	1.0	SM9223 B.2.b/Colilert-18	b	5/11/23	CKK	QT_230510a	
68583-22-2	E. Coli	<1	1		MPN/100mL	1.0	SM9223 B.2.b/Colilert-18	b	5/11/23	CKK	QT_230510a	

Notes:

ND = Not detected above the listed practical quantitation limit (PQL) or not above the Method Detection Limit (MDL), if requested.  
PQL = Practical Quantitation Limit is the lowest level that can be achieved within specified limits of precision and accuracy during routine laboratory operating conditions.  
D.F. - Dilution Factor

If you have any questions concerning this report contact us at the above phone number.

# Data Report

Sample Description: W-127-050923 HF Sinclair PSR								Matrix W	Sample Date: 5/9/23 12:00 pm			
Lab Number: 26934		Sample Comment:						Collected By: Ava Gempler				
CAS ID#	Parameter	Result	PQL	MDL	Units	DF	Method	Lab	Analyzed	Analyst	Batch	Comment

14797-55-8	NITRATE-N	ND	0.100	0.0032	mg/L	1.0	SM4500-NO3 F	a	5/10/23	CJET	NO3NO2_230510B	
14797-65-0	NITRITE-N	ND	0.10	0.0022	mg/L	1.0	SM4500-NO3 F	a	5/10/23	CJET	NO3NO2_230510B	
E-10128	TOTAL NITRATE+NITRITE as N	0.0047 J	0.01	0.0042	mg/L	1.0	SM4500-NO3 F	a	5/12/23	CJET	NO3NO2_230512	
Coli-To-t	TOTAL COLIFORM	<1	1		MPN/100mL	1.0	SM9223 B.2.b/Colilert-18	b	5/11/23	CKK	QT_230510a	
68583-22-2	E. Coli	<1	1		MPN/100mL	1.0	SM9223 B.2.b/Colilert-18	b	5/11/23	CKK	QT_230510a	

Sample Description: SDF-FEB-1-050923 HF Sinclair PSR								Matrix W	Sample Date: 5/9/23 10:30 am			
Lab Number: 26935		Sample Comment:						Collected By: Ava Gempler				
CAS ID#	Parameter	Result	PQL	MDL	Units	DF	Method	Lab	Analyzed	Analyst	Batch	Comment

14797-55-8	NITRATE-N	0.01	0.100	0.0032	mg/L	1.0	SM4500-NO3 F	a	5/10/23	CJET	NO3NO2_230510B	
14797-65-0	NITRITE-N	ND	0.10	0.0022	mg/L	1.0	SM4500-NO3 F	a	5/10/23	CJET	NO3NO2_230510B	
E-10128	TOTAL NITRATE+NITRITE as N	0.02	0.01	0.0042	mg/L	1.0	SM4500-NO3 F	a	5/12/23	CJET	NO3NO2_230512	
Coli-To-t	TOTAL COLIFORM	<1	1		MPN/100mL	1.0	SM9223 B.2.b/Colilert-18	b	5/11/23	CKK	QT_230510a	
68583-22-2	E. Coli	<1	1		MPN/100mL	1.0	SM9223 B.2.b/Colilert-18	b	5/11/23	CKK	QT_230510a	

Sample Description: SDF-DUP-1-050923 HF Sinclair PSR								Matrix W	Sample Date: 5/9/23 9:30 am			
Lab Number: 26936		Sample Comment:						Collected By: Ava Gempler				
CAS ID#	Parameter	Result	PQL	MDL	Units	DF	Method	Lab	Analyzed	Analyst	Batch	Comment

14797-55-8	NITRATE-N	ND	0.100	0.0032	mg/L	1.0	SM4500-NO3 F	a	5/10/23	CJET	NO3NO2_230510B	
14797-65-0	NITRITE-N	ND	0.10	0.0022	mg/L	1.0	SM4500-NO3 F	a	5/10/23	CJET	NO3NO2_230510B	
E-10128	TOTAL NITRATE+NITRITE as N	ND	0.01	0.0042	mg/L	1.0	SM4500-NO3 F	a	5/12/23	CJET	NO3NO2_230512	
Coli-To-t	TOTAL COLIFORM	<1	1		MPN/100mL	1.0	SM9223 B.2.b/Colilert-18	b	5/11/23	CKK	QT_230510a	
68583-22-2	E. Coli	<1	1		MPN/100mL	1.0	SM9223 B.2.b/Colilert-18	b	5/11/23	CKK	QT_230510a	

Notes:

ND = Not detected above the listed practical quantitation limit (PQL) or not above the Method Detection Limit (MDL), if requested.  
 PQL = Practical Quantitation Limit is the lowest level that can be achieved within specified limits of precision and accuracy during routine laboratory operating conditions.  
 D.F. - Dilution Factor



## SAMPLE INDEPENDENT QUALITY CONTROL REPORT

Reference Number: **23-13424**

Report Date: 05/25/23

Batch	Analyte	Result	True Value	Units	Method	% Recovery	Limits*	QC Qualifier	QC Type	Comment
<b>Calibration Check</b>										
NO3NO2_230511	0 NITRATE-N	0.51	0.50	mg/L	SM4500-NO3 F	102	90-110		CAL	
	0 NITRITE-N	0.51	0.50	mg/L	SM4500-NO3 F	102	90-110		CAL	
NO3NO2_230511	0 TOTAL NITRATE+NITRITE as N	1.01	1.00	mg/L	SM4500-NO3 F	101	90-110		CAL	
<b>Laboratory Fortified Blank</b>										
NO3NO2_230511	0 NITRATE-N	2.04	2.00	mg/L	SM4500-NO3 F	102	90-110		LFB	
	0 NITRITE-N	2.04	2.00	mg/L	SM4500-NO3 F	102	90-110		LFB	
<b>Laboratory Reagent Blank</b>										
NO3NO2_230511	0 NITRATE-N	ND		mg/L	SM4500-NO3 F		0-0		LRB	
	0 NITRITE-N	ND		mg/L	SM4500-NO3 F		0-0		LRB	
NO3NO2_230511	0 TOTAL NITRATE+NITRITE as N	ND		mg/L	SM4500-NO3 F		0-0		LRB	
<b>Method Blank</b>										
NO3NO2_230511	0 NITRATE-N	ND		mg/L	SM4500-NO3 F		0-0		MB	
	0 NITRITE-N	ND		mg/L	SM4500-NO3 F		0-0		MB	
NO3NO2_230511	0 TOTAL NITRATE+NITRITE as N	ND		mg/L	SM4500-NO3 F		0-0		MB	
<b>Quality Control Sample</b>										
NO3NO2_230511	0 NITRATE-N	0.99	1.00	mg/L	SM4500-NO3 F	99	90-110		QCS	
	0 NITRITE-N	0.96	1.00	mg/L	SM4500-NO3 F	96	90-110		QCS	
NO3NO2_230511	0 TOTAL NITRATE+NITRITE as N	1.97	2.00	mg/L	SM4500-NO3 F	99	90-110		QCS	

\*Notation:

% Recovery = (Result of Analysis)/(True Value) \* 100

NA = Indicates % Recovery could not be calculated.

Limits are intended for water matrices only. These criteria are for guidance only when reported with soils/solids.

FORM: QCIndependent4.rpt





**SAMPLE DEPENDENT  
QUALITY CONTROL REPORT**  
Duplicate, Matrix Spike/Matrix Spike Duplicate and Confirmation Result Report

**Duplicate**

Batch	Sample	Analyte	Result	Duplicate Result	Units	%RPD	Limits	QC Qualifier	Type	Comments
<b>NO3NO2_230510B</b>										
14797-55-8	26931	NITRATE-N	0.03	0.04	mg/L	<b>28.6</b>	0-20	IM	DUP	
14797-65-0	26931	NITRITE-N	ND	ND	mg/L	<b>NA</b>	0-20		DUP	
<b>NO3NO2_230512</b>										
E-10128	26079	TOTAL NITRATE+NITRITE as N	0.0082	0.0075	mg/L	<b>8.9</b>	0-20		DUP	
E-10128	26158	TOTAL NITRATE+NITRITE as N	1.88	1.87	mg/L	<b>0.5</b>	0-20		DUP	
E-10128	26932	TOTAL NITRATE+NITRITE as N	0.02	0.02	mg/L	<b>0.0</b>	0-20		DUP	
E-10128	27250	TOTAL NITRATE+NITRITE as N	0.06	0.06	mg/L	<b>0.0</b>	0-20		DUP	
E-10128	27814	TOTAL NITRATE+NITRITE as N	0.24	0.23	mg/L	<b>4.3</b>	0-20		DUP	

**Laboratory Fortified Matrix (MS)**

Batch/CAS	Sample	Analyte	Result	Spike Result	Duplicate Spike Result	Conc	Units	Percent Recovery		Limits*	%RPD	Limits*	QC		Comments
								MS	MSD				Qualifier	Type	
<b>NO3NO2_230510B</b>															
14797-55-8	26931	NITRATE-N	0.03	0.53	0.52	0.50	mg/L	<b>100</b>	<b>98</b>	80-120	<b>2.0</b>	0-20		LFM	
14797-65-0	26931	NITRITE-N	ND	0.49	0.49	0.50	mg/L	<b>98</b>	<b>98</b>	80-120	<b>0.0</b>	0-20		LFM	
<b>NO3NO2_230512</b>															
E-10128	26079	TOTAL NITRATE+NITRITE as N	0.0082	0.58	0.58	1.00	mg/L	<b>57</b>	<b>57</b>	80-120	<b>0.0</b>	0-20	IM	LFM	
E-10128	26158	TOTAL NITRATE+NITRITE as N	1.88	2.87	2.91	1.00	mg/L	<b>99</b>	<b>103</b>	80-120	<b>4.0</b>	0-20		LFM	
E-10128	26932	TOTAL NITRATE+NITRITE as N	0.02	1.04	1.03	1.00	mg/L	<b>102</b>	<b>101</b>	80-120	<b>1.0</b>	0-20		LFM	
E-10128	27250	TOTAL NITRATE+NITRITE as N	0.06	1.06	1.06	1.00	mg/L	<b>100</b>	<b>100</b>	80-120	<b>0.0</b>	0-20		LFM	
E-10128	27814	TOTAL NITRATE+NITRITE as N	0.24	1.26	1.26	1.00	mg/L	<b>102</b>	<b>102</b>	80-120	<b>0.0</b>	0-20		LFM	

%RPD = Relative Percent Difference

NA = Indicates %RPD could not be calculated

Matrix Spike (MS)/Matrix Spike Duplicate (MSD) analyses are used to determine the accuracy (MS) and precision (MSD) of an analytical method in a given sample matrix. Therefore, the usefulness of this report is limited to samples of similar matrices analyzed in the same analytical batch.

Only Duplicate sample with detections are listed in this report

Limits are intended for water matrices only. These criteria are for guidance only when reported with soils/solids.

## Qualifier Definitions

Reference Number: 23-13424

Report Date: 05/25/23

Qualifier	Definition
IM	Matrix induced bias assumed
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

Note: Some qualifier definitions found on this page may pertain to results or QC data which are not printed with this report.

# CHAIN OF CUSTODY / ANALYSIS REQUEST (PLEASE COMPLETE)

23-13424  
26931 - 26936 (CONTINUED)



Report To: Whatcom Environmental Services	Billing Email: Same as Client
Address: 228 E Champion St #101	Bill To: Same as Client/Report To
City: Bellingham State: WA Zip: 98225	Address
Attn: Eric Libolt	City: State: Zip:
Phone: 360-752-9571 Fax: 360-752-9573	Phone: P.O.#:
Report Email: elibolt@whatcom-es.com	Card: VISA M/C Expires:
Project Name: 2023 SDF Sampling	Card#:

<b>FOR LAB USE</b>
REF#
<b>CHECK REGULATORY PROGRAM</b>
<input type="checkbox"/> Safe Drinking Water Act
<input type="checkbox"/> Clean Water Act
<input type="checkbox"/> RCRA / CERCLA
<input checked="" type="checkbox"/> Other

**ANALYTICAL**

**Main Lab (800-755-9295)**  
1620 South Walnut St. Burlington, WA 98233

**Microbiology (888-725-1212)**  
805 W. Orchard Dr. Suite 4 Bellingham, WA 98225

**Portland Lab (503-682-7802)**  
9150 SW Pioneer Ct. Suite W Wilsonville, OR 97070

**Corvallis Lab (541-753-4946)**  
540 SW 3<sup>rd</sup> St. Corvallis, OR 97333

**Bend Lab (541-639-8425)**  
20332 Empire Ave. Suite F4 Bend, OR 97703

**INSTRUCTIONS "PLEASE READ"**

1. Use one line per sample location.
2. Be specific in test requests.
3. List each metal individually.
4. Check off analysis to be performed for each sample location.
5. Enter number of containers.

Turn Around Time Required						Analysis Requested							Number Of Containers	Special Instruction/ Conditions on Receipt
Sample ID	Location	Sample Matrix (See Below)	Grab or Composite	Date	Time	Nitrite-N	Nitrate-N	Nitrite+Nitrate-N	Total Coliform M.P.N. - QuantiTray					
1	W-47-050923	HF Sinclair PSR	Ground Water	G	5/9/2023	3:15 pm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2	W-112-050923	HF Sinclair PSR	Ground Water	G	5/9/2023	15:10	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Please also email results to:
3	W-113-050923	HF Sinclair PSR	Ground Water	G	12:15	5/9/2023	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	agempler@whatcom-es.com
4	W-127-050923	HF Sinclair PSR	Ground Water	G	5/9/2023	12:00	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5	SDF-FEB-1-050923	HF Sinclair PSR	Ground Water	G	5/9/2023	10:30	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6	SDF-DUP-1-050923	HF Sinclair PSR	Ground Water	G	5/9/2023	9:30	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
8							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
9							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
10							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Sampled By: Ava Gempler Phone: 360-752-9571 Fax: Email: agempler@whatcom-es.com Total Containers

Sample Receipt requested (Must include FAX or Email)

**\* Sample Matrix**

W - Water SW - Surface Water WW - Wastewater OL - Oil  
 DW - Drinking Water GW - Ground Water S - Soil Other \_\_\_\_\_

(SDF-FEB-1-050923)

Relinquished By	Date	Time	Received By	Date	Time
Ava Gempler	5-9-23	4:58 pm	KRALW/RECY	5-9-23	17:00

	Yes	No	N/A
Custody Seals Intact	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample Temp 11.1 C Satisfactory	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Evidence Of Cooling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Samples Received Intact	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chain Of Custody & Labels Agree	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

# CHAIN OF CUSTODY / ANALYSIS REQUEST (PLEASE COMPLETE ALL APPLICABLE SHADED SECTIONS)



Report To: Whatcom Environmental Services	Billing Email: Same as Client
Address: 228 E Champion St #101	Bill To: Same as Client/Report To
City: Bellingham State: WA Zip: 98225	Address
Attn: Eric Libolt	City: State: Zip:
Phone: 360-752-9571 Fax: 360-752-9573	Phone: P.O.#:
Report Email: elibolt@whatcom-es.com	Card: VISA M/C Expires:
Project Name: 2023 SDF Sampling	Card#:

**FOR LAB USE**

REF# 23-13424

**CHECK REGULATORY PROGRAM**

Safe Drinking Water Act

Clean Water Act

RCRA / CERCLA

Other

**ANALYTICAL**

**Main Lab (800-755-9295)**  
1620 South Walnut St. Burlington, WA 98233

**Microbiology (888-725-1212)**  
805 W. Orchard Dr. Suite 4 Bellingham, WA 98225

**Portland Lab (503-682-7802)**  
1950 SW Pioneer Ct. Suite W Wilsonville, OR 97070

**Corvallis Lab (541-753-4946)**  
540 SW 3<sup>rd</sup> St. Corvallis, OR 97333

**Bend Lab (541-639-8425)**  
20332 Empire Ave. Suite F4 Bend, OR 97703

- INSTRUCTIONS "PLEASE READ"**
1. Use one line per sample location.
  2. Be specific in test requests.
  3. List each metal individually.
  4. Check off analysis to be performed for each sample location.
  5. Enter number of containers.

**Turn Around Time Required**

Standard

Half-Time (50% Surcharge)

Quickest (100% Surcharge) Phone Call Req.

Emergency (Phone Call Required)

**Analysis Requested**

Sample ID	Location	Sample Matrix (See Below)	Grab or Composite	Date	Time	Nitrite-N	Nitrate-N	Nitrite+Nitrate-N	Total Coliform M.P.N. - QuantiTray	Analysis Requested			Number Of Containers	Special Instruction/ Conditions on Receipt
										<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
1	W-47-050923	HF Sinclair PSR	Ground Water	G	5/9/2023	3:15 pm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2	W-112-050923	HF Sinclair PSR	Ground Water	G	5/9/2023	15:10	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3	W-113-050923	HF Sinclair PSR	Ground Water	G	12:15	5/9/2023	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Please also email results to:
4	W-127-050923	HF Sinclair PSR	Ground Water	G	5/9/2023	12:00	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	agempler@whatcom-es.com
5	SDF-FEB-1-050923	HF Sinclair PSR	Ground Water	G	5/9/2023	10:30	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6	SDF-DUP-1-050923	HF Sinclair PSR	Ground Water	G	5/9/2023	9:30	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7						12:00	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
8						Per client table	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
9							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
10							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Sampled By: Ava Gempler Phone: 360-752-9571 Fax: Email: agempler@whatcom-es.com

Sample Receipt requested (Must include FAX or Email)  \* Sample Matrix

W - Water SW - Surface Water WW - Wastewater OL - Oil

DW - Drinking Water GW - Ground Water S - Soil Other \_\_\_\_\_

(SDF-FEB-1-050923)

Relinquished By	Date	Time	Received By	Date	Time
Ava Gempler	5-9-23	4:58 pm	KRAL W RECY	5-9-23	1700

	Yes	No	N/A
Custody Seals Intact	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Sample Temp <u>11.1</u> C Satisfactory	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Evidence Of Cooling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Samples Received Intact	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chain Of Custody & Labels Agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



# ANALYTICAL REPORT

## PREPARED FOR

Attn: Eric Libolt  
Whatcom Environmental Services Inc.  
228 East Champion Street #101  
Bellingham, Washington 98225

Generated 7/11/2023 4:49:19 PM

## JOB DESCRIPTION

2023 SDF Sampling

## JOB NUMBER

580-128741-1

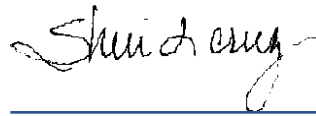
# Eurofins Seattle

## Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Northwest, LLC Project Manager.

## Authorization



Generated  
7/11/2023 4:49:19 PM

Authorized for release by  
Sheri Cruz, Project Manager I  
[Sheri.Cruz@et.eurofinsus.com](mailto:Sheri.Cruz@et.eurofinsus.com)  
(253)922-2310



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# Case Narrative

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-128741-1

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**Job ID: 580-128741-1**

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**Laboratory: Eurofins Seattle**

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**Narrative**

**Job Narrative  
580-128741-1**

**Receipt**

The samples were received on 6/24/2023 9:40 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 1.3° C.

**General Chemistry**

Method SM 5220D: The matrix spike / sample duplicate (MS/DUP) precision for preparation batch 580-431073 and analytical batch 580-431087 was outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample / laboratory control sample duplicate (LCS/LCSD) precision was within acceptance limits.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.





# Definitions/Glossary

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-128741-1

## Qualifiers

### General Chemistry

Qualifier	Qualifier Description
F5	Duplicate RPD exceeds limit, and one or both sample results are less than 5 times RL, and the absolute difference between results is < the upper reporting limits for both.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

# Client Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-128741-1

**Client Sample ID: W-112-062323**

**Lab Sample ID: 580-128741-1**

**Date Collected: 06/23/23 10:40**

**Matrix: Water**

**Date Received: 06/24/23 09:40**

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	18		1.5		mg/L			06/26/23 16:36	1

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11

# Client Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-128741-1

**Client Sample ID: W-127-062323**

**Lab Sample ID: 580-128741-2**

Date Collected: 06/23/23 10:35

Matrix: Water

Date Received: 06/24/23 09:40

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	21		1.5		mg/L			06/26/23 16:47	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chemical Oxygen Demand (SM 5220D)	17		10		mg/L		07/08/23 19:26	07/08/23 23:18	1

# QC Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-128741-1

## Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 580-430084/3  
Matrix: Water  
Analysis Batch: 430084

Client Sample ID: Method Blank  
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.5		mg/L			06/26/23 12:05	1

Lab Sample ID: LCS 580-430084/4  
Matrix: Water  
Analysis Batch: 430084

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	50.0	51.5		mg/L		103	90 - 110

Lab Sample ID: LCSD 580-430084/5  
Matrix: Water  
Analysis Batch: 430084

Client Sample ID: Lab Control Sample Dup  
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	50.0	51.5		mg/L		103	90 - 110	0	15

## Method: SM 5220D - COD

Lab Sample ID: MB 580-431073/3-A  
Matrix: Water  
Analysis Batch: 431087

Client Sample ID: Method Blank  
Prep Type: Total/NA  
Prep Batch: 431073

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chemical Oxygen Demand	ND		10		mg/L		07/08/23 19:26	07/08/23 23:18	1

Lab Sample ID: LCS 580-431073/4-A  
Matrix: Water  
Analysis Batch: 431087

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA  
Prep Batch: 431073

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chemical Oxygen Demand	75.0	70.6		mg/L		94	80 - 120

Lab Sample ID: LCSD 580-431073/5-A  
Matrix: Water  
Analysis Batch: 431087

Client Sample ID: Lab Control Sample Dup  
Prep Type: Total/NA  
Prep Batch: 431073

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chemical Oxygen Demand	75.0	75.1		mg/L		100	80 - 120	6	20

Lab Sample ID: 580-128741-2 MS  
Matrix: Water  
Analysis Batch: 431087

Client Sample ID: W-127-062323  
Prep Type: Total/NA  
Prep Batch: 431073

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chemical Oxygen Demand	17		25.0	38.3		mg/L		84	75 - 125

# QC Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-128741-1

## Method: SM 5220D - COD (Continued)

Lab Sample ID: 580-128741-2 DU  
Matrix: Water  
Analysis Batch: 431087

Client Sample ID: W-127-062323  
Prep Type: Total/NA  
Prep Batch: 431073

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Chemical Oxygen Demand	17		10.4	F5	mg/L		49	20

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11

# Lab Chronicle

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-128741-1

**Client Sample ID: W-112-062323**

**Lab Sample ID: 580-128741-1**

**Date Collected: 06/23/23 10:40**

**Matrix: Water**

**Date Received: 06/24/23 09:40**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	300.0		1	430084	CA	EET SEA	06/26/23 16:36

**Client Sample ID: W-127-062323**

**Lab Sample ID: 580-128741-2**

**Date Collected: 06/23/23 10:35**

**Matrix: Water**

**Date Received: 06/24/23 09:40**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	300.0		1	430084	CA	EET SEA	06/26/23 16:47
Total/NA	Prep	SM 5220			431073	MLT	EET SEA	07/08/23 19:26
Total/NA	Analysis	SM 5220D		1	431087	MLT	EET SEA	07/08/23 23:18

**Laboratory References:**

EET SEA = Eurofins Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310

# Accreditation/Certification Summary

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-128741-1

## Laboratory: Eurofins Seattle

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Washington	State	C788	07-13-23

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
300.0		Water	Chloride



# Sample Summary

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-128741-1

---

<u>Lab Sample ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Collected</u>	<u>Received</u>
580-128741-1	W-112-062323	Water	06/23/23 10:40	06/24/23 09:40
580-128741-2	W-127-062323	Water	06/23/23 10:35	06/24/23 09:40

1

2

3

4

5

6

7

8

9

10

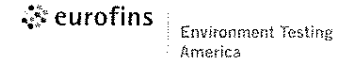
11



**Eurofins ET Northwest- Seattle**

5755 8th Street East  
Tacoma, WA 98424  
Phone (253) 922-2310 Phone (425) 420-9210

**Chain of Custody Record**



<b>Client Information</b>		Sampler: Ava Gempler		Lab PM: Cruz, Sheri L		Carrier Tracking No(s): FedEx		COC No: 580-44411-14188.2																																																																																																								
Client Contact: Eric Libolt		Phone: 360-752-9571		E-Mail: Sheri.Cruz@et.eurofinsus.com		State of Origin: Washington		Page: Page 1 of 1																																																																																																								
Company: Whatcom Environmental Services Inc.		PWSID:		<b>Analysis Requested</b>						Job #:																																																																																																						
Address: 228 East Champion Street #101		Due Date Requested:		<table border="1"> <tr> <td rowspan="6" style="writing-mode: vertical-rl; transform: rotate(180deg);">Field Filtered Sample (Yes or No)</td> <td rowspan="6" style="writing-mode: vertical-rl; transform: rotate(180deg);">Perfor. MS/MSD (Yes or No)</td> <td rowspan="6" style="writing-mode: vertical-rl; transform: rotate(180deg);">300.0 Chloride</td> <td rowspan="6" style="writing-mode: vertical-rl; transform: rotate(180deg);">5220D - COD</td> <td colspan="16">Analysis Requested</td> <td rowspan="6" style="writing-mode: vertical-rl; transform: rotate(180deg);">Total Number of Containers</td> </tr> <tr> <td colspan="16"> </td> </tr> <tr> <td colspan="16"> </td> </tr> <tr> <td colspan="16"> </td> </tr> <tr> <td colspan="16"> </td> </tr> <tr> <td colspan="16"> </td> </tr> </table>						Field Filtered Sample (Yes or No)	Perfor. MS/MSD (Yes or No)	300.0 Chloride	5220D - COD	Analysis Requested																Total Number of Containers																																																																																	<b>Preservation Codes:</b> A - HCL                          M - Hexane B - NaOH                         N - None C - Zn Acetate                  O - AsNaO2 D - Nitric Acid                  P - Na2O4S E - NaHSO4                        Q - Na2SO3 F - MeOH                         R - Na2S2O3 G - Amchlor                      S - H2SO4 H - Ascorbic Acid                T - TSP Dodecahydrate I - Ice                                U - Acetone J - DI Water                        V - MCAA K - EDTA                          W - pH 4-5 L - EDA                             Z - other (specify)	
Field Filtered Sample (Yes or No)	Perfor. MS/MSD (Yes or No)	300.0 Chloride	5220D - COD											Analysis Requested																	Total Number of Containers																																																																																	
City: Bellingham		TAT Requested (days): 10 BD		<table border="1"> <thead> <tr> <th>Sample Identification</th> <th>Sample Date</th> <th>Sample Time</th> <th>Sample Type (C=Comp, G=grab)</th> <th>Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)</th> <th>Field Filtered Sample (Yes or No)</th> <th>Perfor. MS/MSD (Yes or No)</th> <th>300.0 Chloride</th> <th>5220D - COD</th> <th>Total Number of Containers</th> <th>Special Instructions/Note:</th> </tr> </thead> <tbody> <tr> <td>W-112-062323</td> <td>6/23/23</td> <td>10:40</td> <td>G</td> <td>Water</td> <td></td> <td></td> <td>x</td> <td></td> <td>1</td> <td></td> </tr> <tr> <td>W-127-050923</td> <td>6/23/23</td> <td>10:35</td> <td>G</td> <td>Water</td> <td></td> <td></td> <td>x</td> <td>x</td> <td>2</td> <td></td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>						Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perfor. MS/MSD (Yes or No)	300.0 Chloride	5220D - COD	Total Number of Containers	Special Instructions/Note:	W-112-062323	6/23/23	10:40	G	Water			x		1		W-127-050923	6/23/23	10:35	G	Water			x	x	2																																			<b>Other:</b> Please email results to Ava Gempler at agempler@whatcom-es.com and Eric Libolt at elibolt@whatcom-es.com																																				
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**Possible Hazard Identification**  
 Non-Hazard  
 Flammable  
 Skin Irritant  
 Poison B  
 Known  
 Biological

**Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)**  
 Return To Client  
 Disposal By Lab  
 Archive For \_\_\_\_\_ Months

Deliverable Requested: I, II, III, IV, Other (specify)      Special Instructions/QC Requirements:

Empty Kit Relinquished by: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_ Method of Shipment: \_\_\_\_\_

Relinquished by: Ava Gempler *[Signature]* Date/Time: 6-23-23 11:30 Company: WES      Received by: *[Signature]* Date/Time: 6/24/23 0940 Company: *[Signature]*

Relinquished by: \_\_\_\_\_ Date/Time: \_\_\_\_\_ Company: \_\_\_\_\_      Received by: \_\_\_\_\_ Date/Time: \_\_\_\_\_ Company: \_\_\_\_\_

Relinquished by: \_\_\_\_\_ Date/Time: \_\_\_\_\_ Company: \_\_\_\_\_      Received by: \_\_\_\_\_ Date/Time: \_\_\_\_\_ Company: \_\_\_\_\_

Custody Seals Intact:  Yes  No      Custody Seal No.: \_\_\_\_\_      Therm. ID: A3 Cor: 113 °C      Unc: 1.3 °C



Cooler Temperature(s) °C: \_\_\_\_\_      Packing: *[Signature]*      FedEx: *[Signature]*      Lab Cour: \_\_\_\_\_      Other: \_\_\_\_\_

# Login Sample Receipt Checklist

Client: Whatcom Environmental Services Inc.

Job Number: 580-128741-1

**Login Number: 128741**

**List Number: 1**

**Creator: Presley, Kim A**

**List Source: Eurofins Seattle**

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	





# ANALYTICAL REPORT

## PREPARED FOR

Attn: Eric Libolt  
Whatcom Environmental Services Inc.  
228 East Champion Street #101  
Bellingham, Washington 98225

Generated 8/23/2023 7:00:37 PM

## JOB DESCRIPTION

2023 SDF Sampling HF sinclair PSR, LLC

## JOB NUMBER

580-130475-1

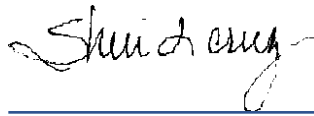
# Eurofins Seattle

## Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Northwest, LLC Project Manager.

## Authorization



Generated  
8/23/2023 7:00:37 PM

Authorized for release by  
Sheri Cruz, Project Manager I  
[Sheri.Cruz@et.eurofinsus.com](mailto:Sheri.Cruz@et.eurofinsus.com)  
(253)922-2310



# Table of Contents

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# Case Narrative

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling HF sinclair PSR, LLC

Job ID: 580-130475-1

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## Job ID: 580-130475-1

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### Laboratory: Eurofins Seattle

#### Narrative

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#### Job Narrative 580-130475-1

#### Comments

No additional comments.

#### Receipt

The samples were received on 8/11/2023 8:00 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperatures of the 3 coolers at receipt time were 1.0° C, 1.0° C and 1.2° C.

#### GC/MS VOA

Method NWTPH-Gx: The continuing calibration verification (CCV) associated with batch 580-434912 recovered above the upper control limit for Gasoline. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The associated samples are impacted: W-112-080923 (580-130475-2), W-113-080923 (580-130475-3), W-127-080923 (580-130475-4), SDF-DUP-1-080923 (580-130475-5), SDF-FEB-1-080923 (580-130475-6), Trip Blanks (580-130475-7), (CCV 580-434912/27) and (CCVIS 580-434912/5).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### GC/MS Semi VOA

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

#### GC Semi VOA

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

#### Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

#### General Chemistry

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

#### Organic Prep

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

#### VOA Prep

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

# Definitions/Glossary

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling HF sinclair PSR, LLC

Job ID: 580-130475-1

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

# Client Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: 2023 SDF Sampling HF sinclair PSR, LLC

Job ID: 580-130475-1

**Client Sample ID: W-47-080923**

**Lab Sample ID: 580-130475-1**

**Date Collected: 08/09/23 10:35**

**Matrix: Water**

**Date Received: 08/11/23 08:00**

### Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L			08/16/23 20:12	1
Toluene	ND		1.0		ug/L			08/16/23 20:12	1
Ethylbenzene	ND		1.0		ug/L			08/16/23 20:12	1
m-Xylene & p-Xylene	ND		2.0		ug/L			08/16/23 20:12	1
o-Xylene	ND		1.0		ug/L			08/16/23 20:12	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	97		80 - 120		08/16/23 20:12	1
4-Bromofluorobenzene (Surr)	98		80 - 120		08/16/23 20:12	1
Dibromofluoromethane (Surr)	107		80 - 120		08/16/23 20:12	1
1,2-Dichloroethane-d4 (Surr)	103		80 - 120		08/16/23 20:12	1

### Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.050		mg/L			08/20/23 17:35	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	99		77 - 123		08/20/23 17:35	1

### Method: SW846 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.054		ug/L		08/14/23 10:55	08/18/23 00:08	1
Chrysene	ND		0.11		ug/L		08/14/23 10:55	08/18/23 00:08	1
Benzo[a]pyrene	ND		0.11		ug/L		08/14/23 10:55	08/18/23 00:08	1
Indeno[1,2,3-cd]pyrene	ND		0.054		ug/L		08/14/23 10:55	08/18/23 00:08	1
Dibenz(a,h)anthracene	ND		0.11		ug/L		08/14/23 10:55	08/18/23 00:08	1
Benzo[b]fluoranthene	ND		0.11		ug/L		08/14/23 10:55	08/18/23 00:08	1
Benzo[k]fluoranthene	ND		0.054		ug/L		08/14/23 10:55	08/18/23 00:08	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Terphenyl-d14	67		29 - 150	08/14/23 10:55	08/18/23 00:08	1

### Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11		mg/L		08/14/23 10:34	08/15/23 04:24	1
Motor Oil (>C24-C36)	ND		0.36		mg/L		08/14/23 10:34	08/15/23 04:24	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	74		50 - 150	08/14/23 10:34	08/15/23 04:24	1

### Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11		mg/L		08/14/23 10:34	08/15/23 01:11	1
Motor Oil (>C24-C36)	ND		0.36		mg/L		08/14/23 10:34	08/15/23 01:11	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	79		50 - 150	08/14/23 10:34	08/15/23 01:11	1

### Method: EPA 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.50		mg/L		08/17/23 16:56	08/19/23 01:58	1
<b>Magnesium</b>	<b>50</b>		0.50		mg/L		08/17/23 16:56	08/19/23 01:58	1

Eurolins Seattle



# Client Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: 2023 SDF Sampling HF sinclair PSR, LLC

Job ID: 580-130475-1

**Client Sample ID: W-47-080923**

**Lab Sample ID: 580-130475-1**

Date Collected: 08/09/23 10:35

Matrix: Water

Date Received: 08/11/23 08:00

**Method: EPA 200.7 Rev 4.4 - Metals (ICP) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	63		0.50		mg/L		08/18/23 18:11	08/21/23 17:25	1
Iron	ND		0.50		mg/L		08/18/23 18:11	08/21/23 17:25	1
Magnesium	45		0.50		mg/L		08/18/23 18:11	08/21/23 17:25	1
Potassium	4.3		3.3		mg/L		08/18/23 18:11	08/21/23 17:25	1
Sodium	34		0.50		mg/L		08/18/23 18:11	08/21/23 17:25	1

**Method: EPA 200.8 - Metals (ICP/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0012		0.0010		mg/L		08/17/23 16:56	08/18/23 16:51	1
Lead	ND		0.00040		mg/L		08/17/23 16:56	08/18/23 16:51	1
Chromium	ND		0.00080		mg/L		08/17/23 16:56	08/18/23 16:51	1
Manganese	0.023		0.0020		mg/L		08/17/23 16:56	08/18/23 16:51	1
Nickel	ND		0.0030		mg/L		08/17/23 16:56	08/18/23 16:51	1
Selenium	ND		0.0080		mg/L		08/17/23 16:56	08/18/23 16:51	1

**Method: EPA 200.8 - Metals (ICP/MS) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0013		0.0010		mg/L		08/18/23 18:11	08/21/23 14:12	1
Chromium	ND		0.00080		mg/L		08/18/23 18:11	08/21/23 14:12	1
Lead	ND		0.00040		mg/L		08/18/23 18:11	08/21/23 14:12	1
Manganese	0.0025		0.0020		mg/L		08/18/23 18:11	08/21/23 14:12	1
Nickel	ND		0.0030		mg/L		08/18/23 18:11	08/21/23 14:12	1
Selenium	ND		0.0080		mg/L		08/18/23 18:11	08/21/23 14:12	1

**Method: SW846 7470A - Mercury (CVAA)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		08/16/23 10:56	08/16/23 18:10	1

**Method: SW846 7470A - Mercury (CVAA) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		08/16/23 10:56	08/16/23 18:16	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	14		1.5		mg/L			08/14/23 20:59	1
Sulfate (EPA 300.0)	58		1.5		mg/L			08/14/23 20:59	1
Ammonia as N (SM 4500 NH3 G)	ND		0.30		mg/L			08/12/23 18:40	1
Total Organic Carbon (SM 5310C)	4.8		1.5		mg/L			08/16/23 18:14	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity (SM 2320B)	360		7.0		mg/L			08/16/23 22:08	1
Bicarbonate Alkalinity as CaCO3 (SM 2320B)	360		7.0		mg/L			08/16/23 22:08	1
Chemical Oxygen Demand (SM 5220D)	ND		10		mg/L		08/15/23 20:59	08/15/23 23:40	1

# Client Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: 2023 SDF Sampling HF sinclair PSR, LLC

Job ID: 580-130475-1

**Client Sample ID: W-112-080923**

**Lab Sample ID: 580-130475-2**

**Date Collected: 08/09/23 12:15**

**Matrix: Water**

**Date Received: 08/11/23 08:00**

### Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L			08/17/23 05:24	1
Toluene	ND		1.0		ug/L			08/17/23 05:24	1
Ethylbenzene	ND		1.0		ug/L			08/17/23 05:24	1
m-Xylene & p-Xylene	ND		2.0		ug/L			08/17/23 05:24	1
o-Xylene	ND		1.0		ug/L			08/17/23 05:24	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	100		80 - 120		08/17/23 05:24	1
4-Bromofluorobenzene (Surr)	97		80 - 120		08/17/23 05:24	1
Dibromofluoromethane (Surr)	102		80 - 120		08/17/23 05:24	1
1,2-Dichloroethane-d4 (Surr)	100		80 - 120		08/17/23 05:24	1

### Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.050		mg/L			08/17/23 05:24	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	97		77 - 123		08/17/23 05:24	1

### Method: SW846 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.051		ug/L		08/14/23 10:55	08/18/23 00:28	1
Chrysene	ND		0.10		ug/L		08/14/23 10:55	08/18/23 00:28	1
Benzo[a]pyrene	ND		0.10		ug/L		08/14/23 10:55	08/18/23 00:28	1
Indeno[1,2,3-cd]pyrene	ND		0.051		ug/L		08/14/23 10:55	08/18/23 00:28	1
Dibenz(a,h)anthracene	ND		0.10		ug/L		08/14/23 10:55	08/18/23 00:28	1
Benzo[b]fluoranthene	ND		0.10		ug/L		08/14/23 10:55	08/18/23 00:28	1
Benzo[k]fluoranthene	ND		0.051		ug/L		08/14/23 10:55	08/18/23 00:28	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Terphenyl-d14	70		29 - 150	08/14/23 10:55	08/18/23 00:28	1

### Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	0.11		0.11		mg/L		08/14/23 10:34	08/15/23 04:43	1
Motor Oil (>C24-C36)	ND		0.35		mg/L		08/14/23 10:34	08/15/23 04:43	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	76		50 - 150	08/14/23 10:34	08/15/23 04:43	1

### Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11		mg/L		08/14/23 10:34	08/15/23 01:30	1
Motor Oil (>C24-C36)	ND		0.35		mg/L		08/14/23 10:34	08/15/23 01:30	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	80		50 - 150	08/14/23 10:34	08/15/23 01:30	1

### Method: EPA 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.50		mg/L		08/17/23 16:56	08/19/23 02:02	1
Magnesium	80		0.50		mg/L		08/17/23 16:56	08/19/23 02:02	1

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# Client Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: 2023 SDF Sampling HF sinclair PSR, LLC

Job ID: 580-130475-1

**Client Sample ID: W-112-080923**

**Lab Sample ID: 580-130475-2**

Date Collected: 08/09/23 12:15

Matrix: Water

Date Received: 08/11/23 08:00

**Method: EPA 200.7 Rev 4.4 - Metals (ICP) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	100		0.50		mg/L		08/18/23 18:11	08/21/23 17:57	1
Iron	ND		0.50		mg/L		08/18/23 18:11	08/21/23 17:57	1
Magnesium	77		0.50		mg/L		08/18/23 18:11	08/21/23 17:57	1
Potassium	6.5		3.3		mg/L		08/18/23 18:11	08/21/23 17:57	1
Sodium	52		0.50		mg/L		08/18/23 18:11	08/21/23 17:57	1

**Method: EPA 200.8 - Metals (ICP/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0014		0.0010		mg/L		08/17/23 16:56	08/18/23 16:54	1
Lead	ND		0.00040		mg/L		08/17/23 16:56	08/18/23 16:54	1
Chromium	ND		0.00080		mg/L		08/17/23 16:56	08/18/23 16:54	1
Manganese	0.017		0.0020		mg/L		08/17/23 16:56	08/18/23 16:54	1
Nickel	ND		0.0030		mg/L		08/17/23 16:56	08/18/23 16:54	1
Selenium	ND		0.0080		mg/L		08/17/23 16:56	08/18/23 16:54	1

**Method: EPA 200.8 - Metals (ICP/MS) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0014		0.0010		mg/L		08/18/23 18:11	08/21/23 14:47	1
Chromium	ND		0.00080		mg/L		08/18/23 18:11	08/21/23 14:47	1
Lead	ND		0.00040		mg/L		08/18/23 18:11	08/21/23 14:47	1
Manganese	ND		0.0020		mg/L		08/18/23 18:11	08/21/23 14:47	1
Nickel	ND		0.0030		mg/L		08/18/23 18:11	08/21/23 14:47	1
Selenium	ND		0.0080		mg/L		08/18/23 18:11	08/21/23 14:47	1

**Method: SW846 7470A - Mercury (CVAA)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		08/16/23 10:56	08/16/23 18:12	1

**Method: SW846 7470A - Mercury (CVAA) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		08/16/23 10:56	08/16/23 18:19	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	42		1.5		mg/L			08/14/23 21:11	1
Sulfate (EPA 300.0)	6.0		1.5		mg/L			08/14/23 21:11	1
Ammonia as N (SM 4500 NH3 G)	ND		0.30		mg/L			08/12/23 18:40	1
Total Organic Carbon (SM 5310C)	8.4		1.5		mg/L			08/16/23 18:31	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity (SM 2320B)	640		7.0		mg/L			08/16/23 22:08	1
Bicarbonate Alkalinity as CaCO3 (SM 2320B)	640		7.0		mg/L			08/16/23 22:08	1
Chemical Oxygen Demand (SM 5220D)	ND		10		mg/L		08/15/23 20:59	08/15/23 23:40	1

# Client Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling HF sinclair PSR, LLC

Job ID: 580-130475-1

**Client Sample ID: W-113-080923**

**Lab Sample ID: 580-130475-3**

Date Collected: 08/09/23 10:20

Matrix: Water

Date Received: 08/11/23 08:00

## Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L			08/17/23 05:48	1
Toluene	ND		1.0		ug/L			08/17/23 05:48	1
Ethylbenzene	ND		1.0		ug/L			08/17/23 05:48	1
m-Xylene & p-Xylene	ND		2.0		ug/L			08/17/23 05:48	1
o-Xylene	ND		1.0		ug/L			08/17/23 05:48	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	98		80 - 120		08/17/23 05:48	1
4-Bromofluorobenzene (Surr)	96		80 - 120		08/17/23 05:48	1
Dibromofluoromethane (Surr)	105		80 - 120		08/17/23 05:48	1
1,2-Dichloroethane-d4 (Surr)	104		80 - 120		08/17/23 05:48	1

## Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.050		mg/L			08/17/23 05:48	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		77 - 123		08/17/23 05:48	1

## Method: SW846 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.051		ug/L		08/14/23 10:55	08/18/23 00:47	1
Chrysene	ND		0.10		ug/L		08/14/23 10:55	08/18/23 00:47	1
Benzo[a]pyrene	ND		0.10		ug/L		08/14/23 10:55	08/18/23 00:47	1
Indeno[1,2,3-cd]pyrene	ND		0.051		ug/L		08/14/23 10:55	08/18/23 00:47	1
Dibenz(a,h)anthracene	ND		0.10		ug/L		08/14/23 10:55	08/18/23 00:47	1
Benzo[b]fluoranthene	ND		0.10		ug/L		08/14/23 10:55	08/18/23 00:47	1
Benzo[k]fluoranthene	ND		0.051		ug/L		08/14/23 10:55	08/18/23 00:47	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Terphenyl-d14	73		29 - 150	08/14/23 10:55	08/18/23 00:47	1

## Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	0.12		0.11		mg/L		08/14/23 10:34	08/15/23 05:03	1
Motor Oil (>C24-C36)	ND		0.35		mg/L		08/14/23 10:34	08/15/23 05:03	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	76		50 - 150	08/14/23 10:34	08/15/23 05:03	1

## Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11		mg/L		08/14/23 10:34	08/15/23 01:50	1
Motor Oil (>C24-C36)	ND		0.35		mg/L		08/14/23 10:34	08/15/23 01:50	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	81		50 - 150	08/14/23 10:34	08/15/23 01:50	1

## Method: EPA 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.50		mg/L		08/17/23 16:56	08/19/23 02:05	1
Magnesium	68		0.50		mg/L		08/17/23 16:56	08/19/23 02:05	1

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# Client Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: 2023 SDF Sampling HF sinclair PSR, LLC

Job ID: 580-130475-1

**Client Sample ID: W-113-080923**

**Lab Sample ID: 580-130475-3**

Date Collected: 08/09/23 10:20

Matrix: Water

Date Received: 08/11/23 08:00

### Method: EPA 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	75		0.50		mg/L		08/18/23 18:11	08/21/23 18:00	1
Iron	ND		0.50		mg/L		08/18/23 18:11	08/21/23 18:00	1
Magnesium	64		0.50		mg/L		08/18/23 18:11	08/21/23 18:00	1
Potassium	6.6		3.3		mg/L		08/18/23 18:11	08/21/23 18:00	1
Sodium	47		0.50		mg/L		08/18/23 18:11	08/21/23 18:00	1

### Method: EPA 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0017		0.0010		mg/L		08/17/23 16:56	08/18/23 16:56	1
Lead	ND		0.00040		mg/L		08/17/23 16:56	08/18/23 16:56	1
Chromium	0.00082		0.00080		mg/L		08/17/23 16:56	08/18/23 16:56	1
Manganese	0.012		0.0020		mg/L		08/17/23 16:56	08/18/23 16:56	1
Nickel	ND		0.0030		mg/L		08/17/23 16:56	08/18/23 16:56	1
Selenium	ND		0.0080		mg/L		08/17/23 16:56	08/18/23 16:56	1

### Method: EPA 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0017		0.0010		mg/L		08/18/23 18:11	08/21/23 14:50	1
Chromium	ND		0.00080		mg/L		08/18/23 18:11	08/21/23 14:50	1
Lead	ND		0.00040		mg/L		08/18/23 18:11	08/21/23 14:50	1
Manganese	ND		0.0020		mg/L		08/18/23 18:11	08/21/23 14:50	1
Nickel	ND		0.0030		mg/L		08/18/23 18:11	08/21/23 14:50	1
Selenium	ND		0.0080		mg/L		08/18/23 18:11	08/21/23 14:50	1

### Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		08/15/23 11:30	08/15/23 19:40	1

### Method: SW846 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		08/15/23 11:30	08/15/23 20:00	1

### General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	26		1.5		mg/L			08/14/23 21:23	1
Sulfate (EPA 300.0)	55		1.5		mg/L			08/14/23 21:23	1
Ammonia as N (SM 4500 NH3 G)	ND		0.30		mg/L			08/12/23 18:40	1
Total Organic Carbon (SM 5310C)	6.1		1.5		mg/L			08/16/23 18:48	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity (SM 2320B)	470		7.0		mg/L			08/16/23 22:08	1
Bicarbonate Alkalinity as CaCO3 (SM 2320B)	470		7.0		mg/L			08/16/23 22:08	1
Chemical Oxygen Demand (SM 5220D)	ND		10		mg/L		08/15/23 20:59	08/15/23 23:40	1

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# Client Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling HF sinclair PSR, LLC

Job ID: 580-130475-1

**Client Sample ID: W-127-080923**

**Lab Sample ID: 580-130475-4**

**Date Collected: 08/09/23 12:25**

**Matrix: Water**

**Date Received: 08/11/23 08:00**

## Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L			08/17/23 06:36	1
Toluene	ND		1.0		ug/L			08/17/23 06:36	1
Ethylbenzene	ND		1.0		ug/L			08/17/23 06:36	1
m-Xylene & p-Xylene	ND		2.0		ug/L			08/17/23 06:36	1
o-Xylene	ND		1.0		ug/L			08/17/23 06:36	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	98		80 - 120		08/17/23 06:36	1
4-Bromofluorobenzene (Surr)	95		80 - 120		08/17/23 06:36	1
Dibromofluoromethane (Surr)	101		80 - 120		08/17/23 06:36	1
1,2-Dichloroethane-d4 (Surr)	105		80 - 120		08/17/23 06:36	1

## Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.050		mg/L			08/17/23 06:36	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	95		77 - 123		08/17/23 06:36	1

## Method: SW846 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.052		ug/L		08/14/23 10:55	08/18/23 01:07	1
Chrysene	ND		0.10		ug/L		08/14/23 10:55	08/18/23 01:07	1
Benzo[a]pyrene	ND		0.10		ug/L		08/14/23 10:55	08/18/23 01:07	1
Indeno[1,2,3-cd]pyrene	ND		0.052		ug/L		08/14/23 10:55	08/18/23 01:07	1
Dibenz(a,h)anthracene	ND		0.10		ug/L		08/14/23 10:55	08/18/23 01:07	1
Benzo[b]fluoranthene	ND		0.10		ug/L		08/14/23 10:55	08/18/23 01:07	1
Benzo[k]fluoranthene	ND		0.052		ug/L		08/14/23 10:55	08/18/23 01:07	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Terphenyl-d14	73		29 - 150	08/14/23 10:55	08/18/23 01:07	1

## Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	0.28		0.11		mg/L		08/14/23 10:34	08/15/23 05:22	1
Motor Oil (>C24-C36)	0.48		0.36		mg/L		08/14/23 10:34	08/15/23 05:22	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	77		50 - 150	08/14/23 10:34	08/15/23 05:22	1

## Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11		mg/L		08/14/23 10:34	08/15/23 02:09	1
Motor Oil (>C24-C36)	ND		0.36		mg/L		08/14/23 10:34	08/15/23 02:09	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	82		50 - 150	08/14/23 10:34	08/15/23 02:09	1

## Method: EPA 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.50		mg/L		08/17/23 16:56	08/19/23 02:09	1
Magnesium	74		0.50		mg/L		08/17/23 16:56	08/19/23 02:09	1

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# Client Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: 2023 SDF Sampling HF sinclair PSR, LLC

Job ID: 580-130475-1

**Client Sample ID: W-127-080923**

**Lab Sample ID: 580-130475-4**

Date Collected: 08/09/23 12:25

Matrix: Water

Date Received: 08/11/23 08:00

### Method: EPA 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	100		0.50		mg/L		08/18/23 18:11	08/21/23 18:04	1
Iron	ND		0.50		mg/L		08/18/23 18:11	08/21/23 18:04	1
Magnesium	69		0.50		mg/L		08/18/23 18:11	08/21/23 18:04	1
Potassium	ND		3.3		mg/L		08/18/23 18:11	08/21/23 18:04	1
Sodium	41		0.50		mg/L		08/18/23 18:11	08/21/23 18:04	1

### Method: EPA 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0010		mg/L		08/17/23 16:56	08/18/23 16:59	1
Lead	ND		0.00040		mg/L		08/17/23 16:56	08/18/23 16:59	1
Chromium	0.0012		0.00080		mg/L		08/17/23 16:56	08/18/23 16:59	1
Manganese	0.011		0.0020		mg/L		08/17/23 16:56	08/18/23 16:59	1
Nickel	ND		0.0030		mg/L		08/17/23 16:56	08/18/23 16:59	1
Selenium	ND		0.0080		mg/L		08/17/23 16:56	08/18/23 16:59	1

### Method: EPA 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0010		mg/L		08/18/23 18:11	08/21/23 14:53	1
Chromium	ND		0.00080		mg/L		08/18/23 18:11	08/21/23 14:53	1
Lead	ND		0.00040		mg/L		08/18/23 18:11	08/21/23 14:53	1
Manganese	ND		0.0020		mg/L		08/18/23 18:11	08/21/23 14:53	1
Nickel	ND		0.0030		mg/L		08/18/23 18:11	08/21/23 14:53	1
Selenium	ND		0.0080		mg/L		08/18/23 18:11	08/21/23 14:53	1

### Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		08/15/23 11:30	08/15/23 19:42	1

### Method: SW846 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		08/15/23 11:30	08/15/23 19:49	1

### General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	39		1.5		mg/L			08/14/23 21:34	1
Sulfate (EPA 300.0)	51		1.5		mg/L			08/14/23 21:34	1
Ammonia as N (SM 4500 NH3 G)	ND		0.30		mg/L			08/12/23 18:40	1
Total Organic Carbon (SM 5310C)	13		1.5		mg/L			08/16/23 19:40	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity (SM 2320B)	540		7.0		mg/L			08/16/23 22:08	1
Bicarbonate Alkalinity as CaCO3 (SM 2320B)	540		7.0		mg/L			08/16/23 22:08	1
Chemical Oxygen Demand (SM 5220D)	18		10		mg/L		08/15/23 20:59	08/15/23 23:40	1

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# Client Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: 2023 SDF Sampling HF sinclair PSR, LLC

Job ID: 580-130475-1

**Client Sample ID: SDF-DUP-1-080923**

**Lab Sample ID: 580-130475-5**

Date Collected: 08/09/23 10:55

Matrix: Water

Date Received: 08/11/23 08:00

### Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L			08/17/23 07:01	1
Toluene	ND		1.0		ug/L			08/17/23 07:01	1
Ethylbenzene	ND		1.0		ug/L			08/17/23 07:01	1
m-Xylene & p-Xylene	ND		2.0		ug/L			08/17/23 07:01	1
o-Xylene	ND		1.0		ug/L			08/17/23 07:01	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	100		80 - 120		08/17/23 07:01	1
4-Bromofluorobenzene (Surr)	97		80 - 120		08/17/23 07:01	1
Dibromofluoromethane (Surr)	102		80 - 120		08/17/23 07:01	1
1,2-Dichloroethane-d4 (Surr)	101		80 - 120		08/17/23 07:01	1

### Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.050		mg/L			08/17/23 07:01	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	97		77 - 123		08/17/23 07:01	1

### Method: SW846 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.052		ug/L		08/14/23 10:55	08/18/23 01:27	1
Chrysene	ND		0.10		ug/L		08/14/23 10:55	08/18/23 01:27	1
Benzo[a]pyrene	ND		0.10		ug/L		08/14/23 10:55	08/18/23 01:27	1
Indeno[1,2,3-cd]pyrene	ND		0.052		ug/L		08/14/23 10:55	08/18/23 01:27	1
Dibenz(a,h)anthracene	ND		0.10		ug/L		08/14/23 10:55	08/18/23 01:27	1
Benzo[b]fluoranthene	ND		0.10		ug/L		08/14/23 10:55	08/18/23 01:27	1
Benzo[k]fluoranthene	ND		0.052		ug/L		08/14/23 10:55	08/18/23 01:27	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Terphenyl-d14	75		29 - 150	08/14/23 10:55	08/18/23 01:27	1

### Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	0.13		0.11		mg/L		08/14/23 10:34	08/15/23 05:41	1
Motor Oil (>C24-C36)	ND		0.35		mg/L		08/14/23 10:34	08/15/23 05:41	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	78		50 - 150	08/14/23 10:34	08/15/23 05:41	1

### Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11		mg/L		08/14/23 10:34	08/15/23 02:28	1
Motor Oil (>C24-C36)	ND		0.35		mg/L		08/14/23 10:34	08/15/23 02:28	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	79		50 - 150	08/14/23 10:34	08/15/23 02:28	1

### Method: EPA 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	0.81		0.50		mg/L		08/17/23 16:56	08/19/23 01:55	1
Magnesium	70		0.50		mg/L		08/17/23 16:56	08/19/23 01:55	1

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# Client Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: 2023 SDF Sampling HF sinclair PSR, LLC

Job ID: 580-130475-1

**Client Sample ID: SDF-DUP-1-080923**

**Lab Sample ID: 580-130475-5**

Date Collected: 08/09/23 10:55

Matrix: Water

Date Received: 08/11/23 08:00

**Method: EPA 200.7 Rev 4.4 - Metals (ICP) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	76		0.50		mg/L		08/18/23 18:11	08/21/23 18:07	1
Iron	ND		0.50		mg/L		08/18/23 18:11	08/21/23 18:07	1
Magnesium	63		0.50		mg/L		08/18/23 18:11	08/21/23 18:07	1
Potassium	6.8		3.3		mg/L		08/18/23 18:11	08/21/23 18:07	1
Sodium	46		0.50		mg/L		08/18/23 18:11	08/21/23 18:07	1

**Method: EPA 200.8 - Metals (ICP/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0016		0.0010		mg/L		08/17/23 16:56	08/18/23 16:48	1
Lead	ND		0.00040		mg/L		08/17/23 16:56	08/18/23 16:48	1
Chromium	0.0016		0.00080		mg/L		08/17/23 16:56	08/18/23 16:48	1
Manganese	0.038		0.0020		mg/L		08/17/23 16:56	08/18/23 16:48	1
Nickel	ND		0.0030		mg/L		08/17/23 16:56	08/18/23 16:48	1
Selenium	ND		0.0080		mg/L		08/17/23 16:56	08/18/23 16:48	1

**Method: EPA 200.8 - Metals (ICP/MS) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0015		0.0010		mg/L		08/18/23 18:11	08/21/23 14:56	1
Chromium	ND		0.00080		mg/L		08/18/23 18:11	08/21/23 14:56	1
Lead	ND		0.00040		mg/L		08/18/23 18:11	08/21/23 14:56	1
Manganese	ND		0.0020		mg/L		08/18/23 18:11	08/21/23 14:56	1
Nickel	ND		0.0030		mg/L		08/18/23 18:11	08/21/23 14:56	1
Selenium	ND		0.0080		mg/L		08/18/23 18:11	08/21/23 14:56	1

**Method: SW846 7470A - Mercury (CVAA)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		08/15/23 11:30	08/15/23 19:44	1

**Method: SW846 7470A - Mercury (CVAA) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		08/15/23 11:30	08/15/23 19:51	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	26		1.5		mg/L			08/14/23 21:46	1
Sulfate (EPA 300.0)	54		1.5		mg/L			08/14/23 21:46	1
Ammonia as N (SM 4500 NH3 G)	ND		0.30		mg/L			08/12/23 18:40	1
Total Organic Carbon (SM 5310C)	5.9		1.5		mg/L			08/16/23 19:58	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity (SM 2320B)	480		7.0		mg/L			08/16/23 22:08	1
Bicarbonate Alkalinity as CaCO3 (SM 2320B)	480		7.0		mg/L			08/16/23 22:08	1
Chemical Oxygen Demand (SM 5220D)	ND		10		mg/L		08/15/23 20:59	08/15/23 23:40	1

# Client Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling HF sinclair PSR, LLC

Job ID: 580-130475-1

**Client Sample ID: SDF-FEB-1-080923**

**Lab Sample ID: 580-130475-6**

**Date Collected: 08/09/23 12:00**

**Matrix: Water**

**Date Received: 08/11/23 08:00**

## Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L			08/17/23 07:25	1
Toluene	ND		1.0		ug/L			08/17/23 07:25	1
Ethylbenzene	ND		1.0		ug/L			08/17/23 07:25	1
m-Xylene & p-Xylene	ND		2.0		ug/L			08/17/23 07:25	1
o-Xylene	ND		1.0		ug/L			08/17/23 07:25	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	98		80 - 120		08/17/23 07:25	1
4-Bromofluorobenzene (Surr)	96		80 - 120		08/17/23 07:25	1
Dibromofluoromethane (Surr)	104		80 - 120		08/17/23 07:25	1
1,2-Dichloroethane-d4 (Surr)	103		80 - 120		08/17/23 07:25	1

## Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.050		mg/L			08/17/23 07:25	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		77 - 123		08/17/23 07:25	1

## Method: SW846 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.052		ug/L		08/14/23 10:55	08/18/23 01:47	1
Chrysene	ND		0.10		ug/L		08/14/23 10:55	08/18/23 01:47	1
Benzo[a]pyrene	ND		0.10		ug/L		08/14/23 10:55	08/18/23 01:47	1
Indeno[1,2,3-cd]pyrene	ND		0.052		ug/L		08/14/23 10:55	08/18/23 01:47	1
Dibenz(a,h)anthracene	ND		0.10		ug/L		08/14/23 10:55	08/18/23 01:47	1
Benzo[b]fluoranthene	ND		0.10		ug/L		08/14/23 10:55	08/18/23 01:47	1
Benzo[k]fluoranthene	ND		0.052		ug/L		08/14/23 10:55	08/18/23 01:47	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Terphenyl-d14	70		29 - 150	08/14/23 10:55	08/18/23 01:47	1

## Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11		mg/L		08/14/23 10:34	08/15/23 06:00	1
Motor Oil (>C24-C36)	ND		0.35		mg/L		08/14/23 10:34	08/15/23 06:00	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	73		50 - 150	08/14/23 10:34	08/15/23 06:00	1

## Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11		mg/L		08/14/23 10:34	08/15/23 02:47	1
Motor Oil (>C24-C36)	ND		0.35		mg/L		08/14/23 10:34	08/15/23 02:47	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	77		50 - 150	08/14/23 10:34	08/15/23 02:47	1

## Method: EPA 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.50		mg/L		08/17/23 16:56	08/19/23 01:51	1
Magnesium	ND		0.50		mg/L		08/17/23 16:56	08/19/23 01:51	1

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# Client Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: 2023 SDF Sampling HF sinclair PSR, LLC

Job ID: 580-130475-1

**Client Sample ID: SDF-FEB-1-080923**

**Lab Sample ID: 580-130475-6**

Date Collected: 08/09/23 12:00

Matrix: Water

Date Received: 08/11/23 08:00

### Method: EPA 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	ND		0.50		mg/L		08/18/23 18:11	08/21/23 18:11	1
Iron	ND		0.50		mg/L		08/18/23 18:11	08/21/23 18:11	1
Magnesium	ND		0.50		mg/L		08/18/23 18:11	08/21/23 18:11	1
Potassium	ND		3.3		mg/L		08/18/23 18:11	08/21/23 18:11	1
Sodium	ND		0.50		mg/L		08/18/23 18:11	08/21/23 18:11	1

### Method: EPA 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0010		mg/L		08/17/23 16:56	08/18/23 16:46	1
Lead	ND		0.00040		mg/L		08/17/23 16:56	08/18/23 16:46	1
<b>Chromium</b>	<b>0.0059</b>		0.00080		mg/L		08/17/23 16:56	08/18/23 16:46	1
Manganese	ND		0.0020		mg/L		08/17/23 16:56	08/18/23 16:46	1
Nickel	ND		0.0030		mg/L		08/17/23 16:56	08/18/23 16:46	1
Selenium	ND		0.0080		mg/L		08/17/23 16:56	08/18/23 16:46	1

### Method: EPA 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0010		mg/L		08/18/23 18:11	08/21/23 14:58	1
<b>Chromium</b>	<b>0.0055</b>		0.00080		mg/L		08/18/23 18:11	08/21/23 14:58	1
Lead	ND		0.00040		mg/L		08/18/23 18:11	08/21/23 14:58	1
Manganese	ND		0.0020		mg/L		08/18/23 18:11	08/21/23 14:58	1
Nickel	ND		0.0030		mg/L		08/18/23 18:11	08/21/23 14:58	1
Selenium	ND		0.0080		mg/L		08/18/23 18:11	08/21/23 14:58	1

### Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		08/15/23 11:30	08/15/23 19:47	1

### Method: SW846 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		08/15/23 11:30	08/15/23 19:53	1

### General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	ND		1.5		mg/L			08/14/23 21:58	1
Sulfate (EPA 300.0)	ND		1.5		mg/L			08/14/23 21:58	1
Ammonia as N (SM 4500 NH3 G)	ND		0.30		mg/L			08/12/23 18:42	1
Total Organic Carbon (SM 5310C)	ND		1.5		mg/L			08/16/23 20:15	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Alkalinity (SM 2320B)</b>	<b>9.8</b>		7.0		mg/L			08/16/23 22:08	1
<b>Bicarbonate Alkalinity as CaCO3 (SM 2320B)</b>	<b>9.8</b>		7.0		mg/L			08/16/23 22:08	1
Chemical Oxygen Demand (SM 5220D)	ND		10		mg/L		08/15/23 20:59	08/15/23 23:40	1

# Client Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: 2023 SDF Sampling HF sinclair PSR, LLC

Job ID: 580-130475-1

**Client Sample ID: Trip Blanks**

**Lab Sample ID: 580-130475-7**

**Date Collected: 08/09/23 00:00**

**Matrix: Water**

**Date Received: 08/11/23 08:00**

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L			08/17/23 04:36	1
Toluene	ND		1.0		ug/L			08/17/23 04:36	1
Ethylbenzene	ND		1.0		ug/L			08/17/23 04:36	1
m-Xylene & p-Xylene	ND		2.0		ug/L			08/17/23 04:36	1
o-Xylene	ND		1.0		ug/L			08/17/23 04:36	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
<i>Toluene-d8 (Surr)</i>	97		80 - 120		08/17/23 04:36	1
<i>4-Bromofluorobenzene (Surr)</i>	98		80 - 120		08/17/23 04:36	1
<i>Dibromofluoromethane (Surr)</i>	104		80 - 120		08/17/23 04:36	1
<i>1,2-Dichloroethane-d4 (Surr)</i>	105		80 - 120		08/17/23 04:36	1

**Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.050		mg/L			08/17/23 04:36	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
<i>4-Bromofluorobenzene (Surr)</i>	98		77 - 123		08/17/23 04:36	1

# QC Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: 2023 SDF Sampling HF sinclair PSR, LLC

Job ID: 580-130475-1

## Method: 8260D - Volatile Organic Compounds by GC/MS

**Lab Sample ID: MB 580-434874/11**  
**Matrix: Water**  
**Analysis Batch: 434874**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L			08/16/23 15:06	1
Toluene	ND		1.0		ug/L			08/16/23 15:06	1
Ethylbenzene	ND		1.0		ug/L			08/16/23 15:06	1
m-Xylene & p-Xylene	ND		2.0		ug/L			08/16/23 15:06	1
o-Xylene	ND		1.0		ug/L			08/16/23 15:06	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	97		80 - 120		08/16/23 15:06	1
4-Bromofluorobenzene (Surr)	97		80 - 120		08/16/23 15:06	1
Dibromofluoromethane (Surr)	105		80 - 120		08/16/23 15:06	1
1,2-Dichloroethane-d4 (Surr)	104		80 - 120		08/16/23 15:06	1

**Lab Sample ID: LCS 580-434874/6**  
**Matrix: Water**  
**Analysis Batch: 434874**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Benzene	10.0	9.77		ug/L		98	80 - 122
Toluene	10.0	10.5		ug/L		105	80 - 120
Ethylbenzene	10.0	10.8		ug/L		108	80 - 120
m-Xylene & p-Xylene	10.0	11.4		ug/L		114	80 - 120
o-Xylene	10.0	10.8		ug/L		108	80 - 120

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Toluene-d8 (Surr)	101		80 - 120
4-Bromofluorobenzene (Surr)	106		80 - 120
Dibromofluoromethane (Surr)	99		80 - 120
1,2-Dichloroethane-d4 (Surr)	96		80 - 120

**Lab Sample ID: LCSD 580-434874/7**  
**Matrix: Water**  
**Analysis Batch: 434874**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Benzene	10.0	9.41		ug/L		94	80 - 122	4	14
Toluene	10.0	9.94		ug/L		99	80 - 120	6	13
Ethylbenzene	10.0	10.0		ug/L		100	80 - 120	8	14
m-Xylene & p-Xylene	10.0	10.3		ug/L		103	80 - 120	10	14
o-Xylene	10.0	9.86		ug/L		99	80 - 120	10	16

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
Toluene-d8 (Surr)	98		80 - 120
4-Bromofluorobenzene (Surr)	98		80 - 120
Dibromofluoromethane (Surr)	99		80 - 120
1,2-Dichloroethane-d4 (Surr)	97		80 - 120

# QC Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: 2023 SDF Sampling HF sinclair PSR, LLC

Job ID: 580-130475-1

## Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

**Lab Sample ID: MB 580-434911/11**  
**Matrix: Water**  
**Analysis Batch: 434911**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L			08/17/23 04:12	1
Toluene	ND		1.0		ug/L			08/17/23 04:12	1
Ethylbenzene	ND		1.0		ug/L			08/17/23 04:12	1
m-Xylene & p-Xylene	ND		2.0		ug/L			08/17/23 04:12	1
o-Xylene	ND		1.0		ug/L			08/17/23 04:12	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	100		80 - 120		08/17/23 04:12	1
4-Bromofluorobenzene (Surr)	99		80 - 120		08/17/23 04:12	1
Dibromofluoromethane (Surr)	104		80 - 120		08/17/23 04:12	1
1,2-Dichloroethane-d4 (Surr)	99		80 - 120		08/17/23 04:12	1

**Lab Sample ID: LCS 580-434911/6**  
**Matrix: Water**  
**Analysis Batch: 434911**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Benzene	10.0	9.85		ug/L		98	80 - 122
Toluene	10.0	10.5		ug/L		105	80 - 120
Ethylbenzene	10.0	10.6		ug/L		106	80 - 120
m-Xylene & p-Xylene	10.0	10.9		ug/L		109	80 - 120
o-Xylene	10.0	10.5		ug/L		105	80 - 120

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Toluene-d8 (Surr)	100		80 - 120
4-Bromofluorobenzene (Surr)	102		80 - 120
Dibromofluoromethane (Surr)	100		80 - 120
1,2-Dichloroethane-d4 (Surr)	97		80 - 120

**Lab Sample ID: LCSD 580-434911/7**  
**Matrix: Water**  
**Analysis Batch: 434911**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Benzene	10.0	9.67		ug/L		97	80 - 122	2	14
Toluene	10.0	9.79		ug/L		98	80 - 120	7	13
Ethylbenzene	10.0	9.81		ug/L		98	80 - 120	7	14
m-Xylene & p-Xylene	10.0	10.1		ug/L		101	80 - 120	8	14
o-Xylene	10.0	9.80		ug/L		98	80 - 120	7	16

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
Toluene-d8 (Surr)	98		80 - 120
4-Bromofluorobenzene (Surr)	101		80 - 120
Dibromofluoromethane (Surr)	101		80 - 120
1,2-Dichloroethane-d4 (Surr)	102		80 - 120

# QC Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: 2023 SDF Sampling HF sinclair PSR, LLC

Job ID: 580-130475-1

## Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

**Lab Sample ID: MB 580-434912/11**  
**Matrix: Water**  
**Analysis Batch: 434912**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.050		mg/L			08/17/23 04:12	1
Surrogate	MB %Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	99		77 - 123					08/17/23 04:12	1

**Lab Sample ID: LCS 580-434912/8**  
**Matrix: Water**  
**Analysis Batch: 434912**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Gasoline	1.00	1.11		mg/L		111	55 - 148
Surrogate	LCS %Recovery	LCS Qualifier	Limits				
4-Bromofluorobenzene (Surr)	104		77 - 123				

**Lab Sample ID: LCSD 580-434912/9**  
**Matrix: Water**  
**Analysis Batch: 434912**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Gasoline	1.00	1.09		mg/L		109	55 - 148	2	10
Surrogate	LCSD %Recovery	LCSD Qualifier	Limits						
4-Bromofluorobenzene (Surr)	102		77 - 123						

**Lab Sample ID: MB 580-435226/7**  
**Matrix: Water**  
**Analysis Batch: 435226**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.050		mg/L			08/20/23 13:06	1
Surrogate	MB %Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	100		77 - 123					08/20/23 13:06	1

**Lab Sample ID: LCS 580-435226/10**  
**Matrix: Water**  
**Analysis Batch: 435226**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Gasoline	1.00	1.00		mg/L		100	55 - 148
Surrogate	LCS %Recovery	LCS Qualifier	Limits				
4-Bromofluorobenzene (Surr)	104		77 - 123				

# QC Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: 2023 SDF Sampling HF sinclair PSR, LLC

Job ID: 580-130475-1

## Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS) (Continued)

**Lab Sample ID: LCSD 580-435226/11**  
**Matrix: Water**  
**Analysis Batch: 435226**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Gasoline	1.00	0.938		mg/L		94	55 - 148	7	10
		<b>LCS</b>	<b>LCS</b>						
<b>Surrogate</b>		<b>%Recovery</b>	<b>Qualifier</b>						
4-Bromofluorobenzene (Surr)		102							

## Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

**Lab Sample ID: MB 580-434577/1-A**  
**Matrix: Water**  
**Analysis Batch: 435100**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 434577**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac	
Benzo[a]anthracene	ND		0.050		ug/L		08/14/23 10:55	08/17/23 21:29	1	
Chrysene	ND		0.10		ug/L		08/14/23 10:55	08/17/23 21:29	1	
Benzo[a]pyrene	ND		0.10		ug/L		08/14/23 10:55	08/17/23 21:29	1	
Indeno[1,2,3-cd]pyrene	ND		0.050		ug/L		08/14/23 10:55	08/17/23 21:29	1	
Dibenz(a,h)anthracene	ND		0.10		ug/L		08/14/23 10:55	08/17/23 21:29	1	
Benzo[b]fluoranthene	ND		0.10		ug/L		08/14/23 10:55	08/17/23 21:29	1	
Benzo[k]fluoranthene	ND		0.050		ug/L		08/14/23 10:55	08/17/23 21:29	1	
		<b>MB</b>	<b>MB</b>							
<b>Surrogate</b>		<b>%Recovery</b>	<b>Qualifier</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Terphenyl-d14		58						08/14/23 10:55	08/17/23 21:29	1

**Lab Sample ID: LCS 580-434577/2-A**  
**Matrix: Water**  
**Analysis Batch: 435100**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 434577**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Benzo[a]anthracene	8.00	6.44		ug/L		81	55 - 123
Chrysene	8.00	6.25		ug/L		78	47 - 120
Benzo[a]pyrene	8.00	6.57		ug/L		82	51 - 120
Indeno[1,2,3-cd]pyrene	8.00	6.99		ug/L		87	45 - 123
Dibenz(a,h)anthracene	8.00	6.84		ug/L		85	54 - 123
Benzo[b]fluoranthene	8.00	6.71		ug/L		84	43 - 120
Benzo[k]fluoranthene	8.00	6.09		ug/L		76	41 - 121
		<b>LCS</b>	<b>LCS</b>				
<b>Surrogate</b>		<b>%Recovery</b>	<b>Qualifier</b>				
Terphenyl-d14		65					

**Lab Sample ID: LCSD 580-434577/3-A**  
**Matrix: Water**  
**Analysis Batch: 435100**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 434577**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Benzo[a]anthracene	8.00	7.30		ug/L		91	55 - 123	13	31
Chrysene	8.00	7.04		ug/L		88	47 - 120	12	30
Benzo[a]pyrene	8.00	7.48		ug/L		93	51 - 120	13	31
Indeno[1,2,3-cd]pyrene	8.00	7.99		ug/L		100	45 - 123	13	35

Eurofins Seattle



# QC Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: 2023 SDF Sampling HF sinclair PSR, LLC

Job ID: 580-130475-1

## Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM) (Continued)

**Lab Sample ID: LCSD 580-434577/3-A**  
**Matrix: Water**  
**Analysis Batch: 435100**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 434577**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Dibenz(a,h)anthracene	8.00	7.70		ug/L		96	54 - 123	12	35
Benzo[b]fluoranthene	8.00	7.40		ug/L		92	43 - 120	10	35
Benzo[k]fluoranthene	8.00	7.13		ug/L		89	41 - 121	16	35
		<b>LCS</b>	<b>LCS</b>						
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>						
Terphenyl-d14	77		29 - 150						

## Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

**Lab Sample ID: MB 580-434571/1-A**  
**Matrix: Water**  
**Analysis Batch: 434640**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 434571**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11		mg/L		08/14/23 10:34	08/15/23 03:26	1
Motor Oil (>C24-C36)	ND		0.35		mg/L		08/14/23 10:34	08/15/23 03:26	1
		<b>MB</b>	<b>MB</b>						
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>			<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>	
o-Terphenyl	84		50 - 150			08/14/23 10:34	08/15/23 03:26	1	

**Lab Sample ID: LCS 580-434571/2-A**  
**Matrix: Water**  
**Analysis Batch: 434640**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 434571**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
#2 Diesel (C10-C24)	4.00	3.14		mg/L		78	50 - 120		
Motor Oil (>C24-C36)	4.00	3.67		mg/L		92	64 - 120		
		<b>LCS</b>	<b>LCS</b>						
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>						
o-Terphenyl	91		50 - 150						

**Lab Sample ID: LCSD 580-434571/3-A**  
**Matrix: Water**  
**Analysis Batch: 434640**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 434571**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
#2 Diesel (C10-C24)	4.00	2.95		mg/L		74	50 - 120	6	26
Motor Oil (>C24-C36)	4.00	3.29		mg/L		82	64 - 120	11	24
		<b>LCS</b>	<b>LCS</b>						
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>						
o-Terphenyl	85		50 - 150						

# QC Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: 2023 SDF Sampling HF sinclair PSR, LLC

Job ID: 580-130475-1

## Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

**Lab Sample ID: MB 580-434571/1-B**  
**Matrix: Water**  
**Analysis Batch: 434640**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 434571**

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
#2 Diesel (C10-C24)	ND		0.11		mg/L		08/14/23 10:34	08/15/23 00:13	1
Motor Oil (>C24-C36)	ND		0.35		mg/L		08/14/23 10:34	08/15/23 00:13	1
Surrogate		MB MB	Limits			Prepared	Analyzed	Dil Fac	
		%Recovery		Qualifier					
o-Terphenyl		90	50 - 150			08/14/23 10:34	08/15/23 00:13	1	

**Lab Sample ID: LCS 580-434571/2-B**  
**Matrix: Water**  
**Analysis Batch: 434640**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 434571**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec	Limits
#2 Diesel (C10-C24)	4.00	3.38		mg/L		84		50 - 120
Motor Oil (>C24-C36)	4.00	3.98		mg/L		100		64 - 120
Surrogate		LCS LCS	Limits			Prepared	Analyzed	Dil Fac
		%Recovery		Qualifier				
o-Terphenyl		100	50 - 150			08/14/23 10:34	08/15/23 00:13	1

**Lab Sample ID: LCSD 580-434571/3-B**  
**Matrix: Water**  
**Analysis Batch: 434640**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 434571**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec	Limits	RPD	RPD Limit
#2 Diesel (C10-C24)	4.00	3.12		mg/L		78		50 - 120	8	26
Motor Oil (>C24-C36)	4.00	3.53		mg/L		88		64 - 120	12	24
Surrogate		LCSD LCSD	Limits			Prepared	Analyzed	Dil Fac		
		%Recovery		Qualifier						
o-Terphenyl		89	50 - 150			08/14/23 10:34	08/15/23 00:13	1		

## Method: 200.7 Rev 4.4 - Metals (ICP)

**Lab Sample ID: MB 580-435079/26-A**  
**Matrix: Water**  
**Analysis Batch: 435279**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 435079**

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Iron	ND		0.50		mg/L		08/17/23 16:56	08/19/23 01:10	1
Magnesium	ND		0.50		mg/L		08/17/23 16:56	08/19/23 01:10	1

**Lab Sample ID: LCS 580-435079/27-A**  
**Matrix: Water**  
**Analysis Batch: 435279**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 435079**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec	Limits
Iron	20.0	20.5		mg/L		103		85 - 115
Magnesium	20.0	21.2		mg/L		106		85 - 115

# QC Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: 2023 SDF Sampling HF sinclair PSR, LLC

Job ID: 580-130475-1

## Method: 200.7 Rev 4.4 - Metals (ICP) (Continued)

**Lab Sample ID: LCSD 580-435079/28-A**  
**Matrix: Water**  
**Analysis Batch: 435279**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 435079**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec		RPD	Limit
							Limits	RPD		
Iron	20.0	20.5		mg/L		102	85 - 115	0	20	
Magnesium	20.0	21.4		mg/L		107	85 - 115	1	20	

**Lab Sample ID: MB 580-435204/14-A**  
**Matrix: Water**  
**Analysis Batch: 435385**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 435204**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.50		mg/L		08/18/23 18:11	08/21/23 17:15	1
Magnesium	ND		0.50		mg/L		08/18/23 18:11	08/21/23 17:15	1
Potassium	ND		3.3		mg/L		08/18/23 18:11	08/21/23 17:15	1
Sodium	ND		0.50		mg/L		08/18/23 18:11	08/21/23 17:15	1

**Lab Sample ID: LCS 580-435204/15-A**  
**Matrix: Water**  
**Analysis Batch: 435385**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 435204**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec	
							Limits	RPD
Calcium	20.0	19.2		mg/L		96	85 - 115	
Iron	20.0	19.5		mg/L		98	85 - 115	
Magnesium	20.0	20.0		mg/L		100	85 - 115	
Potassium	20.0	18.5		mg/L		92	85 - 115	
Sodium	20.0	18.5		mg/L		93	85 - 115	

**Lab Sample ID: LCSD 580-435204/16-A**  
**Matrix: Water**  
**Analysis Batch: 435385**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 435204**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec		RPD	Limit
							Limits	RPD		
Calcium	20.0	19.5		mg/L		97	85 - 115	1	20	
Iron	20.0	19.7		mg/L		99	85 - 115	1	20	
Magnesium	20.0	20.1		mg/L		100	85 - 115	0	20	
Potassium	20.0	18.7		mg/L		93	85 - 115	1	20	
Sodium	20.0	18.7		mg/L		93	85 - 115	1	20	

**Lab Sample ID: 580-130475-1 MS**  
**Matrix: Water**  
**Analysis Batch: 435385**

**Client Sample ID: W-47-080923**  
**Prep Type: Dissolved**  
**Prep Batch: 435204**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec	
									Limits	RPD
Calcium	63		20.0	85.5		mg/L		112	70 - 130	
Iron	ND		20.0	20.2		mg/L		101	70 - 130	
Magnesium	45		20.0	66.5		mg/L		110	70 - 130	
Potassium	4.3		20.0	24.0		mg/L		99	70 - 130	
Sodium	34		20.0	54.6		mg/L		102	70 - 130	

# QC Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: 2023 SDF Sampling HF sinclair PSR, LLC

Job ID: 580-130475-1

## Method: 200.7 Rev 4.4 - Metals (ICP) (Continued)

**Lab Sample ID: 580-130475-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 435385**

**Client Sample ID: W-47-080923**  
**Prep Type: Dissolved**  
**Prep Batch: 435204**

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier				Limits		
Calcium	63		20.0	84.8		mg/L		109	70 - 130	1	20
Iron	ND		20.0	19.9		mg/L		100	70 - 130	1	20
Magnesium	45		20.0	66.2		mg/L		108	70 - 130	0	20
Potassium	4.3		20.0	24.0		mg/L		99	70 - 130	0	20
Sodium	34		20.0	54.3		mg/L		100	70 - 130	1	20

**Lab Sample ID: 580-130475-1 DU**  
**Matrix: Water**  
**Analysis Batch: 435385**

**Client Sample ID: W-47-080923**  
**Prep Type: Dissolved**  
**Prep Batch: 435204**

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Calcium	63		63.7		mg/L		1	20
Iron	ND		ND		mg/L		NC	20
Magnesium	45		45.7		mg/L		3	20
Potassium	4.3		4.35		mg/L		1	20
Sodium	34		34.6		mg/L		1	20

## Method: 200.8 - Metals (ICP/MS)

**Lab Sample ID: MB 580-435079/26-A**  
**Matrix: Water**  
**Analysis Batch: 435248**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 435079**

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Arsenic	ND		0.0010		mg/L		08/17/23 16:56	08/18/23 16:11	1
Chromium	ND		0.00080		mg/L		08/17/23 16:56	08/18/23 16:11	1
Lead	ND		0.00040		mg/L		08/17/23 16:56	08/18/23 16:11	1
Manganese	ND		0.0020		mg/L		08/17/23 16:56	08/18/23 16:11	1
Nickel	ND		0.0030		mg/L		08/17/23 16:56	08/18/23 16:11	1
Selenium	ND		0.0080		mg/L		08/17/23 16:56	08/18/23 16:11	1

**Lab Sample ID: LCS 580-435079/27-A**  
**Matrix: Water**  
**Analysis Batch: 435248**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 435079**

Analyte	Spike	LCS	LCS	Unit	D	%Rec	%Rec
							Added
Arsenic	1.00	1.01		mg/L		101	85 - 115
Chromium	1.00	0.977		mg/L		98	85 - 115
Lead	1.00	0.980		mg/L		98	85 - 115
Manganese	1.00	0.994		mg/L		99	85 - 115
Nickel	1.00	0.978		mg/L		98	85 - 115
Selenium	1.00	1.05		mg/L		105	85 - 115

**Lab Sample ID: LCSD 580-435079/28-A**  
**Matrix: Water**  
**Analysis Batch: 435248**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 435079**

Analyte	Spike	LCSD	LCSD	Unit	D	%Rec	%Rec	RPD	Limit
							Added		
Arsenic	1.00	1.03		mg/L		103	85 - 115	2	20
Chromium	1.00	1.01		mg/L		101	85 - 115	3	20

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# QC Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: 2023 SDF Sampling HF sinclair PSR, LLC

Job ID: 580-130475-1

## Method: 200.8 - Metals (ICP/MS) (Continued)

**Lab Sample ID: LCSD 580-435079/28-A**  
**Matrix: Water**  
**Analysis Batch: 435248**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 435079**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec		RPD	Limit
							Limits	RPD		
Lead	1.00	0.998		mg/L		100	85 - 115	2	20	
Manganese	1.00	1.01		mg/L		101	85 - 115	2	20	
Nickel	1.00	1.00		mg/L		100	85 - 115	3	20	
Selenium	1.00	1.06		mg/L		106	85 - 115	1	20	

**Lab Sample ID: MB 580-435204/14-A**  
**Matrix: Water**  
**Analysis Batch: 435361**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 435204**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	ND		0.00080		mg/L		08/18/23 18:11	08/21/23 14:04	1
Lead	ND		0.00040		mg/L		08/18/23 18:11	08/21/23 14:04	1
Manganese	ND		0.0020		mg/L		08/18/23 18:11	08/21/23 14:04	1
Nickel	ND		0.0030		mg/L		08/18/23 18:11	08/21/23 14:04	1
Selenium	ND		0.0080		mg/L		08/18/23 18:11	08/21/23 14:04	1

**Lab Sample ID: LCS 580-435204/15-A**  
**Matrix: Water**  
**Analysis Batch: 435361**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 435204**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec		RPD	Limit
							Limits	RPD		
Arsenic	1.00	1.00		mg/L		100	85 - 115			
Chromium	1.00	0.991		mg/L		99	85 - 115			
Lead	1.00	0.967		mg/L		97	85 - 115			
Manganese	1.00	1.01		mg/L		101	85 - 115			
Nickel	1.00	0.959		mg/L		96	85 - 115			
Selenium	1.00	1.06		mg/L		106	85 - 115			

**Lab Sample ID: LCSD 580-435204/16-A**  
**Matrix: Water**  
**Analysis Batch: 435361**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 435204**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec		RPD	Limit
							Limits	RPD		
Arsenic	1.00	1.01		mg/L		101	85 - 115	1	20	
Chromium	1.00	0.996		mg/L		100	85 - 115	0	20	
Lead	1.00	0.988		mg/L		99	85 - 115	2	20	
Manganese	1.00	1.02		mg/L		102	85 - 115	1	20	
Nickel	1.00	0.987		mg/L		99	85 - 115	3	20	
Selenium	1.00	1.06		mg/L		106	85 - 115	0	20	

**Lab Sample ID: 580-130475-1 MS**  
**Matrix: Water**  
**Analysis Batch: 435361**

**Client Sample ID: W-47-080923**  
**Prep Type: Dissolved**  
**Prep Batch: 435204**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec		Limit
									Limits	RPD	
Arsenic	0.0013		1.00	1.03		mg/L		103	70 - 130		
Chromium	ND		1.00	1.01		mg/L		101	70 - 130		
Lead	ND		1.00	0.996		mg/L		100	70 - 130		
Manganese	0.0025		1.00	1.06		mg/L		105	70 - 130		

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# QC Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: 2023 SDF Sampling HF sinclair PSR, LLC

Job ID: 580-130475-1

## Method: 200.8 - Metals (ICP/MS) (Continued)

**Lab Sample ID: 580-130475-1 MS**  
**Matrix: Water**  
**Analysis Batch: 435361**

**Client Sample ID: W-47-080923**  
**Prep Type: Dissolved**  
**Prep Batch: 435204**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Nickel	ND		1.00	0.995		mg/L		99	70 - 130
Selenium	ND		1.00	1.12		mg/L		112	70 - 130

**Lab Sample ID: 580-130475-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 435361**

**Client Sample ID: W-47-080923**  
**Prep Type: Dissolved**  
**Prep Batch: 435204**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Arsenic	0.0013		1.00	1.02		mg/L		102	70 - 130	1	20
Chromium	ND		1.00	0.999		mg/L		100	70 - 130	1	20
Lead	ND		1.00	0.988		mg/L		99	70 - 130	1	20
Manganese	0.0025		1.00	1.03		mg/L		103	70 - 130	2	20
Nickel	ND		1.00	0.972		mg/L		97	70 - 130	2	20
Selenium	ND		1.00	1.04		mg/L		104	70 - 130	7	20

**Lab Sample ID: 580-130475-1 DU**  
**Matrix: Water**  
**Analysis Batch: 435361**

**Client Sample ID: W-47-080923**  
**Prep Type: Dissolved**  
**Prep Batch: 435204**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Arsenic	0.0013		0.00127		mg/L		2	20
Chromium	ND		ND		mg/L		NC	20
Lead	ND		ND		mg/L		NC	20
Manganese	0.0025		0.00295		mg/L		16	20
Nickel	ND		ND		mg/L		NC	20
Selenium	ND		ND		mg/L		NC	20

## Method: 7470A - Mercury (CVAA)

**Lab Sample ID: MB 580-434713/25-A**  
**Matrix: Water**  
**Analysis Batch: 434954**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 434713**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		08/15/23 11:30	08/15/23 18:49	1

**Lab Sample ID: LCS 580-434713/26-A**  
**Matrix: Water**  
**Analysis Batch: 434954**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 434713**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.00200	0.00190		mg/L		95	80 - 120

**Lab Sample ID: LCSD 580-434713/27-A**  
**Matrix: Water**  
**Analysis Batch: 434954**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 434713**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury	0.00200	0.00185		mg/L		92	80 - 120	3	20

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# QC Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: 2023 SDF Sampling HF sinclair PSR, LLC

Job ID: 580-130475-1

## Method: 7470A - Mercury (CVAA) (Continued)

Lab Sample ID: MB 580-434858/11-A  
 Matrix: Water  
 Analysis Batch: 435027

Client Sample ID: Method Blank  
 Prep Type: Total/NA  
 Prep Batch: 434858

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		08/16/23 10:56	08/16/23 17:47	1

Lab Sample ID: LCS 580-434858/12-A  
 Matrix: Water  
 Analysis Batch: 435027

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA  
 Prep Batch: 434858

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.00200	0.00216		mg/L		108	80 - 120

Lab Sample ID: LCSD 580-434858/13-A  
 Matrix: Water  
 Analysis Batch: 435027

Client Sample ID: Lab Control Sample Dup  
 Prep Type: Total/NA  
 Prep Batch: 434858

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury	0.00200	0.00206		mg/L		103	80 - 120	5	20

## Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 580-434697/21  
 Matrix: Water  
 Analysis Batch: 434697

Client Sample ID: Method Blank  
 Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.5		mg/L			08/14/23 20:24	1
Sulfate	ND		1.5		mg/L			08/14/23 20:24	1

Lab Sample ID: LCS 580-434697/22  
 Matrix: Water  
 Analysis Batch: 434697

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	50.0	53.3		mg/L		107	90 - 110
Sulfate	50.0	52.3		mg/L		105	90 - 110

Lab Sample ID: LCSD 580-434697/23  
 Matrix: Water  
 Analysis Batch: 434697

Client Sample ID: Lab Control Sample Dup  
 Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	50.0	53.3		mg/L		107	90 - 110	0	15
Sulfate	50.0	52.3		mg/L		105	90 - 110	0	15

## Method: SM 2320B - Alkalinity

Lab Sample ID: LCS 580-434957/2  
 Matrix: Water  
 Analysis Batch: 434957

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Alkalinity	100	105		mg/L		105	85 - 115

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# QC Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: 2023 SDF Sampling HF sinclair PSR, LLC

Job ID: 580-130475-1

## Method: SM 2320B - Alkalinity (Continued)

Lab Sample ID: 580-130475-1 DU  
 Matrix: Water  
 Analysis Batch: 434957

Client Sample ID: W-47-080923  
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Alkalinity	360		382		mg/L		5	17
Bicarbonate Alkalinity as CaCO3	360		382		mg/L		5	20

## Method: SM 4500 NH3 G - Ammonia

Lab Sample ID: MB 580-434505/1  
 Matrix: Water  
 Analysis Batch: 434505

Client Sample ID: Method Blank  
 Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia as N	ND		0.30		mg/L			08/12/23 18:40	1

Lab Sample ID: LCS 580-434505/2  
 Matrix: Water  
 Analysis Batch: 434505

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Ammonia as N	2.00	1.99		mg/L		100	90 - 110

## Method: SM 5220D - COD

Lab Sample ID: MB 580-434810/3-A  
 Matrix: Water  
 Analysis Batch: 434813

Client Sample ID: Method Blank  
 Prep Type: Total/NA  
 Prep Batch: 434810

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chemical Oxygen Demand	ND		10		mg/L		08/15/23 20:59	08/15/23 23:40	1

Lab Sample ID: LCS 580-434810/4-A  
 Matrix: Water  
 Analysis Batch: 434813

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA  
 Prep Batch: 434810

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chemical Oxygen Demand	75.0	77.8		mg/L		104	80 - 120

Lab Sample ID: LCSD 580-434810/5-A  
 Matrix: Water  
 Analysis Batch: 434813

Client Sample ID: Lab Control Sample Dup  
 Prep Type: Total/NA  
 Prep Batch: 434810

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chemical Oxygen Demand	75.0	74.4		mg/L		99	80 - 120	4	20

Lab Sample ID: 580-130475-1 MS  
 Matrix: Water  
 Analysis Batch: 434813

Client Sample ID: W-47-080923  
 Prep Type: Total/NA  
 Prep Batch: 434810

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chemical Oxygen Demand	ND		25.0	25.0		mg/L		100	75 - 125



# QC Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: 2023 SDF Sampling HF sinclair PSR, LLC

Job ID: 580-130475-1

## Method: SM 5220D - COD (Continued)

**Lab Sample ID: 580-130475-1 DU**  
**Matrix: Water**  
**Analysis Batch: 434813**

**Client Sample ID: W-47-080923**  
**Prep Type: Total/NA**  
**Prep Batch: 434810**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Chemical Oxygen Demand	ND		ND		mg/L		NC	20

## Method: SM 5310C - TOC

**Lab Sample ID: MB 580-434963/3**  
**Matrix: Water**  
**Analysis Batch: 434963**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	ND		1.5		mg/L			08/16/23 16:11	1

**Lab Sample ID: LCS 580-434963/4**  
**Matrix: Water**  
**Analysis Batch: 434963**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Organic Carbon	10.0	10.9		mg/L		109	85 - 115

**Lab Sample ID: LCSD 580-434963/5**  
**Matrix: Water**  
**Analysis Batch: 434963**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Total Organic Carbon	10.0	10.7		mg/L		107	85 - 115	2	20

# Lab Chronicle

Client: Whatcom Environmental Services Inc.  
 Project/Site: 2023 SDF Sampling HF sinclair PSR, LLC

Job ID: 580-130475-1

**Client Sample ID: W-47-080923**

**Lab Sample ID: 580-130475-1**

**Date Collected: 08/09/23 10:35**

**Matrix: Water**

**Date Received: 08/11/23 08:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	434874	JBT	EET SEA	08/16/23 20:12
Total/NA	Analysis	NWTPH-Gx		1	435226	JBT	EET SEA	08/20/23 17:35
Total/NA	Prep	3510C			434577	SL	EET SEA	08/14/23 10:55
Total/NA	Analysis	8270E SIM		1	435100	SR	EET SEA	08/18/23 00:08
Total/NA	Prep	3510C			434571	SL	EET SEA	08/14/23 10:34
Total/NA	Cleanup	3630C			434572	SL	EET SEA	08/14/23 10:37
Total/NA	Analysis	NWTPH-Dx		1	434640	KLW	EET SEA	08/15/23 01:11
Total/NA	Prep	3510C			434571	SL	EET SEA	08/14/23 10:34
Total/NA	Analysis	NWTPH-Dx		1	434640	KLW	EET SEA	08/15/23 04:24
Dissolved	Prep	200.8			435204	DLV	EET SEA	08/18/23 18:11
Dissolved	Analysis	200.7 Rev 4.4		1	435385	JLS	EET SEA	08/21/23 17:25
Total/NA	Prep	200.8			435079	TMH	EET SEA	08/17/23 16:56
Total/NA	Analysis	200.7 Rev 4.4		1	435279	JLS	EET SEA	08/19/23 01:58
Dissolved	Prep	200.8			435204	DLV	EET SEA	08/18/23 18:11
Dissolved	Analysis	200.8		1	435361	FCW	EET SEA	08/21/23 14:12
Total/NA	Prep	200.8			435079	TMH	EET SEA	08/17/23 16:56
Total/NA	Analysis	200.8		1	435248	FCW	EET SEA	08/18/23 16:51
Dissolved	Prep	7470A			434858	AUA	EET SEA	08/16/23 10:56
Dissolved	Analysis	7470A		1	435027	JL	EET SEA	08/16/23 18:16
Total/NA	Prep	7470A			434858	AUA	EET SEA	08/16/23 10:56
Total/NA	Analysis	7470A		1	435027	JL	EET SEA	08/16/23 18:10
Total/NA	Analysis	300.0		1	434697	CA	EET SEA	08/14/23 20:59
Total/NA	Analysis	SM 2320B		1	434957	MLT	EET SEA	08/16/23 22:08
Total/NA	Analysis	SM 4500 NH3 G		1	434505	FCG	EET SEA	08/12/23 18:40
Total/NA	Prep	SM 5220			434810	MLT	EET SEA	08/15/23 20:59
Total/NA	Analysis	SM 5220D		1	434813	MLT	EET SEA	08/15/23 23:40
Total/NA	Analysis	SM 5310C		1	434963	AUA	EET SEA	08/16/23 18:14

**Client Sample ID: W-112-080923**

**Lab Sample ID: 580-130475-2**

**Date Collected: 08/09/23 12:15**

**Matrix: Water**

**Date Received: 08/11/23 08:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	434911	JBT	EET SEA	08/17/23 05:24
Total/NA	Analysis	NWTPH-Gx		1	434912	JBT	EET SEA	08/17/23 05:24
Total/NA	Prep	3510C			434577	SL	EET SEA	08/14/23 10:55
Total/NA	Analysis	8270E SIM		1	435100	SR	EET SEA	08/18/23 00:28
Total/NA	Prep	3510C			434571	SL	EET SEA	08/14/23 10:34
Total/NA	Cleanup	3630C			434572	SL	EET SEA	08/14/23 10:37
Total/NA	Analysis	NWTPH-Dx		1	434640	KLW	EET SEA	08/15/23 01:30
Total/NA	Prep	3510C			434571	SL	EET SEA	08/14/23 10:34
Total/NA	Analysis	NWTPH-Dx		1	434640	KLW	EET SEA	08/15/23 04:43
Dissolved	Prep	200.8			435204	DLV	EET SEA	08/18/23 18:11
Dissolved	Analysis	200.7 Rev 4.4		1	435385	JLS	EET SEA	08/21/23 17:57

# Lab Chronicle

Client: Whatcom Environmental Services Inc.  
 Project/Site: 2023 SDF Sampling HF sinclair PSR, LLC

Job ID: 580-130475-1

**Client Sample ID: W-112-080923**

**Lab Sample ID: 580-130475-2**

**Date Collected: 08/09/23 12:15**

**Matrix: Water**

**Date Received: 08/11/23 08:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	200.8			435079	TMH	EET SEA	08/17/23 16:56
Total/NA	Analysis	200.7 Rev 4.4		1	435279	JLS	EET SEA	08/19/23 02:02
Dissolved	Prep	200.8			435204	DLV	EET SEA	08/18/23 18:11
Dissolved	Analysis	200.8		1	435361	FCW	EET SEA	08/21/23 14:47
Total/NA	Prep	200.8			435079	TMH	EET SEA	08/17/23 16:56
Total/NA	Analysis	200.8		1	435248	FCW	EET SEA	08/18/23 16:54
Dissolved	Prep	7470A			434858	AUA	EET SEA	08/16/23 10:56
Dissolved	Analysis	7470A		1	435027	JL	EET SEA	08/16/23 18:19
Total/NA	Prep	7470A			434858	AUA	EET SEA	08/16/23 10:56
Total/NA	Analysis	7470A		1	435027	JL	EET SEA	08/16/23 18:12
Total/NA	Analysis	300.0		1	434697	CA	EET SEA	08/14/23 21:11
Total/NA	Analysis	SM 2320B		1	434957	MLT	EET SEA	08/16/23 22:08
Total/NA	Analysis	SM 4500 NH3 G		1	434505	FCG	EET SEA	08/12/23 18:40
Total/NA	Prep	SM 5220			434810	MLT	EET SEA	08/15/23 20:59
Total/NA	Analysis	SM 5220D		1	434813	MLT	EET SEA	08/15/23 23:40
Total/NA	Analysis	SM 5310C		1	434963	AUA	EET SEA	08/16/23 18:31

**Client Sample ID: W-113-080923**

**Lab Sample ID: 580-130475-3**

**Date Collected: 08/09/23 10:20**

**Matrix: Water**

**Date Received: 08/11/23 08:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	434911	JBT	EET SEA	08/17/23 05:48
Total/NA	Analysis	NWTPH-Gx		1	434912	JBT	EET SEA	08/17/23 05:48
Total/NA	Prep	3510C			434577	SL	EET SEA	08/14/23 10:55
Total/NA	Analysis	8270E SIM		1	435100	SR	EET SEA	08/18/23 00:47
Total/NA	Prep	3510C			434571	SL	EET SEA	08/14/23 10:34
Total/NA	Cleanup	3630C			434572	SL	EET SEA	08/14/23 10:37
Total/NA	Analysis	NWTPH-Dx		1	434640	KLW	EET SEA	08/15/23 01:50
Total/NA	Prep	3510C			434571	SL	EET SEA	08/14/23 10:34
Total/NA	Analysis	NWTPH-Dx		1	434640	KLW	EET SEA	08/15/23 05:03
Dissolved	Prep	200.8			435204	DLV	EET SEA	08/18/23 18:11
Dissolved	Analysis	200.7 Rev 4.4		1	435385	JLS	EET SEA	08/21/23 18:00
Total/NA	Prep	200.8			435079	TMH	EET SEA	08/17/23 16:56
Total/NA	Analysis	200.7 Rev 4.4		1	435279	JLS	EET SEA	08/19/23 02:05
Dissolved	Prep	200.8			435204	DLV	EET SEA	08/18/23 18:11
Dissolved	Analysis	200.8		1	435361	FCW	EET SEA	08/21/23 14:50
Total/NA	Prep	200.8			435079	TMH	EET SEA	08/17/23 16:56
Total/NA	Analysis	200.8		1	435248	FCW	EET SEA	08/18/23 16:56
Dissolved	Prep	7470A			434713	TMH	EET SEA	08/15/23 11:30
Dissolved	Analysis	7470A		1	434954	JLS	EET SEA	08/15/23 20:00
Total/NA	Prep	7470A			434713	TMH	EET SEA	08/15/23 11:30
Total/NA	Analysis	7470A		1	434954	JLS	EET SEA	08/15/23 19:40
Total/NA	Analysis	300.0		1	434697	CA	EET SEA	08/14/23 21:23

# Lab Chronicle

Client: Whatcom Environmental Services Inc.  
 Project/Site: 2023 SDF Sampling HF sinclair PSR, LLC

Job ID: 580-130475-1

**Client Sample ID: W-113-080923**

**Lab Sample ID: 580-130475-3**

**Date Collected: 08/09/23 10:20**

**Matrix: Water**

**Date Received: 08/11/23 08:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	SM 2320B		1	434957	MLT	EET SEA	08/16/23 22:08
Total/NA	Analysis	SM 4500 NH3 G		1	434505	FCG	EET SEA	08/12/23 18:40
Total/NA	Prep	SM 5220			434810	MLT	EET SEA	08/15/23 20:59
Total/NA	Analysis	SM 5220D		1	434813	MLT	EET SEA	08/15/23 23:40
Total/NA	Analysis	SM 5310C		1	434963	AUA	EET SEA	08/16/23 18:48

**Client Sample ID: W-127-080923**

**Lab Sample ID: 580-130475-4**

**Date Collected: 08/09/23 12:25**

**Matrix: Water**

**Date Received: 08/11/23 08:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	434911	JBT	EET SEA	08/17/23 06:36
Total/NA	Analysis	NWTPH-Gx		1	434912	JBT	EET SEA	08/17/23 06:36
Total/NA	Prep	3510C			434577	SL	EET SEA	08/14/23 10:55
Total/NA	Analysis	8270E SIM		1	435100	SR	EET SEA	08/18/23 01:07
Total/NA	Prep	3510C			434571	SL	EET SEA	08/14/23 10:34
Total/NA	Cleanup	3630C			434572	SL	EET SEA	08/14/23 10:37
Total/NA	Analysis	NWTPH-Dx		1	434640	KLW	EET SEA	08/15/23 02:09
Total/NA	Prep	3510C			434571	SL	EET SEA	08/14/23 10:34
Total/NA	Analysis	NWTPH-Dx		1	434640	KLW	EET SEA	08/15/23 05:22
Dissolved	Prep	200.8			435204	DLV	EET SEA	08/18/23 18:11
Dissolved	Analysis	200.7 Rev 4.4		1	435385	JLS	EET SEA	08/21/23 18:04
Total/NA	Prep	200.8			435079	TMH	EET SEA	08/17/23 16:56
Total/NA	Analysis	200.7 Rev 4.4		1	435279	JLS	EET SEA	08/19/23 02:09
Dissolved	Prep	200.8			435204	DLV	EET SEA	08/18/23 18:11
Dissolved	Analysis	200.8		1	435361	FCW	EET SEA	08/21/23 14:53
Total/NA	Prep	200.8			435079	TMH	EET SEA	08/17/23 16:56
Total/NA	Analysis	200.8		1	435248	FCW	EET SEA	08/18/23 16:59
Dissolved	Prep	7470A			434713	TMH	EET SEA	08/15/23 11:30
Dissolved	Analysis	7470A		1	434954	JLS	EET SEA	08/15/23 19:49
Total/NA	Prep	7470A			434713	TMH	EET SEA	08/15/23 11:30
Total/NA	Analysis	7470A		1	434954	JLS	EET SEA	08/15/23 19:42
Total/NA	Analysis	300.0		1	434697	CA	EET SEA	08/14/23 21:34
Total/NA	Analysis	SM 2320B		1	434957	MLT	EET SEA	08/16/23 22:08
Total/NA	Analysis	SM 4500 NH3 G		1	434505	FCG	EET SEA	08/12/23 18:40
Total/NA	Prep	SM 5220			434810	MLT	EET SEA	08/15/23 20:59
Total/NA	Analysis	SM 5220D		1	434813	MLT	EET SEA	08/15/23 23:40
Total/NA	Analysis	SM 5310C		1	434963	AUA	EET SEA	08/16/23 19:40

# Lab Chronicle

Client: Whatcom Environmental Services Inc.  
 Project/Site: 2023 SDF Sampling HF sinclair PSR, LLC

Job ID: 580-130475-1

**Client Sample ID: SDF-DUP-1-080923**

**Lab Sample ID: 580-130475-5**

**Date Collected: 08/09/23 10:55**

**Matrix: Water**

**Date Received: 08/11/23 08:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	434911	JBT	EET SEA	08/17/23 07:01
Total/NA	Analysis	NWTPH-Gx		1	434912	JBT	EET SEA	08/17/23 07:01
Total/NA	Prep	3510C			434577	SL	EET SEA	08/14/23 10:55
Total/NA	Analysis	8270E SIM		1	435100	SR	EET SEA	08/18/23 01:27
Total/NA	Prep	3510C			434571	SL	EET SEA	08/14/23 10:34
Total/NA	Cleanup	3630C			434572	SL	EET SEA	08/14/23 10:37
Total/NA	Analysis	NWTPH-Dx		1	434640	KLW	EET SEA	08/15/23 02:28
Total/NA	Prep	3510C			434571	SL	EET SEA	08/14/23 10:34
Total/NA	Analysis	NWTPH-Dx		1	434640	KLW	EET SEA	08/15/23 05:41
Dissolved	Prep	200.8			435204	DLV	EET SEA	08/18/23 18:11
Dissolved	Analysis	200.7 Rev 4.4		1	435385	JLS	EET SEA	08/21/23 18:07
Total/NA	Prep	200.8			435079	TMH	EET SEA	08/17/23 16:56
Total/NA	Analysis	200.7 Rev 4.4		1	435279	JLS	EET SEA	08/19/23 01:55
Dissolved	Prep	200.8			435204	DLV	EET SEA	08/18/23 18:11
Dissolved	Analysis	200.8		1	435361	FCW	EET SEA	08/21/23 14:56
Total/NA	Prep	200.8			435079	TMH	EET SEA	08/17/23 16:56
Total/NA	Analysis	200.8		1	435248	FCW	EET SEA	08/18/23 16:48
Dissolved	Prep	7470A			434713	TMH	EET SEA	08/15/23 11:30
Dissolved	Analysis	7470A		1	434954	JLS	EET SEA	08/15/23 19:51
Total/NA	Prep	7470A			434713	TMH	EET SEA	08/15/23 11:30
Total/NA	Analysis	7470A		1	434954	JLS	EET SEA	08/15/23 19:44
Total/NA	Analysis	300.0		1	434697	CA	EET SEA	08/14/23 21:46
Total/NA	Analysis	SM 2320B		1	434957	MLT	EET SEA	08/16/23 22:08
Total/NA	Analysis	SM 4500 NH3 G		1	434505	FCG	EET SEA	08/12/23 18:40
Total/NA	Prep	SM 5220			434810	MLT	EET SEA	08/15/23 20:59
Total/NA	Analysis	SM 5220D		1	434813	MLT	EET SEA	08/15/23 23:40
Total/NA	Analysis	SM 5310C		1	434963	AUA	EET SEA	08/16/23 19:58

**Client Sample ID: SDF-FEB-1-080923**

**Lab Sample ID: 580-130475-6**

**Date Collected: 08/09/23 12:00**

**Matrix: Water**

**Date Received: 08/11/23 08:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	434911	JBT	EET SEA	08/17/23 07:25
Total/NA	Analysis	NWTPH-Gx		1	434912	JBT	EET SEA	08/17/23 07:25
Total/NA	Prep	3510C			434577	SL	EET SEA	08/14/23 10:55
Total/NA	Analysis	8270E SIM		1	435100	SR	EET SEA	08/18/23 01:47
Total/NA	Prep	3510C			434571	SL	EET SEA	08/14/23 10:34
Total/NA	Cleanup	3630C			434572	SL	EET SEA	08/14/23 10:37
Total/NA	Analysis	NWTPH-Dx		1	434640	KLW	EET SEA	08/15/23 02:47
Total/NA	Prep	3510C			434571	SL	EET SEA	08/14/23 10:34
Total/NA	Analysis	NWTPH-Dx		1	434640	KLW	EET SEA	08/15/23 06:00
Dissolved	Prep	200.8			435204	DLV	EET SEA	08/18/23 18:11
Dissolved	Analysis	200.7 Rev 4.4		1	435385	JLS	EET SEA	08/21/23 18:11

# Lab Chronicle

Client: Whatcom Environmental Services Inc.  
 Project/Site: 2023 SDF Sampling HF sinclair PSR, LLC

Job ID: 580-130475-1

**Client Sample ID: SDF-FEB-1-080923**

**Lab Sample ID: 580-130475-6**

**Date Collected: 08/09/23 12:00**

**Matrix: Water**

**Date Received: 08/11/23 08:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	200.8			435079	TMH	EET SEA	08/17/23 16:56
Total/NA	Analysis	200.7 Rev 4.4		1	435279	JLS	EET SEA	08/19/23 01:51
Dissolved	Prep	200.8			435204	DLV	EET SEA	08/18/23 18:11
Dissolved	Analysis	200.8		1	435361	FCW	EET SEA	08/21/23 14:58
Total/NA	Prep	200.8			435079	TMH	EET SEA	08/17/23 16:56
Total/NA	Analysis	200.8		1	435248	FCW	EET SEA	08/18/23 16:46
Dissolved	Prep	7470A			434713	TMH	EET SEA	08/15/23 11:30
Dissolved	Analysis	7470A		1	434954	JLS	EET SEA	08/15/23 19:53
Total/NA	Prep	7470A			434713	TMH	EET SEA	08/15/23 11:30
Total/NA	Analysis	7470A		1	434954	JLS	EET SEA	08/15/23 19:47
Total/NA	Analysis	300.0		1	434697	CA	EET SEA	08/14/23 21:58
Total/NA	Analysis	SM 2320B		1	434957	MLT	EET SEA	08/16/23 22:08
Total/NA	Analysis	SM 4500 NH3 G		1	434505	FCG	EET SEA	08/12/23 18:42
Total/NA	Prep	SM 5220			434810	MLT	EET SEA	08/15/23 20:59
Total/NA	Analysis	SM 5220D		1	434813	MLT	EET SEA	08/15/23 23:40
Total/NA	Analysis	SM 5310C		1	434963	AUA	EET SEA	08/16/23 20:15

**Client Sample ID: Trip Blanks**

**Lab Sample ID: 580-130475-7**

**Date Collected: 08/09/23 00:00**

**Matrix: Water**

**Date Received: 08/11/23 08:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	434911	JBT	EET SEA	08/17/23 04:36
Total/NA	Analysis	NWTPH-Gx		1	434912	JBT	EET SEA	08/17/23 04:36

**Laboratory References:**

EET SEA = Eurofins Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310

# Accreditation/Certification Summary

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling HF sinclair PSR, LLC

Job ID: 580-130475-1

## Laboratory: Eurofins Seattle

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Washington	State	C788	07-13-23 *

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11

\* Accreditation/Certification renewal pending - accreditation/certification considered valid.

# Sample Summary

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling HF sinclair PSR, LLC

Job ID: 580-130475-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-130475-1	W-47-080923	Water	08/09/23 10:35	08/11/23 08:00
580-130475-2	W-112-080923	Water	08/09/23 12:15	08/11/23 08:00
580-130475-3	W-113-080923	Water	08/09/23 10:20	08/11/23 08:00
580-130475-4	W-127-080923	Water	08/09/23 12:25	08/11/23 08:00
580-130475-5	SDF-DUP-1-080923	Water	08/09/23 10:55	08/11/23 08:00
580-130475-6	SDF-FEB-1-080923	Water	08/09/23 12:00	08/11/23 08:00
580-130475-7	Trip Blanks	Water	08/09/23 00:00	08/11/23 08:00

1

2

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10

11



**Chain of Custody Record**

Client Information		Sampler: Ava Gempier		Lab PM: Cruz, Sheri L		Carrier Tracking No(s): FedEx		COC No: 580-44411-14188.2	
Client Contact: Eric Libolt		Phone: 360-752-9571		E-Mail: Sheri.Cruz@et.eurofinsus.com		State of Origin: Washington		Page: 1 of 1	
Company: Whatcom Environmental Services Inc.		PWSID:						Job #:	
Address: 228 East Champion Street #101		Due Date Requested:							
City: Bellingham		TAT Requested (days): 10 BD							
State, Zip: WA, 98225		Compliance Project: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No							
Phone: 360-752-9571		PO #:		Bill to WES					
Email: elibolt@whatcom-es.com		WO #:							
Project Name: 2023 SDF Sampling		Project #:							
Site: HF Sinclair Puget Sound Refining LLC		SSOW#:							
Analysis Requested								Preservation Codes:	
								A - HCL M - Hexane B - NaOH N - None C - Zn Acetate O - AsNaO2 D - Nitric Acid P - Na2O4S E - NaHSO4 Q - Na2SO3 F - MeOH R - Na2S2O3 G - Amchlor S - H2SO4 H - Ascorbic Acid T - TSP Dodecahydrate I - Ice U - Acetone J - DI Water V - MCAA K - EDTA W - pH 4-5 L - EDA Z - other (specify)	
Sample Identification		Sample Date		Sample Time		Sample Type (C=comp, G=grab)		Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	
Sample Date		Sample Time		Sample Type (C=comp, G=grab)		Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)		Special Instructions/Note:	
W-47-080923		8/9/23		10:35		G Water			
W-112-080923		8/9/23		12:15		G Water			
W-113-080923		8/9/23		10:20		G Water		Please email results to Ava Gempier at agempier@whatcom-es.com and Eric Libolt at elibolt@whatcom-es.com	
W-127-080923		8/9/23		12:25		G Water			
SDF-DUP-1-080923		8/9/23		10:55		G Water			
SDF-FEB-1-080923		8/9/23		12:00		G Water		There is one nitric poly bottle field filtered for dissolved analytes, and one nitric poly not field filtered for total analytes.	
Trip Blanks		Filled At Lab				Water		6	
Possible Hazard Identification		<input checked="" type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Irritant <input type="checkbox"/> Poison		580-130475 Chain of Custody				Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input checked="" type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months	
Deliverable Requested: I, II, III, IV, Other (specify)								Special Instructions/QC Requirements:	
Empty Kit Relinquished by:		Date:		Time:		Method of Shipment:			
Relinquished by: Ava Gempier		Date/Time: 8-10-23 13:45		Company: WES		Received by: [Signature]		Date/Time: 8/11/23 0800	
Relinquished by:		Date/Time:		Company:		Received by:		Date/Time:	
Relinquished by:		Date/Time:		Company:		Received by:		Date/Time:	
Custody Seals Intact: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No.:				Cooler Temperature(s) °C and Other Remarks:			



will require the EIM file (CEDD) in addition to the report

Therm. ID: A3 Cor: 10 ° Unc: 10 °  
Cooler Dsc: LB  
Packing: Bubb FedEx: SD  
Cust. Seal: Yes  No  UPS:  
Blue Ice  Wet  Dry, None  Lab Cour:  
Other: \_\_\_\_\_

1/3

Therm. ID: A3 Cor: 12 ° Unc: 12 °  
Cooler Dsc: LB  
Packing: Bubb FedEx: SD  
Cust. Seal: Yes  No  UPS:  
Blue Ice  Wet  Dry, None  Lab Cour:  
Other: \_\_\_\_\_

2/3

Therm. ID: A3 Cor: 10 ° Unc: 10 °  
Cooler Dsc: LB  
Packing: Bubb FedEx: SD  
Cust. Seal: Yes  No  UPS:  
Blue Ice  Wet  Dry, None  Lab Cour:  
Other: \_\_\_\_\_

3/3



# Login Sample Receipt Checklist

Client: Whatcom Environmental Services Inc.

Job Number: 580-130475-1

**Login Number: 130475**

**List Number: 1**

**Creator: Groves, Elizabeth**

**List Source: Eurofins Seattle**

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



Burlington, WA *Corporate Laboratory (a)*  
1620 S Walnut St - Burlington, WA 98233 - 800.755.9295 • 360.757.1400  
Bellingham, WA *Microbiology (b)*  
805 Orchard Dr Ste 4 - Bellingham, WA 98225 - 360.715.1212

Portland, OR *Microbiology/Chemistry (c)*  
9725 SW Commerce Cr Ste A2 - Wilsonville, OR 97070 - 503.682.7802  
Corvallis, OR *Microbiology/Chemistry (d)*  
1100 NE Circle Blvd, Ste 130 - Corvallis, OR 97330 - 541.753.4946  
Bend, OR *Microbiology (e)*  
20332 Empire Blvd Ste 4 - Bend, OR 97701 - 541.639.8425

August 25, 2023

Page 1 of 1

Mr. Eric Libolt  
Whatcom Environmental Services  
228 E Champion #101  
Bellingham, WA 98225  
RE: 23-24072 - 2023 SDF Groundwater Sampling

Dear Mr. Eric Libolt,

Your project: 2023 SDF Groundwater Sampling, was received on Wednesday August 09, 2023.

All samples were analyzed within the accepted holding times and were appropriately preserved and analyzed according to approved analytical protocols, unless noted in the data or QC reports. The quality control data was within laboratory acceptance limits, unless specified in the data or QC reports.

If you have questions phone us at 800 755-9295.

Respectfully

A handwritten signature in blue ink that reads "C. K. Knox". The signature is fluid and cursive, with a large initial "C" and "K".

Ceann K Knox  
Lab Manager, Bellingham

Enclosures: Data Report  
QC Reports  
Chain of Custody



Burlington, WA Corporate Laboratory (a)  
1620 S Walnut St - Burlington, WA 98233 - 800.755.9295 • 360.757.1400  
Bellingham, WA Microbiology (b)  
805 Orchard Dr Ste 4 - Bellingham, WA 98225 - 360.715.1212

Portland, OR Microbiology/Chemistry (c)  
9725 SW Commerce Cr Ste A2 - Wilsonville, OR 97070 - 503.682.7802  
Corvallis, OR Microbiology/Chemistry (d)  
1100 NE Circle Blvd, Ste 130 - Corvallis, OR 97330 - 541.753.4946  
Bend, OR Microbiology (e)  
20332 Empire Blvd Ste 4 - Bend, OR 97701 - 541.639.8425

# Data Report

Client Name: Whatcom Environmental Services  
228 E Champion #101  
Bellingham, WA 98225

Reference Number: **23-24072**  
Project: 2023 SDF Groundwater  
Sampling

Report Date: 8/25/23

Date Received: 8/9/23

Approved by: tjb

Authorized by:

Ceann K Knox  
Lab Manager, Bellingham

Sample Description: W-47-080923 HF Sinclair PSR								Matrix W	Sample Date: 8/9/23 10:35 am			
Lab Number: 47538		Sample Comment:						Collected By: Ava Gempler				
CAS ID#	Parameter	Result	PQL	MDL	Units	DF	Method	Lab	Analyzed	Analyst	Batch	Comment

14797-55-8	NITRATE-N	0.035	0.005	0.0032	mg/L	1.0	SM4500-NO3 F	a	8/9/23	CJET	NO3NO2_230809B	
14797-65-0	NITRITE-N	ND	0.005	0.0022	mg/L	1.0	SM4500-NO3 F	a	8/9/23	CJET	NO3NO2_230809B	
E-10128	TOTAL NITRATE+NITRITE as N	0.04	0.01	0.0042	mg/L	1.0	SM4500-NO3 F	a	8/9/23	CJET	NO3NO2_230809B	

Sample Description: W-112-080923 HF Sinclair PSR								Matrix W	Sample Date: 8/9/23 12:15 pm			
Lab Number: 47539		Sample Comment:						Collected By: Ava Gempler				
CAS ID#	Parameter	Result	PQL	MDL	Units	DF	Method	Lab	Analyzed	Analyst	Batch	Comment

14797-55-8	NITRATE-N	0.04	0.005	0.0032	mg/L	1.0	SM4500-NO3 F	a	8/9/23	CJET	NO3NO2_230809B	
14797-65-0	NITRITE-N	ND	0.005	0.0022	mg/L	1.0	SM4500-NO3 F	a	8/9/23	CJET	NO3NO2_230809B	
E-10128	TOTAL NITRATE+NITRITE as N	0.04	0.01	0.0042	mg/L	1.0	SM4500-NO3 F	a	8/9/23	CJET	NO3NO2_230809B	

Sample Description: W-113-080923 HF Sinclair PSR								Matrix W	Sample Date: 8/9/23 10:20 am			
Lab Number: 47540		Sample Comment:						Collected By: Ava Gempler				
CAS ID#	Parameter	Result	PQL	MDL	Units	DF	Method	Lab	Analyzed	Analyst	Batch	Comment

14797-55-8	NITRATE-N	0.02	0.005	0.0032	mg/L	1.0	SM4500-NO3 F	a	8/9/23	CJET	NO3NO2_230809B	
14797-65-0	NITRITE-N	ND	0.005	0.0022	mg/L	1.0	SM4500-NO3 F	a	8/9/23	CJET	NO3NO2_230809B	
E-10128	TOTAL NITRATE+NITRITE as N	0.02	0.01	0.0042	mg/L	1.0	SM4500-NO3 F	a	8/9/23	CJET	NO3NO2_230809B	

Sample Description: W-127-080923 HF Sinclair PSR								Matrix W	Sample Date: 8/9/23 12:25 pm			
Lab Number: 47541		Sample Comment:						Collected By: Ava Gempler				
CAS ID#	Parameter	Result	PQL	MDL	Units	DF	Method	Lab	Analyzed	Analyst	Batch	Comment

14797-55-8	NITRATE-N	0.09	0.005	0.0032	mg/L	1.0	SM4500-NO3 F	a	8/9/23	CJET	NO3NO2_230809B	
14797-65-0	NITRITE-N	ND	0.005	0.0022	mg/L	1.0	SM4500-NO3 F	a	8/9/23	CJET	NO3NO2_230809B	
E-10128	TOTAL NITRATE+NITRITE as N	0.09	0.01	0.0042	mg/L	1.0	SM4500-NO3 F	a	8/9/23	CJET	NO3NO2_230809B	

Notes:

ND = Not detected above the listed practical quantitation limit (PQL) or not above the Method Detection Limit (MDL), if requested.  
PQL = Practical Quantitation Limit is the lowest level that can be achieved within specified limits of precision and accuracy during routine laboratory operating conditions.  
D.F. - Dilution Factor

If you have any questions concerning this report contact us at the above phone number.

# Data Report

Sample Description: SDF-FEB-1-080923 HF Sinclair PSR								Matrix W	Sample Date: 8/9/23 12:00 pm			
Lab Number: 47542		Sample Comment:						Collected By: Ava Gempler				
CAS ID#	Parameter	Result	PQL	MDL	Units	DF	Method	Lab	Analyzed	Analyst	Batch	Comment

14797-55-8	<b>NITRATE-N</b>	0.006	0.005	0.0032	mg/L	1.0	SM4500-NO3 F	a	8/9/23	CJET	NO3NO2_230809B	
14797-65-0	<b>NITRITE-N</b>	ND	0.005	0.0022	mg/L	1.0	SM4500-NO3 F	a	8/9/23	CJET	NO3NO2_230809B	
E-10128	<b>TOTAL NITRATE+NITRITE as N</b>	0.006 J	0.01	0.0042	mg/L	1.0	SM4500-NO3 F	a	8/9/23	CJET	NO3NO2_230809B	

Sample Description: SDF-DUP-1-080903 HF Sinclair PSR								Matrix W	Sample Date: 8/9/23 10:55 am			
Lab Number: 47543		Sample Comment:						Collected By: Ava Gempler				
CAS ID#	Parameter	Result	PQL	MDL	Units	DF	Method	Lab	Analyzed	Analyst	Batch	Comment

14797-55-8	<b>NITRATE-N</b>	0.02	0.005	0.0032	mg/L	1.0	SM4500-NO3 F	a	8/9/23	CJET	NO3NO2_230809B	
14797-65-0	<b>NITRITE-N</b>	ND	0.005	0.0022	mg/L	1.0	SM4500-NO3 F	a	8/9/23	CJET	NO3NO2_230809B	
E-10128	<b>TOTAL NITRATE+NITRITE as N</b>	0.02	0.01	0.0042	mg/L	1.0	SM4500-NO3 F	a	8/9/23	CJET	NO3NO2_230809B	

**Notes:** \_\_\_\_\_

ND = Not detected above the listed practical quantitation limit (PQL) or not above the Method Detection Limit (MDL), if requested.  
 PQL = Practical Quantitation Limit is the lowest level that can be achieved within specified limits of precision and accuracy during routine laboratory operating conditions.  
 D.F. - Dilution Factor



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## Washington State Department of Health WATER BACTERIOLOGICAL ANALYSIS

Client Name: Whatcom Environmental Services  
228 E Champion #101  
Bellingham, WA 98225

Reference Number: 23-24072  
Project: 2023 SDF Groundwater  
Sampling

System Name:  
System ID Number:  
DOH Source Number:  
Sample Type:  
Sample Purpose: Investigative or Other  
Sample Location: HF Sinclair PSR  
County:  
Sampled By: Ava Gempler  
Sampler Phone:

Repeat Sample Number:  
Lab Number: 164-47538  
Field ID: W-47-080923  
Date Collected: 8/9/23 10:35  
Date Received: 8/9/23  
Date Set: 8/9/23 17:18  
Date Analyzed: 8/10/23 13:44  
Report Date: 8/25/23  
Comment:  
Approved By: ckk,jln

Authorized by:



Ceann K Knox  
Lab Manager, Bellingham

DOH#	PARAMETER	RESULT	Qualifier	UNITS	Analyst	METHOD	Batch	COMMENT
1	TOTAL COLIFORM	<1		MPN/100mL	mlp	SM9223 B.2.f	QT_230809	
2	E. Coli	<1		MPN/100mL	mlp	SM9223 B.2.f	QT_230809	

If the sample is unsatisfactory you can get information at the following health department websites or phone numbers:

- Island Co: <http://www.islandcounty.net/health/Envh/DrinkingWater/index.htm>
- San Juan Co: <http://www.sanjuanco.com/health/ehswater.aspx>
- Skagit Co: [http://www.skagitcounty.net/drinkingwater\\_](http://www.skagitcounty.net/drinkingwater_) or 360-336-9380
- Snohomish Co: 425-339-5250
- Whatcom Co: [http://www.co.whatcom.wa.us/health/environmental/drinking\\_water/index.jsp](http://www.co.whatcom.wa.us/health/environmental/drinking_water/index.jsp)
- WSDOH: <http://www.doh.wa.gov/ehp/dw/Programs/coliform.htm>

**NOTES:**

If the result is Unsatisfactory, three (3) repeat samples and groundwater source samples are required for Group A Public Water Systems. Private individuals should investigate the cause of the unsatisfactory result and resample.

If E. Coli or Fecal Coliform are present in sample do not drink the water until it is properly treated.

\*If data qualifiers are present, see accompanying Qualifier Definition report.



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## Washington State Department of Health WATER BACTERIOLOGICAL ANALYSIS

Client Name: Whatcom Environmental Services  
228 E Champion #101  
Bellingham, WA 98225

Reference Number: 23-24072  
Project: 2023 SDF Groundwater  
Sampling

System Name:  
System ID Number:  
DOH Source Number:  
Sample Type:  
Sample Purpose: Investigative or Other  
Sample Location: HF Sinclair PSR  
County:  
Sampled By: Ava Gempler  
Sampler Phone:

Repeat Sample Number:  
Lab Number: 164-47539  
Field ID: W-112-080923  
Date Collected: 8/9/23 12:15  
Date Received: 8/9/23  
Date Set: 8/9/23 17:18  
Date Analyzed: 8/10/23 13:44  
Report Date: 8/25/23  
Comment:  
Approved By: ckk,jln

Authorized by:

Ceann K Knox  
Lab Manager, Bellingham

DOH#	PARAMETER	RESULT	Qualifier	UNITS	Analyst	METHOD	Batch	COMMENT
1	TOTAL COLIFORM	<1		MPN/100mL	mlp	SM9223 B.2.f	QT_230809	
2	E. Coli	<1		MPN/100mL	mlp	SM9223 B.2.f	QT_230809	

If the sample is unsatisfactory you can get information at the following health department websites or phone numbers:

- Island Co: <http://www.islandcounty.net/health/Envh/DrinkingWater/index.htm>
- San Juan Co: <http://www.sanjuanco.com/health/ehswater.aspx>
- Skagit Co: [http://www.skagitcounty.net/drinkingwater\\_](http://www.skagitcounty.net/drinkingwater_) or 360-336-9380
- Snohomish Co: [425-339-5250](http://www.snohomishcounty.net/health/ehs/DrinkingWater/index.jsp)
- Whatcom Co: [http://www.co.whatcom.wa.us/health/environmental/drinking\\_water/index.jsp](http://www.co.whatcom.wa.us/health/environmental/drinking_water/index.jsp)
- WSDOH: <http://www.doh.wa.gov/ehp/dw/Programs/coliform.htm>

**NOTES:**

If the result is Unsatisfactory, three (3) repeat samples and groundwater source samples are required for Group A Public Water Systems. Private individuals should investigate the cause of the unsatisfactory result and resample.

If E. Coli or Fecal Coliform are present in sample do not drink the water until it is properly treated.

\*If data qualifiers are present, see accompanying Qualifier Definition report.





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Bend, OR *Microbiology (e)*  
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## Washington State Department of Health WATER BACTERIOLOGICAL ANALYSIS

Client Name: Whatcom Environmental Services  
228 E Champion #101  
Bellingham, WA 98225

Reference Number: 23-24072  
Project: 2023 SDF Groundwater  
Sampling

System Name:  
System ID Number:  
DOH Source Number:  
Sample Type:  
Sample Purpose: Investigative or Other  
Sample Location: HF Sinclair PSR  
County:  
Sampled By: Ava Gempler  
Sampler Phone:

Repeat Sample Number:  
Lab Number: 164-47540  
Field ID: W-113-080923  
Date Collected: 8/9/23 10:20  
Date Received: 8/9/23  
Date Set: 8/9/23 17:18  
Date Analyzed: 8/10/23 13:44  
Report Date: 8/25/23  
Comment:  
Approved By: ckk,jln

Authorized by:



Ceann K Knox  
Lab Manager, Bellingham

DOH#	PARAMETER	RESULT	Qualifier	UNITS	Analyst	METHOD	Batch	COMMENT
1	TOTAL COLIFORM	<1		MPN/100mL	mlp	SM9223 B.2.f	QT_230809	
2	E. Coli	<1		MPN/100mL	mlp	SM9223 B.2.f	QT_230809	

If the sample is unsatisfactory you can get information at the following health department websites or phone numbers:

- Island Co: <http://www.islandcounty.net/health/Envh/DrinkingWater/index.htm>
- San Juan Co: <http://www.sanjuanco.com/health/ehswater.aspx>
- Skagit Co: [http://www.skagitcounty.net/drinkingwater\\_](http://www.skagitcounty.net/drinkingwater_) or 360-336-9380
- Snohomish Co: 425-339-5250
- Whatcom Co: [http://www.co.whatcom.wa.us/health/environmental/drinking\\_water/index.jsp](http://www.co.whatcom.wa.us/health/environmental/drinking_water/index.jsp)
- WSDOH: <http://www.doh.wa.gov/ehp/dw/Programs/coliform.htm>

**NOTES:**

If the result is Unsatisfactory, three (3) repeat samples and groundwater source samples are required for Group A Public Water Systems. Private individuals should investigate the cause of the unsatisfactory result and resample.

If E. Coli or Fecal Coliform are present in sample do not drink the water until it is properly treated.

\*If data qualifiers are present, see accompanying Qualifier Definition report.



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## Washington State Department of Health WATER BACTERIOLOGICAL ANALYSIS

Client Name: Whatcom Environmental Services  
228 E Champion #101  
Bellingham, WA 98225

Reference Number: 23-24072  
Project: 2023 SDF Groundwater  
Sampling

System Name:  
System ID Number:  
DOH Source Number:  
Sample Type:  
Sample Purpose: Investigative or Other  
Sample Location: HF Sinclair PSR  
County:  
Sampled By: Ava Gempler  
Sampler Phone:

Repeat Sample Number:  
Lab Number: 164-47541  
Field ID: W-127-080923  
Date Collected: 8/9/23 12:25  
Date Received: 8/9/23  
Date Set: 8/9/23 17:18  
Date Analyzed: 8/10/23 13:44  
Report Date: 8/25/23  
Comment:  
Approved By: ckk,jln

Authorized by:



Ceann K Knox  
Lab Manager, Bellingham

DOH#	PARAMETER	RESULT	Qualifier	UNITS	Analyst	METHOD	Batch	COMMENT
1	TOTAL COLIFORM	<1		MPN/100mL	mlp	SM9223 B.2.f	QT_230809	
2	E. Coli	<1		MPN/100mL	mlp	SM9223 B.2.f	QT_230809	

If the sample is unsatisfactory you can get information at the following health department websites or phone numbers:

- Island Co: <http://www.islandcounty.net/health/Envh/DrinkingWater/index.htm>
- San Juan Co: <http://www.sanjuanco.com/health/ehswater.aspx>
- Skagit Co: <http://www.skagitcounty.net/drinkingwater> or 360-336-9380
- Snohomish Co: 425-339-5250
- Whatcom Co: [http://www.co.whatcom.wa.us/health/environmental/drinking\\_water/index.jsp](http://www.co.whatcom.wa.us/health/environmental/drinking_water/index.jsp)
- WSDOH: <http://www.doh.wa.gov/ehp/dw/Programs/coliform.htm>

**NOTES:**

If the result is Unsatisfactory, three (3) repeat samples and groundwater source samples are required for Group A Public Water Systems. Private individuals should investigate the cause of the unsatisfactory result and resample.

If E. Coli or Fecal Coliform are present in sample do not drink the water until it is properly treated.

\*If data qualifiers are present, see accompanying Qualifier Definition report.



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## Washington State Department of Health WATER BACTERIOLOGICAL ANALYSIS

Client Name: Whatcom Environmental Services  
228 E Champion #101  
Bellingham, WA 98225

Reference Number: 23-24072  
Project: 2023 SDF Groundwater  
Sampling

System Name:  
System ID Number:  
DOH Source Number:  
Sample Type:  
Sample Purpose: Investigative or Other  
Sample Location: HF Sinclair PSR  
County:  
Sampled By: Ava Gempler  
Sampler Phone:

Repeat Sample Number:  
Lab Number: 164-47542  
Field ID: SDF-FEB-1-080923  
Date Collected: 8/9/23 12:00  
Date Received: 8/9/23  
Date Set: 8/9/23 17:18  
Date Analyzed: 8/10/23 13:44  
Report Date: 8/25/23  
Comment:  
Approved By: ckk,jln

Authorized by:



Ceann K Knox  
Lab Manager, Bellingham

DOH#	PARAMETER	RESULT	Qualifier	UNITS	Analyst	METHOD	Batch	COMMENT
1	TOTAL COLIFORM	<1		MPN/100mL	mlp	SM9223 B.2.f	QT_230809	
2	E. Coli	<1		MPN/100mL	mlp	SM9223 B.2.f	QT_230809	

If the sample is unsatisfactory you can get information at the following health department websites or phone numbers:

- Island Co: <http://www.islandcounty.net/health/Envh/DrinkingWater/index.htm>
- San Juan Co: <http://www.sanjuanco.com/health/ehswater.aspx>
- Skagit Co: [http://www.skagitcounty.net/drinkingwater\\_](http://www.skagitcounty.net/drinkingwater_) or 360-336-9380
- Snohomish Co: 425-339-5250
- Whatcom Co: [http://www.co.whatcom.wa.us/health/environmental/drinking\\_water/index.jsp](http://www.co.whatcom.wa.us/health/environmental/drinking_water/index.jsp)
- WSDOH: <http://www.doh.wa.gov/ehp/dw/Programs/coliform.htm>

**NOTES:**

If the result is Unsatisfactory, three (3) repeat samples and groundwater source samples are required for Group A Public Water Systems. Private individuals should investigate the cause of the unsatisfactory result and resample.

If E. Coli or Fecal Coliform are present in sample do not drink the water until it is properly treated.

\*If data qualifiers are present, see accompanying Qualifier Definition report.



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## Washington State Department of Health WATER BACTERIOLOGICAL ANALYSIS

Client Name: Whatcom Environmental Services  
228 E Champion #101  
Bellingham, WA 98225

Reference Number: 23-24072  
Project: 2023 SDF Groundwater  
Sampling

System Name:  
System ID Number:  
DOH Source Number:  
Sample Type:  
Sample Purpose: Investigative or Other  
Sample Location: HF Sinclair PSR  
County:  
Sampled By: Ava Gempler  
Sampler Phone:

Repeat Sample Number:  
Lab Number: 164-47543  
Field ID: SDF-DUP-1-080903  
Date Collected: 8/9/23 10:55  
Date Received: 8/9/23  
Date Set: 8/9/23 17:18  
Date Analyzed: 8/10/23 13:44  
Report Date: 8/25/23  
Comment:  
Approved By: ckk,jln

Authorized by:



Ceann K Knox  
Lab Manager, Bellingham

DOH#	PARAMETER	RESULT	Qualifier	UNITS	Analyst	METHOD	Batch	COMMENT
1	TOTAL COLIFORM	<1		MPN/100mL	mlp	SM9223 B.2.f	QT_230809	
2	E. Coli	<1		MPN/100mL	mlp	SM9223 B.2.f	QT_230809	

If the sample is unsatisfactory you can get information at the following health department websites or phone numbers:

- Island Co: <http://www.islandcounty.net/health/Envh/DrinkingWater/index.htm>
- San Juan Co: <http://www.sanjuanco.com/health/ehswater.aspx>
- Skagit Co: [http://www.skagitcounty.net/drinkingwater\\_](http://www.skagitcounty.net/drinkingwater_) or 360-336-9380
- Snohomish Co: 425-339-5250
- Whatcom Co: [http://www.co.whatcom.wa.us/health/environmental/drinking\\_water/index.jsp](http://www.co.whatcom.wa.us/health/environmental/drinking_water/index.jsp)
- WSDOH: <http://www.doh.wa.gov/ehp/dw/Programs/coliform.htm>

**NOTES:**

If the result is Unsatisfactory, three (3) repeat samples and groundwater source samples are required for Group A Public Water Systems. Private individuals should investigate the cause of the unsatisfactory result and resample.

If E. Coli or Fecal Coliform are present in sample do not drink the water until it is properly treated.

\*If data qualifiers are present, see accompanying Qualifier Definition report.



## SAMPLE INDEPENDENT QUALITY CONTROL REPORT

Reference Number: **23-24072**

Report Date: 08/25/23

Batch	Analyte	Result	True Value	Units	Method	% Recovery	Limits*	QC Qualifier	QC Type	Comment
<b>Calibration Check</b>										
NO3NO2_23080	0 NITRATE-N	0.52	0.50	mg/L	SM4500-NO3 F	104	90-110		CAL	
	0 NITRITE-N	0.51	0.50	mg/L	SM4500-NO3 F	102	90-110		CAL	
	0 TOTAL NITRATE+NITRITE as N	1.03	1.00	mg/L	SM4500-NO3 F	103	90-110		CAL	
<b>Laboratory Fortified Blank</b>										
NO3NO2_23080	0 NITRATE-N	1.92	2.00	mg/L	SM4500-NO3 F	96	90-110		LFB	
	0 NITRITE-N	2.13	2.00	mg/L	SM4500-NO3 F	107	90-110		LFB	
<b>Laboratory Reagent Blank</b>										
NO3NO2_23080	0 NITRATE-N	ND		mg/L	SM4500-NO3 F		0-0		LRB	
	0 NITRITE-N	ND		mg/L	SM4500-NO3 F		0-0		LRB	
	0 TOTAL NITRATE+NITRITE as N	ND		mg/L	SM4500-NO3 F		0-0		LRB	
<b>Method Blank</b>										
NO3NO2_23080	0 NITRATE-N	ND		mg/L	SM4500-NO3 F		0-0		MB	
	0 NITRITE-N	ND		mg/L	SM4500-NO3 F		0-0		MB	
	0 TOTAL NITRATE+NITRITE as N	ND		mg/L	SM4500-NO3 F		0-0		MB	
<b>Quality Control Sample</b>										
NO3NO2_23080	0 NITRATE-N	1.02	1.00	mg/L	SM4500-NO3 F	102	90-110		QCS	
	0 NITRITE-N	1.00	1.00	mg/L	SM4500-NO3 F	100	90-110		QCS	
	0 TOTAL NITRATE+NITRITE as N	2.02	2.00	mg/L	SM4500-NO3 F	101	90-110		QCS	

\*Notation:

% Recovery = (Result of Analysis)/(True Value) \* 100

NA = Indicates % Recovery could not be calculated.

Limits are intended for water matrices only. These criteria are for guidance only when reported with soils/solids.

FORM: QCIndependent4.rpt



**SAMPLE DEPENDENT  
QUALITY CONTROL REPORT**  
Duplicate, Matrix Spike/Matrix Spike Duplicate and Confirmation Result Report

**Duplicate**

Batch	Sample	Analyte	Result	Duplicate Result	Units	%RPD	Limits	QC Qualifier	Type	Comments
<b>NO3NO2_230809B</b>										
14797-55-8	46958	NITRATE-N	0.083	0.082	mg/L	<b>1.2</b>	0-20		DUP	
14797-65-0	46958	NITRITE-N	0.012	0.012	mg/L	<b>0.0</b>	0-20		DUP	
14797-55-8	47538	NITRATE-N	0.04	0.04	mg/L	<b>0.0</b>	0-20		DUP	
14797-65-0	47538	NITRITE-N	ND	ND	mg/L	<b>NA</b>	0-20		DUP	
E-10128	47538	TOTAL NITRATE+NITRITE as N	0.04	0.04	mg/L	<b>0.0</b>	0-20		DUP	

**Laboratory Fortified Matrix (MS)**

Batch/CAS	Sample	Analyte	Result	Duplicate		Conc	Units	Percent Recovery		Limits*	%RPD	Limits*	QC		Comments
				Spike Result	Spike Result			MS	MSD				Qualifier	Type	
<b>NO3NO2_230809B</b>															
14797-55-8	46958	NITRATE-N	0.083	0.60	0.60	0.50	mg/L	<b>103</b>	<b>103</b>	80-120	<b>0.0</b>	0-20		LFM	
14797-65-0	46958	NITRITE-N	0.012	0.52	0.52	0.50	mg/L	<b>102</b>	<b>102</b>	80-120	<b>0.0</b>	0-20		LFM	
14797-55-8	47538	NITRATE-N	0.04	0.57	0.57	0.50	mg/L	<b>106</b>	<b>106</b>	80-120	<b>0.0</b>	0-20		LFM	
14797-65-0	47538	NITRITE-N	ND	0.52	0.52	0.50	mg/L	<b>104</b>	<b>104</b>	80-120	<b>0.0</b>	0-20		LFM	
E-10128	47538	TOTAL NITRATE+NITRITE as N	0.04	1.09	1.09	1.00	mg/L	<b>105</b>	<b>105</b>	80-120	<b>0.0</b>	0-20		LFM	

%RPD = Relative Percent Difference

NA = Indicates %RPD could not be calculated

Matrix Spike (MS)/Matrix Spike Duplicate (MSD) analyses are used to determine the accuracy (MS) and precision (MSD) of an analytical method in a given sample matrix. Therefore, the usefulness of this report is limited to samples of similar matrices analyzed in the same analytical batch.

Only Duplicate sample with detections are listed in this report

Limits are intended for water matrices only. These criteria are for guidance only when reported with soils/solids.

## Qualifier Definitions

Reference Number: 23-24072

Report Date: 08/25/23

Qualifier	Definition
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

Note: Some qualifier definitions found on this page may pertain to results or QC data which are not printed with this report.

# CHAIN OF CUSTODY / ANALYSIS REQUEST (PLEASE COMPLETE ALL APPLICABLE SHADED SECTIONS)

# 23-24072

47538 - 47543



Report To: Whatcom Environmental Services	Billing Email: Same as Client
Address: 228 E Champion St #101	Bill To: Same as Client/Report To
City: Bellingham State: WA Zip: 98225	Address
Attn: Eric Libolt	City: State: Zip:
Phone: 360-752-9571 Fax: 360-752-9573	Phone: P.O.#:
Report Email: elibolt@whatcom-es.com	Card: VISA M/C Expires:
Project Name: 2023 SDF Groundwater Sampling	Card#:

<b>FOR LAB USE</b>
REF#
<b>CHECK REGULATORY PROGRAM</b>
<input type="checkbox"/> Safe Drinking Water Act
<input type="checkbox"/> Clean Water Act
<input type="checkbox"/> RCRA / CERCLA
<input checked="" type="checkbox"/> Other

**ANALYTICAL**

**Main Lab (800-755-9295)**  
1620 South Walnut St. Burlington, WA 98233

**Microbiology (888-725-1212)**  
805 W. Orchard Dr. Suite 4 Bellingham, WA 98225

**Portland Lab (503-682-7802)**  
9150 SW Pioneer Ct. Suite W Wilsonville, OR 97070

**Corvallis Lab (541-753-4946)**  
540 SW 3<sup>rd</sup> St. Corvallis, OR 97333

**Bend Lab (541-639-8425)**  
20332 Empire Ave. Suite F4 Bend, OR 97703

**INSTRUCTIONS "PLEASE READ"**

1. Use one line per sample location.
2. Be specific in test requests.
3. List each metal individually.
4. Check off analysis to be performed for each sample location.
5. Enter number of containers.

**Analysis Requested**

**Turn Around Time Required**

Standard

Half-Time (50% Surcharge)

Quickest (100% Surcharge) Phone Call Req.

Emergency (Phone Call Required)

Sample ID	Location	Sample Matrix (See Below)	Grab or Composite	Date	Time	Nitrite-N	Nitrate-N	Nitrite+Nitrate-N	Total Coliform M.P.N. - QuantiTray				Number Of Containers	Special Instruction/ Conditions on Receipt	
1	W-47-080923	HF Sinclair PSR	Ground Water	G	8/9/2023	10:35	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3	
2	W-112-080923	HF Sinclair PSR	Ground Water	G	8/9/2023	12:15	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3	Please also email results to:
3	W-113-080923	HF Sinclair PSR	Ground Water	G	8/9/2023	10:20	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3	agempler@whatcom-es.com
4	W-127-080923	HF Sinclair PSR	Ground Water	G	8/9/2023	12:25	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3	
5	SDF-FEB-1-080923	HF Sinclair PSR	Ground Water	G	8/9/2023	12:00	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3	Will require the EIM file
6	SDF-DUP-1-08093	HF Sinclair PSR	Ground Water	G	8/9/2023	10:55	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3	(EDD) in addition to
7							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		the report.
8							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
9							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
10							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

**Sampled By:** Ava Gempler **Phone:** 360-752-9571 **Fax:** **Email:** agempler@whatcom-es.com **18** **← Total Containers**

Sample Receipt requested (Must include FAX or Email)

**\* Sample Matrix**

W - Water      SW - Surface Water      WW - Wastewater      OL - Oil

DW - Drinking Water      GW - Ground Water      S - Soil      Other \_\_\_\_\_

Relinquished By	Date	Time	Received By	Date	Time
<i>Ava Gempler</i>	8-9-23	14:20	<i>DD S (WI) REC8</i>	8-9-23	14:19

	Yes	No	N/A
Custody Seals Intact	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Sample Temp <u>13.3</u> C Satisfactory	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Evidence Of Cooling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Samples Received Intact	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chain Of Custody & Labels Agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



# CHAIN OF CUSTODY / ANALYSIS REQUEST (PLEASE COMPLETE ALL APPLICABLE SHADED SECTIONS)



Report To: Whatcom Environmental Services	Billing Email: Same as Client
Address: 228 E Champion St #101	Bill To: Same as Client/Report To
City: Bellingham State: WA Zip: 98225	Address
Attn: Eric Libolt	City: State: Zip:
Phone: 360-752-9571 Fax: 360-752-9573	Phone: P.O.#:
Report Email: elibolt@whatcom-es.com	Card: VISA M/C Expires:
Project Name: 2023 SDF Groundwater Sampling	Card#:

**FOR LAB USE**  
REF# 23-24072

**CHECK REGULATORY PROGRAM**

Safe Drinking Water Act  
 Clean Water Act  
 RCRA / CERCLA  
 Other

**ANALYTICAL**

**Main Lab (800-755-9295)**  
1620 South Walnut St. Burlington, WA 98233

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540 SW 3<sup>rd</sup> St. Corvallis, OR 97333

**Bend Lab (541-639-8425)**  
20332 Empire Ave. Suite F4 Bend, OR 97703

- INSTRUCTIONS "PLEASE READ"**
1. Use one line per sample location.
  2. Be specific in test requests.
  3. List each metal individually.
  4. Check off analysis to be performed for each sample location.
  5. Enter number of containers.

Sample ID	Location	Sample Matrix (See Below)	Grab or Composite	Date	Time	Analysis Requested				Number Of Containers	Special Instruction/ Conditions on Receipt			
						Nitrite-N	Nitrate-N	Nitrite+Nitrate-N	Total Coliform M.P.N. - QuantiTray					
1	W-47-080923	Ground Water	G	8/9/2023	10:35	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3	
2	W-112-080923	Ground Water	G	8/9/2023	12:15	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3	Please also email results to:
3	W-113-080923	Ground Water	G	8/9/2023	10:20	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3	agempler@whatcom-es.com
4	W-127-080923	Ground Water	G	8/9/2023	12:25	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3	
5	SDF-FEB-1-080923	Ground Water	G	8/9/2023	12:00	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3	Will require the EIM file
6	SDF-DUP-1-08093	Ground Water	G	8/9/2023	10:55	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3	(EDD) in addition to
7						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		the report.
8						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
9						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
10						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

Sampled By: Ava Gempler Phone: 360-752-9571 Fax: Email: agempler@whatcom-es.com **18** Total Containers

Sample Receipt requested (Must include FAX or Email)

\* Sample Matrix

W - Water SW - Surface Water WW - Wastewater OL - Oil  
 DW - Drinking Water GW - Ground Water S - Soil Other \_\_\_\_\_

Relinquished By	Date	Time	Received By	Date	Time
Ava Gempler	8-9-23	14:20	MS (WI) REC8	8-9-23	14:19
			JLW 9.6°C	8/9/23	16:10

	Yes	No	N/A
Custody Seals Intact	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Sample Temp <u>13.3</u> C Satisfactory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Evidence Of Cooling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Samples Received Intact	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chain Of Custody & Labels Agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



# ANALYTICAL REPORT

## PREPARED FOR

Attn: Eric Libolt  
Whatcom Environmental Services Inc.  
228 East Champion Street #101  
Bellingham, Washington 98225

Generated 10/13/2023 3:22:41 PM

## JOB DESCRIPTION

Whatcom Env - HollyFrontier Puget Sound

## JOB NUMBER

580-132212-1

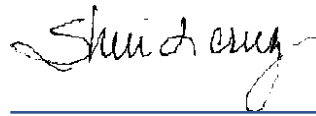
# Eurofins Seattle

## Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Northwest, LLC Project Manager.

## Authorization



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Authorized for release by  
Sheri Cruz, Project Manager I  
[Sheri.Cruz@et.eurofinsus.com](mailto:Sheri.Cruz@et.eurofinsus.com)  
(253)922-2310



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# Case Narrative

Client: Whatcom Environmental Services Inc.  
Project/Site: Whatcom Env - HollyFrontier Puget Sound

Job ID: 580-132212-1

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**Job ID: 580-132212-1**

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**Laboratory: Eurofins Seattle**

## Narrative

### Job Narrative 580-132212-1

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers are applied to indicate exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method. Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

## Receipt

The samples were received on 9/29/2023 9:15 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 1.5°C

## Metals

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

## General Chemistry

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

# Definitions/Glossary

Client: Whatcom Environmental Services Inc.  
Project/Site: Whatcom Env - HollyFrontier Puget Sound

Job ID: 580-132212-1

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

# Client Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: Whatcom Env - HollyFrontier Puget Sound

Job ID: 580-132212-1

**Client Sample ID: W-47-092823**

**Lab Sample ID: 580-132212-1**

**Date Collected: 09/28/23 10:35**

**Matrix: Water**

**Date Received: 09/29/23 09:15**

**Method: EPA 200.8 - Metals (ICP/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	ND		0.00080		mg/L		10/09/23 15:23	10/10/23 14:11	1

**Method: EPA 200.8 - Metals (ICP/MS) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	ND		0.00080		mg/L		10/10/23 16:39	10/11/23 15:00	1

# Client Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: Whatcom Env - HollyFrontier Puget Sound

Job ID: 580-132212-1

**Client Sample ID: W-112-092823**

**Lab Sample ID: 580-132212-2**

Date Collected: 09/28/23 12:45

Matrix: Water

Date Received: 09/29/23 09:15

**Method: EPA 200.7 Rev 4.4 - Metals (ICP) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Magnesium	73		0.50		mg/L		10/10/23 16:39	10/11/23 20:48	1

**Method: EPA 200.8 - Metals (ICP/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	0.00094		0.00080		mg/L		10/09/23 15:23	10/10/23 14:14	1

**Method: EPA 200.8 - Metals (ICP/MS) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	ND		0.00080		mg/L		10/10/23 16:39	10/11/23 15:37	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	38		1.5		mg/L			10/04/23 11:03	1



# Client Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: Whatcom Env - HollyFrontier Puget Sound

Job ID: 580-132212-1

**Client Sample ID: W-113-092823**

**Lab Sample ID: 580-132212-3**

Date Collected: 09/28/23 10:40

Matrix: Water

Date Received: 09/29/23 09:15

**Method: EPA 200.8 - Metals (ICP/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	0.00092		0.00080		mg/L		10/09/23 15:23	10/10/23 14:17	1

**Method: EPA 200.8 - Metals (ICP/MS) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	0.0051		0.00080		mg/L		10/10/23 16:39	10/11/23 15:45	1

# Client Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: Whatcom Env - HollyFrontier Puget Sound

Job ID: 580-132212-1

**Client Sample ID: W-127-092823**

**Lab Sample ID: 580-132212-4**

Date Collected: 09/28/23 11:35

Matrix: Water

Date Received: 09/29/23 09:15

**Method: EPA 200.8 - Metals (ICP/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	0.00086		0.00080		mg/L		10/09/23 15:23	10/10/23 12:37	1

**Method: EPA 200.8 - Metals (ICP/MS) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	ND		0.00080		mg/L		10/10/23 16:39	10/11/23 15:48	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	39		1.5		mg/L			10/04/23 11:15	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chemical Oxygen Demand (SM 5220D)	24		10		mg/L		10/10/23 18:42	10/10/23 22:49	1

# Client Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: Whatcom Env - HollyFrontier Puget Sound

Job ID: 580-132212-1

**Client Sample ID: SDF-DUP-1-092823**

**Lab Sample ID: 580-132212-5**

Date Collected: 09/28/23 08:00

Matrix: Water

Date Received: 09/29/23 09:15

**Method: EPA 200.8 - Metals (ICP/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	ND		0.00080		mg/L		10/10/23 16:39	10/11/23 16:42	1

**Method: EPA 200.8 - Metals (ICP/MS) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	ND		0.00080		mg/L		10/10/23 16:39	10/11/23 15:51	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	39		1.5		mg/L			10/04/23 11:50	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chemical Oxygen Demand (SM 5220D)	19		10		mg/L		10/10/23 18:42	10/10/23 22:49	1

# Client Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: Whatcom Env - HollyFrontier Puget Sound

Job ID: 580-132212-1

**Client Sample ID: SDF-FEB-1-092823**

**Lab Sample ID: 580-132212-6**

Date Collected: 09/28/23 16:00

Matrix: Water

Date Received: 09/29/23 09:15

**Method: EPA 200.7 Rev 4.4 - Metals (ICP) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Magnesium	ND		0.50		mg/L		10/10/23 16:39	10/11/23 21:05	1

**Method: EPA 200.8 - Metals (ICP/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	0.0018		0.00080		mg/L		10/10/23 16:39	10/11/23 16:17	1

**Method: EPA 200.8 - Metals (ICP/MS) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	0.0020		0.00080		mg/L		10/10/23 16:39	10/11/23 15:53	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	ND		1.5		mg/L			10/04/23 12:49	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chemical Oxygen Demand (SM 5220D)	ND		10		mg/L		10/10/23 18:42	10/10/23 22:49	1

# QC Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: Whatcom Env - HollyFrontier Puget Sound

Job ID: 580-132212-1

## Method: 200.7 Rev 4.4 - Metals (ICP)

**Lab Sample ID: MB 580-440437/26-A**  
**Matrix: Water**  
**Analysis Batch: 440651**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 440437**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Magnesium	ND		0.50		mg/L		10/10/23 16:39	10/11/23 20:19	1

**Lab Sample ID: LCS 580-440437/27-A**  
**Matrix: Water**  
**Analysis Batch: 440651**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 440437**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Magnesium	20.0	19.3		mg/L		96	85 - 115

**Lab Sample ID: LCSD 580-440437/28-A**  
**Matrix: Water**  
**Analysis Batch: 440651**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 440437**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Magnesium	20.0	19.8		mg/L		99	85 - 115	3	20

**Lab Sample ID: 580-132212-2 MS**  
**Matrix: Water**  
**Analysis Batch: 440651**

**Client Sample ID: W-112-092823**  
**Prep Type: Dissolved**  
**Prep Batch: 440437**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Magnesium	73		20.0	92.5		mg/L		98	70 - 130

**Lab Sample ID: 580-132212-2 MSD**  
**Matrix: Water**  
**Analysis Batch: 440651**

**Client Sample ID: W-112-092823**  
**Prep Type: Dissolved**  
**Prep Batch: 440437**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Magnesium	73		20.0	88.5		mg/L		78	70 - 130	4	20

## Method: 200.8 - Metals (ICP/MS)

**Lab Sample ID: MB 580-440282/26-A**  
**Matrix: Water**  
**Analysis Batch: 440462**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 440282**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	ND		0.00080		mg/L		10/09/23 15:23	10/10/23 12:34	1

**Lab Sample ID: LCS 580-440282/27-A**  
**Matrix: Water**  
**Analysis Batch: 440462**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 440282**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chromium	1.00	1.01		mg/L		101	85 - 115

# QC Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: Whatcom Env - HollyFrontier Puget Sound

Job ID: 580-132212-1

## Method: 200.8 - Metals (ICP/MS) (Continued)

**Lab Sample ID: LCSD 580-440282/28-A**  
**Matrix: Water**  
**Analysis Batch: 440462**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 440282**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chromium	1.00	1.00		mg/L		100	85 - 115	0	20

**Lab Sample ID: MB 580-440437/26-A**  
**Matrix: Water**  
**Analysis Batch: 440640**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 440437**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	ND		0.00080		mg/L		10/10/23 16:39	10/11/23 14:55	1

**Lab Sample ID: LCS 580-440437/27-A**  
**Matrix: Water**  
**Analysis Batch: 440640**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 440437**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chromium	1.00	1.02		mg/L		102	85 - 115

**Lab Sample ID: LCSD 580-440437/28-A**  
**Matrix: Water**  
**Analysis Batch: 440640**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 440437**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chromium	1.00	1.04		mg/L		104	85 - 115	2	20

**Lab Sample ID: 580-132212-1 MS**  
**Matrix: Water**  
**Analysis Batch: 440640**

**Client Sample ID: W-47-092823**  
**Prep Type: Dissolved**  
**Prep Batch: 440437**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chromium	ND		1.00	1.06		mg/L		106	70 - 130

**Lab Sample ID: 580-132212-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 440640**

**Client Sample ID: W-47-092823**  
**Prep Type: Dissolved**  
**Prep Batch: 440437**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chromium	ND		1.00	1.10		mg/L		110	70 - 130	4	20

**Lab Sample ID: 580-132212-2 MS**  
**Matrix: Water**  
**Analysis Batch: 440640**

**Client Sample ID: W-112-092823**  
**Prep Type: Dissolved**  
**Prep Batch: 440437**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chromium	ND		1.00	1.12		mg/L		112	70 - 130

**Lab Sample ID: 580-132212-2 MSD**  
**Matrix: Water**  
**Analysis Batch: 440640**

**Client Sample ID: W-112-092823**  
**Prep Type: Dissolved**  
**Prep Batch: 440437**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chromium	ND		1.00	1.08		mg/L		108	70 - 130	3	20

Eurofins Seattle

# QC Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: Whatcom Env - HollyFrontier Puget Sound

Job ID: 580-132212-1

## Method: 200.8 - Metals (ICP/MS)

Lab Sample ID: 580-132212-1 DU  
 Matrix: Water  
 Analysis Batch: 440640

Client Sample ID: W-47-092823  
 Prep Type: Dissolved  
 Prep Batch: 440437

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Chromium	ND		ND		mg/L		NC	20

## Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 580-439916/38  
 Matrix: Water  
 Analysis Batch: 439916

Client Sample ID: Method Blank  
 Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.5		mg/L			10/04/23 09:30	1

Lab Sample ID: LCS 580-439916/39  
 Matrix: Water  
 Analysis Batch: 439916

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	50.0	52.0		mg/L		104	90 - 110

Lab Sample ID: LCSD 580-439916/1  
 Matrix: Water  
 Analysis Batch: 439916

Client Sample ID: Lab Control Sample Dup  
 Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Chloride	50.0	52.0		mg/L		104	90 - 110	0	15

Lab Sample ID: 580-132212-6 MS  
 Matrix: Water  
 Analysis Batch: 439916

Client Sample ID: SDF-FEB-1-092823  
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	ND		50.0	52.2		mg/L		104	90 - 110

Lab Sample ID: 580-132212-6 MSD  
 Matrix: Water  
 Analysis Batch: 439916

Client Sample ID: SDF-FEB-1-092823  
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Chloride	ND		50.0	52.2		mg/L		104	90 - 110	0	15

## Method: SM 5220D - COD

Lab Sample ID: MB 580-440458/3-A  
 Matrix: Water  
 Analysis Batch: 440461

Client Sample ID: Method Blank  
 Prep Type: Total/NA  
 Prep Batch: 440458

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chemical Oxygen Demand	ND		10		mg/L		10/10/23 18:42	10/10/23 22:49	1

# QC Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: Whatcom Env - HollyFrontier Puget Sound

Job ID: 580-132212-1

## Method: SM 5220D - COD (Continued)

**Lab Sample ID: LCS 580-440458/4-A**  
**Matrix: Water**  
**Analysis Batch: 440461**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 440458**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chemical Oxygen Demand	75.0	75.9		mg/L		101	80 - 120

**Lab Sample ID: LCSD 580-440458/5-A**  
**Matrix: Water**  
**Analysis Batch: 440461**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 440458**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chemical Oxygen Demand	75.0	77.5		mg/L		103	80 - 120	2	20

**Lab Sample ID: 580-132212-4 MS**  
**Matrix: Water**  
**Analysis Batch: 440461**

**Client Sample ID: W-127-092823**  
**Prep Type: Total/NA**  
**Prep Batch: 440458**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chemical Oxygen Demand	24		25.0	48.8		mg/L		100	75 - 125

**Lab Sample ID: 580-132212-4 DU**  
**Matrix: Water**  
**Analysis Batch: 440461**

**Client Sample ID: W-127-092823**  
**Prep Type: Total/NA**  
**Prep Batch: 440458**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Chemical Oxygen Demand	24		21.4		mg/L		10	20



# Lab Chronicle

Client: Whatcom Environmental Services Inc.  
 Project/Site: Whatcom Env - HollyFrontier Puget Sound

Job ID: 580-132212-1

**Client Sample ID: W-47-092823**

**Lab Sample ID: 580-132212-1**

**Date Collected: 09/28/23 10:35**

**Matrix: Water**

**Date Received: 09/29/23 09:15**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Dissolved	Prep	200.8			440437	JLS	EET SEA	10/10/23 16:39
Dissolved	Analysis	200.8		1	440640	FCW	EET SEA	10/11/23 15:00
Total/NA	Prep	200.8			440282	AUA	EET SEA	10/09/23 15:23
Total/NA	Analysis	200.8		1	440462	FCW	EET SEA	10/10/23 14:11

**Client Sample ID: W-112-092823**

**Lab Sample ID: 580-132212-2**

**Date Collected: 09/28/23 12:45**

**Matrix: Water**

**Date Received: 09/29/23 09:15**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Dissolved	Prep	200.8			440437	JLS	EET SEA	10/10/23 16:39
Dissolved	Analysis	200.7 Rev 4.4		1	440651	JLS	EET SEA	10/11/23 20:48
Dissolved	Prep	200.8			440437	JLS	EET SEA	10/10/23 16:39
Dissolved	Analysis	200.8		1	440640	FCW	EET SEA	10/11/23 15:37
Total/NA	Prep	200.8			440282	AUA	EET SEA	10/09/23 15:23
Total/NA	Analysis	200.8		1	440462	FCW	EET SEA	10/10/23 14:14
Total/NA	Analysis	300.0		1	439916	CA	EET SEA	10/04/23 11:03

**Client Sample ID: W-113-092823**

**Lab Sample ID: 580-132212-3**

**Date Collected: 09/28/23 10:40**

**Matrix: Water**

**Date Received: 09/29/23 09:15**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Dissolved	Prep	200.8			440437	JLS	EET SEA	10/10/23 16:39
Dissolved	Analysis	200.8		1	440640	FCW	EET SEA	10/11/23 15:45
Total/NA	Prep	200.8			440282	AUA	EET SEA	10/09/23 15:23
Total/NA	Analysis	200.8		1	440462	FCW	EET SEA	10/10/23 14:17

**Client Sample ID: W-127-092823**

**Lab Sample ID: 580-132212-4**

**Date Collected: 09/28/23 11:35**

**Matrix: Water**

**Date Received: 09/29/23 09:15**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Dissolved	Prep	200.8			440437	JLS	EET SEA	10/10/23 16:39
Dissolved	Analysis	200.8		1	440640	FCW	EET SEA	10/11/23 15:48
Total/NA	Prep	200.8			440282	AUA	EET SEA	10/09/23 15:23
Total/NA	Analysis	200.8		1	440462	FCW	EET SEA	10/10/23 12:37
Total/NA	Analysis	300.0		1	439916	CA	EET SEA	10/04/23 11:15
Total/NA	Prep	SM 5220			440458	MLT	EET SEA	10/10/23 18:42
Total/NA	Analysis	SM 5220D		1	440461	MLT	EET SEA	10/10/23 22:49

# Lab Chronicle

Client: Whatcom Environmental Services Inc.  
 Project/Site: Whatcom Env - HollyFrontier Puget Sound

Job ID: 580-132212-1

**Client Sample ID: SDF-DUP-1-092823**

**Lab Sample ID: 580-132212-5**

**Date Collected: 09/28/23 08:00**

**Matrix: Water**

**Date Received: 09/29/23 09:15**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Dissolved	Prep	200.8			440437	JLS	EET SEA	10/10/23 16:39
Dissolved	Analysis	200.8		1	440640	FCW	EET SEA	10/11/23 15:51
Total/NA	Prep	200.8			440437	JLS	EET SEA	10/10/23 16:39
Total/NA	Analysis	200.8		1	440640	FCW	EET SEA	10/11/23 16:42
Total/NA	Analysis	300.0		1	439916	CA	EET SEA	10/04/23 11:50
Total/NA	Prep	SM 5220			440458	MLT	EET SEA	10/10/23 18:42
Total/NA	Analysis	SM 5220D		1	440461	MLT	EET SEA	10/10/23 22:49

**Client Sample ID: SDF-FEB-1-092823**

**Lab Sample ID: 580-132212-6**

**Date Collected: 09/28/23 16:00**

**Matrix: Water**

**Date Received: 09/29/23 09:15**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Dissolved	Prep	200.8			440437	JLS	EET SEA	10/10/23 16:39
Dissolved	Analysis	200.7 Rev 4.4		1	440651	JLS	EET SEA	10/11/23 21:05
Dissolved	Prep	200.8			440437	JLS	EET SEA	10/10/23 16:39
Dissolved	Analysis	200.8		1	440640	FCW	EET SEA	10/11/23 15:53
Total/NA	Prep	200.8			440437	JLS	EET SEA	10/10/23 16:39
Total/NA	Analysis	200.8		1	440640	FCW	EET SEA	10/11/23 16:17
Total/NA	Analysis	300.0		1	439916	CA	EET SEA	10/04/23 12:49
Total/NA	Prep	SM 5220			440458	MLT	EET SEA	10/10/23 18:42
Total/NA	Analysis	SM 5220D		1	440461	MLT	EET SEA	10/10/23 22:49

**Laboratory References:**

EET SEA = Eurofins Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310

# Accreditation/Certification Summary

Client: Whatcom Environmental Services Inc.  
Project/Site: Whatcom Env - HollyFrontier Puget Sound

Job ID: 580-132212-1

## Laboratory: Eurofins Seattle

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Washington	State	C788	07-13-24

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
200.7 Rev 4.4	200.8	Water	Magnesium
200.8	200.8	Water	Chromium
300.0		Water	Chloride



# Sample Summary

Client: Whatcom Environmental Services Inc.  
Project/Site: Whatcom Env - HollyFrontier Puget Sound

Job ID: 580-132212-1

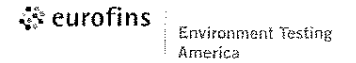
Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-132212-1	W-47-092823	Water	09/28/23 10:35	09/29/23 09:15
580-132212-2	W-112-092823	Water	09/28/23 12:45	09/29/23 09:15
580-132212-3	W-113-092823	Water	09/28/23 10:40	09/29/23 09:15
580-132212-4	W-127-092823	Water	09/28/23 11:35	09/29/23 09:15
580-132212-5	SDF-DUP-1-092823	Water	09/28/23 08:00	09/29/23 09:15
580-132212-6	SDF-FEB-1-092823	Water	09/28/23 16:00	09/29/23 09:15

- 1
- 2
- 3
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- 8
- 9
- 10
- 11

**Eurofins ET Northwest- Seattle**

5755 8th Street East  
Tacoma, WA 98424  
Phone (253) 922-2310 Phone (425) 420-9210

**Chain of Custody Record**



<b>Client Information</b>		Sampler: Ava Gempler		Lab PM: Cruz, Sheri L		Carrier Tracking No(s): FedEx		COC No: 580-44411-14188.2							
Client Contact: Eric Libolt		Phone: 360-752-9571		E-Mail: Sheri.Cruz@et.eurofinsus.com		State of Origin: Washington		Page: Page 1 of 1							
Company: Whatcom Environmental Services Inc.				PWSID:		<b>Analysis Requested</b>									
Address: 228 East Champion Street #101		Due Date Requested:		Field Filtered Sample (Yes or No) Parom MS/MSD (Yes or No) Dissolved 200.9 - (FF) - Chromium Total Chromium Dissolved 200.7 - (FF) - Magnesium 300.0 Chloride 5229D - COD		Total Number of Containers		Job #:							
City: Bellingham		TAT Requested (days): 10 BD						Preservation Codes:							
State, Zip: WA, 98225		Compliance Project: <input type="checkbox"/> Yes <input type="checkbox"/> No						A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 Z - other (specify)					
Phone: 360-752-9571		PO #: Bill to WES						Other:							
Email: elibolt@whatcom-es.com		W/O #:													
Project Name: 2023 SDF Sampling		Project #:													
Site: HF Sinclair Puget Sound Refining LLC		SSOW#:													
<b>Sample Identification</b>		<b>Sample Date</b>	<b>Sample Time</b>	<b>Sample Type (C=Comp, G=grab)</b>	<b>Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)</b>	Field Filtered Sample (Yes or No)	Parom MS/MSD (Yes or No)	Dissolved 200.9 - (FF) - Chromium	Total Chromium	Dissolved 200.7 - (FF) - Magnesium	300.0 Chloride	5229D - COD	Total Number of Containers	<b>Special Instructions/Note:</b>	
W-47-092823		9/28/23	10:35	G	Water			x	x				2		
W-112-092823		9/28/23	12:45	G	Water			x	x	x	x		3		
W-113-092823		9/28/23	10:40	G	Water			x	x				2	Please email results to Ava Gempler at agempler@whatcom-es.com and Eric Libolt at elibolt@whatcom-es.com	
W-127-092823		9/28/23	11:35	G	Water			x	x	x	x		4		
SDF-DUP-1-092823		9/28/23	8:00	G	Water			x	x	x	x		4		
SDF-FEB-1-092823		9/28/23	16:00	G	Water			x	x	x	x	x	4	There is one nitric poly bottle field filtered for dissolved analytes, and one nitric poly not field filtered for total analytes.	
<b>Possible Hazard Identification</b>		<input checked="" type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological		<b>Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)</b>		<input type="checkbox"/> Return To Client <input checked="" type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months									
Deliverable Requested: I, II, III, IV, Other (specify)				Special Instructions/QC Requirements:											
Empty Kit Relinquished by:		Date:		Time:		Method of Shipment:									
Relinquished by: Ava Gempler		Date/Time: 9/28/23 14:35		Company: WES		Received by: [Signature]		Date/Time: 9/29/23 09:15		Company: LBTV					
Relinquished by:		Date/Time:		Company:		Received by:		Date/Time:		Company:					
Relinquished by:		Date/Time:		Company:		Received by:		Date/Time:		Company:					
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No.:				Temperature(s) °C and Other Remarks: 18.9 15/1.8									

18.9 15/1.8  
UB/Ice/BBB/FPO

## Login Sample Receipt Checklist

Client: Whatcom Environmental Services Inc.

Job Number: 580-132212-1

**Login Number: 132212**

**List Number: 1**

**Creator: Presley, Kim A**

**List Source: Eurofins Seattle**

Question	Answer	Comment
Radioactivity wasn't checked or is <math>\leq</math> background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



# ANALYTICAL REPORT

## PREPARED FOR

Attn: Eric Libolt  
Whatcom Environmental Services Inc.  
228 East Champion Street #101  
Bellingham, Washington 98225

Generated 11/30/2023 10:44:06 AM

## JOB DESCRIPTION

HollyFrontier Puget Sound Refining LLC

## JOB NUMBER

580-133690-1

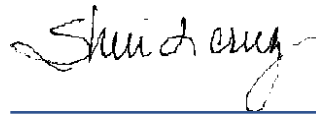
# Eurofins Seattle

## Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Northwest, LLC Project Manager.

## Authorization



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# Case Narrative

Client: Whatcom Environmental Services Inc.  
Project/Site: HollyFrontier Puget Sound Refining LLC

Job ID: 580-133690-1

## Job ID: 580-133690-1

### Laboratory: Eurofins Seattle

#### Narrative

#### Job Narrative 580-133690-1

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers are applied to indicate exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method. Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

#### Receipt

The samples were received on 11/10/2023 9:35 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperatures of the 3 coolers at receipt time were 1.1°C, 1.4°C and 1.5°C

#### GC/MS VOA

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

#### GC/MS Semi VOA

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

#### GC Semi VOA

Method NWTPH\_Dx: The continuing calibration verification (CCV) standard associated with batch 580-443806 recovered outside of %Drift criteria for o-Terphenyl (Surr). The associated client and laboratory quality control (QC) samples recovered within, and were not biased into, passing criteria for this analyte; therefore, the data have been reported. W-47-110823 (580-133690-1), W-112-110823 (580-133690-2), W-113-110823 (580-133690-3), W-127-110823 (580-133690-4), SDF-DUP-1-110823 (580-133690-5), SDF-FEB-1-110823 (580-133690-6), (CCV 580-443806/20), (CCV 580-443806/30), (LCS 580-443768/2-A), (LCS 580-443768/2-B), (LCSD 580-443768/3-A), (LCSD 580-443768/3-B), (MB 580-443768/1-A) and (MB 580-443768/1-B)

Method NWTPH\_Dx: The continuing calibration verification (CCV) standard associated with batch 580-443806 recovered outside of %Drift criteria for o-Terphenyl (Surr). The associated client and laboratory quality control (QC) samples recovered within, and were not biased into, passing criteria for this analyte; therefore, the data have been reported. W-47-110823 (580-133690-1), W-112-110823 (580-133690-2), W-113-110823 (580-133690-3), W-127-110823 (580-133690-4), SDF-DUP-1-110823 (580-133690-5), SDF-FEB-1-110823 (580-133690-6), (CCV 580-443806/20), (CCV 580-443806/30), (LCS 580-443768/2-A), (LCS 580-443768/2-B), (LCSD 580-443768/3-A), (LCSD 580-443768/3-B), (MB 580-443768/1-A) and (MB 580-443768/1-B)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

#### Metals

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

#### General Chemistry

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

# Definitions/Glossary

Client: Whatcom Environmental Services Inc.  
Project/Site: HollyFrontier Puget Sound Refining LLC

Job ID: 580-133690-1

## Qualifiers

### Metals

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

# Client Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: HollyFrontier Puget Sound Refining LLC

Job ID: 580-133690-1

**Client Sample ID: W-47-110823**

**Lab Sample ID: 580-133690-1**

**Date Collected: 11/08/23 11:05**

**Matrix: Water**

**Date Received: 11/10/23 09:35**

### Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L			11/14/23 20:04	1
Toluene	ND		1.0		ug/L			11/14/23 20:04	1
Ethylbenzene	ND		1.0		ug/L			11/14/23 20:04	1
m-Xylene & p-Xylene	ND		2.0		ug/L			11/14/23 20:04	1
o-Xylene	ND		1.0		ug/L			11/14/23 20:04	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		80 - 120		11/14/23 20:04	1
4-Bromofluorobenzene (Surr)	99		80 - 120		11/14/23 20:04	1
Dibromofluoromethane (Surr)	97		80 - 120		11/14/23 20:04	1
1,2-Dichloroethane-d4 (Surr)	103		80 - 120		11/14/23 20:04	1

### Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.10		mg/L			11/14/23 20:04	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	99		77 - 123		11/14/23 20:04	1

### Method: SW846 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.052		ug/L		11/14/23 08:58	11/28/23 21:32	1
Chrysene	ND		0.10		ug/L		11/14/23 08:58	11/28/23 21:32	1
Benzo[a]pyrene	ND		0.10		ug/L		11/14/23 08:58	11/28/23 21:32	1
Indeno[1,2,3-cd]pyrene	ND		0.052		ug/L		11/14/23 08:58	11/28/23 21:32	1
Dibenz(a,h)anthracene	ND		0.10		ug/L		11/14/23 08:58	11/28/23 21:32	1
Benzo[b]fluoranthene	ND		0.10		ug/L		11/14/23 08:58	11/28/23 21:32	1
Benzo[k]fluoranthene	ND		0.052		ug/L		11/14/23 08:58	11/28/23 21:32	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Terphenyl-d14	76		29 - 150	11/14/23 08:58	11/28/23 21:32	1

### Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11		mg/L		11/14/23 08:38	11/14/23 19:45	1
Motor Oil (>C24-C36)	ND		0.36		mg/L		11/14/23 08:38	11/14/23 19:45	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	82		50 - 150	11/14/23 08:38	11/14/23 19:45	1

### Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11		mg/L		11/14/23 08:38	11/14/23 16:31	1
Motor Oil (>C24-C36)	ND		0.36		mg/L		11/14/23 08:38	11/14/23 16:31	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	78		50 - 150	11/14/23 08:38	11/14/23 16:31	1

### Method: EPA 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.50		mg/L		11/15/23 12:10	11/16/23 23:09	1
Magnesium	49		0.50		mg/L		11/15/23 12:10	11/16/23 23:09	1

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# Client Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: HollyFrontier Puget Sound Refining LLC

Job ID: 580-133690-1

**Client Sample ID: W-47-110823**

**Lab Sample ID: 580-133690-1**

Date Collected: 11/08/23 11:05

Matrix: Water

Date Received: 11/10/23 09:35

### Method: EPA 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	69		0.50		mg/L		11/16/23 16:26	11/17/23 18:29	1
Iron	ND		0.50		mg/L		11/16/23 16:26	11/17/23 18:29	1
Magnesium	49		0.50		mg/L		11/16/23 16:26	11/17/23 18:29	1
Potassium	5.1		3.3		mg/L		11/16/23 16:26	11/17/23 18:29	1
Sodium	38		0.50		mg/L		11/16/23 16:26	11/17/23 18:29	1

### Method: EPA 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0012		0.0010		mg/L		11/15/23 12:10	11/21/23 00:24	1
Chromium	ND		0.00080		mg/L		11/15/23 12:10	11/21/23 00:24	1
Lead	ND		0.00040		mg/L		11/15/23 12:10	11/21/23 00:24	1
Manganese	0.022		0.0020		mg/L		11/15/23 12:10	11/21/23 00:24	1
Nickel	ND		0.0030		mg/L		11/15/23 12:10	11/21/23 00:24	1
Selenium	ND		0.0080		mg/L		11/15/23 12:10	11/21/23 00:24	1

### Method: EPA 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0014		0.0010		mg/L		11/16/23 16:26	11/20/23 22:40	1
Chromium	ND		0.00080		mg/L		11/16/23 16:26	11/20/23 22:40	1
Lead	ND		0.00040		mg/L		11/16/23 16:26	11/20/23 22:40	1
Manganese	0.0058		0.0020		mg/L		11/16/23 16:26	11/20/23 22:40	1
Nickel	ND		0.0030		mg/L		11/16/23 16:26	11/20/23 22:40	1
Selenium	ND		0.0080		mg/L		11/16/23 16:26	11/20/23 22:40	1

### Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		11/16/23 10:01	11/17/23 14:52	1

### Method: SW846 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		11/16/23 10:01	11/17/23 15:10	1

### General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	13		1.5		mg/L			11/13/23 17:15	1
Sulfate (EPA 300.0)	61		1.5		mg/L			11/13/23 17:15	1
Ammonia as N (SM 4500 NH3 G)	ND		0.30		mg/L			11/21/23 20:49	1
Total Organic Carbon - Duplicates (SM 5310B)	1.6		1.0		mg/L			11/21/23 13:53	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity (SM 2320B)	340		7.0		mg/L			11/18/23 19:33	1
Bicarbonate Alkalinity as CaCO3 (SM 2320B)	340		7.0		mg/L			11/18/23 19:33	1
Chemical Oxygen Demand (SM 5220D)	ND		10		mg/L		11/11/23 16:04	11/11/23 20:01	1

# Client Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: HollyFrontier Puget Sound Refining LLC

Job ID: 580-133690-1

**Client Sample ID: W-112-110823**

**Lab Sample ID: 580-133690-2**

**Date Collected: 11/08/23 12:50**

**Matrix: Water**

**Date Received: 11/10/23 09:35**

## Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L			11/14/23 20:26	1
Toluene	ND		1.0		ug/L			11/14/23 20:26	1
Ethylbenzene	ND		1.0		ug/L			11/14/23 20:26	1
m-Xylene & p-Xylene	ND		2.0		ug/L			11/14/23 20:26	1
o-Xylene	ND		1.0		ug/L			11/14/23 20:26	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		80 - 120		11/14/23 20:26	1
4-Bromofluorobenzene (Surr)	99		80 - 120		11/14/23 20:26	1
Dibromofluoromethane (Surr)	96		80 - 120		11/14/23 20:26	1
1,2-Dichloroethane-d4 (Surr)	102		80 - 120		11/14/23 20:26	1

## Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.10		mg/L			11/14/23 20:26	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	99		77 - 123		11/14/23 20:26	1

## Method: SW846 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.052		ug/L		11/14/23 08:58	11/28/23 21:55	1
Chrysene	ND		0.10		ug/L		11/14/23 08:58	11/28/23 21:55	1
Benzo[a]pyrene	ND		0.10		ug/L		11/14/23 08:58	11/28/23 21:55	1
Indeno[1,2,3-cd]pyrene	ND		0.052		ug/L		11/14/23 08:58	11/28/23 21:55	1
Dibenz(a,h)anthracene	ND		0.10		ug/L		11/14/23 08:58	11/28/23 21:55	1
Benzo[b]fluoranthene	ND		0.10		ug/L		11/14/23 08:58	11/28/23 21:55	1
Benzo[k]fluoranthene	ND		0.052		ug/L		11/14/23 08:58	11/28/23 21:55	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Terphenyl-d14	80		29 - 150	11/14/23 08:58	11/28/23 21:55	1

## Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11		mg/L		11/14/23 08:38	11/14/23 20:05	1
Motor Oil (>C24-C36)	ND		0.36		mg/L		11/14/23 08:38	11/14/23 20:05	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	85		50 - 150	11/14/23 08:38	11/14/23 20:05	1

## Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11		mg/L		11/14/23 08:38	11/14/23 16:51	1
Motor Oil (>C24-C36)	ND		0.36		mg/L		11/14/23 08:38	11/14/23 16:51	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	87		50 - 150	11/14/23 08:38	11/14/23 16:51	1

## Method: EPA 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.50		mg/L		11/16/23 16:26	11/17/23 19:06	1
Magnesium	72		0.50		mg/L		11/16/23 16:26	11/17/23 19:06	1

Eurofins Seattle

# Client Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: HollyFrontier Puget Sound Refining LLC

Job ID: 580-133690-1

**Client Sample ID: W-112-110823**

**Lab Sample ID: 580-133690-2**

Date Collected: 11/08/23 12:50

Matrix: Water

Date Received: 11/10/23 09:35

**Method: EPA 200.7 Rev 4.4 - Metals (ICP) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	100		0.50		mg/L		11/16/23 16:26	11/17/23 18:56	1
Iron	ND		0.50		mg/L		11/16/23 16:26	11/17/23 18:56	1
Magnesium	75		0.50		mg/L		11/16/23 16:26	11/17/23 18:56	1
Potassium	8.7		3.3		mg/L		11/16/23 16:26	11/17/23 18:56	1
Sodium	58		0.50		mg/L		11/16/23 16:26	11/17/23 18:56	1

**Method: EPA 200.8 - Metals (ICP/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0021		0.0010		mg/L		11/16/23 16:26	11/20/23 23:25	1
Chromium	ND		0.00080		mg/L		11/16/23 16:26	11/20/23 23:25	1
Lead	ND		0.00040		mg/L		11/16/23 16:26	11/20/23 23:25	1
Manganese	0.031		0.0020		mg/L		11/16/23 16:26	11/20/23 23:25	1
Nickel	ND		0.0030		mg/L		11/16/23 16:26	11/20/23 23:25	1
Selenium	ND		0.0080		mg/L		11/16/23 16:26	11/20/23 23:25	1

**Method: EPA 200.8 - Metals (ICP/MS) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0018		0.0010		mg/L		11/16/23 16:26	11/20/23 23:16	1
Chromium	ND		0.00080		mg/L		11/16/23 16:26	11/20/23 23:16	1
Lead	ND		0.00040		mg/L		11/16/23 16:26	11/20/23 23:16	1
Manganese	ND		0.0020		mg/L		11/16/23 16:26	11/20/23 23:16	1
Nickel	ND		0.0030		mg/L		11/16/23 16:26	11/20/23 23:16	1
Selenium	ND		0.0080		mg/L		11/16/23 16:26	11/20/23 23:16	1

**Method: SW846 7470A - Mercury (CVAA)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		11/16/23 10:01	11/17/23 14:55	1

**Method: SW846 7470A - Mercury (CVAA) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		11/16/23 10:01	11/17/23 15:13	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	38		1.5		mg/L			11/13/23 17:50	1
Sulfate (EPA 300.0)	6.7		1.5		mg/L			11/13/23 17:50	1
Ammonia as N (SM 4500 NH3 G)	ND		0.30		mg/L			11/21/23 20:56	1
Total Organic Carbon - Duplicates (SM 5310B)	2.5		1.0		mg/L			11/21/23 14:07	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity (SM 2320B)	560		7.0		mg/L			11/18/23 19:33	1
Bicarbonate Alkalinity as CaCO3 (SM 2320B)	560		7.0		mg/L			11/18/23 19:33	1
Chemical Oxygen Demand (SM 5220D)	11		10		mg/L		11/11/23 16:04	11/11/23 20:01	1

# Client Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: HollyFrontier Puget Sound Refining LLC

Job ID: 580-133690-1

**Client Sample ID: W-113-110823**

**Lab Sample ID: 580-133690-3**

**Date Collected: 11/08/23 10:20**

**Matrix: Water**

**Date Received: 11/10/23 09:35**

## Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L			11/14/23 20:47	1
Toluene	ND		1.0		ug/L			11/14/23 20:47	1
Ethylbenzene	ND		1.0		ug/L			11/14/23 20:47	1
m-Xylene & p-Xylene	ND		2.0		ug/L			11/14/23 20:47	1
o-Xylene	ND		1.0		ug/L			11/14/23 20:47	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	102		80 - 120		11/14/23 20:47	1
4-Bromofluorobenzene (Surr)	99		80 - 120		11/14/23 20:47	1
Dibromofluoromethane (Surr)	96		80 - 120		11/14/23 20:47	1
1,2-Dichloroethane-d4 (Surr)	101		80 - 120		11/14/23 20:47	1

## Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.10		mg/L			11/14/23 20:47	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	99		77 - 123		11/14/23 20:47	1

## Method: SW846 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.051		ug/L		11/14/23 08:58	11/28/23 22:19	1
Chrysene	ND		0.10		ug/L		11/14/23 08:58	11/28/23 22:19	1
Benzo[a]pyrene	ND		0.10		ug/L		11/14/23 08:58	11/28/23 22:19	1
Indeno[1,2,3-cd]pyrene	ND		0.051		ug/L		11/14/23 08:58	11/28/23 22:19	1
Dibenz(a,h)anthracene	ND		0.10		ug/L		11/14/23 08:58	11/28/23 22:19	1
Benzo[b]fluoranthene	ND		0.10		ug/L		11/14/23 08:58	11/28/23 22:19	1
Benzo[k]fluoranthene	ND		0.051		ug/L		11/14/23 08:58	11/28/23 22:19	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Terphenyl-d14	82		29 - 150	11/14/23 08:58	11/28/23 22:19	1

## Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	0.12		0.11		mg/L		11/14/23 08:38	11/14/23 20:24	1
Motor Oil (>C24-C36)	ND		0.36		mg/L		11/14/23 08:38	11/14/23 20:24	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	88		50 - 150	11/14/23 08:38	11/14/23 20:24	1

## Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11		mg/L		11/14/23 08:38	11/14/23 17:10	1
Motor Oil (>C24-C36)	ND		0.36		mg/L		11/14/23 08:38	11/14/23 17:10	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	88		50 - 150	11/14/23 08:38	11/14/23 17:10	1

## Method: EPA 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.50		mg/L		11/16/23 16:26	11/17/23 19:13	1
Magnesium	64		0.50		mg/L		11/16/23 16:26	11/17/23 19:13	1

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# Client Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: HollyFrontier Puget Sound Refining LLC

Job ID: 580-133690-1

**Client Sample ID: W-113-110823**

**Lab Sample ID: 580-133690-3**

Date Collected: 11/08/23 10:20

Matrix: Water

Date Received: 11/10/23 09:35

**Method: EPA 200.7 Rev 4.4 - Metals (ICP) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	70		0.50		mg/L		11/16/23 16:26	11/17/23 19:09	1
Iron	ND		0.50		mg/L		11/16/23 16:26	11/17/23 19:09	1
Magnesium	63		0.50		mg/L		11/16/23 16:26	11/17/23 19:09	1
Potassium	9.2		3.3		mg/L		11/16/23 16:26	11/17/23 19:09	1
Sodium	51		0.50		mg/L		11/16/23 16:26	11/17/23 19:09	1

**Method: EPA 200.8 - Metals (ICP/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0028		0.0010		mg/L		11/16/23 16:26	11/20/23 23:30	1
Chromium	ND		0.00080		mg/L		11/16/23 16:26	11/20/23 23:30	1
Lead	ND		0.00040		mg/L		11/16/23 16:26	11/20/23 23:30	1
Manganese	ND		0.0020		mg/L		11/16/23 16:26	11/20/23 23:30	1
Nickel	ND		0.0030		mg/L		11/16/23 16:26	11/20/23 23:30	1
Selenium	ND		0.0080		mg/L		11/16/23 16:26	11/20/23 23:30	1

**Method: EPA 200.8 - Metals (ICP/MS) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0029		0.0010		mg/L		11/16/23 16:26	11/20/23 23:28	1
Chromium	ND		0.00080		mg/L		11/16/23 16:26	11/20/23 23:28	1
Lead	ND		0.00040		mg/L		11/16/23 16:26	11/20/23 23:28	1
Manganese	ND		0.0020		mg/L		11/16/23 16:26	11/20/23 23:28	1
Nickel	ND		0.0030		mg/L		11/16/23 16:26	11/20/23 23:28	1
Selenium	ND		0.0080		mg/L		11/16/23 16:26	11/20/23 23:28	1

**Method: SW846 7470A - Mercury (CVAA)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		11/16/23 10:01	11/17/23 15:01	1

**Method: SW846 7470A - Mercury (CVAA) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		11/16/23 10:01	11/17/23 15:19	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	27		1.5		mg/L			11/13/23 18:02	1
Sulfate (EPA 300.0)	49		1.5		mg/L			11/13/23 18:02	1
Ammonia as N (SM 4500 NH3 G)	ND		0.30		mg/L			11/21/23 20:58	1
Total Organic Carbon - Duplicates (SM 5310B)	2.0		1.0		mg/L			11/21/23 14:23	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity (SM 2320B)	440		7.0		mg/L			11/18/23 19:33	1
Bicarbonate Alkalinity as CaCO3 (SM 2320B)	440		7.0		mg/L			11/18/23 19:33	1
Chemical Oxygen Demand (SM 5220D)	ND		10		mg/L		11/11/23 16:04	11/11/23 20:01	1

# Client Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: HollyFrontier Puget Sound Refining LLC

Job ID: 580-133690-1

**Client Sample ID: W-127-110823**

**Lab Sample ID: 580-133690-4**

Date Collected: 11/08/23 12:20

Matrix: Water

Date Received: 11/10/23 09:35

## Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L			11/14/23 21:08	1
Toluene	ND		1.0		ug/L			11/14/23 21:08	1
Ethylbenzene	ND		1.0		ug/L			11/14/23 21:08	1
m-Xylene & p-Xylene	ND		2.0		ug/L			11/14/23 21:08	1
o-Xylene	ND		1.0		ug/L			11/14/23 21:08	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	102		80 - 120		11/14/23 21:08	1
4-Bromofluorobenzene (Surr)	100		80 - 120		11/14/23 21:08	1
Dibromofluoromethane (Surr)	96		80 - 120		11/14/23 21:08	1
1,2-Dichloroethane-d4 (Surr)	101		80 - 120		11/14/23 21:08	1

## Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.10		mg/L			11/14/23 21:08	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	100		77 - 123		11/14/23 21:08	1

## Method: SW846 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.051		ug/L		11/14/23 08:58	11/28/23 22:43	1
Chrysene	ND		0.10		ug/L		11/14/23 08:58	11/28/23 22:43	1
Benzo[a]pyrene	ND		0.10		ug/L		11/14/23 08:58	11/28/23 22:43	1
Indeno[1,2,3-cd]pyrene	ND		0.051		ug/L		11/14/23 08:58	11/28/23 22:43	1
Dibenz(a,h)anthracene	ND		0.10		ug/L		11/14/23 08:58	11/28/23 22:43	1
Benzo[b]fluoranthene	ND		0.10		ug/L		11/14/23 08:58	11/28/23 22:43	1
Benzo[k]fluoranthene	ND		0.051		ug/L		11/14/23 08:58	11/28/23 22:43	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Terphenyl-d14	75		29 - 150	11/14/23 08:58	11/28/23 22:43	1

## Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	0.25		0.11		mg/L		11/14/23 08:38	11/14/23 20:43	1
Motor Oil (>C24-C36)	ND		0.35		mg/L		11/14/23 08:38	11/14/23 20:43	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	74		50 - 150	11/14/23 08:38	11/14/23 20:43	1

## Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11		mg/L		11/14/23 08:38	11/14/23 17:30	1
Motor Oil (>C24-C36)	ND		0.35		mg/L		11/14/23 08:38	11/14/23 17:30	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	77		50 - 150	11/14/23 08:38	11/14/23 17:30	1

## Method: EPA 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.50		mg/L		11/16/23 16:26	11/17/23 19:20	1
Magnesium	72		0.50		mg/L		11/16/23 16:26	11/17/23 19:20	1

Eurofins Seattle

# Client Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: HollyFrontier Puget Sound Refining LLC

Job ID: 580-133690-1

**Client Sample ID: W-127-110823**

**Lab Sample ID: 580-133690-4**

Date Collected: 11/08/23 12:20

Matrix: Water

Date Received: 11/10/23 09:35

**Method: EPA 200.7 Rev 4.4 - Metals (ICP) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	110		0.50		mg/L		11/16/23 16:26	11/17/23 19:16	1
Iron	ND		0.50		mg/L		11/16/23 16:26	11/17/23 19:16	1
Magnesium	71		0.50		mg/L		11/16/23 16:26	11/17/23 19:16	1
Potassium	3.7		3.3		mg/L		11/16/23 16:26	11/17/23 19:16	1
Sodium	44		0.50		mg/L		11/16/23 16:26	11/17/23 19:16	1

**Method: EPA 200.8 - Metals (ICP/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0010		mg/L		11/16/23 16:26	11/20/23 23:36	1
Chromium	ND		0.00080		mg/L		11/16/23 16:26	11/20/23 23:36	1
Lead	ND		0.00040		mg/L		11/16/23 16:26	11/20/23 23:36	1
Manganese	0.080		0.0020		mg/L		11/16/23 16:26	11/20/23 23:36	1
Nickel	0.0043		0.0030		mg/L		11/16/23 16:26	11/20/23 23:36	1
Selenium	ND		0.0080		mg/L		11/16/23 16:26	11/20/23 23:36	1

**Method: EPA 200.8 - Metals (ICP/MS) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0010		mg/L		11/16/23 16:26	11/20/23 23:33	1
Chromium	ND		0.00080		mg/L		11/16/23 16:26	11/20/23 23:33	1
Lead	ND		0.00040		mg/L		11/16/23 16:26	11/20/23 23:33	1
Manganese	0.076		0.0020		mg/L		11/16/23 16:26	11/20/23 23:33	1
Nickel	0.0042		0.0030		mg/L		11/16/23 16:26	11/20/23 23:33	1
Selenium	ND		0.0080		mg/L		11/16/23 16:26	11/20/23 23:33	1

**Method: SW846 7470A - Mercury (CVAA)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		11/16/23 10:01	11/17/23 15:04	1

**Method: SW846 7470A - Mercury (CVAA) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		11/16/23 10:01	11/17/23 15:22	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	37		1.5		mg/L			11/13/23 18:13	1
Sulfate (EPA 300.0)	48		1.5		mg/L			11/13/23 18:13	1
Ammonia as N (SM 4500 NH3 G)	ND		0.30		mg/L			11/21/23 21:00	1
Total Organic Carbon - Duplicates (SM 5310B)	7.1		1.0		mg/L			11/21/23 15:52	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity (SM 2320B)	500		7.0		mg/L			11/18/23 19:33	1
Bicarbonate Alkalinity as CaCO3 (SM 2320B)	500		7.0		mg/L			11/18/23 19:33	1
Chemical Oxygen Demand (SM 5220D)	10		10		mg/L		11/11/23 16:04	11/11/23 20:01	1

# Client Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: HollyFrontier Puget Sound Refining LLC

Job ID: 580-133690-1

**Client Sample ID: SDF-DUP-1-110823**

**Lab Sample ID: 580-133690-5**

Date Collected: 11/08/23 08:00

Matrix: Water

Date Received: 11/10/23 09:35

## Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L			11/15/23 23:15	1
Toluene	ND		1.0		ug/L			11/15/23 23:15	1
Ethylbenzene	ND		1.0		ug/L			11/15/23 23:15	1
m-Xylene & p-Xylene	ND		2.0		ug/L			11/15/23 23:15	1
o-Xylene	ND		1.0		ug/L			11/15/23 23:15	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		80 - 120		11/15/23 23:15	1
4-Bromofluorobenzene (Surr)	98		80 - 120		11/15/23 23:15	1
Dibromofluoromethane (Surr)	96		80 - 120		11/15/23 23:15	1
1,2-Dichloroethane-d4 (Surr)	100		80 - 120		11/15/23 23:15	1

## Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.10		mg/L			11/15/23 23:15	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		77 - 123		11/15/23 23:15	1

## Method: SW846 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.053		ug/L		11/14/23 08:58	11/29/23 14:20	1
Chrysene	ND		0.11		ug/L		11/14/23 08:58	11/29/23 14:20	1
Benzo[a]pyrene	ND		0.11		ug/L		11/14/23 08:58	11/29/23 14:20	1
Indeno[1,2,3-cd]pyrene	ND		0.053		ug/L		11/14/23 08:58	11/29/23 14:20	1
Dibenz(a,h)anthracene	ND		0.11		ug/L		11/14/23 08:58	11/29/23 14:20	1
Benzo[b]fluoranthene	ND		0.11		ug/L		11/14/23 08:58	11/29/23 14:20	1
Benzo[k]fluoranthene	ND		0.053		ug/L		11/14/23 08:58	11/29/23 14:20	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Terphenyl-d14	76		29 - 150	11/14/23 08:58	11/29/23 14:20	1

## Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	0.12		0.11		mg/L		11/14/23 08:38	11/14/23 21:03	1
Motor Oil (>C24-C36)	ND		0.36		mg/L		11/14/23 08:38	11/14/23 21:03	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	78		50 - 150	11/14/23 08:38	11/14/23 21:03	1

## Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11		mg/L		11/14/23 08:38	11/14/23 17:49	1
Motor Oil (>C24-C36)	ND		0.36		mg/L		11/14/23 08:38	11/14/23 17:49	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	80		50 - 150	11/14/23 08:38	11/14/23 17:49	1

## Method: EPA 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.50		mg/L		11/16/23 16:26	11/17/23 19:27	1
Magnesium	65		0.50		mg/L		11/16/23 16:26	11/17/23 19:27	1

Eurofins Seattle

# Client Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: HollyFrontier Puget Sound Refining LLC

Job ID: 580-133690-1

**Client Sample ID: SDF-DUP-1-110823**

**Lab Sample ID: 580-133690-5**

Date Collected: 11/08/23 08:00

Matrix: Water

Date Received: 11/10/23 09:35

**Method: EPA 200.7 Rev 4.4 - Metals (ICP) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	75		0.50		mg/L		11/16/23 16:26	11/17/23 19:23	1
Iron	ND		0.50		mg/L		11/16/23 16:26	11/17/23 19:23	1
Magnesium	66		0.50		mg/L		11/16/23 16:26	11/17/23 19:23	1
Potassium	9.6		3.3		mg/L		11/16/23 16:26	11/17/23 19:23	1
Sodium	54		0.50		mg/L		11/16/23 16:26	11/17/23 19:23	1

**Method: EPA 200.8 - Metals (ICP/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0027		0.0010		mg/L		11/16/23 16:26	11/20/23 23:42	1
Chromium	ND		0.00080		mg/L		11/16/23 16:26	11/20/23 23:42	1
Lead	ND		0.00040		mg/L		11/16/23 16:26	11/20/23 23:42	1
Manganese	0.0049		0.0020		mg/L		11/16/23 16:26	11/20/23 23:42	1
Nickel	ND		0.0030		mg/L		11/16/23 16:26	11/20/23 23:42	1
Selenium	ND		0.0080		mg/L		11/16/23 16:26	11/20/23 23:42	1

**Method: EPA 200.8 - Metals (ICP/MS) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0028		0.0010		mg/L		11/16/23 16:26	11/20/23 23:39	1
Chromium	ND		0.00080		mg/L		11/16/23 16:26	11/20/23 23:39	1
Lead	ND		0.00040		mg/L		11/16/23 16:26	11/20/23 23:39	1
Manganese	ND		0.0020		mg/L		11/16/23 16:26	11/20/23 23:39	1
Nickel	ND		0.0030		mg/L		11/16/23 16:26	11/20/23 23:39	1
Selenium	ND		0.0080		mg/L		11/16/23 16:26	11/20/23 23:39	1

**Method: SW846 7470A - Mercury (CVAA)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		11/16/23 10:01	11/17/23 15:06	1

**Method: SW846 7470A - Mercury (CVAA) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		11/16/23 10:01	11/17/23 15:24	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	27		1.5		mg/L			11/13/23 18:25	1
Sulfate (EPA 300.0)	50		1.5		mg/L			11/13/23 18:25	1
Ammonia as N (SM 4500 NH3 G)	ND		0.30		mg/L			11/21/23 21:02	1
Total Organic Carbon - Duplicates (SM 5310B)	2.0		1.0		mg/L			11/21/23 16:06	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity (SM 2320B)	440		7.0		mg/L			11/18/23 19:35	1
Bicarbonate Alkalinity as CaCO3 (SM 2320B)	440		7.0		mg/L			11/18/23 19:35	1
Chemical Oxygen Demand (SM 5220D)	ND		10		mg/L		11/11/23 16:04	11/11/23 20:01	1

# Client Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: HollyFrontier Puget Sound Refining LLC

Job ID: 580-133690-1

**Client Sample ID: SDF-FEB-1-110823**

**Lab Sample ID: 580-133690-6**

Date Collected: 11/08/23 09:45

Matrix: Water

Date Received: 11/10/23 09:35

### Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L			11/15/23 23:36	1
Toluene	ND		1.0		ug/L			11/15/23 23:36	1
Ethylbenzene	ND		1.0		ug/L			11/15/23 23:36	1
m-Xylene & p-Xylene	ND		2.0		ug/L			11/15/23 23:36	1
o-Xylene	ND		1.0		ug/L			11/15/23 23:36	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	102		80 - 120		11/15/23 23:36	1
4-Bromofluorobenzene (Surr)	99		80 - 120		11/15/23 23:36	1
Dibromofluoromethane (Surr)	98		80 - 120		11/15/23 23:36	1
1,2-Dichloroethane-d4 (Surr)	101		80 - 120		11/15/23 23:36	1

### Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.10		mg/L			11/15/23 23:36	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	99		77 - 123		11/15/23 23:36	1

### Method: SW846 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.051		ug/L		11/14/23 08:58	11/29/23 14:45	1
Chrysene	ND		0.10		ug/L		11/14/23 08:58	11/29/23 14:45	1
Benzo[a]pyrene	ND		0.10		ug/L		11/14/23 08:58	11/29/23 14:45	1
Indeno[1,2,3-cd]pyrene	ND		0.051		ug/L		11/14/23 08:58	11/29/23 14:45	1
Dibenz(a,h)anthracene	ND		0.10		ug/L		11/14/23 08:58	11/29/23 14:45	1
Benzo[b]fluoranthene	ND		0.10		ug/L		11/14/23 08:58	11/29/23 14:45	1
Benzo[k]fluoranthene	ND		0.051		ug/L		11/14/23 08:58	11/29/23 14:45	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Terphenyl-d14	78		29 - 150	11/14/23 08:58	11/29/23 14:45	1

### Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11		mg/L		11/14/23 08:38	11/14/23 21:22	1
Motor Oil (>C24-C36)	ND		0.36		mg/L		11/14/23 08:38	11/14/23 21:22	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	70		50 - 150	11/14/23 08:38	11/14/23 21:22	1

### Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11		mg/L		11/14/23 08:38	11/14/23 18:09	1
Motor Oil (>C24-C36)	ND		0.36		mg/L		11/14/23 08:38	11/14/23 18:09	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	72		50 - 150	11/14/23 08:38	11/14/23 18:09	1

### Method: EPA 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.50		mg/L		11/16/23 16:26	11/17/23 19:42	1
Magnesium	ND		0.50		mg/L		11/16/23 16:26	11/17/23 19:42	1

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# Client Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: HollyFrontier Puget Sound Refining LLC

Job ID: 580-133690-1

**Client Sample ID: SDF-FEB-1-110823**

**Lab Sample ID: 580-133690-6**

Date Collected: 11/08/23 09:45

Matrix: Water

Date Received: 11/10/23 09:35

### Method: EPA 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	ND		0.50		mg/L		11/16/23 16:26	11/17/23 19:39	1
Iron	ND		0.50		mg/L		11/16/23 16:26	11/17/23 19:39	1
Magnesium	ND		0.50		mg/L		11/16/23 16:26	11/17/23 19:39	1
Potassium	ND		3.3		mg/L		11/16/23 16:26	11/17/23 19:39	1
Sodium	ND		0.50		mg/L		11/16/23 16:26	11/17/23 19:39	1

### Method: EPA 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0010		mg/L		11/16/23 16:26	11/21/23 00:01	1
Chromium	ND		0.00080		mg/L		11/16/23 16:26	11/21/23 00:01	1
Lead	ND		0.00040		mg/L		11/16/23 16:26	11/21/23 00:01	1
Manganese	ND		0.0020		mg/L		11/16/23 16:26	11/21/23 00:01	1
Nickel	ND		0.0030		mg/L		11/16/23 16:26	11/21/23 00:01	1
Selenium	ND		0.0080		mg/L		11/16/23 16:26	11/21/23 00:01	1

### Method: EPA 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0010		mg/L		11/16/23 16:26	11/20/23 23:58	1
Chromium	ND		0.00080		mg/L		11/16/23 16:26	11/20/23 23:58	1
Lead	ND		0.00040		mg/L		11/16/23 16:26	11/20/23 23:58	1
Manganese	ND		0.0020		mg/L		11/16/23 16:26	11/20/23 23:58	1
Nickel	ND		0.0030		mg/L		11/16/23 16:26	11/20/23 23:58	1
Selenium	ND		0.0080		mg/L		11/16/23 16:26	11/20/23 23:58	1

### Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		11/16/23 10:01	11/17/23 15:08	1

### Method: SW846 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		11/16/23 10:01	11/17/23 15:26	1

### General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	ND		1.5		mg/L			11/13/23 18:37	1
Sulfate (EPA 300.0)	ND		1.5		mg/L			11/13/23 18:37	1
Ammonia as N (SM 4500 NH3 G)	ND		0.30		mg/L			11/21/23 21:04	1
Total Organic Carbon - Duplicates (SM 5310B)	ND		1.0		mg/L			11/21/23 16:20	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Alkalinity (SM 2320B)</b>	<b>8.4</b>		7.0		mg/L			11/18/23 19:35	1
<b>Bicarbonate Alkalinity as CaCO3 (SM 2320B)</b>	<b>8.4</b>		7.0		mg/L			11/18/23 19:35	1
Chemical Oxygen Demand (SM 5220D)	ND		10		mg/L		11/11/23 16:04	11/11/23 20:01	1

Eurofins Seattle

# Client Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: HollyFrontier Puget Sound Refining LLC

Job ID: 580-133690-1

## Client Sample ID: Trip Blanks

Lab Sample ID: 580-133690-7

Date Collected: 11/08/23 00:01

Matrix: Water

Date Received: 11/10/23 09:35

### Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L			11/14/23 18:17	1
Toluene	ND		1.0		ug/L			11/14/23 18:17	1
Ethylbenzene	ND		1.0		ug/L			11/14/23 18:17	1
m-Xylene & p-Xylene	ND		2.0		ug/L			11/14/23 18:17	1
o-Xylene	ND		1.0		ug/L			11/14/23 18:17	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	102		80 - 120		11/14/23 18:17	1
4-Bromofluorobenzene (Surr)	98		80 - 120		11/14/23 18:17	1
Dibromofluoromethane (Surr)	98		80 - 120		11/14/23 18:17	1
1,2-Dichloroethane-d4 (Surr)	104		80 - 120		11/14/23 18:17	1

### Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.10		mg/L			11/14/23 18:17	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		77 - 123		11/14/23 18:17	1



# QC Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: HollyFrontier Puget Sound Refining LLC

Job ID: 580-133690-1

## Method: 8260D - Volatile Organic Compounds by GC/MS

**Lab Sample ID: MB 580-443844/11**  
**Matrix: Water**  
**Analysis Batch: 443844**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L			11/14/23 17:55	1
Toluene	ND		1.0		ug/L			11/14/23 17:55	1
Ethylbenzene	ND		1.0		ug/L			11/14/23 17:55	1
m-Xylene & p-Xylene	ND		2.0		ug/L			11/14/23 17:55	1
o-Xylene	ND		1.0		ug/L			11/14/23 17:55	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	100		80 - 120		11/14/23 17:55	1
4-Bromofluorobenzene (Surr)	101		80 - 120		11/14/23 17:55	1
Dibromofluoromethane (Surr)	96		80 - 120		11/14/23 17:55	1
1,2-Dichloroethane-d4 (Surr)	104		80 - 120		11/14/23 17:55	1

**Lab Sample ID: LCS 580-443844/6**  
**Matrix: Water**  
**Analysis Batch: 443844**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Benzene	10.0	10.2		ug/L		102	80 - 122
Toluene	10.0	10.2		ug/L		102	80 - 120
Ethylbenzene	10.0	10.3		ug/L		103	80 - 120
m-Xylene & p-Xylene	10.0	10.4		ug/L		104	80 - 120
o-Xylene	10.0	10.3		ug/L		103	80 - 120

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Toluene-d8 (Surr)	102		80 - 120
4-Bromofluorobenzene (Surr)	96		80 - 120
Dibromofluoromethane (Surr)	98		80 - 120
1,2-Dichloroethane-d4 (Surr)	103		80 - 120

**Lab Sample ID: LCSD 580-443844/7**  
**Matrix: Water**  
**Analysis Batch: 443844**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Benzene	10.0	10.2		ug/L		102	80 - 122	1	14
Toluene	10.0	10.2		ug/L		102	80 - 120	0	13
Ethylbenzene	10.0	10.2		ug/L		102	80 - 120	1	14
m-Xylene & p-Xylene	10.0	10.2		ug/L		102	80 - 120	1	14
o-Xylene	10.0	10.4		ug/L		104	80 - 120	1	16

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
Toluene-d8 (Surr)	103		80 - 120
4-Bromofluorobenzene (Surr)	97		80 - 120
Dibromofluoromethane (Surr)	99		80 - 120
1,2-Dichloroethane-d4 (Surr)	102		80 - 120

# QC Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: HollyFrontier Puget Sound Refining LLC

Job ID: 580-133690-1

## Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

**Lab Sample ID: MB 580-443963/13**  
**Matrix: Water**  
**Analysis Batch: 443963**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Benzene	ND		1.0		ug/L			11/15/23 18:19	1
Toluene	ND		1.0		ug/L			11/15/23 18:19	1
Ethylbenzene	ND		1.0		ug/L			11/15/23 18:19	1
m-Xylene & p-Xylene	ND		2.0		ug/L			11/15/23 18:19	1
o-Xylene	ND		1.0		ug/L			11/15/23 18:19	1

Surrogate	MB	MB	Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
Toluene-d8 (Surr)	102		80 - 120		11/15/23 18:19	1
4-Bromofluorobenzene (Surr)	98		80 - 120		11/15/23 18:19	1
Dibromofluoromethane (Surr)	96		80 - 120		11/15/23 18:19	1
1,2-Dichloroethane-d4 (Surr)	102		80 - 120		11/15/23 18:19	1

**Lab Sample ID: LCS 580-443963/8**  
**Matrix: Water**  
**Analysis Batch: 443963**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec Limits
		Result	Qualifier				
Benzene	10.0	10.6		ug/L		106	80 - 122
Toluene	10.0	10.8		ug/L		108	80 - 120
Ethylbenzene	10.0	10.9		ug/L		109	80 - 120
m-Xylene & p-Xylene	10.0	11.1		ug/L		111	80 - 120
o-Xylene	10.0	10.7		ug/L		107	80 - 120

Surrogate	LCS	LCS	Limits
	%Recovery	Qualifier	
Toluene-d8 (Surr)	103		80 - 120
4-Bromofluorobenzene (Surr)	96		80 - 120
Dibromofluoromethane (Surr)	99		80 - 120
1,2-Dichloroethane-d4 (Surr)	98		80 - 120

**Lab Sample ID: LCSD 580-443963/9**  
**Matrix: Water**  
**Analysis Batch: 443963**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD	LCSD	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
		Result	Qualifier						
Benzene	10.0	10.9		ug/L		109	80 - 122	3	14
Toluene	10.0	10.8		ug/L		108	80 - 120	0	13
Ethylbenzene	10.0	10.8		ug/L		108	80 - 120	1	14
m-Xylene & p-Xylene	10.0	10.8		ug/L		108	80 - 120	3	14
o-Xylene	10.0	10.7		ug/L		107	80 - 120	1	16

Surrogate	LCSD	LCSD	Limits
	%Recovery	Qualifier	
Toluene-d8 (Surr)	101		80 - 120
4-Bromofluorobenzene (Surr)	96		80 - 120
Dibromofluoromethane (Surr)	98		80 - 120
1,2-Dichloroethane-d4 (Surr)	101		80 - 120

# QC Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: HollyFrontier Puget Sound Refining LLC

Job ID: 580-133690-1

## Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

**Lab Sample ID: MB 580-443838/11**  
**Matrix: Water**  
**Analysis Batch: 443838**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.10		mg/L			11/14/23 17:55	1
Surrogate	MB %Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	101		77 - 123					11/14/23 17:55	1

**Lab Sample ID: LCS 580-443838/8**  
**Matrix: Water**  
**Analysis Batch: 443838**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Gasoline	1.00	0.933		mg/L		93	55 - 148
Surrogate	LCS %Recovery	LCS Qualifier	Limits				
4-Bromofluorobenzene (Surr)	98		77 - 123				

**Lab Sample ID: LCSD 580-443838/9**  
**Matrix: Water**  
**Analysis Batch: 443838**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Gasoline	1.00	0.909		mg/L		91	55 - 148	3	10
Surrogate	LCSD %Recovery	LCSD Qualifier	Limits						
4-Bromofluorobenzene (Surr)	96		77 - 123						

**Lab Sample ID: MB 580-443957/13**  
**Matrix: Water**  
**Analysis Batch: 443957**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.10		mg/L			11/15/23 18:19	1
Surrogate	MB %Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		77 - 123					11/15/23 18:19	1

**Lab Sample ID: LCS 580-443957/10**  
**Matrix: Water**  
**Analysis Batch: 443957**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Gasoline	1.00	0.902		mg/L		90	55 - 148
Surrogate	LCS %Recovery	LCS Qualifier	Limits				
4-Bromofluorobenzene (Surr)	95		77 - 123				

# QC Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: HollyFrontier Puget Sound Refining LLC

Job ID: 580-133690-1

## Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS) (Continued)

**Lab Sample ID: LCSD 580-443957/11**  
**Matrix: Water**  
**Analysis Batch: 443957**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Gasoline	1.00	0.925		mg/L		93	55 - 148	3	10
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>						
4-Bromofluorobenzene (Surr)	98		77 - 123						

## Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

**Lab Sample ID: MB 580-443773/1-A**  
**Matrix: Water**  
**Analysis Batch: 444832**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 443773**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.050		ug/L		11/14/23 08:58	11/28/23 13:10	1
Chrysene	ND		0.10		ug/L		11/14/23 08:58	11/28/23 13:10	1
Benzo[a]pyrene	ND		0.10		ug/L		11/14/23 08:58	11/28/23 13:10	1
Indeno[1,2,3-cd]pyrene	ND		0.050		ug/L		11/14/23 08:58	11/28/23 13:10	1
Dibenz(a,h)anthracene	ND		0.10		ug/L		11/14/23 08:58	11/28/23 13:10	1
Benzo[b]fluoranthene	ND		0.10		ug/L		11/14/23 08:58	11/28/23 13:10	1
Benzo[k]fluoranthene	ND		0.050		ug/L		11/14/23 08:58	11/28/23 13:10	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Terphenyl-d14	89		29 - 150				11/14/23 08:58	11/28/23 13:10	1

**Lab Sample ID: LCS 580-443773/2-A**  
**Matrix: Water**  
**Analysis Batch: 444832**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 443773**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Benzo[a]anthracene	8.00	6.14		ug/L		77	55 - 123
Chrysene	8.00	5.79		ug/L		72	47 - 120
Benzo[a]pyrene	8.00	6.27		ug/L		78	51 - 120
Indeno[1,2,3-cd]pyrene	8.00	6.37		ug/L		80	45 - 123
Dibenz(a,h)anthracene	8.00	6.42		ug/L		80	54 - 123
Benzo[b]fluoranthene	8.00	6.34		ug/L		79	43 - 120
Benzo[k]fluoranthene	8.00	6.43		ug/L		80	41 - 121
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				
Terphenyl-d14	78		29 - 150				

**Lab Sample ID: LCSD 580-443773/3-A**  
**Matrix: Water**  
**Analysis Batch: 444832**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 443773**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Benzo[a]anthracene	8.00	6.73		ug/L		84	55 - 123	9	31
Chrysene	8.00	6.17		ug/L		77	47 - 120	6	30
Benzo[a]pyrene	8.00	6.76		ug/L		85	51 - 120	7	31
Indeno[1,2,3-cd]pyrene	8.00	7.42		ug/L		93	45 - 123	15	35

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# QC Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: HollyFrontier Puget Sound Refining LLC

Job ID: 580-133690-1

## Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM) (Continued)

**Lab Sample ID: LCSD 580-443773/3-A**  
**Matrix: Water**  
**Analysis Batch: 444832**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 443773**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Dibenz(a,h)anthracene	8.00	6.91		ug/L		86	54 - 123	7	35
Benzo[b]fluoranthene	8.00	7.37		ug/L		92	43 - 120	15	35
Benzo[k]fluoranthene	8.00	6.27		ug/L		78	41 - 121	3	35
<b>LCSD LCSD</b>									
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>						
<i>Terphenyl-d14</i>	85		29 - 150						

## Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

**Lab Sample ID: MB 580-443768/1-A**  
**Matrix: Water**  
**Analysis Batch: 443806**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 443768**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11		mg/L		11/14/23 08:38	11/14/23 18:47	1
Motor Oil (>C24-C36)	ND		0.35		mg/L		11/14/23 08:38	11/14/23 18:47	1
<b>MB MB</b>									
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>			<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>	
<i>o-Terphenyl</i>	86		50 - 150			11/14/23 08:38	11/14/23 18:47	1	

**Lab Sample ID: LCS 580-443768/2-A**  
**Matrix: Water**  
**Analysis Batch: 443806**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 443768**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
#2 Diesel (C10-C24)	4.00	3.80		mg/L		95	50 - 120		
Motor Oil (>C24-C36)	4.00	4.05		mg/L		101	64 - 120		
<b>LCS LCS</b>									
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>						
<i>o-Terphenyl</i>	88		50 - 150						

**Lab Sample ID: LCSD 580-443768/3-A**  
**Matrix: Water**  
**Analysis Batch: 443806**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 443768**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
#2 Diesel (C10-C24)	4.00	3.40		mg/L		85	50 - 120	11	26
Motor Oil (>C24-C36)	4.00	3.67		mg/L		92	64 - 120	10	24
<b>LCSD LCSD</b>									
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>						
<i>o-Terphenyl</i>	77		50 - 150						

# QC Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: HollyFrontier Puget Sound Refining LLC

Job ID: 580-133690-1

## Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

**Lab Sample ID: MB 580-443768/1-B**  
**Matrix: Water**  
**Analysis Batch: 443806**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 443768**

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
#2 Diesel (C10-C24)	ND		0.11		mg/L		11/14/23 08:38	11/14/23 15:33	1
Motor Oil (>C24-C36)	ND		0.35		mg/L		11/14/23 08:38	11/14/23 15:33	1
Surrogate		MB MB	Limits			Prepared	Analyzed	Dil Fac	
		%Recovery		Qualifier					
o-Terphenyl		90	50 - 150			11/14/23 08:38	11/14/23 15:33	1	

**Lab Sample ID: LCS 580-443768/2-B**  
**Matrix: Water**  
**Analysis Batch: 443806**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 443768**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits	%Rec
Motor Oil (>C24-C36)	4.00	4.44		mg/L		111	64 - 120	
Surrogate		LCS LCS	Limits			Prepared	Analyzed	Dil Fac
		%Recovery		Qualifier				
o-Terphenyl		87	50 - 150					

**Lab Sample ID: LCSD 580-443768/3-B**  
**Matrix: Water**  
**Analysis Batch: 443806**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 443768**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Motor Oil (>C24-C36)	4.00	3.83		mg/L		96	64 - 120	15	24
Surrogate		LCSD LCSD	Limits			Prepared	Analyzed	Dil Fac	
		%Recovery		Qualifier					
o-Terphenyl		77	50 - 150						

## Method: 200.7 Rev 4.4 - Metals (ICP)

**Lab Sample ID: MB 580-443941/14-A**  
**Matrix: Water**  
**Analysis Batch: 444154**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 443941**

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Iron	ND		0.50		mg/L		11/15/23 12:10	11/16/23 22:03	1
Magnesium	ND		0.50		mg/L		11/15/23 12:10	11/16/23 22:03	1

**Lab Sample ID: LCS 580-443941/15-A**  
**Matrix: Water**  
**Analysis Batch: 444154**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 443941**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Magnesium	20.0	20.9		mg/L		104	85 - 115

# QC Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: HollyFrontier Puget Sound Refining LLC

Job ID: 580-133690-1

## Method: 200.7 Rev 4.4 - Metals (ICP) (Continued)

**Lab Sample ID: LCSD 580-443941/16-A**  
**Matrix: Water**  
**Analysis Batch: 444154**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 443941**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Iron	20.0	20.5		mg/L		103	85 - 115	1	20
Magnesium	20.0	20.8		mg/L		104	85 - 115	0	20

**Lab Sample ID: MB 580-444103/19-A**  
**Matrix: Water**  
**Analysis Batch: 444311**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 444103**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	ND		0.50		mg/L		11/16/23 16:26	11/17/23 18:19	1
Iron	ND		0.50		mg/L		11/16/23 16:26	11/17/23 18:19	1
Magnesium	ND		0.50		mg/L		11/16/23 16:26	11/17/23 18:19	1
Potassium	ND		3.3		mg/L		11/16/23 16:26	11/17/23 18:19	1
Sodium	ND		0.50		mg/L		11/16/23 16:26	11/17/23 18:19	1

**Lab Sample ID: LCS 580-444103/20-A**  
**Matrix: Water**  
**Analysis Batch: 444311**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 444103**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Calcium	20.0	19.4		mg/L		97	85 - 115
Iron	20.0	19.3		mg/L		96	85 - 115
Magnesium	20.0	20.7		mg/L		103	85 - 115
Potassium	20.0	20.3		mg/L		101	85 - 115
Sodium	20.0	20.7		mg/L		103	85 - 115

**Lab Sample ID: LCSD 580-444103/21-A**  
**Matrix: Water**  
**Analysis Batch: 444311**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 444103**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Calcium	20.0	20.0		mg/L		100	85 - 115	3	20
Iron	20.0	19.9		mg/L		99	85 - 115	3	20
Magnesium	20.0	21.1		mg/L		105	85 - 115	2	20
Potassium	20.0	20.5		mg/L		103	85 - 115	1	20
Sodium	20.0	20.4		mg/L		102	85 - 115	1	20

**Lab Sample ID: 580-133690-1 MS**  
**Matrix: Water**  
**Analysis Batch: 444311**

**Client Sample ID: W-47-110823**  
**Prep Type: Dissolved**  
**Prep Batch: 444103**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Calcium	69		20.0	86.7		mg/L		90	70 - 130
Iron	ND		20.0	19.1		mg/L		95	70 - 130
Magnesium	49		20.0	67.3		mg/L		93	70 - 130
Potassium	5.1		20.0	25.1		mg/L		100	70 - 130
Sodium	38		20.0	57.8		mg/L		99	70 - 130

# QC Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: HollyFrontier Puget Sound Refining LLC

Job ID: 580-133690-1

## Method: 200.7 Rev 4.4 - Metals (ICP) (Continued)

**Lab Sample ID: 580-133690-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 444311**

**Client Sample ID: W-47-110823**  
**Prep Type: Dissolved**  
**Prep Batch: 444103**

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier				Limits		
Calcium	69		20.0	88.3		mg/L		98	70 - 130	2	20
Iron	ND		20.0	19.4		mg/L		97	70 - 130	2	20
Magnesium	49		20.0	68.5		mg/L		99	70 - 130	2	20
Potassium	5.1		20.0	25.6		mg/L		103	70 - 130	2	20
Sodium	38		20.0	58.8		mg/L		104	70 - 130	2	20

**Lab Sample ID: 580-133690-2 MS**  
**Matrix: Water**  
**Analysis Batch: 444311**

**Client Sample ID: W-112-110823**  
**Prep Type: Dissolved**  
**Prep Batch: 444103**

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier				Limits		
Calcium	100		20.0	119	4	mg/L		82	70 - 130		
Iron	ND		20.0	19.2		mg/L		96	70 - 130		
Magnesium	75		20.0	92.7		mg/L		90	70 - 130		
Potassium	8.7		20.0	29.2		mg/L		103	70 - 130		
Sodium	58		20.0	77.1		mg/L		98	70 - 130		

**Lab Sample ID: 580-133690-2 MSD**  
**Matrix: Water**  
**Analysis Batch: 444311**

**Client Sample ID: W-112-110823**  
**Prep Type: Dissolved**  
**Prep Batch: 444103**

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier				Limits		
Calcium	100		20.0	119	4	mg/L		81	70 - 130	0	20
Iron	ND		20.0	19.1		mg/L		96	70 - 130	1	20
Magnesium	75		20.0	93.5		mg/L		94	70 - 130	1	20
Potassium	8.7		20.0	29.6		mg/L		105	70 - 130	1	20
Sodium	58		20.0	77.9		mg/L		102	70 - 130	1	20

**Lab Sample ID: 580-133690-1 DU**  
**Matrix: Water**  
**Analysis Batch: 444311**

**Client Sample ID: W-47-110823**  
**Prep Type: Dissolved**  
**Prep Batch: 444103**

Analyte	Sample	Sample	DU		Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Calcium	69		68.2		mg/L		0.7	20
Iron	ND		ND		mg/L		NC	20
Magnesium	49		48.8		mg/L		0.4	20
Potassium	5.1		5.04		mg/L		0.9	20
Sodium	38		37.9		mg/L		0.2	20

## Method: 200.8 - Metals (ICP/MS)

**Lab Sample ID: MB 580-443941/14-A**  
**Matrix: Water**  
**Analysis Batch: 444413**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 443941**

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Arsenic	ND		0.0010		mg/L		11/15/23 12:10	11/21/23 00:21	1
Chromium	ND		0.00080		mg/L		11/15/23 12:10	11/21/23 00:21	1
Lead	ND		0.00040		mg/L		11/15/23 12:10	11/21/23 00:21	1
Manganese	ND		0.0020		mg/L		11/15/23 12:10	11/21/23 00:21	1

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# QC Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: HollyFrontier Puget Sound Refining LLC

Job ID: 580-133690-1

## Method: 200.8 - Metals (ICP/MS) (Continued)

**Lab Sample ID: MB 580-443941/14-A**  
**Matrix: Water**  
**Analysis Batch: 444413**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 443941**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nickel	ND		0.0030		mg/L		11/15/23 12:10	11/21/23 00:21	1
Selenium	ND		0.0080		mg/L		11/15/23 12:10	11/21/23 00:21	1

**Lab Sample ID: LCS 580-443941/15-A**  
**Matrix: Water**  
**Analysis Batch: 444413**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 443941**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	1.00	1.05		mg/L		105	85 - 115
Chromium	1.00	1.06		mg/L		106	85 - 115
Lead	1.00	1.06		mg/L		106	85 - 115
Manganese	1.00	1.02		mg/L		102	85 - 115
Nickel	1.00	1.09		mg/L		109	85 - 115
Selenium	1.00	0.999		mg/L		100	85 - 115

**Lab Sample ID: LCSD 580-443941/16-A**  
**Matrix: Water**  
**Analysis Batch: 444413**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 443941**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Arsenic	1.00	1.04		mg/L		104	85 - 115	1	20
Chromium	1.00	1.05		mg/L		105	85 - 115	1	20
Lead	1.00	1.03		mg/L		103	85 - 115	3	20
Manganese	1.00	1.00		mg/L		100	85 - 115	1	20
Nickel	1.00	1.08		mg/L		108	85 - 115	1	20
Selenium	1.00	0.964		mg/L		96	85 - 115	4	20

**Lab Sample ID: MB 580-444103/19-A**  
**Matrix: Water**  
**Analysis Batch: 444413**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 444103**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0010		mg/L		11/16/23 16:26	11/20/23 22:38	1
Chromium	ND		0.00080		mg/L		11/16/23 16:26	11/20/23 22:38	1
Lead	ND		0.00040		mg/L		11/16/23 16:26	11/20/23 22:38	1
Manganese	ND		0.0020		mg/L		11/16/23 16:26	11/20/23 22:38	1
Nickel	ND		0.0030		mg/L		11/16/23 16:26	11/20/23 22:38	1
Selenium	ND		0.0080		mg/L		11/16/23 16:26	11/20/23 22:38	1

**Lab Sample ID: LCS 580-444103/20-A**  
**Matrix: Water**  
**Analysis Batch: 444413**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 444103**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	1.00	1.00		mg/L		100	85 - 115
Chromium	1.00	1.03		mg/L		103	85 - 115
Lead	1.00	1.01		mg/L		101	85 - 115
Manganese	1.00	0.982		mg/L		98	85 - 115
Nickel	1.00	1.05		mg/L		105	85 - 115
Selenium	1.00	0.970		mg/L		97	85 - 115

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# QC Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: HollyFrontier Puget Sound Refining LLC

Job ID: 580-133690-1

## Method: 200.8 - Metals (ICP/MS)

**Lab Sample ID: LCSD 580-444103/21-A**  
**Matrix: Water**  
**Analysis Batch: 444413**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 444103**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec		RPD	Limit
							Limits	RPD		
Arsenic	1.00	0.994		mg/L		99	85 - 115	1	20	
Chromium	1.00	1.03		mg/L		103	85 - 115	0	20	
Lead	1.00	1.03		mg/L		103	85 - 115	1	20	
Manganese	1.00	0.978		mg/L		98	85 - 115	0	20	
Nickel	1.00	1.05		mg/L		105	85 - 115	0	20	
Selenium	1.00	0.957		mg/L		96	85 - 115	1	20	

**Lab Sample ID: 580-133690-1 MS**  
**Matrix: Water**  
**Analysis Batch: 444413**

**Client Sample ID: W-47-110823**  
**Prep Type: Dissolved**  
**Prep Batch: 444103**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec		RPD	Limit
									Limits	RPD		
Arsenic	0.0014		1.00	1.06		mg/L		106	70 - 130			
Chromium	ND		1.00	1.06		mg/L		106	70 - 130			
Lead	ND		1.00	1.06		mg/L		106	70 - 130			
Manganese	0.0058		1.00	1.01		mg/L		101	70 - 130			
Nickel	ND		1.00	1.08		mg/L		108	70 - 130			
Selenium	ND		1.00	1.01		mg/L		101	70 - 130			

**Lab Sample ID: 580-133690-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 444413**

**Client Sample ID: W-47-110823**  
**Prep Type: Dissolved**  
**Prep Batch: 444103**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec		RPD	Limit
									Limits	RPD		
Arsenic	0.0014		1.00	1.03		mg/L		103	70 - 130	3	20	
Chromium	ND		1.00	1.06		mg/L		106	70 - 130	0	20	
Lead	ND		1.00	1.04		mg/L		104	70 - 130	3	20	
Manganese	0.0058		1.00	1.01		mg/L		101	70 - 130	0	20	
Nickel	ND		1.00	1.07		mg/L		107	70 - 130	1	20	
Selenium	ND		1.00	1.01		mg/L		101	70 - 130	0	20	

**Lab Sample ID: 580-133690-2 MS**  
**Matrix: Water**  
**Analysis Batch: 444413**

**Client Sample ID: W-112-110823**  
**Prep Type: Dissolved**  
**Prep Batch: 444103**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec		RPD	Limit
									Limits	RPD		
Arsenic	0.0018		1.00	1.03		mg/L		103	70 - 130			
Chromium	ND		1.00	1.05		mg/L		105	70 - 130			
Lead	ND		1.00	1.06		mg/L		106	70 - 130			
Manganese	ND		1.00	1.01		mg/L		101	70 - 130			
Nickel	ND		1.00	1.06		mg/L		106	70 - 130			
Selenium	ND		1.00	0.984		mg/L		98	70 - 130			

**Lab Sample ID: 580-133690-2 MSD**  
**Matrix: Water**  
**Analysis Batch: 444413**

**Client Sample ID: W-112-110823**  
**Prep Type: Dissolved**  
**Prep Batch: 444103**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec		RPD	Limit
									Limits	RPD		
Arsenic	0.0018		1.00	1.05		mg/L		104	70 - 130	1	20	

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# QC Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: HollyFrontier Puget Sound Refining LLC

Job ID: 580-133690-1

## Method: 200.8 - Metals (ICP/MS) (Continued)

**Lab Sample ID: 580-133690-2 MSD**  
**Matrix: Water**  
**Analysis Batch: 444413**

**Client Sample ID: W-112-110823**  
**Prep Type: Dissolved**  
**Prep Batch: 444103**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chromium	ND		1.00	1.05		mg/L		105	70 - 130	0	20
Lead	ND		1.00	1.05		mg/L		105	70 - 130	1	20
Manganese	ND		1.00	1.01		mg/L		101	70 - 130	0	20
Nickel	ND		1.00	1.06		mg/L		106	70 - 130	0	20
Selenium	ND		1.00	0.977		mg/L		98	70 - 130	1	20

**Lab Sample ID: 580-133690-1 DU**  
**Matrix: Water**  
**Analysis Batch: 444413**

**Client Sample ID: W-47-110823**  
**Prep Type: Dissolved**  
**Prep Batch: 444103**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Arsenic	0.0014		0.00128		mg/L		6	20
Chromium	ND		ND		mg/L		NC	20
Lead	ND		ND		mg/L		NC	20
Manganese	0.0058		0.00613		mg/L		5	20
Nickel	ND		ND		mg/L		NC	20
Selenium	ND		ND		mg/L		NC	20

## Method: 7470A - Mercury (CVAA)

**Lab Sample ID: MB 580-444038/24-A**  
**Matrix: Water**  
**Analysis Batch: 444213**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 444038**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030		mg/L		11/16/23 10:02	11/17/23 14:32	1

**Lab Sample ID: LCS 580-444038/25-A**  
**Matrix: Water**  
**Analysis Batch: 444213**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 444038**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.00200	0.00207		mg/L		103	80 - 120

**Lab Sample ID: LCSD 580-444038/26-A**  
**Matrix: Water**  
**Analysis Batch: 444213**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 444038**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury	0.00200	0.00210		mg/L		105	80 - 120	1	20

**Lab Sample ID: 580-133690-2 MS**  
**Matrix: Water**  
**Analysis Batch: 444213**

**Client Sample ID: W-112-110823**  
**Prep Type: Total/NA**  
**Prep Batch: 444038**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	ND		0.00200	0.00211		mg/L		105	80 - 120

# QC Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: HollyFrontier Puget Sound Refining LLC

Job ID: 580-133690-1

## Method: 7470A - Mercury (CVAA) (Continued)

Lab Sample ID: 580-133690-2 MSD  
 Matrix: Water  
 Analysis Batch: 444213

Client Sample ID: W-112-110823  
 Prep Type: Total/NA  
 Prep Batch: 444038

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury	ND		0.00200	0.00206		mg/L		103	80 - 120	3	20

## Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 580-443800/3  
 Matrix: Water  
 Analysis Batch: 443800

Client Sample ID: Method Blank  
 Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.5		mg/L			11/13/23 10:42	1
Sulfate	ND		1.5		mg/L			11/13/23 10:42	1

Lab Sample ID: LCS 580-443800/4  
 Matrix: Water  
 Analysis Batch: 443800

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	50.0	52.2		mg/L		104	90 - 110
Sulfate	50.0	51.4		mg/L		103	90 - 110

Lab Sample ID: LCSD 580-443800/5  
 Matrix: Water  
 Analysis Batch: 443800

Client Sample ID: Lab Control Sample Dup  
 Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	50.0	52.2		mg/L		104	90 - 110	0	15
Sulfate	50.0	51.4		mg/L		103	90 - 110	0	15

Lab Sample ID: 580-133690-1 MS  
 Matrix: Water  
 Analysis Batch: 443800

Client Sample ID: W-47-110823  
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	13		50.0	65.4		mg/L		104	90 - 110
Sulfate	61		50.0	107		mg/L		93	90 - 110

Lab Sample ID: 580-133690-1 MSD  
 Matrix: Water  
 Analysis Batch: 443800

Client Sample ID: W-47-110823  
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	13		50.0	65.4		mg/L		104	90 - 110	0	15
Sulfate	61		50.0	107		mg/L		92	90 - 110	0	15

# QC Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: HollyFrontier Puget Sound Refining LLC

Job ID: 580-133690-1

## Method: SM 2320B - Alkalinity

Lab Sample ID: LCS 580-444238/2  
 Matrix: Water  
 Analysis Batch: 444238

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Alkalinity	100	92.0		mg/L		92	85 - 115

## Method: SM 4500 NH3 G - Ammonia

Lab Sample ID: MB 580-444537/14  
 Matrix: Water  
 Analysis Batch: 444537

Client Sample ID: Method Blank  
 Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia as N	ND		0.30		mg/L			11/21/23 20:45	1

Lab Sample ID: LCS 580-444537/15  
 Matrix: Water  
 Analysis Batch: 444537

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Ammonia as N	2.00	1.97		mg/L		98	90 - 110

Lab Sample ID: 580-133690-1 MS  
 Matrix: Water  
 Analysis Batch: 444537

Client Sample ID: W-47-110823  
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Ammonia as N	ND		2.00	2.00		mg/L		100	90 - 110

Lab Sample ID: 580-133690-1 MSD  
 Matrix: Water  
 Analysis Batch: 444537

Client Sample ID: W-47-110823  
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Ammonia as N	ND		2.00	1.99		mg/L		99	90 - 110	1	20

Lab Sample ID: 580-133690-1 DU  
 Matrix: Water  
 Analysis Batch: 444537

Client Sample ID: W-47-110823  
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Ammonia as N	ND		ND		mg/L		NC	20

## Method: SM 5220D - COD

Lab Sample ID: MB 580-443611/3-A  
 Matrix: Water  
 Analysis Batch: 443617

Client Sample ID: Method Blank  
 Prep Type: Total/NA  
 Prep Batch: 443611

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chemical Oxygen Demand	ND		10		mg/L		11/11/23 16:04	11/11/23 20:01	1

# QC Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: HollyFrontier Puget Sound Refining LLC

Job ID: 580-133690-1

## Method: SM 5220D - COD (Continued)

**Lab Sample ID: LCS 580-443611/4-A**  
**Matrix: Water**  
**Analysis Batch: 443617**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 443611**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chemical Oxygen Demand	75.0	76.8		mg/L		102	80 - 120

**Lab Sample ID: LCSD 580-443611/5-A**  
**Matrix: Water**  
**Analysis Batch: 443617**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 443611**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chemical Oxygen Demand	75.0	72.2		mg/L		96	80 - 120	6	20

## Method: SM 5310B - Organic Carbon, Total (TOC)

**Lab Sample ID: MB 280-634911/69**  
**Matrix: Water**  
**Analysis Batch: 634911**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon - Duplicates	ND		1.0		mg/L			11/21/23 10:55	1

**Lab Sample ID: LCS 280-634911/68**  
**Matrix: Water**  
**Analysis Batch: 634911**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Organic Carbon - Duplicates	25.0	25.9		mg/L		104	88 - 112

# Lab Chronicle

Client: Whatcom Environmental Services Inc.  
Project/Site: HollyFrontier Puget Sound Refining LLC

Job ID: 580-133690-1

**Client Sample ID: W-47-110823**

**Lab Sample ID: 580-133690-1**

**Date Collected: 11/08/23 11:05**

**Matrix: Water**

**Date Received: 11/10/23 09:35**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	443844	JBT	EET SEA	11/14/23 20:04
Total/NA	Analysis	NWTPH-Gx		1	443838	JBT	EET SEA	11/14/23 20:04
Total/NA	Prep	3510C			443773	SL	EET SEA	11/14/23 08:58
Total/NA	Analysis	8270E SIM		1	444832	K1K	EET SEA	11/28/23 21:32
Total/NA	Prep	3510C			443768	SL	EET SEA	11/14/23 08:38
Total/NA	Cleanup	3630C			443770	SL	EET SEA	11/14/23 08:47
Total/NA	Analysis	NWTPH-Dx		1	443806	KLW	EET SEA	11/14/23 16:31
Total/NA	Prep	3510C			443768	SL	EET SEA	11/14/23 08:38
Total/NA	Analysis	NWTPH-Dx		1	443806	KLW	EET SEA	11/14/23 19:45
Dissolved	Prep	200.8			444103	JLS	EET SEA	11/16/23 16:26
Dissolved	Analysis	200.7 Rev 4.4		1	444311	TMH	EET SEA	11/17/23 18:29
Total/NA	Prep	200.8			443941	TMH	EET SEA	11/15/23 12:10
Total/NA	Analysis	200.7 Rev 4.4		1	444154	JLS	EET SEA	11/16/23 23:09
Dissolved	Prep	200.8			444103	JLS	EET SEA	11/16/23 16:26
Dissolved	Analysis	200.8		1	444413	FCW	EET SEA	11/20/23 22:40
Total/NA	Prep	200.8			443941	TMH	EET SEA	11/15/23 12:10
Total/NA	Analysis	200.8		1	444413	FCW	EET SEA	11/21/23 00:24
Dissolved	Prep	7470A			444038	JL	EET SEA	11/16/23 10:01
Dissolved	Analysis	7470A		1	444213	JL	EET SEA	11/17/23 15:10
Total/NA	Prep	7470A			444038	JL	EET SEA	11/16/23 10:01
Total/NA	Analysis	7470A		1	444213	JL	EET SEA	11/17/23 14:52
Total/NA	Analysis	300.0		1	443800	CA	EET SEA	11/13/23 17:15
Total/NA	Analysis	SM 2320B		1	444238	MLT	EET SEA	11/18/23 19:33
Total/NA	Analysis	SM 4500 NH3 G		1	444537	MLT	EET SEA	11/21/23 20:49
Total/NA	Prep	SM 5220			443611	MLT	EET SEA	11/11/23 16:04
Total/NA	Analysis	SM 5220D		1	443617	MLT	EET SEA	11/11/23 20:01
Total/NA	Analysis	SM 5310B		1	634911	ABW	EET DEN	11/21/23 13:53

**Client Sample ID: W-112-110823**

**Lab Sample ID: 580-133690-2**

**Date Collected: 11/08/23 12:50**

**Matrix: Water**

**Date Received: 11/10/23 09:35**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	443844	JBT	EET SEA	11/14/23 20:26
Total/NA	Analysis	NWTPH-Gx		1	443838	JBT	EET SEA	11/14/23 20:26
Total/NA	Prep	3510C			443773	SL	EET SEA	11/14/23 08:58
Total/NA	Analysis	8270E SIM		1	444832	K1K	EET SEA	11/28/23 21:55
Total/NA	Prep	3510C			443768	SL	EET SEA	11/14/23 08:38
Total/NA	Cleanup	3630C			443770	SL	EET SEA	11/14/23 08:47
Total/NA	Analysis	NWTPH-Dx		1	443806	KLW	EET SEA	11/14/23 16:51
Total/NA	Prep	3510C			443768	SL	EET SEA	11/14/23 08:38
Total/NA	Analysis	NWTPH-Dx		1	443806	KLW	EET SEA	11/14/23 20:05
Dissolved	Prep	200.8			444103	JLS	EET SEA	11/16/23 16:26
Dissolved	Analysis	200.7 Rev 4.4		1	444311	TMH	EET SEA	11/17/23 18:56

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# Lab Chronicle

Client: Whatcom Environmental Services Inc.  
 Project/Site: HollyFrontier Puget Sound Refining LLC

Job ID: 580-133690-1

**Client Sample ID: W-112-110823**

**Lab Sample ID: 580-133690-2**

**Date Collected: 11/08/23 12:50**

**Matrix: Water**

**Date Received: 11/10/23 09:35**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	200.8			444103	JLS	EET SEA	11/16/23 16:26
Total/NA	Analysis	200.7 Rev 4.4		1	444311	TMH	EET SEA	11/17/23 19:06
Dissolved	Prep	200.8			444103	JLS	EET SEA	11/16/23 16:26
Dissolved	Analysis	200.8		1	444413	FCW	EET SEA	11/20/23 23:16
Total/NA	Prep	200.8			444103	JLS	EET SEA	11/16/23 16:26
Total/NA	Analysis	200.8		1	444413	FCW	EET SEA	11/20/23 23:25
Dissolved	Prep	7470A			444038	JL	EET SEA	11/16/23 10:01
Dissolved	Analysis	7470A		1	444213	JL	EET SEA	11/17/23 15:13
Total/NA	Prep	7470A			444038	JL	EET SEA	11/16/23 10:01
Total/NA	Analysis	7470A		1	444213	JL	EET SEA	11/17/23 14:55
Total/NA	Analysis	300.0		1	443800	CA	EET SEA	11/13/23 17:50
Total/NA	Analysis	SM 2320B		1	444238	MLT	EET SEA	11/18/23 19:33
Total/NA	Analysis	SM 4500 NH3 G		1	444537	MLT	EET SEA	11/21/23 20:56
Total/NA	Prep	SM 5220			443611	MLT	EET SEA	11/11/23 16:04
Total/NA	Analysis	SM 5220D		1	443617	MLT	EET SEA	11/11/23 20:01
Total/NA	Analysis	SM 5310B		1	634911	ABW	EET DEN	11/21/23 14:07

**Client Sample ID: W-113-110823**

**Lab Sample ID: 580-133690-3**

**Date Collected: 11/08/23 10:20**

**Matrix: Water**

**Date Received: 11/10/23 09:35**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	443844	JBT	EET SEA	11/14/23 20:47
Total/NA	Analysis	NWTPH-Gx		1	443838	JBT	EET SEA	11/14/23 20:47
Total/NA	Prep	3510C			443773	SL	EET SEA	11/14/23 08:58
Total/NA	Analysis	8270E SIM		1	444832	K1K	EET SEA	11/28/23 22:19
Total/NA	Prep	3510C			443768	SL	EET SEA	11/14/23 08:38
Total/NA	Cleanup	3630C			443770	SL	EET SEA	11/14/23 08:47
Total/NA	Analysis	NWTPH-Dx		1	443806	KLW	EET SEA	11/14/23 17:10
Total/NA	Prep	3510C			443768	SL	EET SEA	11/14/23 08:38
Total/NA	Analysis	NWTPH-Dx		1	443806	KLW	EET SEA	11/14/23 20:24
Dissolved	Prep	200.8			444103	JLS	EET SEA	11/16/23 16:26
Dissolved	Analysis	200.7 Rev 4.4		1	444311	TMH	EET SEA	11/17/23 19:09
Total/NA	Prep	200.8			444103	JLS	EET SEA	11/16/23 16:26
Total/NA	Analysis	200.7 Rev 4.4		1	444311	TMH	EET SEA	11/17/23 19:13
Dissolved	Prep	200.8			444103	JLS	EET SEA	11/16/23 16:26
Dissolved	Analysis	200.8		1	444413	FCW	EET SEA	11/20/23 23:28
Total/NA	Prep	200.8			444103	JLS	EET SEA	11/16/23 16:26
Total/NA	Analysis	200.8		1	444413	FCW	EET SEA	11/20/23 23:30
Dissolved	Prep	7470A			444038	JL	EET SEA	11/16/23 10:01
Dissolved	Analysis	7470A		1	444213	JL	EET SEA	11/17/23 15:19
Total/NA	Prep	7470A			444038	JL	EET SEA	11/16/23 10:01
Total/NA	Analysis	7470A		1	444213	JL	EET SEA	11/17/23 15:01
Total/NA	Analysis	300.0		1	443800	CA	EET SEA	11/13/23 18:02



# Lab Chronicle

Client: Whatcom Environmental Services Inc.  
 Project/Site: HollyFrontier Puget Sound Refining LLC

Job ID: 580-133690-1

**Client Sample ID: W-113-110823**

**Lab Sample ID: 580-133690-3**

**Date Collected: 11/08/23 10:20**

**Matrix: Water**

**Date Received: 11/10/23 09:35**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	SM 2320B		1	444238	MLT	EET SEA	11/18/23 19:33
Total/NA	Analysis	SM 4500 NH3 G		1	444537	MLT	EET SEA	11/21/23 20:58
Total/NA	Prep	SM 5220			443611	MLT	EET SEA	11/11/23 16:04
Total/NA	Analysis	SM 5220D		1	443617	MLT	EET SEA	11/11/23 20:01
Total/NA	Analysis	SM 5310B		1	634911	ABW	EET DEN	11/21/23 14:23

**Client Sample ID: W-127-110823**

**Lab Sample ID: 580-133690-4**

**Date Collected: 11/08/23 12:20**

**Matrix: Water**

**Date Received: 11/10/23 09:35**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	443844	JBT	EET SEA	11/14/23 21:08
Total/NA	Analysis	NWTPH-Gx		1	443838	JBT	EET SEA	11/14/23 21:08
Total/NA	Prep	3510C			443773	SL	EET SEA	11/14/23 08:58
Total/NA	Analysis	8270E SIM		1	444832	K1K	EET SEA	11/28/23 22:43
Total/NA	Prep	3510C			443768	SL	EET SEA	11/14/23 08:38
Total/NA	Cleanup	3630C			443770	SL	EET SEA	11/14/23 08:47
Total/NA	Analysis	NWTPH-Dx		1	443806	KLW	EET SEA	11/14/23 17:30
Total/NA	Prep	3510C			443768	SL	EET SEA	11/14/23 08:38
Total/NA	Analysis	NWTPH-Dx		1	443806	KLW	EET SEA	11/14/23 20:43
Dissolved	Prep	200.8			444103	JLS	EET SEA	11/16/23 16:26
Dissolved	Analysis	200.7 Rev 4.4		1	444311	TMH	EET SEA	11/17/23 19:16
Total/NA	Prep	200.8			444103	JLS	EET SEA	11/16/23 16:26
Total/NA	Analysis	200.7 Rev 4.4		1	444311	TMH	EET SEA	11/17/23 19:20
Dissolved	Prep	200.8			444103	JLS	EET SEA	11/16/23 16:26
Dissolved	Analysis	200.8		1	444413	FCW	EET SEA	11/20/23 23:33
Total/NA	Prep	200.8			444103	JLS	EET SEA	11/16/23 16:26
Total/NA	Analysis	200.8		1	444413	FCW	EET SEA	11/20/23 23:36
Dissolved	Prep	7470A			444038	JL	EET SEA	11/16/23 10:01
Dissolved	Analysis	7470A		1	444213	JL	EET SEA	11/17/23 15:22
Total/NA	Prep	7470A			444038	JL	EET SEA	11/16/23 10:01
Total/NA	Analysis	7470A		1	444213	JL	EET SEA	11/17/23 15:04
Total/NA	Analysis	300.0		1	443800	CA	EET SEA	11/13/23 18:13
Total/NA	Analysis	SM 2320B		1	444238	MLT	EET SEA	11/18/23 19:33
Total/NA	Analysis	SM 4500 NH3 G		1	444537	MLT	EET SEA	11/21/23 21:00
Total/NA	Prep	SM 5220			443611	MLT	EET SEA	11/11/23 16:04
Total/NA	Analysis	SM 5220D		1	443617	MLT	EET SEA	11/11/23 20:01
Total/NA	Analysis	SM 5310B		1	634911	ABW	EET DEN	11/21/23 15:52

# Lab Chronicle

Client: Whatcom Environmental Services Inc.  
 Project/Site: HollyFrontier Puget Sound Refining LLC

Job ID: 580-133690-1

**Client Sample ID: SDF-DUP-1-110823**

**Lab Sample ID: 580-133690-5**

**Date Collected: 11/08/23 08:00**

**Matrix: Water**

**Date Received: 11/10/23 09:35**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	443963	JBT	EET SEA	11/15/23 23:15
Total/NA	Analysis	NWTPH-Gx		1	443957	JBT	EET SEA	11/15/23 23:15
Total/NA	Prep	3510C			443773	SL	EET SEA	11/14/23 08:58
Total/NA	Analysis	8270E SIM		1	444976	T1L	EET SEA	11/29/23 14:20
Total/NA	Prep	3510C			443768	SL	EET SEA	11/14/23 08:38
Total/NA	Cleanup	3630C			443770	SL	EET SEA	11/14/23 08:47
Total/NA	Analysis	NWTPH-Dx		1	443806	KLW	EET SEA	11/14/23 17:49
Total/NA	Prep	3510C			443768	SL	EET SEA	11/14/23 08:38
Total/NA	Analysis	NWTPH-Dx		1	443806	KLW	EET SEA	11/14/23 21:03
Dissolved	Prep	200.8			444103	JLS	EET SEA	11/16/23 16:26
Dissolved	Analysis	200.7 Rev 4.4		1	444311	TMH	EET SEA	11/17/23 19:23
Total/NA	Prep	200.8			444103	JLS	EET SEA	11/16/23 16:26
Total/NA	Analysis	200.7 Rev 4.4		1	444311	TMH	EET SEA	11/17/23 19:27
Dissolved	Prep	200.8			444103	JLS	EET SEA	11/16/23 16:26
Dissolved	Analysis	200.8		1	444413	FCW	EET SEA	11/20/23 23:39
Total/NA	Prep	200.8			444103	JLS	EET SEA	11/16/23 16:26
Total/NA	Analysis	200.8		1	444413	FCW	EET SEA	11/20/23 23:42
Dissolved	Prep	7470A			444038	JL	EET SEA	11/16/23 10:01
Dissolved	Analysis	7470A		1	444213	JL	EET SEA	11/17/23 15:24
Total/NA	Prep	7470A			444038	JL	EET SEA	11/16/23 10:01
Total/NA	Analysis	7470A		1	444213	JL	EET SEA	11/17/23 15:06
Total/NA	Analysis	300.0		1	443800	CA	EET SEA	11/13/23 18:25
Total/NA	Analysis	SM 2320B		1	444238	MLT	EET SEA	11/18/23 19:35
Total/NA	Analysis	SM 4500 NH3 G		1	444537	MLT	EET SEA	11/21/23 21:02
Total/NA	Prep	SM 5220			443611	MLT	EET SEA	11/11/23 16:04
Total/NA	Analysis	SM 5220D		1	443617	MLT	EET SEA	11/11/23 20:01
Total/NA	Analysis	SM 5310B		1	634911	ABW	EET DEN	11/21/23 16:06

**Client Sample ID: SDF-FEB-1-110823**

**Lab Sample ID: 580-133690-6**

**Date Collected: 11/08/23 09:45**

**Matrix: Water**

**Date Received: 11/10/23 09:35**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	443963	JBT	EET SEA	11/15/23 23:36
Total/NA	Analysis	NWTPH-Gx		1	443957	JBT	EET SEA	11/15/23 23:36
Total/NA	Prep	3510C			443773	SL	EET SEA	11/14/23 08:58
Total/NA	Analysis	8270E SIM		1	444976	T1L	EET SEA	11/29/23 14:45
Total/NA	Prep	3510C			443768	SL	EET SEA	11/14/23 08:38
Total/NA	Cleanup	3630C			443770	SL	EET SEA	11/14/23 08:47
Total/NA	Analysis	NWTPH-Dx		1	443806	KLW	EET SEA	11/14/23 18:09
Total/NA	Prep	3510C			443768	SL	EET SEA	11/14/23 08:38
Total/NA	Analysis	NWTPH-Dx		1	443806	KLW	EET SEA	11/14/23 21:22
Dissolved	Prep	200.8			444103	JLS	EET SEA	11/16/23 16:26
Dissolved	Analysis	200.7 Rev 4.4		1	444311	TMH	EET SEA	11/17/23 19:39

# Lab Chronicle

Client: Whatcom Environmental Services Inc.  
 Project/Site: HollyFrontier Puget Sound Refining LLC

Job ID: 580-133690-1

**Client Sample ID: SDF-FEB-1-110823**

**Lab Sample ID: 580-133690-6**

**Date Collected: 11/08/23 09:45**

**Matrix: Water**

**Date Received: 11/10/23 09:35**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	200.8			444103	JLS	EET SEA	11/16/23 16:26
Total/NA	Analysis	200.7 Rev 4.4		1	444311	TMH	EET SEA	11/17/23 19:42
Dissolved	Prep	200.8			444103	JLS	EET SEA	11/16/23 16:26
Dissolved	Analysis	200.8		1	444413	FCW	EET SEA	11/20/23 23:58
Total/NA	Prep	200.8			444103	JLS	EET SEA	11/16/23 16:26
Total/NA	Analysis	200.8		1	444413	FCW	EET SEA	11/21/23 00:01
Dissolved	Prep	7470A			444038	JL	EET SEA	11/16/23 10:01
Dissolved	Analysis	7470A		1	444213	JL	EET SEA	11/17/23 15:26
Total/NA	Prep	7470A			444038	JL	EET SEA	11/16/23 10:01
Total/NA	Analysis	7470A		1	444213	JL	EET SEA	11/17/23 15:08
Total/NA	Analysis	300.0		1	443800	CA	EET SEA	11/13/23 18:37
Total/NA	Analysis	SM 2320B		1	444238	MLT	EET SEA	11/18/23 19:35
Total/NA	Analysis	SM 4500 NH3 G		1	444537	MLT	EET SEA	11/21/23 21:04
Total/NA	Prep	SM 5220			443611	MLT	EET SEA	11/11/23 16:04
Total/NA	Analysis	SM 5220D		1	443617	MLT	EET SEA	11/11/23 20:01
Total/NA	Analysis	SM 5310B		1	634911	ABW	EET DEN	11/21/23 16:20

**Client Sample ID: Trip Blanks**

**Lab Sample ID: 580-133690-7**

**Date Collected: 11/08/23 00:01**

**Matrix: Water**

**Date Received: 11/10/23 09:35**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	443844	JBT	EET SEA	11/14/23 18:17
Total/NA	Analysis	NWTPH-Gx		1	443838	JBT	EET SEA	11/14/23 18:17

**Laboratory References:**

EET DEN = Eurofins Denver, 4955 Yarrow Street, Arvada, CO 80002, TEL (303)736-0100  
 EET SEA = Eurofins Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310

# Accreditation/Certification Summary

Client: Whatcom Environmental Services Inc.  
 Project/Site: HollyFrontier Puget Sound Refining LLC

Job ID: 580-133690-1

## Laboratory: Eurofins Seattle

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Washington	State	C788	07-13-24
The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.			
Analysis Method	Prep Method	Matrix	Analyte
200.7 Rev 4.4	200.8	Water	Calcium
200.7 Rev 4.4	200.8	Water	Iron
200.7 Rev 4.4	200.8	Water	Magnesium
200.7 Rev 4.4	200.8	Water	Potassium
200.7 Rev 4.4	200.8	Water	Sodium
200.8	200.8	Water	Arsenic
200.8	200.8	Water	Chromium
200.8	200.8	Water	Lead
200.8	200.8	Water	Manganese
200.8	200.8	Water	Nickel
200.8	200.8	Water	Selenium
300.0		Water	Chloride
300.0		Water	Sulfate
SM 2320B		Water	Alkalinity
SM 2320B		Water	Bicarbonate Alkalinity as CaCO3

## Laboratory: Eurofins Denver

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
A2LA	Dept. of Defense ELAP	2907.01	10-31-24
A2LA	ISO/IEC 17025	2907.01	10-31-25
Alabama	State Program	40730	09-30-12 *
Alaska (UST)	State	18-001	02-10-24
Arizona	State	AZ0713	12-20-23
Arkansas DEQ	State	19-047-0	05-31-23 *
California	State	2513	01-09-24
Connecticut	State	PH-0686	09-30-24
Florida	NELAP	E87667-57	06-30-24
Georgia	State	4025-011	01-08-24
Illinois	NELAP	2000172019-1	04-30-24
Iowa	State	370	12-01-24
Kansas	NELAP	E-10166	04-30-24
Kentucky (WW)	State	KY98047	12-31-23
Louisiana	NELAP	30785	06-30-14 *
Louisiana	NELAP	30785	06-30-23 *
Louisiana (All)	NELAP	30785	06-30-24
Minnesota	NELAP	1788752	12-31-23
Nevada	State	CO000262020-1	07-31-24
New Hampshire	NELAP	2053	04-28-24
New Jersey	NELAP	230001	06-30-24
New York	NELAP	59923	03-31-24
North Carolina (WW/SW)	State	358	12-31-23
North Dakota	State	R-034	01-08-24
Oklahoma	NELAP	8614	08-31-24
Oregon	NELAP	4025-019	01-08-24

\* Accreditation/Certification renewal pending - accreditation/certification considered valid.

# Accreditation/Certification Summary

Client: Whatcom Environmental Services Inc.  
Project/Site: HollyFrontier Puget Sound Refining LLC

Job ID: 580-133690-1

## Laboratory: Eurofins Denver (Continued)

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

<u>Authority</u>	<u>Program</u>	<u>Identification Number</u>	<u>Expiration Date</u>
Pennsylvania	NELAP	013	07-31-24
South Carolina	State	72002001	01-08-24
Texas	NELAP	TX104704183-08-TX	09-30-09 *
Texas	NELAP	T104704183-21-19	09-30-24
USDA	US Federal Programs	P330-20-00065	12-19-25
Utah	NELAP	QUAN5	06-30-13 *
Utah	NELAP	CO000262019-11	07-31-24
Virginia	NELAP	460232	06-14-24
Washington	State	C583	08-03-24
West Virginia DEP	State	354	11-30-23
Wisconsin	State	999615430	08-31-24
Wyoming (UST)	A2LA	2907.01	10-31-25

\* Accreditation/Certification renewal pending - accreditation/certification considered valid.

# Sample Summary

Client: Whatcom Environmental Services Inc.  
Project/Site: HollyFrontier Puget Sound Refining LLC

Job ID: 580-133690-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-133690-1	W-47-110823	Water	11/08/23 11:05	11/10/23 09:35
580-133690-2	W-112-110823	Water	11/08/23 12:50	11/10/23 09:35
580-133690-3	W-113-110823	Water	11/08/23 10:20	11/10/23 09:35
580-133690-4	W-127-110823	Water	11/08/23 12:20	11/10/23 09:35
580-133690-5	SDF-DUP-1-110823	Water	11/08/23 08:00	11/10/23 09:35
580-133690-6	SDF-FEB-1-110823	Water	11/08/23 09:45	11/10/23 09:35
580-133690-7	Trip Blanks	Water	11/08/23 00:01	11/10/23 09:35

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**Eurofins ET Northwest- Seattle**

5755 8th Street East  
Tacoma, WA 98424  
Phone (253) 922-2310 Phone (425) 420-9210

**Chain of Custody Record**



**Client Information**  
Client Contact: Ava Gempler  
Eric Libolt  
Company: Whatcom Environmental Services Inc.  
Address: 228 East Champion Street #101  
City: Bellingham  
State Zip: WA, 98225  
Phone: 360-752-9571  
Email: elibolt@whatcom-es.com

Sampler: Ava Gempler  
Lab P.M.: Cruz, Sheri L  
E-Mail: Sheri.Cruz@et.eurofins.com  
Carrier Tracking No(s): 580-4441-1-14188.2  
Page: Page 1 of 1  
Job #:

Due Date Requested:  
TAT Requested (days): 10 BD  
Compliance Project:  Yes  No  
PO #: Bill to WES  
WC #:  
Project #:  
SSOW#:

Project Name: 2023 SDF Sampling  
Site: HF Sinclair Puget Sound Refining LLC  
Matrix (Water, Seawater, Onwater, Oil, BTEX, Tissue, Ash):

Sample Identification	Sample Date	Sample Time	Sample Type (G=comp, G=grab)	Matrix	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	Analysis Requested	Carrier Tracking No(s)	Preservation Codes:
W-47-110823	11/8/23	11:05	G	Water	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	2320B Alkalinity and bicarbonate 350.1 Ammonia SM5310_TOC_B -TOC 5220D - COD NWTPH_Dx - Northwest - DRO/RRO NWTPH_Dx - Northwest - DRO/RRO with silica gel NDTPH-Gx 300.0 Chloride and Sulfate Dissolved 200.7 - (FF) - Ca, Fe, Mg, Na, K Dissolved 200.8 - (FF) - As, Cr, Pb, Mn, Ni, Se Dissolved 7470_Mercury Total Fe, Mg Total As, Cr, Pb, Mn, Ni, Se Total Mercury cPAHs (carcinogenic polycyclic aromatic hydrobarbons) 8260D - BTEX Total Number of containers	580-4441-1-14188.2	A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Anchor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA M - Hexane N - None O - AshNaO2 P - Na2O4S Q - Na2SO4 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - WCAA W - pH 4.5 Z - other (specify)
W-112-110823	11/8/23	12:50	G	Water	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			
W-113-110823	11/8/23	10:20	G	Water	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			
W-127-110823	11/8/23	12:20	G	Water	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			
SDF-DUP-1-110823	11/8/23	8:00	G	Water	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			
SDF-FEB-1-110823	11/8/23	9:45	G	Water	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			
Trip Blanks	Filled At Lab			Water					

**Special Instructions/Note:**  
Please email results to Ava Gempler at agempler@whatcom-es.com and Eric Libolt at elibolt@whatcom-es.com  
There is one nitric poly bottle field filtered for dissolved analytes, and one nitric poly not field filtered for total analytes.

Possible Hazard Identification	Deliverable Requested: I, II, III, IV, Other (specify)	Sample Disposal (A fee may be assessed if samples are retained)	Return To Client	Disposal By Lab	Arch
Non-Hazard	flammable Skin <input type="checkbox"/> ent Poision B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological <input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>



580-133690 Chain of Custody

Empty Kit Relinquished by: \_\_\_\_\_ Date: \_\_\_\_\_  
Relinquished by: Ava Gempler Date/Time: 11/9/2023 2:00 Company: WES  
Relinquished by: \_\_\_\_\_ Date/Time: \_\_\_\_\_ Company: \_\_\_\_\_  
Relinquished by: \_\_\_\_\_ Date/Time: \_\_\_\_\_ Company: \_\_\_\_\_

Custody Seals Intact:  Yes  No Custody Seal No.: \_\_\_\_\_  
Cooler Temperature(s) °C and Other Remarks: 1/3 AIR 15.1/4 WB/15cc/BWB/1 PPO

Company: WES  
Date/Time: 11/10/23 0935  
Company: BCTV

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Therm ID: 1812 Corr: 11 ° Unc: 1.0 °  
 Cooler Desc: 1B  
 Packing: 8UP  
 Cust. Seal: Yes X No  
 Lab Cour: \_\_\_\_\_  
 Other: \_\_\_\_\_  
 Blue Ice, Wet, Dry, None

3/3

Therm ID: 1812 Corr: 14 ° Unc: 1.3 °  
 Cooler Desc: 1B  
 Packing: 8UP  
 Cust. Seal: Yes X No  
 Lab Cour: \_\_\_\_\_  
 Other: ~~PO~~

2/3

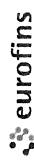
Therm ID: 1812 Corr: 15 ° Unc: 1.4 °  
 Cooler Desc: 1B  
 Packing: 8UP  
 Cust. Seal: Yes X No  
 Lab Cour: \_\_\_\_\_  
 Other: \_\_\_\_\_  
 Blue Ice, Wet, Dry, None


1/3



**Eurofins Seattle**  
 5755 8th Street East  
 Tacoma, WA 98424  
 Phone: 253-922-2310

# Chain of Custody Record



<b>Client Information (Sub Contract Lab)</b>		Lab PW: Cruz, Sheri L	Carrier Tracking No(s): 580-127378.1
Shipping/Receiving		E-Mail: Sheri.Cruz@et.eurofins.com	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - Washington	
Address: 4955 Yarrow Street,		Job #: 580-133690-1	
City: Arvada	Due Date Requested: 11/27/2023	<b>Analysis Requested</b>	
State, Zip: CO, 80002	TAT Requested (days):	A - HCL M - Hexane N - None O - AsNaO2 P - Na2OAS Q - Nitric Acid R - Na2S2O3 S - H2SO4 hydrate	
Phone: 303-736-0100(Tel) 303-431-7171(Fax)	PO #:	 580-133690 Chain of Custody	
Email:	WO #:		
Project Name: HollyFrontier Puget Sound Refining LLC	Project #: 58004434		
Site: HollyFrontier PSR: BWON-Benzene	SSOW#:		

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	MATRIX (W=water, S=solid, O=waste/oil, BT=tissue, A=air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	SM5310B/ (MOD) Local Method	Total Num	Special Instructions/Note:
W-47-110823 (580-133690-1)	11/8/23	11:05 Pacific		Water	X	X		1	
W-112-110823 (580-133690-2)	11/8/23	12:50 Pacific		Water	X	X		1	
W-113-110823 (580-133690-3)	11/8/23	10:20 Pacific		Water	X	X		1	
W-127-110823 (580-133690-4)	11/8/23	12:20 Pacific		Water	X	X		1	
SDF-DUP-1-110823 (580-133690-5)	11/8/23	08:00 Pacific		Water	X	X		1	
SDF-FEB-1-110823 (580-133690-6)	11/8/23	09:45 Pacific		Water	X	X		1	

Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing Northwest, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/test/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing Northwest, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing Northwest, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing Northwest, LLC.

**Possible Hazard Identification**  
 Unconfirmed  
 Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2  
 Empty Kit Relinquished by: \_\_\_\_\_ Date: \_\_\_\_\_ Method of Shipment: \_\_\_\_\_  
 Relinquished by: *Khesler* Date/Time: *11/13/23 15:30* Company: *EST*  
 Relinquished by: \_\_\_\_\_ Date/Time: \_\_\_\_\_ Company: \_\_\_\_\_  
 Relinquished by: \_\_\_\_\_ Date/Time: \_\_\_\_\_ Company: \_\_\_\_\_

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)  
 Return To Client  Disposal By Lab  Archive For \_\_\_\_\_ Months  
 Special Instructions/QC Requirements: \_\_\_\_\_

Received by: *MSD* Date/Time: *11/14/23 9:45* Company: *EST*  
 Received by: \_\_\_\_\_ Date/Time: \_\_\_\_\_ Company: \_\_\_\_\_  
 Received by: \_\_\_\_\_ Date/Time: \_\_\_\_\_ Company: \_\_\_\_\_

Cooler Temperature(s): *0.0* °C and Other Remarks: *EST*



# Login Sample Receipt Checklist

Client: Whatcom Environmental Services Inc.

Job Number: 580-133690-1

**Login Number: 133690**

**List Number: 1**

**Creator: Prigge, Madison**

**List Source: Eurofins Seattle**

Question	Answer	Comment
Radioactivity wasn't checked or is <math>\leq</math> background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



# Login Sample Receipt Checklist

Client: Whatcom Environmental Services Inc.

Job Number: 580-133690-1

**Login Number: 133690**

**List Number: 2**

**Creator: Little, Matthew L**

**List Source: Eurofins Denver**

**List Creation: 11/14/23 12:34 PM**

Question	Answer	Comment
Radioactivity wasn't checked or is <math>\leq</math> background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	





Burlington, WA *Corporate Laboratory (a)*  
1620 S Walnut St - Burlington, WA 98233 - 800.755.9295 • 360.757.1400  
Bellingham, WA *Microbiology (b)*  
805 Orchard Dr Ste 4 - Bellingham, WA 98225 - 360.715.1212

Portland, OR *Microbiology/Chemistry (c)*  
9725 SW Commerce Cr Ste A2 - Wilsonville, OR 97070 - 503.682.7802  
Corvallis, OR *Microbiology/Chemistry (d)*  
1100 NE Circle Blvd, Ste 130 - Corvallis, OR 97330 - 541.753.4946  
Bend, OR *Microbiology (e)*  
20332 Empire Blvd Ste 4 - Bend, OR 97701 - 541.639.8425

November 21, 2023

Page 1 of 1

Mr. Eric Libolt  
Whatcom Environmental Services  
228 E Champion #101  
Bellingham, WA 98225  
RE: 23-34294 - 2023 SDF Groundwater Sampling

Dear Mr. Eric Libolt,

Your project: 2023 SDF Groundwater Sampling, was received on Wednesday November 08, 2023.

All samples were analyzed within the accepted holding times and were appropriately preserved and analyzed according to approved analytical protocols, unless noted in the data or QC reports. The quality control data was within laboratory acceptance limits, unless specified in the data or QC reports.

If you have questions phone us at 800 755-9295.

Respectfully

A handwritten signature in blue ink that reads "Lawrence J Henderson". The signature is fluid and cursive, with a long, sweeping underline.

Lawrence J Henderson, PhD  
Director of Laboratories, Vice President

Enclosures: Data Report  
QC Reports  
Chain of Custody



Burlington, WA Corporate Laboratory (a)  
 1620 S Walnut St - Burlington, WA 98233 - 800.755.9295 • 360.757.1400  
 Bellingham, WA Microbiology (b)  
 805 Orchard Dr Ste 4 - Bellingham, WA 98225 - 360.715.1212

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 9725 SW Commerce Cr Ste A2 - Wilsonville, OR 97070 - 503.682.7802  
 Corvallis, OR Microbiology/Chemistry (d)  
 1100 NE Circle Blvd, Ste 130 - Corvallis, OR 97330 - 541.753.4946  
 Bend, OR Microbiology (e)  
 20332 Empire Blvd Ste 4 - Bend, OR 97701 - 541.639.8425

# Data Report

Client Name: Whatcom Environmental Services  
 228 E Champion #101  
 Bellingham, WA 98225

Reference Number: **23-34294**  
 Project: 2023 SDF Groundwater  
 Sampling

Report Date: 11/21/23

Date Received: 11/8/23

Approved by: bj,jln

Authorized by:

Lawrence J Henderson, PhD  
 Director of Laboratories, Vice President

Sample Description: W-47-110823 HF Sinclair PSR								Matrix W	Sample Date: 11/8/23 11:05 am			
Lab Number: 68488		Sample Comment:						Collected By: Ava Gempler				
CAS ID#	Parameter	Result	PQL	MDL	Units	DF	Method	Lab	Analyzed	Analyst	Batch	Comment

14797-55-8	NITRATE-N	0.0153 J	0.01	0.0035	mg/L	1.0	SM4500-NO3 F	a	11/9/23	TJL	NO3NO2_231109	
14797-65-0	NITRITE-N	0.054 J	0.005	0.003	mg/L	1.0	SM4500-NO3 F	a	11/9/23	TJL	NO3NO2_231109	
E-10128	TOTAL NITRATE+NITRITE as N	0.02	0.01	0.0047	mg/L	1.0	SM4500-NO3 F	a	11/9/23	TJL	NO3NO2_231109	
Coli-To-t	TOTAL COLIFORM	<1	1		MPN/100mL	1.0	SM9223 B.2.b/Colilert-18	b	11/9/23	MLP	QT_231108	
68583-22-2	E. Coli	<1	1		MPN/100mL	1.0	SM9223 B.2.b/Colilert-18	b	11/9/23	MLP	QT_231108	

Sample Description: W-112-110823 HF Sinclair PSR								Matrix W	Sample Date: 11/8/23 12:50 pm			
Lab Number: 68489		Sample Comment:						Collected By: Ava Gempler				
CAS ID#	Parameter	Result	PQL	MDL	Units	DF	Method	Lab	Analyzed	Analyst	Batch	Comment

14797-55-8	NITRATE-N	0.0335 J	0.01	0.0035	mg/L	1.0	SM4500-NO3 F	a	11/9/23	TJL	NO3NO2_231109	
14797-65-0	NITRITE-N	ND	0.005	0.003	mg/L	1.0	SM4500-NO3 F	a	11/9/23	TJL	NO3NO2_231109	
E-10128	TOTAL NITRATE+NITRITE as N	0.03	0.01	0.0047	mg/L	1.0	SM4500-NO3 F	a	11/9/23	TJL	NO3NO2_231109	
Coli-To-t	TOTAL COLIFORM	<1	1		MPN/100mL	1.0	SM9223 B.2.b/Colilert-18	b	11/9/23	MLP	QT_231108	
68583-22-2	E. Coli	<1	1		MPN/100mL	1.0	SM9223 B.2.b/Colilert-18	b	11/9/23	MLP	QT_231108	

Sample Description: W-113-110823 HF Sinclair PSR								Matrix W	Sample Date: 11/8/23 10:20 am			
Lab Number: 68490		Sample Comment:						Collected By: Ava Gempler				
CAS ID#	Parameter	Result	PQL	MDL	Units	DF	Method	Lab	Analyzed	Analyst	Batch	Comment

14797-55-8	NITRATE-N	0.0198 J	0.01	0.0035	mg/L	1.0	SM4500-NO3 F	a	11/9/23	TJL	NO3NO2_231109	
14797-65-0	NITRITE-N	ND	0.005	0.003	mg/L	1.0	SM4500-NO3 F	a	11/9/23	TJL	NO3NO2_231109	
E-10128	TOTAL NITRATE+NITRITE as N	0.02	0.01	0.0047	mg/L	1.0	SM4500-NO3 F	a	11/9/23	TJL	NO3NO2_231109	
Coli-To-t	TOTAL COLIFORM	<1	1		MPN/100mL	1.0	SM9223 B.2.b/Colilert-18	b	11/9/23	MLP	QT_231108	
68583-22-2	E. Coli	<1	1		MPN/100mL	1.0	SM9223 B.2.b/Colilert-18	b	11/9/23	MLP	QT_231108	

Notes:

ND = Not detected above the listed practical quantitation limit (PQL) or not above the Method Detection Limit (MDL), if requested.  
 PQL = Practical Quantitation Limit is the lowest level that can be achieved within specified limits of precision and accuracy during routine laboratory operating conditions.  
 D.F. - Dilution Factor

If you have any questions concerning this report contact us at the above phone number.

# Data Report

Sample Description: W-127-110823 HF Sinclair PSR								Matrix W	Sample Date: 11/8/23 12:20 pm			
Lab Number: 68491		Sample Comment:						Collected By: Ava Gempler				
CAS ID#	Parameter	Result	PQL	MDL	Units	DF	Method	Lab	Analyzed	Analyst	Batch	Comment

14797-55-8	NITRATE-N	0.170	0.01	0.0035	mg/L	1.0	SM4500-NO3 F	a	11/9/23	TJL	NO3NO2_231109	
14797-65-0	NITRITE-N	ND	0.005	0.003	mg/L	1.0	SM4500-NO3 F	a	11/9/23	TJL	NO3NO2_231109	
E-10128	TOTAL NITRATE+NITRITE as N	0.17	0.01	0.0047	mg/L	1.0	SM4500-NO3 F	a	11/9/23	TJL	NO3NO2_231109	
Coli-To-t	TOTAL COLIFORM	<1	1		MPN/100mL	1.0	SM9223 B.2.b/Colilert-18	b	11/9/23	MLP	QT_231108	
68583-22-2	E. Coli	<1	1		MPN/100mL	1.0	SM9223 B.2.b/Colilert-18	b	11/9/23	MLP	QT_231108	

Sample Description: SDF-FEB-1-110823 HF Sinclair PSR								Matrix W	Sample Date: 11/8/23 9:45 am			
Lab Number: 68492		Sample Comment:						Collected By: Ava Gempler				
CAS ID#	Parameter	Result	PQL	MDL	Units	DF	Method	Lab	Analyzed	Analyst	Batch	Comment

14797-55-8	NITRATE-N	ND	0.01	0.0035	mg/L	1.0	SM4500-NO3 F	a	11/9/23	TJL	NO3NO2_231109	
14797-65-0	NITRITE-N	ND	0.005	0.003	mg/L	1.0	SM4500-NO3 F	a	11/9/23	TJL	NO3NO2_231109	
E-10128	TOTAL NITRATE+NITRITE as N	ND	0.01	0.0047	mg/L	1.0	SM4500-NO3 F	a	11/9/23	TJL	NO3NO2_231109	
Coli-To-t	TOTAL COLIFORM	<1	1		MPN/100mL	1.0	SM9223 B.2.b/Colilert-18	b	11/9/23	MLP	QT_231108	
68583-22-2	E. Coli	<1	1		MPN/100mL	1.0	SM9223 B.2.b/Colilert-18	b	11/9/23	MLP	QT_231108	

Sample Description: SDF-DUP-1-110823 HF Sinclair PSR								Matrix W	Sample Date: 11/8/23 8:00 am			
Lab Number: 68493		Sample Comment:						Collected By: Ava Gempler				
CAS ID#	Parameter	Result	PQL	MDL	Units	DF	Method	Lab	Analyzed	Analyst	Batch	Comment

14797-55-8	NITRATE-N	0.0198 J	0.01	0.0035	mg/L	1.0	SM4500-NO3 F	a	11/9/23	TJL	NO3NO2_231109	
14797-65-0	NITRITE-N	ND	0.005	0.003	mg/L	1.0	SM4500-NO3 F	a	11/9/23	TJL	NO3NO2_231109	
E-10128	TOTAL NITRATE+NITRITE as N	0.02	0.01	0.0047	mg/L	1.0	SM4500-NO3 F	a	11/9/23	TJL	NO3NO2_231109	
Coli-To-t	TOTAL COLIFORM	<1 H3	1		MPN/100mL	1.0	SM9223 B.2.b/Colilert-18	b	11/9/23	MLP	QT_231108	
68583-22-2	E. Coli	<1 H3	1		MPN/100mL	1.0	SM9223 B.2.b/Colilert-18	b	11/9/23	MLP	QT_231108	

Notes:

ND = Not detected above the listed practical quantitation limit (PQL) or not above the Method Detection Limit (MDL), if requested.  
 PQL = Practical Quantitation Limit is the lowest level that can be achieved within specified limits of precision and accuracy during routine laboratory operating conditions.  
 D.F. - Dilution Factor



## SAMPLE INDEPENDENT QUALITY CONTROL REPORT

Reference Number: **23-34294**

Report Date: 11/21/23

Batch	Analyte	Result	True Value	Units	Method	% Recovery	Limits*	QC Qualifier	QC Type	Comment
<b>Calibration Check</b>										
NO3NO2_231105	0 NITRATE-N	0.45	0.50	mg/L	SM4500-NO3 F	90	90-110		CAL	
	0 NITRITE-N	0.49	0.50	mg/L	SM4500-NO3 F	98	90-110		CAL	
	0 TOTAL NITRATE+NITRITE as N	1.00	1.00	mg/L	SM4500-NO3 F	100	90-110		CAL	
<b>Laboratory Fortified Blank</b>										
NO3NO2_231105	0 NITRATE-N	2.00	2.00	mg/L	SM4500-NO3 F	100	90-110		LFB	
	0 NITRITE-N	1.99	2.00	mg/L	SM4500-NO3 F	100	90-110		LFB	
<b>Laboratory Reagent Blank</b>										
NO3NO2_231105	0 NITRATE-N	ND		mg/L	SM4500-NO3 F		0-0		LRB	
	0 NITRITE-N	ND		mg/L	SM4500-NO3 F		0-0		LRB	
	0 TOTAL NITRATE+NITRITE as N	ND		mg/L	SM4500-NO3 F		0-0		LRB	
<b>Method Blank</b>										
NO3NO2_231105	0 NITRATE-N	ND		mg/L	SM4500-NO3 F		0-0		MB	
	0 NITRITE-N	ND		mg/L	SM4500-NO3 F		0-0		MB	
	0 TOTAL NITRATE+NITRITE as N	ND		mg/L	SM4500-NO3 F		0-0		MB	
<b>Quality Control Sample</b>										
NO3NO2_231105	0 NITRATE-N	1.03	1.00	mg/L	SM4500-NO3 F	103	90-110		QCS	
	0 NITRITE-N	0.96	1.00	mg/L	SM4500-NO3 F	96	90-110		QCS	
	0 TOTAL NITRATE+NITRITE as N	1.98	2.00	mg/L	SM4500-NO3 F	99	90-110		QCS	

\*Notation:

% Recovery = (Result of Analysis)/(True Value) \* 100

NA = Indicates % Recovery could not be calculated.

Limits are intended for water matrices only. These criteria are for guidance only when reported with soils/solids.

FORM: QCIndependent4.rpt



**SAMPLE DEPENDENT  
 QUALITY CONTROL REPORT**  
 Duplicate, Matrix Spike/Matrix Spike Duplicate and Confirmation Result Report

**Duplicate**

Batch/CAS	Sample	Analyte	Result	Duplicate Result	Units	%RPD	Limits	QC Qualifier	Comments
<b>NO3NO2_231109</b>									
E-10128	68268	TOTAL NITRATE+NITRITE as N	5.29	5.31	mg/L	<b>0.4</b>	0-20		
14797-55-8	68489	NITRATE-N	0.0335	0.0312	mg/L	<b>7.1</b>	0-20		
14797-65-0	68489	NITRITE-N	ND	ND	mg/L	<b>NA</b>	0-20		
E-10128	68489	TOTAL NITRATE+NITRITE as N	0.03	0.03	mg/L	<b>0.0</b>	0-20		
14797-55-8	68797	NITRATE-N	ND	0.0056	mg/L	<b>NA</b>	0-20	INH	

**Laboratory Fortified Matrix (MS)**

Batch/CAS	Sample	Analyte	Result	Spike Result	Duplicate		Conc	Units	Percent Recovery			%RPD	Limits*	QC Qualifier	Comments
					Spike	Result			MS	MSD	Limits*				
<b>NO3NO2_231109</b>															
E-10128	68268	TOTAL NITRATE+NITRITE as N	5.29	15.2	15.4	10.0	mg/L	<b>99</b>	<b>101</b>	80-120	<b>2.0</b>	0-20			
14797-55-8	68489	NITRATE-N	0.0335	0.517	0.524	0.50	mg/L	<b>97</b>	<b>98</b>	80-120	<b>1.4</b>	0-20			
14797-65-0	68489	NITRITE-N	ND	0.48	0.50	0.50	mg/L	<b>96</b>	<b>100</b>	80-120	<b>4.1</b>	0-20			
E-10128	68489	TOTAL NITRATE+NITRITE as N	0.03	1.00	1.02	1.00	mg/L	<b>97</b>	<b>99</b>	80-120	<b>2.0</b>	0-20			
14797-55-8	68797	NITRATE-N	ND	0.12	0.15	0.50	mg/L	<b>24</b>	<b>30</b>	80-120	<b>22.2</b>	0-20	IM		

%RPD = Relative Percent Difference

NA = Indicates %RPD could not be calculated

Matrix Spike (MS)/Matrix Spike Duplicate (MSD) analyses are used to determine the accuracy (MS) and precision (MSD) of an analytical method in a given sample matrix.

Therefore, the usefulness of this report is limited to samples of similar matrices analyzed in the same analytical batch.

Only Duplicate sample with detections are listed in this report

Limits are intended for water matrices only. These criteria are for guidance only when reported with soils/solids.

FORM: QC Dependent\_Port.rpt



## Qualifier Definitions

Reference Number: 23-34294

Report Date: 11/21/23

Qualifier	Definition
H3	Sample was received and analyzed past holding time.
IM	Matrix induced bias assumed
INH	The sample was non-homogeneous
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

Note: Some qualifier definitions found on this page may pertain to results or QC data which are not printed with this report.

# CHAIN OF CUSTODY / ANALYSIS REQUEST (PLEASE COMPLETE ALL APPLICABLE SHADED SECTIONS)



Report To: Whatcom Environmental Services	Billing Email: Same as Client
Address: 228 E Champion St #101	Bill To: Same as Client/Report To
City: Bellingham State: WA Zip: 98225	Address
Attn: Eric Libolt	City: State: Zip:
Phone: 360-752-9571 Fax: 360-752-9573	Phone: P.O.#:
Report Email: elibolt@whatcom-es.com	Card: VISA M/C Expires:
Project Name: 2023 SDF Groundwater Sampling	Card#:

**23-34294**  
ERRR - EROR

**CHECK REGULATORY PROGRAM**

- Safe Drinking Water Act
- Clean Water Act
- RCRA / CERCLA
- Other

**ANALYTICAL**

Main Lab (800-755-9295)  
1620 South Walnut St. Burlington, WA 98233  
Microbiology (888-725-1212)  
805 W. Orchard Dr. Suite 4 Bellingham, WA 98225  
Portland Lab (503-682-7802)  
9150 SW Pioneer Ct. Suite W Wilsonville, OR 97070  
Corvallis Lab (541-753-4946)  
540 SW 3<sup>rd</sup> St. Corvallis, OR 97333  
Bend Lab (541-639-8425)  
20332 Empire Ave. Suite F4 Bend, OR 97703

**INSTRUCTIONS "PLEASE READ"**

1. Use one line per sample location.
2. Be specific in test requests.
3. List each metal individually.
4. Check off analysis to be performed for each sample location.
5. Enter number of containers.

**Turn Around Time Required**

- Standard
- Half-Time (50% Surcharge)
- Quickest (100% Surcharge) Phone Call Req.
- Emergency (Phone Call Required)

**Analysis Requested**

Sample ID	Location	Sample Matrix (See Below)	Grab or Composite	Date	Time	Nitrite-N	Nitrate-N	Nitrite+Nitrate-N	Total Coliform M.P.N. - QuantiTray				Number Of Containers	Special Instruction/ Conditions on Receipt	
1	W-47-110823	HF Sinclair PSR	Ground Water	G	11/8/2023	11:05	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3	
2	W-112-110823	HF Sinclair PSR	Ground Water	G	11/8/2023	12:50	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	↓	Please also email results to: agempler@whatcom-es.com
3	W-113-110823	HF Sinclair PSR	Ground Water	G	11/8/2023	10:20	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
4	W-127-110823	HF Sinclair PSR	Ground Water	G	11/8/2023	12:20	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
5	SDF-FEB-1-110823	HF Sinclair PSR	Ground Water	G	11/8/2023	9:45	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	↓	Will require the EIM file (EDD) in addition to the report.
6	SDF-DUP-1-110823	HF Sinclair PSR	Ground Water	G	11/8/2023	8:00	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
7							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
8							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
9							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
10							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

Sampled By: Ava Gempler Phone: 360-752-9571 Fax: Email: agempler@whatcom-es.com **18** Total Containers

Sample Receipt requested (Must include FAX or Email)

**\* Sample Matrix**

W - Water SW - Surface Water WW - Wastewater OL - Oil  
 DW - Drinking Water GW - Ground Water S - Soil Other \_\_\_\_\_

Relinquished By	Date	Time	Received By	Date	Time
Ava Gempler	11-8-23	15:10	JOS (WI) RECB	11-8-23	15:12

	Yes	No	N/A
Custody Seals Intact	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Sample Temp <u>10.7</u> C Satisfactory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Evidence Of Cooling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Samples Received Intact	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chain Of Custody & Labels Agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

 **ANALYTICAL REPORT****PREPARED FOR**

Attn: Eric Libolt  
Whatcom Environmental Services Inc.  
228 East Champion Street #101  
Bellingham, Washington 98225

Generated 12/21/2023 9:25:45 AM

**JOB DESCRIPTION**

2023 SDF Sampling

**JOB NUMBER**

580-135019-1

# Eurofins Seattle

## Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Northwest, LLC Project Manager.

## Authorization



Generated  
12/21/2023 9:25:45 AM

Authorized for release by  
Katie Grant, Project Manager I  
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Designee for  
Sheri Cruz, Project Manager I  
[Sheri.Cruz@et.eurofinsus.com](mailto:Sheri.Cruz@et.eurofinsus.com)  
(253)922-2310



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# Case Narrative

Client: Whatcom Environmental Services Inc.  
Project: 2023 SDF Sampling

Job ID: 580-135019-1

**Job ID: 580-135019-1**

**Eurofins Seattle**

## Job Narrative 580-135019-1

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers are applied to indicate exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

- Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
- Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

### Receipt

The samples were received on 12/15/2023 9:45 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 0.6°C

### Metals

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

### General Chemistry

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Eurofins Seattle

# Definitions/Glossary

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-135019-1

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

# Client Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-135019-1

**Client Sample ID: W-112-121323**

**Lab Sample ID: 580-135019-1**

Date Collected: 12/13/23 11:45

Matrix: Water

Date Received: 12/15/23 09:45

## Method: EPA 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Magnesium	74		0.50		mg/L		12/18/23 15:51	12/19/23 20:52	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	39		1.5		mg/L			12/18/23 18:25	1



# Client Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-135019-1

**Client Sample ID: W-127-121323**

**Lab Sample ID: 580-135019-2**

**Date Collected: 12/13/23 10:55**

**Matrix: Water**

**Date Received: 12/15/23 09:45**

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	37		1.5		mg/L			12/18/23 18:36	1

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11

# Client Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-135019-1

**Client Sample ID: SDF-DUP-1-092823**

**Lab Sample ID: 580-135019-3**

Date Collected: 12/13/23 11:20

Matrix: Water

Date Received: 12/15/23 09:45

## Method: EPA 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Magnesium	73		0.50		mg/L		12/18/23 15:51	12/19/23 21:19	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	39		1.5		mg/L			12/18/23 18:48	1

# Client Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-135019-1

**Client Sample ID: SDF-FEB-1-092823**

**Lab Sample ID: 580-135019-4**

Date Collected: 12/13/23 09:45

Matrix: Water

Date Received: 12/15/23 09:45

## Method: EPA 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Magnesium	ND		0.50		mg/L		12/18/23 15:51	12/19/23 21:23	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	ND		1.5		mg/L			12/18/23 19:00	1

# QC Sample Results

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-135019-1

## Method: 200.7 Rev 4.4 - Metals (ICP)

**Lab Sample ID: MB 580-446546/14-A**  
**Matrix: Water**  
**Analysis Batch: 446736**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 446546**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Magnesium	ND		0.50		mg/L		12/18/23 15:51	12/19/23 20:42	1

**Lab Sample ID: LCS 580-446546/15-A**  
**Matrix: Water**  
**Analysis Batch: 446736**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 446546**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Magnesium	20.0	19.8		mg/L		99	85 - 115

**Lab Sample ID: LCSD 580-446546/16-A**  
**Matrix: Water**  
**Analysis Batch: 446736**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 446546**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Magnesium	20.0	19.8		mg/L		99	85 - 115	0	20

**Lab Sample ID: 580-135019-1 MS**  
**Matrix: Water**  
**Analysis Batch: 446736**

**Client Sample ID: W-112-121323**  
**Prep Type: Dissolved**  
**Prep Batch: 446546**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Magnesium	74		20.0	91.3		mg/L		84	70 - 130

**Lab Sample ID: 580-135019-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 446736**

**Client Sample ID: W-112-121323**  
**Prep Type: Dissolved**  
**Prep Batch: 446546**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Magnesium	74		20.0	91.7		mg/L		86	70 - 130	0	20

**Lab Sample ID: 580-135019-1 DU**  
**Matrix: Water**  
**Analysis Batch: 446736**

**Client Sample ID: W-112-121323**  
**Prep Type: Dissolved**  
**Prep Batch: 446546**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Magnesium	74		73.0		mg/L		2	20

## Method: 300.0 - Anions, Ion Chromatography

**Lab Sample ID: MB 580-446750/1**  
**Matrix: Water**  
**Analysis Batch: 446750**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.5		mg/L			12/18/23 11:35	1

# QC Sample Results

Client: Whatcom Environmental Services Inc.  
 Project/Site: 2023 SDF Sampling

Job ID: 580-135019-1

## Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCS 580-446750/4  
 Matrix: Water  
 Analysis Batch: 446750

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	50.0	52.3		mg/L		105	90 - 110

Lab Sample ID: LCSD 580-446750/5  
 Matrix: Water  
 Analysis Batch: 446750

Client Sample ID: Lab Control Sample Dup  
 Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	50.0	52.3		mg/L		105	90 - 110	0	15

# Lab Chronicle

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-135019-1

**Client Sample ID: W-112-121323**

**Lab Sample ID: 580-135019-1**

**Date Collected: 12/13/23 11:45**

**Matrix: Water**

**Date Received: 12/15/23 09:45**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Dissolved	Prep	200.7			446546	TMH	EET SEA	12/18/23 15:51
Dissolved	Analysis	200.7 Rev 4.4		1	446736	JLS	EET SEA	12/19/23 20:52
Total/NA	Analysis	300.0		1	446750	CA	EET SEA	12/18/23 18:25

**Client Sample ID: W-127-121323**

**Lab Sample ID: 580-135019-2**

**Date Collected: 12/13/23 10:55**

**Matrix: Water**

**Date Received: 12/15/23 09:45**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	300.0		1	446750	CA	EET SEA	12/18/23 18:36

**Client Sample ID: SDF-DUP-1-092823**

**Lab Sample ID: 580-135019-3**

**Date Collected: 12/13/23 11:20**

**Matrix: Water**

**Date Received: 12/15/23 09:45**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Dissolved	Prep	200.7			446546	TMH	EET SEA	12/18/23 15:51
Dissolved	Analysis	200.7 Rev 4.4		1	446736	JLS	EET SEA	12/19/23 21:19
Total/NA	Analysis	300.0		1	446750	CA	EET SEA	12/18/23 18:48

**Client Sample ID: SDF-FEB-1-092823**

**Lab Sample ID: 580-135019-4**

**Date Collected: 12/13/23 09:45**

**Matrix: Water**

**Date Received: 12/15/23 09:45**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Dissolved	Prep	200.7			446546	TMH	EET SEA	12/18/23 15:51
Dissolved	Analysis	200.7 Rev 4.4		1	446736	JLS	EET SEA	12/19/23 21:23
Total/NA	Analysis	300.0		1	446750	CA	EET SEA	12/18/23 19:00

**Laboratory References:**

EET SEA = Eurofins Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310

# Accreditation/Certification Summary

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-135019-1

## Laboratory: Eurofins Seattle

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

<u>Authority</u>	<u>Program</u>	<u>Identification Number</u>	<u>Expiration Date</u>
Washington	State	C788	07-13-24

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

<u>Analysis Method</u>	<u>Prep Method</u>	<u>Matrix</u>	<u>Analyte</u>
200.7 Rev 4.4	200.7	Water	Magnesium
300.0		Water	Chloride



# Sample Summary

Client: Whatcom Environmental Services Inc.  
Project/Site: 2023 SDF Sampling

Job ID: 580-135019-1

<u>Lab Sample ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Collected</u>	<u>Received</u>
580-135019-1	W-112-121323	Water	12/13/23 11:45	12/15/23 09:45
580-135019-2	W-127-121323	Water	12/13/23 10:55	12/15/23 09:45
580-135019-3	SDF-DUP-1-092823	Water	12/13/23 11:20	12/15/23 09:45
580-135019-4	SDF-FEB-1-092823	Water	12/13/23 09:45	12/15/23 09:45

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- 9
- 10
- 11



**Eurofins ET Northwest- Seattle**  
 5755 8th Street East  
 Tacoma, WA 98424  
 Phone (253) 922-2310 Phone (425) 420-9210

**Chain of Custody Record**



**Client Information**  
 Client Contact: Eric Libolt  
 Company: Whatcom Environmental Services Inc.  
 Address: 228 East Champion Street #101  
 City: Bellingham  
 State, Zip: WA, 98225  
 Phone: 360-752-9571  
 Email: ellibolt@whatcom-es.com

Sampler: Ava Gempler  
 Phone: 360-752-9571  
 E-Mail: Shari.Cruz@et.eurofins.com

Lab PM: Cruz, Shari L  
 Carrier Tracking No(s): FedEX  
 State of Origin: Washington

COC No: 580-44411-14188.2  
 Page: Page 1 of 1  
 Job #:

**Analysis Requested**  
 Due Date Requested:  
 TAT Requested (days): 10 BD  
 Compliance Project:  Yes  No  
 PO #:  
 Bill to WES  
 WO #:  
 Project #:  
 SSON#:

**Sample Identification**

Sample ID	Sample Date	Sample Time	Sample Type (G=Comp, BT=Trace, As=Al)	Matrix (Water, Seawater, Onwater, Oil)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	300.0 Chloride	Dissolved 200.7 - (FF) - Magnesium	Total Number of containers	Special Instructions/Note:
W-112-121323	12/13/23	11:45	G	Water	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			2	
W-127-121323	12/13/23	10:55	G	Water	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			1	
SDF-DUP-1-092823	12/13/23	11:20	G	Water	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			2	Please email results to Ava Gempler at agempler@whatcom-es.com and Eric Libolt at ellibolt@whatcom-es.com
SDF-FEB-1-092823	12/13/23	9:45	G	Water	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			2	



**Possible Hazard Identification**  
 Non-Hazard  Flammable  Skin Irritant  Poison B  Unknown  Radiological

Deliverable Requested: I, II, III, IV, Other (specify)

**Special Instructions/QC Requirements:**

**Empty Kit Relinquished by:** Date: \_\_\_\_\_ Time: \_\_\_\_\_ Method of Shipment: \_\_\_\_\_

Relinquished by: Ava Gempler  
 Date/Time: 12-14-23, 13:45  
 Company: WES

Relinquished by: [Signature]  
 Date/Time: \_\_\_\_\_  
 Company: \_\_\_\_\_

Relinquished by: \_\_\_\_\_  
 Date/Time: \_\_\_\_\_  
 Company: \_\_\_\_\_

**Custody Seals Intact:**  Yes  No  
 Custody Seal No.: \_\_\_\_\_

Cooler Temperature(s) °C and Other Remarks: TR11 0.1e/p.8 LB/Budhuat/FPD

Ver: 01/16/2019

## Login Sample Receipt Checklist

Client: Whatcom Environmental Services Inc.

Job Number: 580-135019-1

**Login Number: 135019**

**List Number: 1**

**Creator: Prigge, Madison**

**List Source: Eurofins Seattle**

Question	Answer	Comment
Radioactivity wasn't checked or is <math>\leq</math> background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



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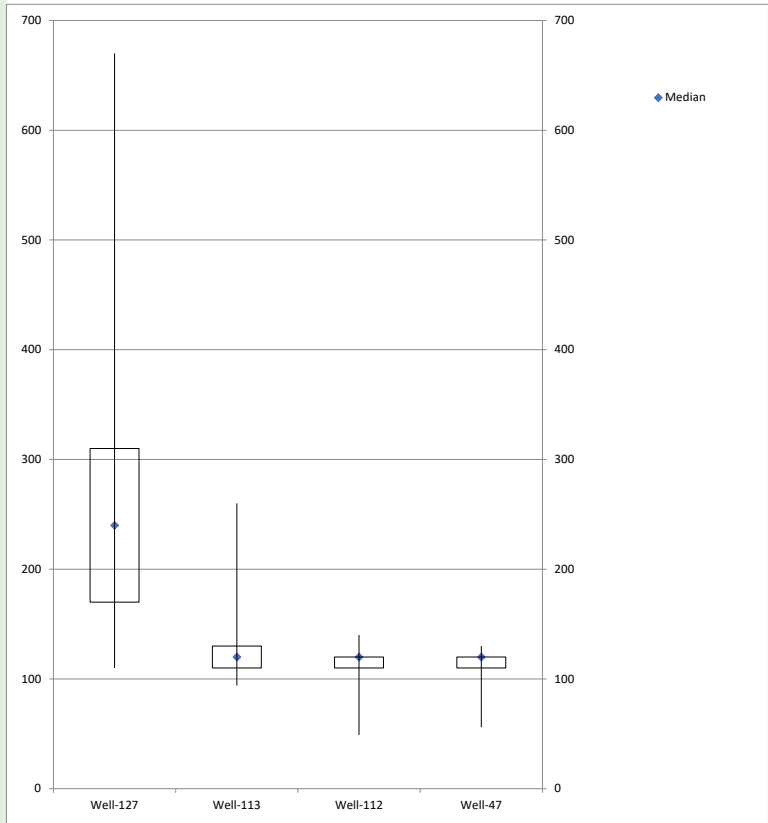
**APPENDIX E -  
INTERWELL ANALYSIS – BOX PLOTS**

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**Diesel Range TPH - Box Plots**

DATE	Well-127	Well-113	Well-112	(Background) Well-47
	Dx-Diesel	Dx-Diesel	Dx-Diesel	Dx-Diesel
3/29/2010	270	<u>120</u>	<u>120</u>	<u>130</u>
6/23/2010	560	140	<u>120</u>	<u>120</u>
9/14/2010	300	<u>120</u>	<u>120</u>	<u>120</u>
12/7/2010	460	130	<u>120</u>	<u>120</u>
3/3/2011	230	<u>120</u>	<u>120</u>	<u>120</u>
6/20/2011	420	140	<u>120</u>	<u>120</u>
9/27/2011	460	<u>120</u>	<u>120</u>	<u>120</u>
12/5/2011	370	120	<u>120</u>	<u>120</u>
3/21/2012	500	190	<u>120</u>	<u>120</u>
6/25/2012	390	140	<u>120</u>	<u>120</u>
9/18/2012	410	<u>120</u>	<u>120</u>	<u>120</u>
11/20/2012	400	180	<u>120</u>	<u>120</u>
2/19/2013	320	170	<u>120</u>	<u>120</u>
4/22/2013	350	<u>120</u>	<u>120</u>	<u>120</u>
7/31/2013	190	<u>120</u>	<u>120</u>	<u>120</u>
11/25/2013	290	160	<u>120</u>	<u>120</u>
3/25/2014	200	130	<u>120</u>	<u>120</u>
6/11/2014	190	<u>120</u>	<u>120</u>	<u>120</u>
8/20/2014	170	<u>120</u>	<u>120</u>	<u>120</u>
11/10/2014	200	<u>130</u>	<u>130</u>	<u>130</u>
2/18/2015	260	140	<u>120</u>	<u>120</u>
5/28/2015	170	110	<u>110</u>	<u>110</u>
10/28/2015	160	<u>110</u>	<u>110</u>	<u>110</u>
2/22/2016	160	<u>110</u>	<u>110</u>	<u>110</u>
5/11/2016	190	<u>110</u>	<u>110</u>	<u>110</u>
8/9/2016	270	<u>120</u>	SA	SA
11/10/2016	140	<u>120</u>	<u>120</u>	<u>120</u>
2/2/2017	150	SA	SA	SA
5/10/2017	180	94	49	56
8/9/2017	130	<u>110</u>	SA	SA
11/7/2017	240	<u>110</u>	<u>110</u>	<u>110</u>
2/21/2018	160	<u>110</u>	SA	SA
4/11/2018	140	<u>120</u>	<u>120</u>	<u>120</u>
9/7/2018	250	<u>110</u>	SA	SA
11/6/2018	240	120	140	<u>120</u>
2/25/2019	200	<u>110</u>	<u>120</u>	SA
5/21/2019	130	<u>110</u>	<u>120</u>	<u>110</u>
9/3/2019	270	<u>110</u>	<u>110</u>	SA
11/13/2019	140	<u>110</u>	<u>120</u>	<u>120</u>
2/12/2020	130	<u>120</u>	SA	SA
4/29/2020	180	<u>110</u>	<u>110</u>	<u>110</u>
8/5/2020	220	<u>110</u>	SA	SA
11/3/2020	670	180	<u>110</u>	<u>110</u>
2/10/2021	130	<u>120</u>	SA	SA
5/25/2021	380	160	<u>120</u>	<u>110</u>
8/4/2021	430	260	SA	SA
11/9/2021	<u>110</u>	<u>110</u>	<u>110</u>	<u>110</u>
2/15/2022	140	110	SA	SA
4/18/2022	180	<u>110</u>	<u>110</u>	<u>110</u>
8/10/2022	270	<u>110</u>	<u>110</u>	<u>110</u>
11/16/2022	270	<u>120</u>	<u>110</u>	<u>110</u>
2/6/2023	220	<u>110</u>	<u>110</u>	<u>110</u>
5/9/2023	260	<u>110</u>	<u>110</u>	<u>110</u>
8/9/2023	280	130	110	<u>110</u>
11/8/2023	250	120	<u>110</u>	<u>110</u>
2023 Average	253	118	110	<u>110</u>

	Median	Lower quartile, Q1	Minimum	Maximum	Upper quartile, Q3
Well-127	240	170	110	670	310
Well-113	120	110	94	260	130
Well-112	120	110	49	140	120
Well-47	120	110	56	130	120



Prediction Limit does not apply  
Fewer than 8 detect values

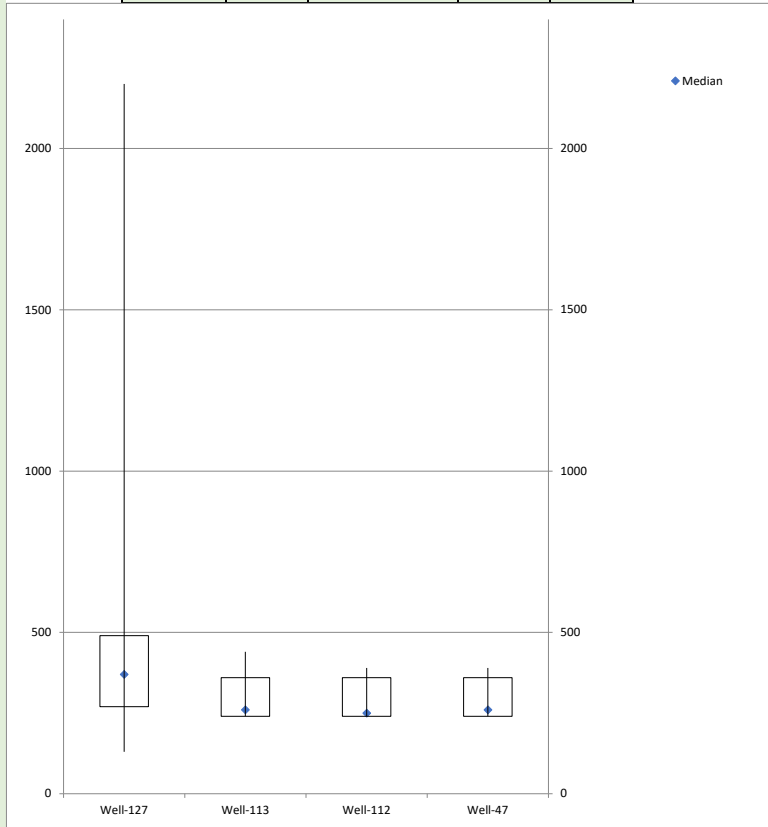
m= 4  
n= 43  
CI= 0.91489362  
alpha= 0.08510638  
The test is significant at the 0.09 level.  
**Prediction Limit (PL) = 130 ug/L**  
Prediction Limit is a Reporting Limit (Non-Detect value)

All Non-Detect (ND) Data used in Statistical analysis was entered at a concentration equal to the Laboratory Detection Limit and are indicated by underlined italics.  
SA indicates that the analysis occurred on a Semi-Annual basis

**Oil Range TPH - Box Plots**

DATE	Well-127	Well-113	Well-112	(Background) Well-47
	Dx-Oil	Dx-Oil	Dx-Oil	Dx-Oil
3/29/2010	520	240	250	259
6/23/2010	850	250	250	249
9/14/2010	500	240	240	240
12/7/2010	570	240	240	240
3/3/2011	240	240	240	240
6/20/2011	460	240	240	240
9/27/2011	640	240	240	240
12/5/2011	440	240	240	240
3/21/2012	640	240	240	240
6/25/2012	570	240	240	240
9/18/2012	610	240	240	240
11/21/2012	530	240	240	240
2/19/2013	410	240	240	240
4/22/2013	670	240	240	240
7/31/2013	240	240	240	240
11/25/2013	270	240	240	240
3/25/2014	310	240	240	240
6/11/2014	250	240	240	240
8/20/2014	240	240	240	240
11/10/2014	260	260	260	260
2/18/2015	240	240	240	240
5/28/2015	250	250	250	260
10/28/2015	250	260	250	260
2/22/2016	260	250	260	260
5/11/2016	250	250	250	250
8/9/2016	350	270	SA	SA
11/10/2016	270	270	280	260
2/2/2017	270	SA	SA	SA
5/10/2017	130	260	260	270
8/9/2017	270	SA	SA	SA
11/7/2017	420	250	260	260
2/21/2018	370	370	SA	SA
4/11/2018	380	380	380	370
9/7/2018	350	350	SA	SA
11/6/2018	540	380	390	390
2/25/2019	380	390	380	SA
5/21/2019	370	360	370	360
9/3/2019	360	350	350	SA
11/13/2019	390	360	370	370
2/12/2020	380	390	SA	SA
4/29/2020	360	360	360	360
8/5/2020	370	360	SA	SA
11/3/2020	2,200	350	360	340
2/10/2021	390	390	SA	SA
5/25/2021	400	380	370	360
8/4/2021	670	440	SA	SA
11/9/2021	350	360	360	360
2/15/2022	370	360	SA	SA
4/18/2022	360	360	360	360
8/10/2022	570	360	370	350
11/16/2022	390	380	360	360
2/6/2023	380	360	360	360
5/9/2023	370	360	360	360
8/9/2023	480	350	350	350
11/8/2023	350	360	360	360
2023 Average	395	358	358	358

	Median	Lower quartile, Q1	Minimum	Maximum	Upper quartile, Q3
Well-127	370	270	130	2200	490
Well-113	260	240	240	440	360
Well-112	250	240	240	390	360
Well-47	260	240	240	390	360



Prediction Limit does not apply  
Fewer than 8 detect values  
Results were all ND, PL equal to Reporting Limit

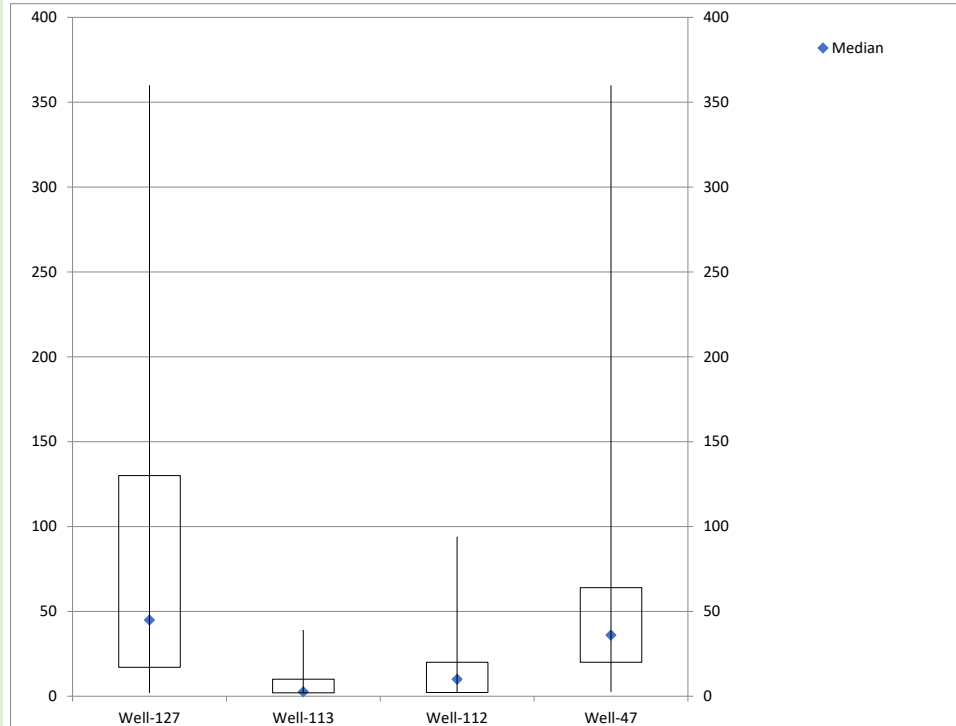
m= 4  
n= 43  
CI= 0.91489362  
alpha= 0.08510638  
The test is significant at the 0.09 level.  
Prediction Limit (PL) = 390 ug/L  
Prediction Limit is a Reporting Limit (Non-Detect value)

All Non-Detect (ND) Data used in Statistical analysis was entered at a concentration equal to the Laboratory Detection Limit and are indicated by underlined italics  
SA indicates that the analysis occurred on a Semi-Annual basis

## Dissolved Manganese

DATE	(Background)			
	Well-127 Manganese	Well-113 Manganese	Well-112 Manganese	Well-47 Manganese
6/11/2014	100	<u>2</u>	4.2	41
8/20/2014	170	39	52	88
11/20/2014	120	14	69	78
2/18/2015	22	<u>2</u>	<u>10</u>	12
5/28/2015	150	<u>10</u>	<u>10</u>	77
9/1/2015	190	<u>10</u>	19	360
10/28/2015	45	<u>10</u>	57	36
2/22/2016	12	<u>10</u>	<u>10</u>	69
5/11/2016	67	<u>10</u>	<u>10</u>	30
8/9/2016	200	<u>10</u>	<u>10</u>	<u>10</u>
11/10/2016	17	<u>10</u>	70	47
2/2/2017	<u>20</u>	<u>10</u>	<u>20</u>	<u>20</u>
5/10/2017	11	<u>10</u>	<u>10</u>	42
8/9/2017	220	SA	<u>20</u>	59
11/7/2017	<u>20</u>	<u>20</u>	94	32
2/21/2018	16	SA	6.3	11
4/11/2018	3.1	<u>2</u>	<u>2</u>	16
9/7/2018	12	SA	41	72
11/6/2018	<u>2</u>	4.7	44	39
2/25/2019	10	<u>2</u>	<u>2</u>	28
5/21/2019	30	24	37	39
9/3/2019	84	<u>2</u>	<u>20</u>	<u>20</u>
11/13/2019	39	3.2	5.2	9.7
2/12/2020	17	<u>2</u>	<u>2</u>	32
4/29/2020	15	<u>2</u>	2.4	36
8/5/2020	170	<u>2</u>	<u>2</u>	110
11/3/2020	59	32	4.3	97
2/10/2021	140	15	<u>2</u>	39
5/25/2021	96	<u>2</u>	<u>2</u>	24
8/4/2021	140	2.1	3	75
11/9/2021	56	20	17	6.1
2/15/2022	30	<u>2</u>	<u>2</u>	4.9
4/18/2022	30	<u>2</u>	<u>2</u>	35
8/10/2022	360	<u>2</u>	6.3	230
11/16/2022	250	<u>2</u>	32	24
2/6/2023	18	<u>2</u>	3	58
5/9/2023	45	<u>2</u>	4.4	20
8/9/2023	<u>2</u>	<u>2</u>	<u>2</u>	2.5
11/8/2023	76	<u>2</u>	<u>2</u>	5.8
2023 Average	35	2	3	22

	Median	Lower quartile, Q1	Minimum	Maximum	Upper quartile, Q3
Well-127	45	17	2	360	130
Well-113	2.65	2	2	39	10
Well-112	10	2.2	2	94	20
Well-47	36	20	2.5	360	64



m=	4
n=	39
CI=	0.906976744
alpha=	0.093023256

The test is significant at the 0.09 level.  
**Prediction Limit (PL) = 360 ug/L**

All Non-Detect (ND) Data used in Statistical analysis was entered at a concentration equal to the Laboratory Detection Limit and are indicated by *underlined italics*

SA indicates that the analysis occurred on a Semi-Annual basis

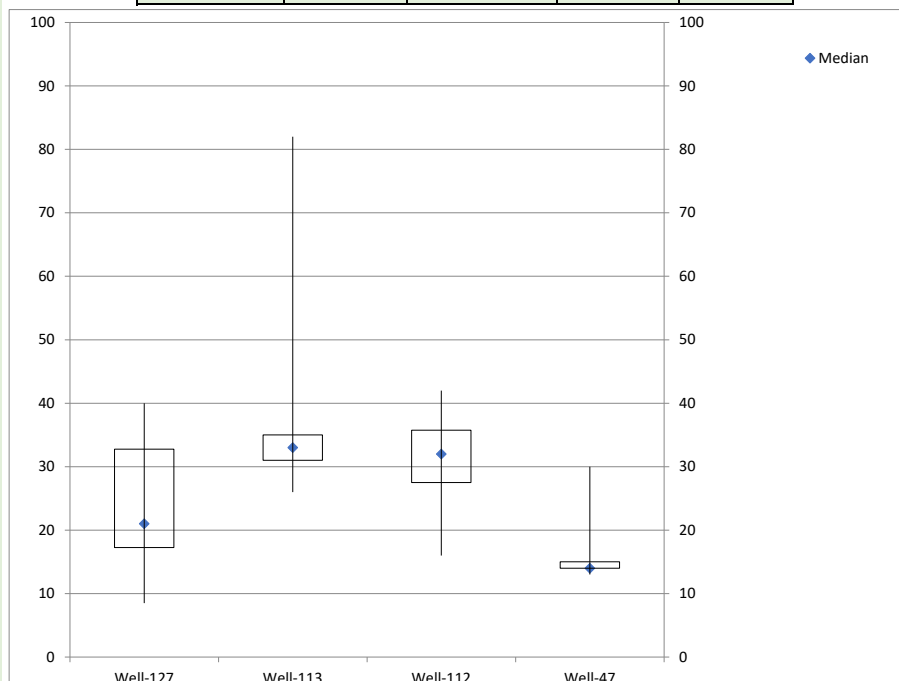
## Chloride

DATE	(Background)			
	Well-127 Chloride	Well-113 Chloride	Well-112 Chloride	Well-47 Chloride
6/11/2014	17	30	22	13
8/20/2014	17	35	26	15
11/10/2014	18	35	26	15
2/18/2015	15	31	22	13
5/28/2015	18	34	27	15
9/1/2015	16	35	27	16
10/28/2015	16	38	16	30
2/22/2016	22	39	32	17
5/11/2016	20	39	33	17
8/9/2016	22	82	30	16
11/10/2016	8.5	33	27	14
2/2/2017	15	32	26	14
5/10/2017	20	34	29	15
8/9/2017	21	32	29	14
11/7/2017	10	32	27	13
2/21/2018	18	34	30	15
4/11/2018	19	33	31	15
9/7/2018	21	33	30	13
11/6/2018	17	39	37	18
2/25/2019	21	33	31	15
5/21/2019	23	31	30	14
9/3/2019	27	33	31	14
11/13/2019	9.5	32	32	14
2/12/2020	20	33	34	15
4/29/2020	24	35	36	16
8/5/2020	25	32	34	14
11/3/2020	16	32	34	14
2/10/2021	27	33	37	17
5/25/2021	35	35	40	13
8/4/2021	40	36	40	17
11/9/2021	27	31	35	14
2/15/2022	32	29	34	14
4/18/2022	33	29	34	14
8/10/2022	35	29	35	14
11/16/2022	35	27	33	13
2/6/2023	38	31	38	15
5/9/2023	38	31	39	15
6/23/2023	21	NS	18	NS
8/9/2023	39	26	42	14
9/28/2023	39	NS	38	NS
11/8/2023	37	27	38	13
12/13/2023	37	NS	39	NS
2023 Average	35	29	36	14

NS - Not Sampled

All Non-Detect (ND) Data used in Statistical analysis were entered at a concentration equal to the Laboratory Detection Limit and are indicated by underlined italics

	Median	Lower quartile, Q1	Minimum	Maximum	Upper quartile, Q3
Well-127	21.00	17.25	8.5	40	32.75
Well-113	33.00	31	26	82	35
Well-112	32.00	27.5	16	42	35.75
Well-47	14.00	14	13	30	15



Indicates value exceeds Upper Quartile, Q3

m=	4
n=	39
Cl=	90.69767442
alpha=	0.093023256

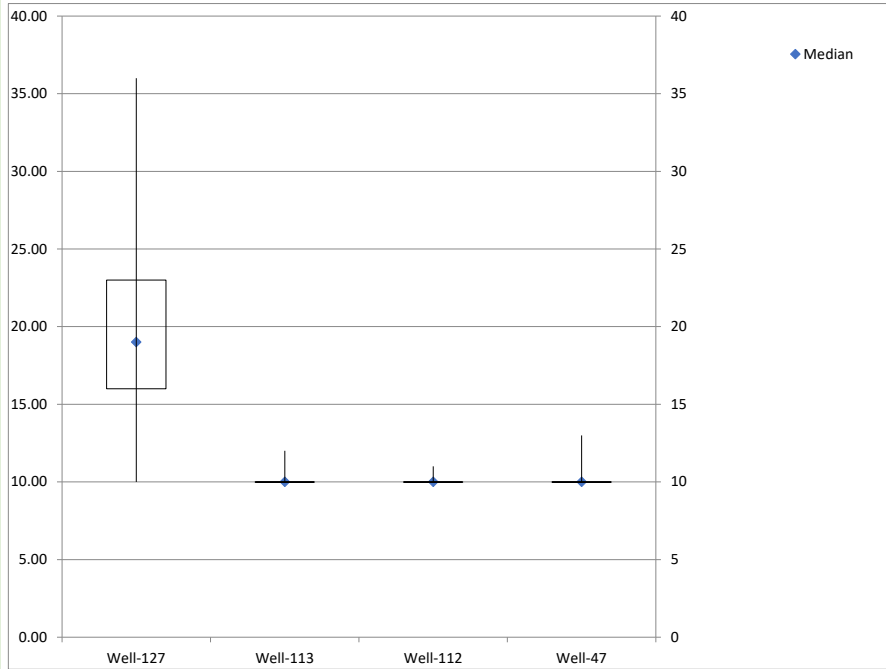
The test is significant at the 0.09 level.

Prediction Limit (PL) = 30 mg/L

**COD**

DATE	Well-127	Well-113	Well-112	(Background) Well-47
	COD	COD	COD	COD
6/11/2014	15	<u>10</u>	<u>10</u>	<u>10</u>
8/20/2014	17	<u>10</u>	<u>10</u>	<u>10</u>
11/10/2014	13	<u>10</u>	<u>10</u>	13
2/18/2015	18	<u>10</u>	<u>10</u>	<u>10</u>
5/28/2015	13	<u>10</u>	<u>10</u>	<u>10</u>
9/1/2015	10	<u>10</u>	<u>10</u>	<u>10</u>
10/28/2015	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>
2/22/2016	13	<u>10</u>	<u>10</u>	<u>10</u>
5/11/2016	15	<u>10</u>	<u>10</u>	<u>10</u>
8/9/2016	20	SA	SA	<u>10</u>
11/10/2016	21	<u>10</u>	<u>10</u>	<u>10</u>
2/2/2017	16	SA	SA	SA
5/10/2017	14	<u>10</u>	<u>10</u>	<u>10</u>
8/9/2017	<u>10</u>	SA	SA	SA
11/7/2017	34	12	<u>10</u>	<u>10</u>
2/21/2018	29	SA	SA	SA
4/11/2018	19	<u>10</u>	<u>10</u>	<u>10</u>
9/7/2018	36	SA	SA	SA
11/6/2018	31	<u>10</u>	10	<u>10</u>
2/25/2019	16	<u>10</u>	<u>10</u>	SA
5/21/2019	21	<u>10</u>	<u>10</u>	<u>10</u>
9/3/2019	27	SA	<u>10</u>	SA
11/13/2019	30	<u>10</u>	<u>10</u>	<u>10</u>
2/12/2020	17	SA	<u>10</u>	SA
4/29/2020	16	<u>10</u>	<u>10</u>	<u>10</u>
8/5/2020	30	SA	SA	SA
11/3/2020	25	<u>10</u>	<u>10</u>	<u>10</u>
2/10/2021	19	SA	<u>10</u>	SA
5/25/2021	22	<u>10</u>	<u>10</u>	<u>10</u>
8/4/2021	21	SA	<u>10</u>	SA
11/9/2021	21	<u>10</u>	<u>10</u>	<u>10</u>
2/15/2022	20	SA	<u>10</u>	SA
4/18/2022	18	<u>10</u>	<u>10</u>	<u>10</u>
8/10/2022	30	<u>10</u>	<u>10</u>	<u>10</u>
11/16/2022	20	<u>10</u>	<u>10</u>	<u>10</u>
2/6/2023	21	11	11	<u>10</u>
5/9/2023	23	<u>10</u>	11	<u>10</u>
6/23/2023	17	NA	NA	NA
8/9/2023	18	<u>10</u>	<u>10</u>	<u>10</u>
9/28/2023	24	NA	NA	NA
11/8/2023	10	<u>10</u>	11	<u>10</u>
2023 Average	19	10.3	11	10

	Median	Lower quartile, Q1	Minimum	Maximum	Upper quartile, Q3
Well-127	19.00	16	10.00	36.00	23
Well-113	10.00	10	10.00	12.00	10
Well-112	10.00	10	10.00	11.00	10
Well-47	10.00	10	10.00	13.00	10



Indicates value exceeds Upper Quartile, Q3

Prediction Limit does not apply  
Fewer than 8 detect values

m=	4
n=	28
CI=	87.5
alpha=	0.125

The test is significant at the 0.13 level.

**Prediction Limit (PL) = 13 mg/L**

All Non-Detect (ND) Data used in Statistical analysis were entered at a concentration equal to the Laboratory Detection Limit and are indicated by *underlined italics*

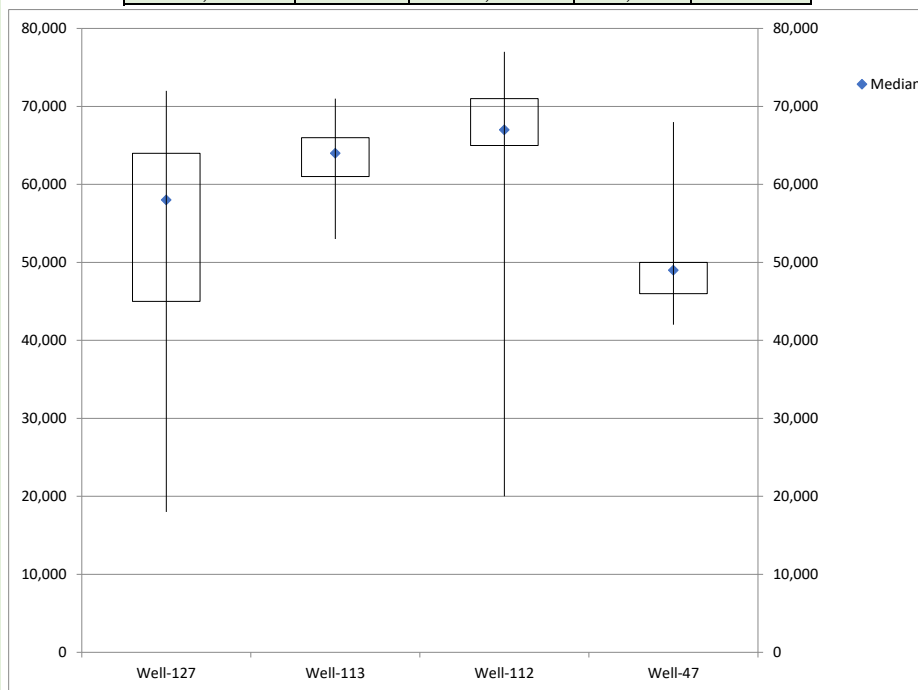
SA indicates that the analysis occurred on a Semi-Annual basis



## Dissolved Magnesium

DATE	(Background)			
	Well-127 Magnesium	Well-113 Magnesium	Well-112 Magnesium	Well-47 Magnesium
6/11/2014	72,000	67,000	67,000	52,000
8/20/2014	62,000	61,000	62,000	<u>50,000</u>
11/20/2014	62,000	53,000	63,000	46,000
2/18/2015	65,000	63,000	64,000	<u>50,000</u>
5/28/2015	63,000	68,000	69,000	50,000
9/1/2015	63,000	63,000	66,000	50,000
10/28/2015	60,000	61,000	<u>50,000</u>	64,000
2/22/2016	67,000	66,000	68,000	<u>50,000</u>
5/11/2016	64,000	64,000	67,000	<u>50,000</u>
8/9/2016	67,000	68,000	72,000	<u>50,000</u>
11/10/2016	<u>50,000</u>	64,000	67,000	<u>50,000</u>
2/2/2017	45,000	64,000	72,000	46,000
5/10/2017	67,000	71,000	75,000	53,000
8/9/2017	52,000	62,000	63,000	48,000
11/7/2017	21,000	61,000	58,000	44,000
2/21/2018	44,000	62,000	66,000	48,000
4/11/2018	45,000	56,000	59,000	42,000
9/7/2018	47,000	68,000	68,000	49,000
11/6/2018	18,000	61,000	64,000	45,000
2/25/2019	50,000	65,000	<u>20,000</u>	68,000
5/21/2019	42,000	64,000	69,000	47,000
9/3/2019	48,000	69,000	71,000	50,000
11/13/2019	28,000	66,000	67,000	48,000
2/12/2020	44,000	60,000	65,000	47,000
4/29/2020	44,000	68,000	75,000	52,000
8/5/2020	47,000	67,000	70,000	49,000
11/3/2020	31,000	65,000	66,000	49,000
2/10/2021	58,000	67,000	73,000	51,000
5/25/2021	47,000	64,000	74,000	51,000
8/4/2021	51,000	61,000	67,000	45,000
11/9/2021	42,000	66,000	69,000	49,000
2/15/2022	58,000	59,000	66,000	44,000
4/18/2022	63,000	61,000	67,000	44,000
8/10/2022	59,000	58,000	63,000	42,000
11/16/2022	64,000	63,000	69,000	46,000
2/6/2023	71,000	64,000	71,000	48,000
5/9/2023	72,000	63,000	70,000	47,000
8/9/2023	69,000	64,000	77,000	45,000
9/28/2023	NS	NS	73,000	NS
11/8/2023	71,000	66,000	75,000	49,000
12/13/2023	NS	NS	74,000	NS
2023 Average	70750	64250	73200	47250

	Median	Lower quartile, Q1	Minumum	Maximum	Upper quartile, Q3
Well-127	58,000	45000	18,000	72,000	64000
Well-113	64,000	61000	53,000	71,000	66000
Well-112	67,000	65000	20,000	77,000	71000
Well-47	49,000	46000	42,000	68,000	50000



Indicates value exceeds Upper Quartile, Q3

m=	4
n=	39
CI=	0.906976744
alpha=	0.093023256

The test is significant at the 0.09 level.

Prediction Limit (PL) = 68000 ug/L

NS - Not Sampled

All Non-Detect (ND) Data used in Statistical analysis were entered at a concentration equal to the Laboratory Detection Limit and are indicated by underlined italics

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**APPENDIX F -  
INTRAWELL ANALYSIS – TIME SERIES PLOTS AND TREND ANALYSIS**

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### Mann Kendall Test Output Statistics

Mann-Kendall	W112 Chloride	W112 Diss. Magnesium
<b>z</b>	5.86	3.04
<b>n</b>	42	41
<b>p-value</b>	4.64E-09	0.0023
<b>S</b>	540	271
<b>Var(S)</b>	8461.33	7865.67
<b>tau</b>	0.6418836	0.3390733
<b>Trend:</b>	TRUE	TRUE
<b>Increasing or Decreasing</b>	Increasing	Increasing

Mann-Kendall	W113 Diesel
<b>z</b>	-1.29
<b>n</b>	56
<b>p-value</b>	0.20
<b>S</b>	-157
<b>Var(S)</b>	14611.00
<b>tau</b>	-0.1337297
<b>Trend:</b>	FALSE
<b>Increasing or Decreasing</b>	No Trend

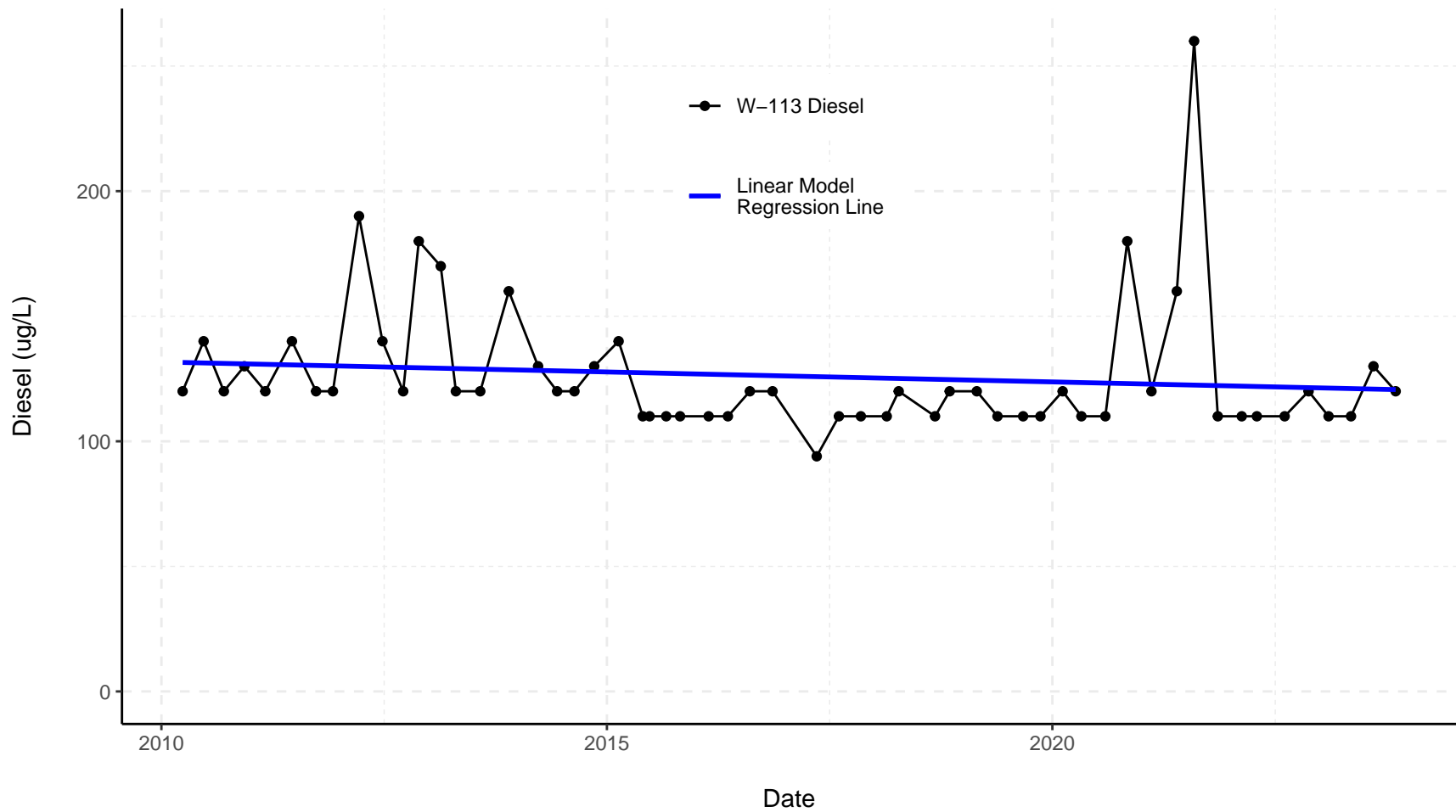
Mann-Kendall	W127 Chloride	W127 COD	W127 Diesel	W127 Oil
<b>z</b>	5.57	2.15	-2.87	-2.16
<b>n</b>	42	41	56	56
<b>p-value</b>	2.53E-08	0.031	0.0041	0.031
<b>S</b>	514	192	-407	-290
<b>Var(S)</b>	8478.67	7884	19964.33	17954.00
<b>tau</b>	0.6072952	0.2388533	-0.26788	-0.21262
<b>Trend:</b>	TRUE	TRUE	TRUE	TRUE
<b>Increasing or Decreasing</b>	Increasing	Increasing	Decreasing	Decreasing

z	magnitude of variation in the data
n	number of data points
p<0.05	a trend exists
Positive S	increasing trend
Negative S	decreasing trend
varS	variance among data points
tau = 0	no relationship among data points
tau = -1 or 1	perfect relationship among data points

# Well 113 Diesel

Concentration in Groundwater 2010–2023

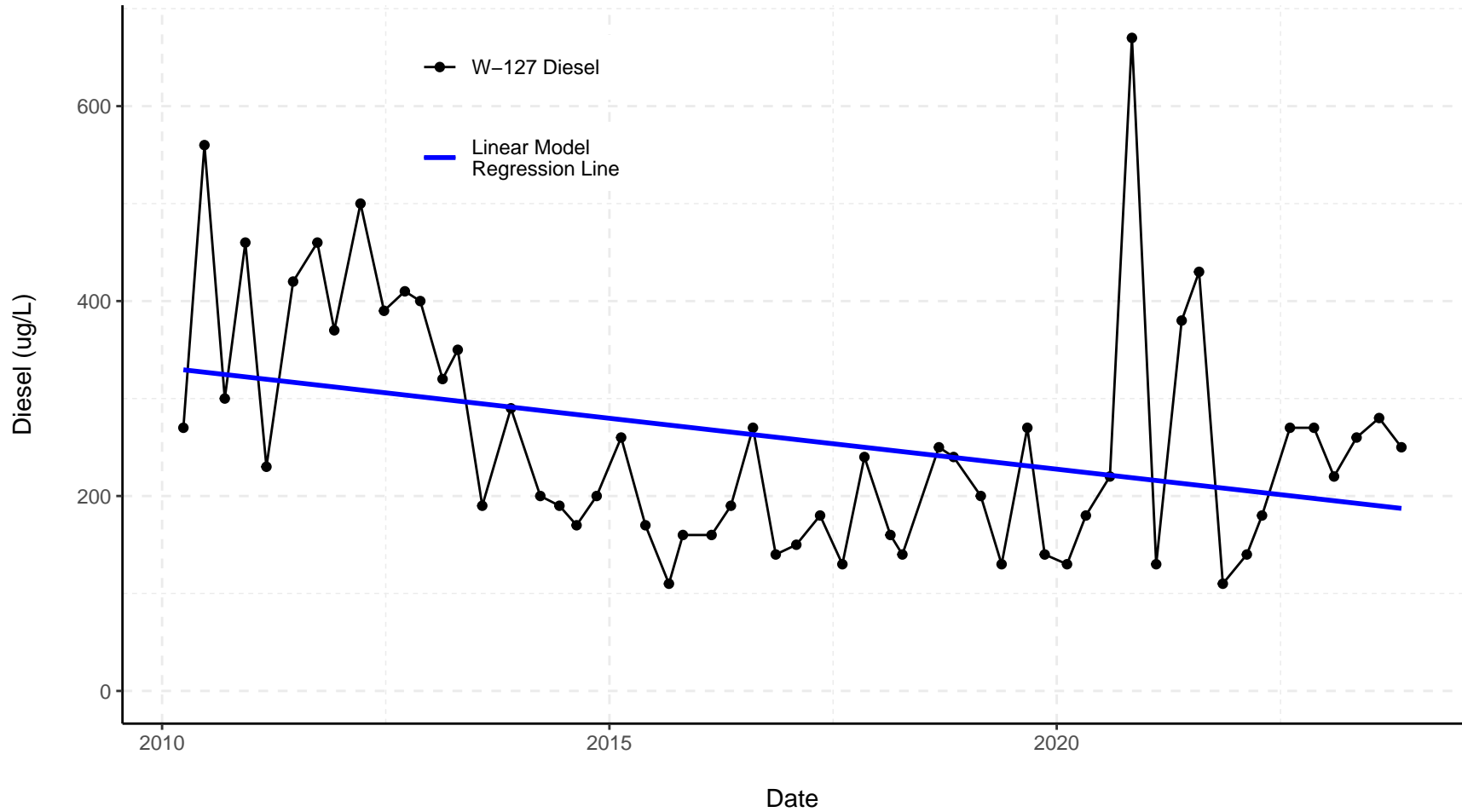
Mann–Kendall Trend Analysis Results: **No Trend**



# Well 127 Diesel

Concentration in Groundwater 2010–2023

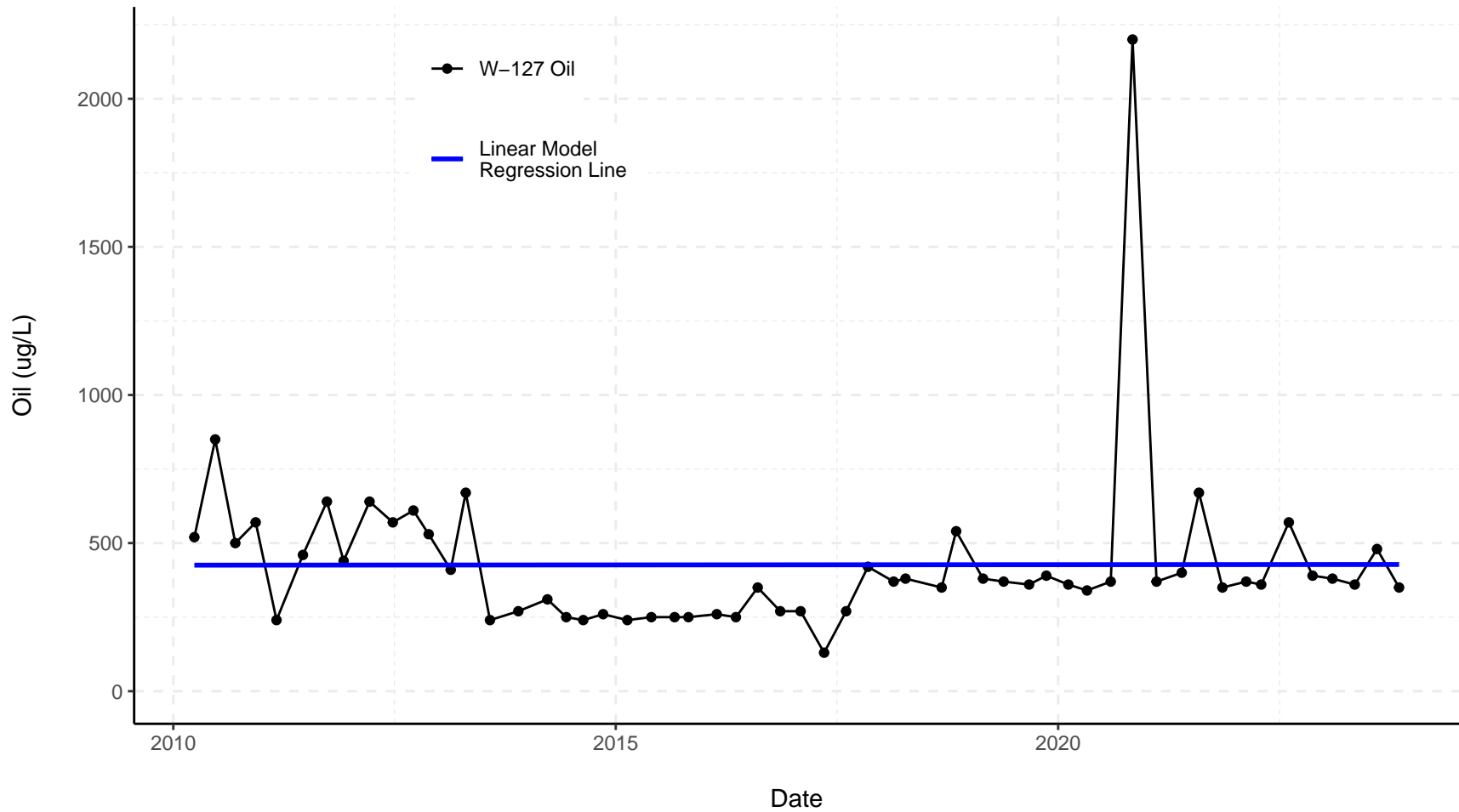
Mann–Kendall Trend Analysis Results: **Decreasing Trend**



# Well 127 Oil

Concentration in Groundwater 2010–2023

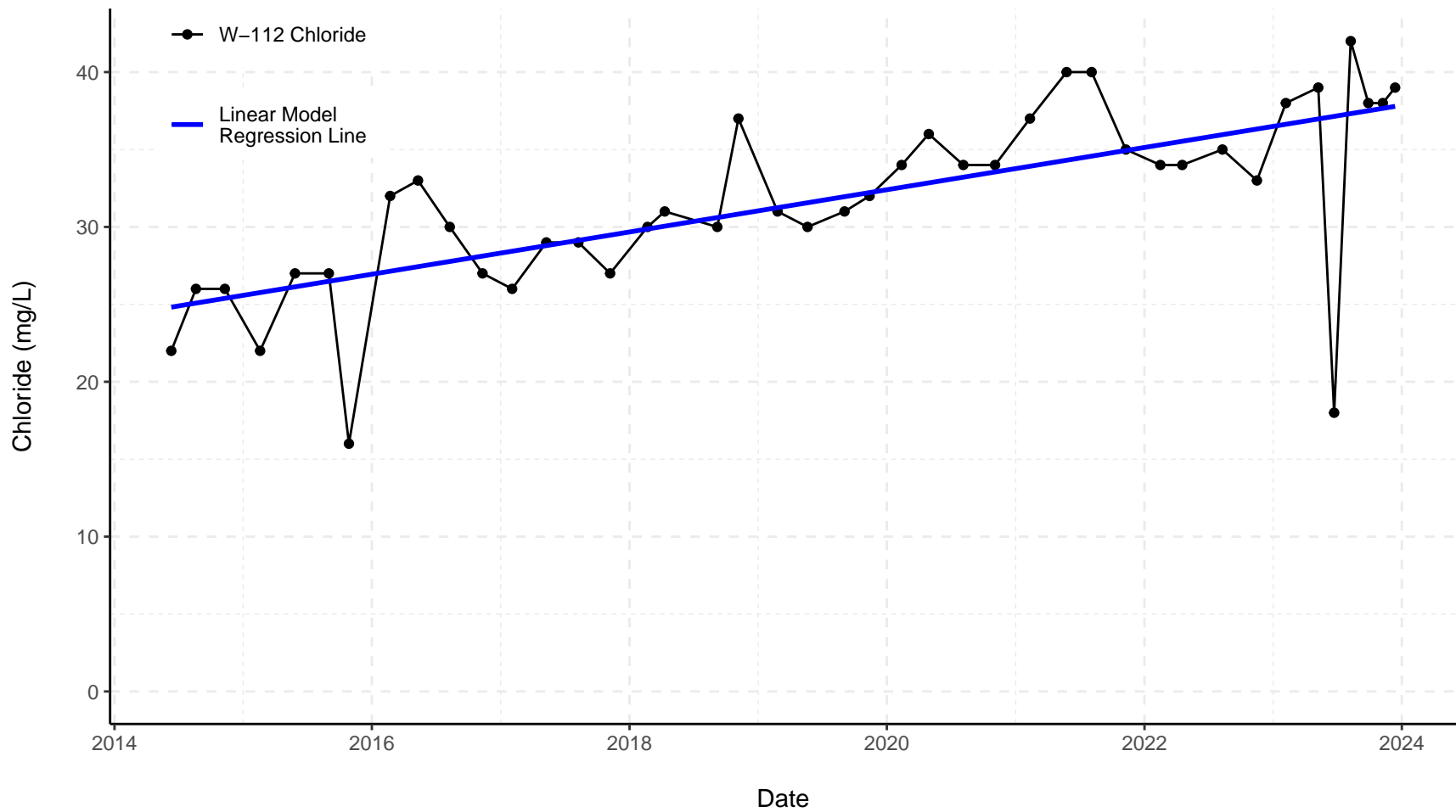
Mann–Kendall Trend Analysis Results: **Decreasing Trend**



# Well 112 Chloride

Concentration in Groundwater 2014–2023

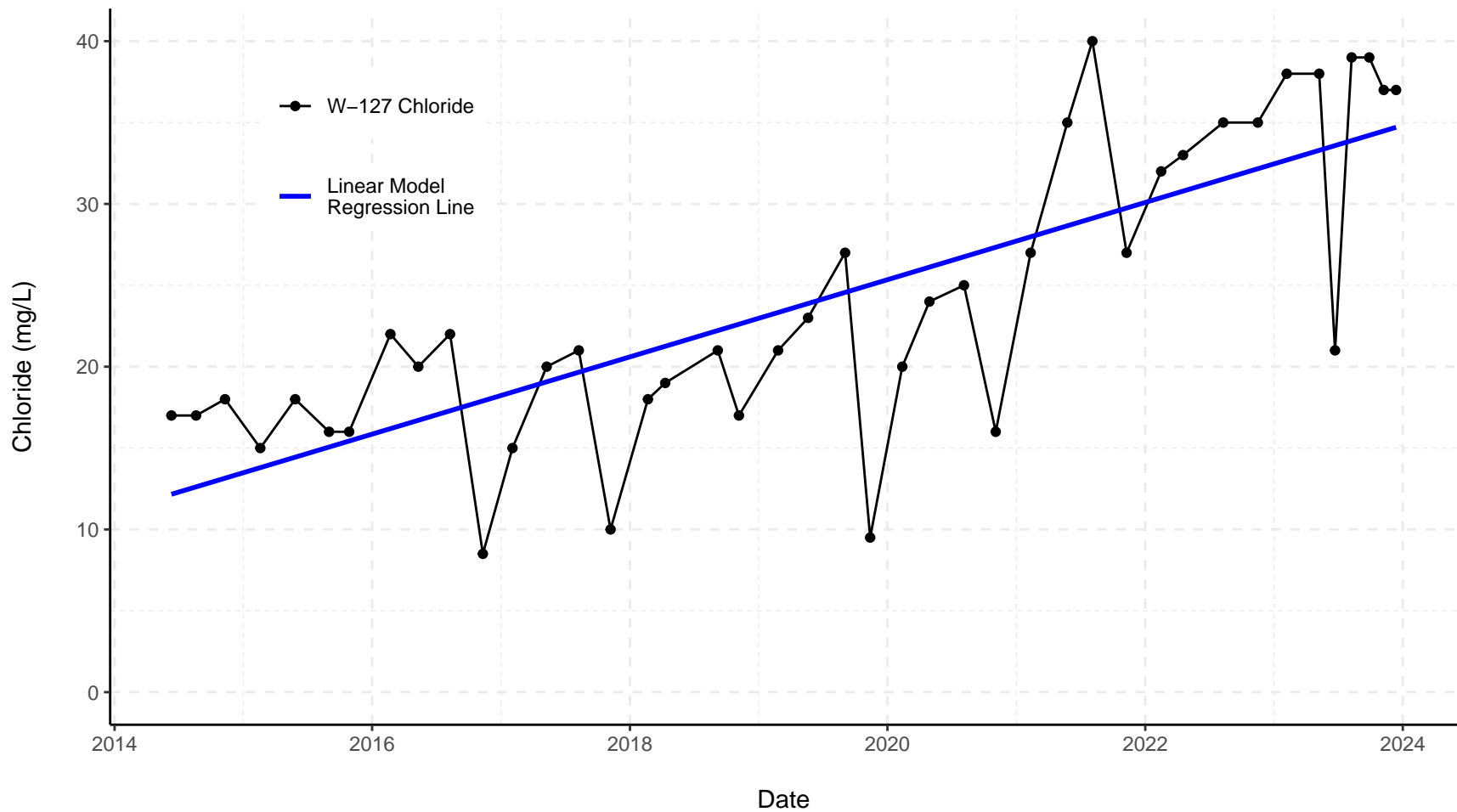
Mann–Kendall Trend Analysis Results: **Increasing Trend**



# Well 127 Chloride

Concentration in Groundwater 2014–2023

Mann–Kendall Trend Analysis Results: **Increasing Trend**

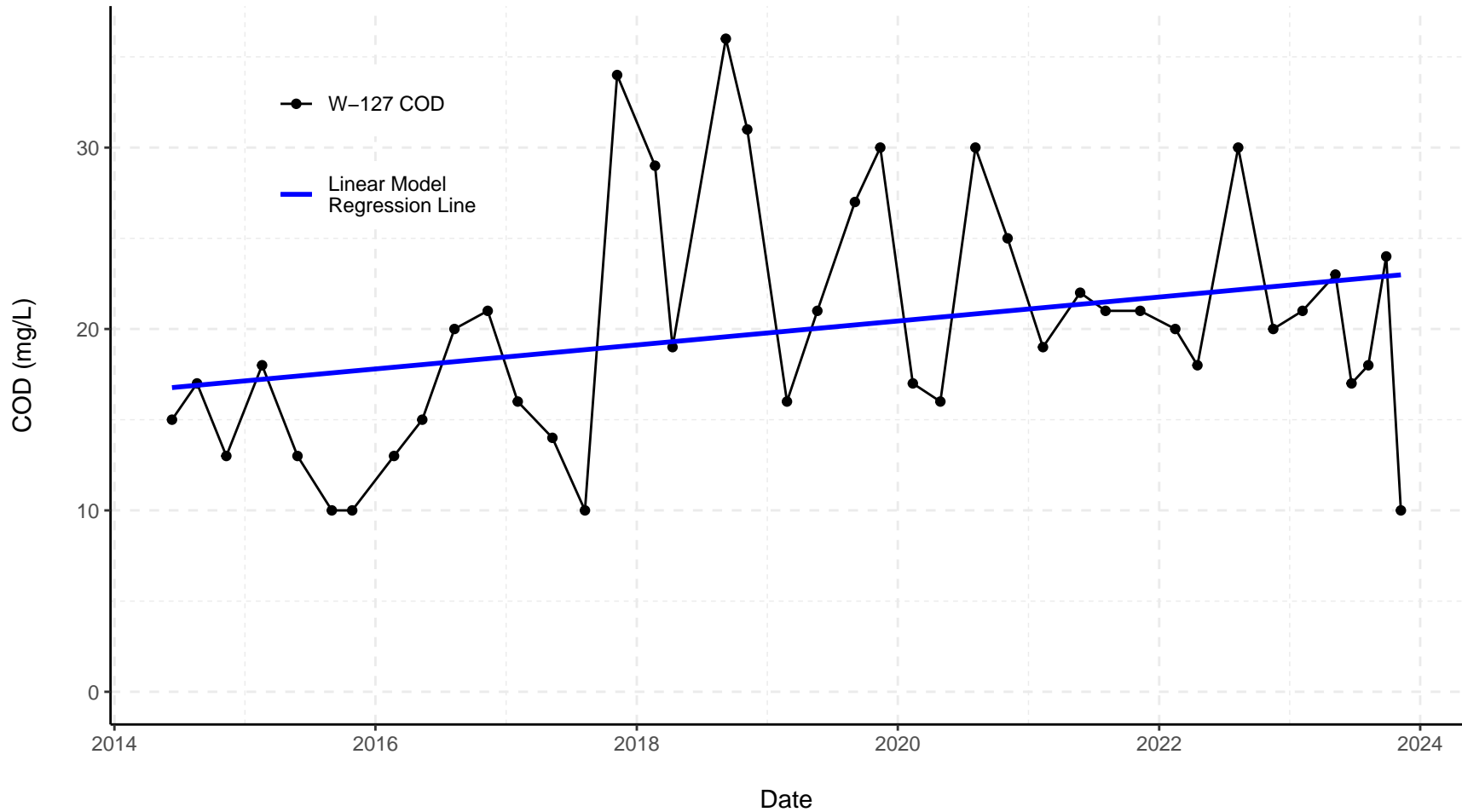




# Well 127 COD

Concentration in Groundwater 2014–2023

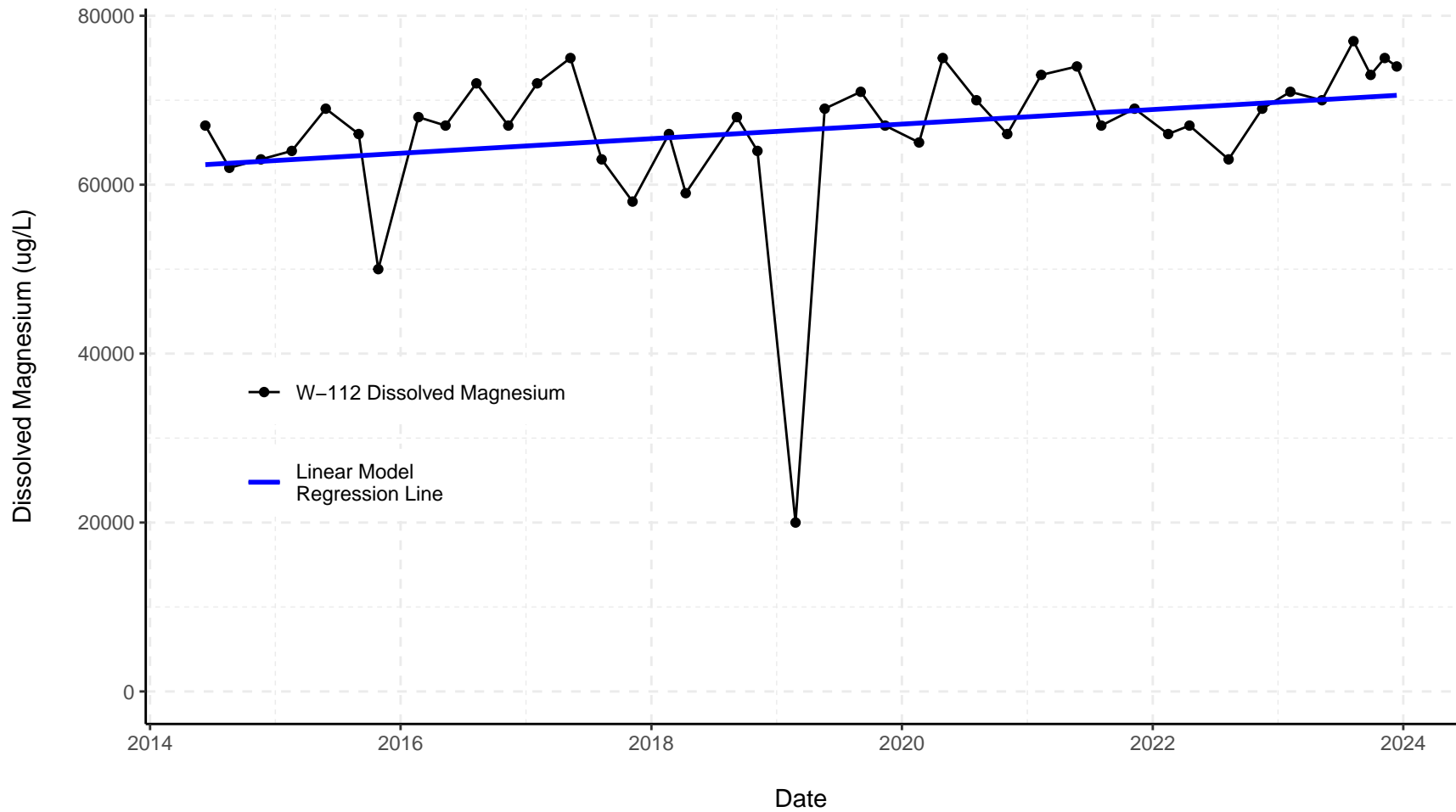
Mann–Kendall Trend Analysis Results: **Increasing Trend**



# Well 112 Dissolved Magnesium

Concentration in Groundwater 2014–2023

Mann–Kendall Trend Analysis Results: **Increasing Trend**



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**APPENDIX G -  
INTERWELL ANALYSIS – CATION-ANION BALANCE/STIFF AND PIPER DIAGRAMS**

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**2023 - QUARTER #1**

# W-47

**Name:** W-47\_Q1 Please enter the concentrations in milligrams per litre in the "Data" worksheet and select the row number here: 2

<b>Species</b>	<b>Calcium</b>	<b>Magnesium</b>	<b>Sulphate</b>	<b>Chloride</b>	<b>Alkalinity</b>	<b>Potassium</b>	<b>Sodium</b>
mg/L	66	49	55	15	350	5.6	35
<b>Units</b>	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
<b>AtomicWt</b>	40.08	24.32	96.06	35.45	96.06	39.10	23.00
<b>Equivalents</b>	3.29 meq/L	3.95 meq/L	1.15 meq/L	0.42 meq/L	7.29 meq/L	0.14 meq/L	1.52 meq/L
<b>Maucha</b>				<b>Anions</b>			<b>Cations</b>
				8.86 meq/L			8.91 meq/L
				<b>Total</b>		17.76 meq/L	
<b>FullArea</b>	5863.59						
<b>FullRadius</b>	43.76						
<b>IonArea</b>	1087.26	1303.16	378.04	139.69	2405.72	47.29	502.44
<b>IonRadius</b>	64.92	77.81	22.57	8.34	143.64	2.82	30.00
<b>Angle</b>	7	6	5	4	3	1	0
<b>StartAngle</b>	315	270	225	180	135	45	0
<b>IonAngle</b>	337.5	292.5	247.5	202.5	157.5	67.5	22.5
<b>EndAngle</b>	360	315	270	225	180	90	45
<b>x</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>y</b>	30.9	-30.9	0.0	-43.8	-30.9	-30.9	-43.8
<b>x</b>	60.0	-24.8	29.8	-71.9	-8.6	-20.9	-7.7
<b>y</b>	43.8	0.0	30.9	-30.9	0.0	-43.8	-30.9
<b>x</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>y</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0

<b>Circle</b>	0	43.8	0.0
	22.5	40.4	16.7
	45	30.9	30.9
	67.5	16.7	40.4
	90	0.0	43.8
	112.5	-16.7	40.4
	135	-30.9	30.9
	157.5	-40.4	16.7
	180	-43.8	0.0
	202.5	-40.4	-16.7
	225	-30.9	-30.9
	247.5	-16.7	-40.4
	270	0.0	-43.8
	292.5	16.7	-40.4
	315	30.9	-30.9
	337.5	40.4	-16.7
	360	43.8	0.0

**Stiff diagram**

Height	5
5.0	-1.67
5.0	0
0.0	-3.29
0.0	0
-5.0	-3.95
-5.0	0.0
5.0	-1.7
0	-3.3
-5.0	-3.9
-5.0	1.1
0	7.3
5.0	0.4

**Collins bar**

	Ca	Mg	Na+K
Cations	66	49	40.6
Anions	TAL	Cl	SO4
	350	15	55

W-47\_Q1

W-47\_Q1

W-47\_Q1

**Piper diagram**

**Anions**

<b>Cations</b>	Ion%	Cation%	-Cation%	c	x	y	<b>Anions</b>	Cl	SO4	HCO3+CO2	Cl∩SO4
Ca	18.54%	37.09%	-37.09%	-0.64	-59.31%	38.49%	Cl	2.38%	4.76%	0	0
Mg	22.22%	44.45%	-44.45%	-0.6423	-59.31%	38.49%	SO4	6.45%	12.89%	0	0
Na+K	9.38%	18.75%	-18.75%	-0.6423	-59.31%	38.49%	HCO3+CO2	41.03%	82.06%	8.97%	89.72%
Ca+Mg	50.14%	100.28%					Cl∩SO4	49.86%	99.72%	8.83%	

<b>Cation equations</b>				<b>Anion equations</b>			
Ca line	y =	x * -1.7321	+ -0.6423	Cl line	y =	x * 1.7321	+ -0.0825
	1.0897	-1.0			-0.0825	0.0	
	-0.6423	0.0			1.6495	1.0	
Mg line	y =	x * 0.0000	+ 0.3849	SO4 line	y =	x * 0	+ 0.1117
	0.3849	-1.0			0.1117	0.0	
	0.3849	0.0			0.1117	1.0	
Na+K line	y =	x * 1.7321	+ 1.4073	HCO3+CO2	y =	x * -1.7321	+ 0.3108
	-0.32477	-1			2.0429	-1.0	
	3.13933	1			-1.4213	1.0	

<b>Cation intersection equations</b>				<b>Anion intersection equations</b>			
Ca ∩ Mg	0.3849	-0.5931		Cl ∩ SO4	0.1117	0.1121	
Ca ∩ Na+K	0.3825	-0.5917		Cl ∩ HCO	0.1144	0.1135	
Mg ∩ Na+K	0.3849	-0.5902		SO4 ∩ HCO	0.1117	0.1150	
Cationt	0.3841	-0.5917		Aniont	0.1125	0.1135	

<b>Lozenge intersection</b>			
	y	x	
Na+K ∩ SO	0.8590	-0.3165	

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# W-112

Name <b>W-112_Q1</b>								Please enter the concentrations in milligrams per litre in the "Data" worksheet and select the row number here:								3	
Spinet		Magnesium		Sulphate		Chloride		Alkalinity		Potassium		Sodium					
Ion	Calcium	71	mg/L	5	mg/L	38	mg/L	560	mg/L	7.5	mg/L	52	mg/L				
Valency	2	2		2		1		2		1		1					
AtomicWt	40.08	24.32		96.06		35.45		96.06		39.10		23.00					
Equivalents	4.79	meq/L		5.84	meq/L	0.10	meq/L	1.07	meq/L	11.66	meq/L	0.19	meq/L	2.26	meq/L		
Maucha				Anions				Cations				Balance					
				12.84				25.92				1.89%					
				Total				25.92				meq/L					

FullArea	6585.56															
FullRadius	46.38															
IonArea	1217.23	1483.62	26.45	272.37	2962.60	48.74	574.55									
IonRadius	68.58	83.59	1.49	15.35	166.92	2.75	32.37									
Angle	7	6	5	4	3	1	0									
StartAngle	315	270	225	180	135	45	0									
IonAngle	337.5	292.5	247.5	202.5	157.5	67.5	22.5									
EndAngle	360	315	270	225	180	90	45									
	x	y	x	y	x	y	x	y	x	y	x	y				
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	32.8	-32.8	0.0	-46.4	-32.8	-32.8	-46.4	0.0	-32.8	32.8	32.8	32.8	46.4	0.0	0.0	0.0
	63.4	-26.2	32.0	-77.2	-0.6	-1.4	-14.2	-5.9	-154.2	63.9	1.1	2.5	29.9	12.4	0.0	0.0
	46.4	0.0	32.8	-32.8	0.0	-46.4	-32.8	-46.4	0.0	0.0	0.0	46.4	32.8	32.8	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Circle	0	46.4	0.0
	22.5	42.8	17.7
	45	32.8	32.8
	67.5	17.7	42.8
	90	0.0	46.4
	112.5	-17.7	42.8
	135	-32.8	32.8
	157.5	-42.8	17.7
	180	-46.4	0.0
	202.5	-42.8	-17.7
	225	-32.8	-32.8
	247.5	-17.7	-42.8
	270	0.0	-46.4
	292.5	17.7	-42.8
	315	32.8	-32.8
	337.5	42.8	-17.7
	360	46.4	0.0

Collins	Na	Ca	Mg	K
	96	71	59.5	5
	TAL	Cl	SO4	
	560	38		

Stiff diagram	Height	5	
	5.0	-2.45	1.1
	5.0	0	0
	0.0	-4.79	11.7
	0.0	0	0
	-5.0	-5.84	0.1
	-5.0	0.0	0.0
	5.0	-2.5	
	0	-4.8	
	-5.0	-5.8	
	-5.0	0.1	
	0	11.7	
	5.0	1.1	

Collins bar	Ca	Mg	Na+K
Cations	96	71	59.5
	TAL	Cl	SO4
Anions	560	38	5

Cations	Ion%	0	Cation%	-Cation%	c	x	y	60° axes
Ca	18.48%	36.97%	-36.97%	-0.64	-59.49%	39.02%	-77.47%	0.14
Mg	22.53%	45.06%	-45.06%					8.67%
Na+K	9.46%	18.93%	-18.93%					0.70%
	50.48%	100.95%						99.60%
Ca+Mg	41.01%							8.68%
Anions	Cl	4.14%	0	Anion%	8.27%	0		
	SO4	0.40%	0	0.80%				
	HCO3+CO2	44.99%	5.01%	89.97%				
		49.52%		99.05%				
	Cl+SO4	4.54%						

Cation equations				Anion equations							
Ca line	y =	x *	-1.7321	+	-0.6403	Cl line	y =	x *	1.7321	+	-0.1433
	1.0918	-1.0					-0.1433	0.0			
	-0.6403	0.0					1.5888	1.0			
Mg line	y =	x *	0.0000	+	0.3902	SO4 line	y =	x *	0	+	0.0070
	0.3902	-1.0					0.0070	0.0			
	0.3902	0.0					0.0070	1.0			
Na+K line	y =	x *	1.7321	+	1.4042	HCO3+CO2	y =	x *	-1.7321	+	0.1737
	-0.32786	-1					1.9057	-1.0			
	3.13624	1					-1.5584	1.0			

Cation intersection equations				Anion intersection equations			
Ca ∩ Mg	0.3902	-0.5949		Cl ∩ SO4	0.0070	0.0867	
Ca ∩ Na+K	0.3820	-0.5902		Cl ∩ HCO	0.0152	0.0915	
Mg ∩ Na+K	0.3902	-0.5854		SO4 ∩ HCO	0.0070	0.0963	
<b>Cation</b>	<b>0.3875</b>	<b>-0.5902</b>		<b>Anion</b>	<b>0.0097</b>	<b>0.0915</b>	

Lozenge intersection			
	y	x	
Na+K ∩ SO	0.7889	-0.3552	

# W-113

**Name** W-113\_Q1 4

**Please enter the concentrations in milligrams per litre in the "Data" worksheet and select the row number here:**

<b>Spirit</b>	<b>6</b>	<b>7</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>2</b>	<b>1</b>
<b>Ion Calcium</b>	<b>Magnesium</b>	<b>Sulphate</b>	<b>Chloride</b>	<b>Alkalinity</b>	<b>Potassium</b>	<b>Sodium</b>	
mg/L 78	64	49	31	450	5.6	47	
<b>Valency</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>	
<b>AtomicWt</b>	40.08	24.32	96.06	35.45	96.06	39.10	23.00
<b>Equivalents</b>	3.89 meq/L	5.26 meq/L	1.02 meq/L	0.87 meq/L	9.37 meq/L	0.14 meq/L	2.04 meq/L
<b>Maucha</b>				<b>Anions</b>		<b>Cations</b>	<b>Balance</b>
				11.26 meq/L		11.34 meq/L	0.69%
				<b>Total</b>			
				22.61 meq/L			

<b>FullArea</b>	6323.02						
<b>FullRadius</b>	45.45						
<b>IonRadius</b>	1088.66	1472.12	285.35	244.59	2620.58	40.06	571.64
<b>Angle</b>	7	6	5	4	3	1	0
<b>StartAngle</b>	315	270	225	180	135	45	0
<b>IonAngle</b>	337.5	292.5	247.5	202.5	157.5	67.5	22.5
<b>EndAngle</b>	360	315	270	225	180	90	45
	x	y	x	y	x	y	x
	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	32.1	-32.1	0.0	-45.4	-32.1	-32.1	32.1
	57.8	-24.0	32.4	-78.2	-6.3	-15.2	-13.0
	45.4	0.0	32.1	-32.1	0.0	-45.4	-32.1
	0.0	0.0	0.0	0.0	0.0	0.0	0.0

<b>Circle</b>	0	45.4	0.0
	22.5	42.0	17.4
	45	32.1	32.1
	67.5	17.4	42.0
	90	0.0	45.4
	112.5	-17.4	42.0
	135	-32.1	32.1
	157.5	-42.0	17.4
	180	-45.4	0.0
	202.5	-42.0	-17.4
	225	-32.1	-32.1
	247.5	-17.4	-42.0
	270	0.0	-45.4
	292.5	17.4	-42.0
	315	32.1	-32.1
	337.5	42.0	-17.4
	360	45.4	0.0

Stiff W-113\_Q1

Maucha W-113\_Q1

<b>Stiff diagram</b>	5		
Height	5.0	-2.19	0.9
	5.0	0	0
	0.0	-3.89	9.4
	0.0	0	0
	-5.0	-5.26	1.0
	-5.0	0.0	0.0
	5.0	-2.2	
	0	-3.9	
	-5.0	-5.3	
	-5.0	1.0	
	0	9.4	
	5.0	0.9	

<b>Collins bar</b>	Ca	Mg	Na+K
<b>Cations</b>	78	64	52.6
<b>TAL</b>		Cl	SO4
<b>Anions</b>	450	31	49

Piper W-113\_Q1

W-113\_Q1

Cations

Anions

<b>Cations</b>	Ion%		<b>Cation%</b>	<b>-Cation%</b>	<b>c</b>	<b>x</b>	<b>y</b>	
Ca	17.22%	0	34.43%	-34.43%	-0.60	-57.72%	40.33%	-76.72%
Mg	23.28%	0	46.56%	-46.56%				
Na+K	9.67%	-40.33%	19.35%	-19.35%				69.85%
Ca+Mg	50.17%		100.35%					

<b>Anions</b>		<b>Cl</b>	<b>SO4</b>	<b>HCO3+CO2</b>	<b>Cl+SO4</b>	<b>Anion%</b>		<b>c</b>	<b>x</b>	<b>y</b>	<b>60° axes</b>
		3.87%	4.51%	41.45%	49.83%	8.55%	99.65%	-0.13	12.25%	7.82%	14.82%
		0	0	8.55%	8.38%						

<b>Cation equations</b>				<b>Anion equations</b>							
Ca line	y =	x *	-1.7321	+	-0.5964	Cl line	y =	x *	1.7321	+	-0.1340
	1.1356	-1.0					-0.1340	0.0			
	-0.5964	0.0					1.5980	1.0			
Mg line	y =	x *	0.0000	+	0.4033	SO4 line	y =	x *	0	+	0.0782
	0.4033	-1.0					0.0782	0.0			
	0.4033	0.0					0.0782	1.0			
Na+K line	y =	x *	1.7321	+	1.3969	HCO3+CO2	y =	x *	-1.7321	+	0.2964
	-0.33513	-1					2.0284	-1.0			
	3.12898	1					-1.4357	1.0			

<b>Cation intersection equations</b>				<b>Anion intersection equations</b>			
Ca ∩ Mg	0.4033	-0.5772		Cl ∩ SO4	0.0782	0.1225	
Ca ∩ Na+K	0.4002	-0.5754		Cl ∩ HCO	0.0812	0.1242	
Mg ∩ Na+K	0.4033	-0.5737		SO4 ∩ HCO	0.0782	0.1260	
<b>Cation</b>	<b>0.4023</b>	<b>-0.5754</b>		<b>Anion</b>	<b>0.0792</b>	<b>0.1242</b>	

<b>Lozenge intersection</b>			
	y	x	
Na+K ∩ SO	0.8466	-0.3177	

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# W-127

Name <b>W-127_Q1</b>										Please enter the concentrations in milligrams per litre in the "Data" worksheet and select the row number here:										5
Spinet		Magnesium			Sulphate			Chloride			Alkalinity			Potassium			Sodium			
Ion	Calcium	71	mg/L	54	mg/L	38	mg/L	510	mg/L	0	mg/L	40	mg/L							
Valency	2	2		2		1		2		1		1								
AtomicWt	40.08	24.32		96.06		35.45		96.06		39.10		23.00								
Equivalents	5.49 meq/L	5.84 meq/L		1.12 meq/L		1.07 meq/L		10.62 meq/L		0.00 meq/L		1.74 meq/L								
Maucha				Anions			Cations			Balance										
				12.81 meq/L			13.07 meq/L			1.93%										
							Total			25.88 meq/L										

FullArea	6582.90																	
FullRadius	46.37																	
IonArea	1396.10	1485.07	285.96	272.64	2700.73	0.00	442.40											
IonRadius	78.67	83.69	16.11	15.36	152.19	0.00	24.93											
Angle	7	6	5	4	3	1	0											
StartAngle	315	270	225	180	135	45	0											
IonAngle	337.5	292.5	247.5	202.5	157.5	67.5	22.5											
EndAngle	360	315	270	225	180	90	45											
	x	y	x	y	x	y	x	y	x	y	x	y						
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	32.8	-32.8	0.0	-46.4	-32.8	-32.8	-46.4	0.0	-32.8	32.8	32.8	32.8	46.4	0.0	0.0	0.0	0.0	0.0
	72.7	-30.1	32.0	-77.3	-6.2	-14.9	-14.2	-5.9	-140.6	58.2	0.0	0.0	23.0	9.5	0.0	0.0	0.0	0.0
	46.4	0.0	32.8	-32.8	0.0	-46.4	-32.8	-46.4	0.0	0.0	0.0	46.4	32.8	32.8	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Circle	0	46.4	0.0																
	22.5	42.8	17.7																
	45	32.8	32.8																
	67.5	17.7	42.8																
	90	0.0	46.4																
	112.5	-17.7	42.8																
	135	-32.8	32.8																
	157.5	-42.8	17.7																
	180	-46.4	0.0																
	202.5	-42.8	-17.7																
	225	-32.8	-32.8																
	247.5	-17.7	-42.8																
	270	0.0	-46.4																
	292.5	17.7	-42.8																
	315	32.8	-32.8																
	337.5	42.8	-17.7																
	360	46.4	0.0																

Stiff W-127\_Q1

Maucha W-127\_Q1

Collins bar	Ca	Mg	Na+K			
Cations	110	71	40			
Anions	510	38	54			

Piper W-127\_Q1

W-127\_Q1

Piper diagram

Piper diagram

Cations	Ion%	Cation%	-Cation%	c	x	y					
Ca	21.21%	0	42.42%	-42.42%	-0.73	-64.98%	39.07%	-77.44%			
Mg	22.56%	0	45.12%	-45.12%							
Na+K	6.72%	-43.28%	13.44%	-13.44%							
	50.49%		100.98%								
Ca+Mg	43.77%										

Anions	Cl	4.14%	0	Anion%	c	x	y	60° axes
	SO4	4.34%	0	8.28%	-0.14	12.63%	7.52%	
	HCO3+CO2	41.03%	8.97%	82.05%			7.52%	95.66%
		49.51%		99.02%				15.54%
	Cl+SO4	8.49%						

Cation equations				Anion equations							
Ca line	y =	x *	-1.7321	+	-0.7347	Cl line	y =	x *	1.7321	+	-0.1435
	0.9974	-1.0					-0.1435	0.0			
	-0.7347	0.0					1.5886	1.0			
Mg line	y =	x *	0.0000	+	0.3907	SO4 line	y =	x *	0	+	0.0752
	0.3907	-1.0					0.0752	0.0			
	0.3907	0.0					0.0752	1.0			
Na+K line	y =	x *	1.7321	+	1.4992	HCO3+CO2	y =	x *	-1.7321	+	0.3109
	-0.23280	-1					2.0429	-1.0			
	3.23130	1					-1.4212	1.0			

Cation intersection equations				Anion intersection equations			
Ca ∩ Mg	0.3907	-0.6498		Cl ∩ SO4	0.0752	0.1263	
Ca ∩ Na+K	0.3823	-0.6449		Cl ∩ HCO	0.0837	0.1312	
Mg ∩ Na+K	0.3907	-0.6400		SO4 ∩ HCO	0.0752	0.1360	
<b>Cation</b>	<b>0.3879</b>	<b>-0.6449</b>		<b>Anion</b>	<b>0.0781</b>	<b>0.1312</b>	

Lozenge intersection			
	y	x	
Na+K ∩ SO	0.9051	-0.3431	



**2023 - QUARTER #2**

# W-47

**Name:** W-47\_Q2 6

**Please enter the concentrations in milligrams per litre in the "Data" worksheet and select the row number here:**

Species	1	2	3	4	5	6	7
Ion	Calcium	Magnesium	Sulphate	Chloride	Alkalinity	Potassium	Sodium
mg/L	68	47	51	15	350	6.6	37
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
AtomEqWI	40.08	24.32	96.06	35.45	96.06	39.10	23.00
Equivalents	3.39 meq/L	3.87 meq/L	1.06 meq/L	0.42 meq/L	7.29 meq/L	0.17 meq/L	1.61 meq/L
Maucha				<b>Anions</b>		<b>Cations</b>	
				8.77 meq/L		9.04 meq/L	
				<b>Total</b>			
				17.81 meq/L			

FullArea	5868.58						
FullRadius	43.78						
IonArea	1118.22	1273.73	349.92	139.44	2401.43	55.63	530.21
IonRadius	66.74	76.02	20.88	8.32	143.33	3.32	31.64
Angle	7	6	5	4	3	2	1
StartAngle	315	270	225	180	135	90	45
IonAngle	337.5	292.5	247.5	202.5	157.5	67.5	22.5
EndAngle	360	315	270	225	180	90	45
	x	y	x	y	x	y	x
	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	31.0	-31.0	0.0	-43.8	-31.0	-31.0	-43.8
	61.7	-25.5	29.1	-70.2	-8.0	-19.3	-7.7
	43.8	0.0	31.0	-31.0	0.0	-43.8	-31.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Circle	0	43.8	0.0
	22.5	40.4	16.8
	45	31.0	31.0
	67.5	16.8	40.4
	90	0.0	43.8
	112.5	-16.8	40.4
	135	-31.0	31.0
	157.5	-40.4	16.8
	180	-43.8	0.0
	202.5	-40.4	-16.8
	225	-31.0	-31.0
	247.5	-16.8	-40.4
	270	0.0	-43.8
	292.5	16.8	-40.4
	315	31.0	-31.0
	337.5	40.4	-16.8
	360	43.8	0.0

**Stiff diagram**

Height	5
5.0	-1.78
5.0	0
0.0	-3.39
0.0	0
-5.0	-3.87
-5.0	0.0
5.0	-1.8
0	-3.4
-5.0	-3.9
-5.0	1.1
0	7.3
5.0	0.4

**Collins bar**

	Ca	Mg	Na+K
Cations	68	47	43.6
Anions	TAL	Cl	SO4
	350	15	51

W-47\_Q2

W-47\_Q2

W-47\_Q2

**Piper diagram**

**Anions**

Cations	Ion%		Cation%	-Cation%	c	x	y		Anions		Anion%							
Ca	19.05%	0	38.11%	-38.11%	-0.66	-59.81%	37.59%	-78.30%	Cl	2.38%	0	4.75%	10.33%	10.33%	10.33%	94.04%	15.73%	
Mg	21.70%	0	43.41%	-43.41%				69.31%	SO4	5.96%	0	11.93%	81.84%	81.84%	81.84%			
Na+K	9.98%	-40.02%	19.97%	-19.97%					HCO3+CO2	40.92%	9.08%	81.84%	98.52%	98.52%				
Ca+Mg	50.74%		101.48%						Cl+SO4	49.26%	8.34%							

<b>Cation equations</b>				<b>Anion equations</b>			
Ca line	y =	x *	-1.7321	+	-0.6601	Cl line	y =
	1.0720	-1.0			1.7321	+	-0.0823
	-0.6601	0.0			1.6497	1.0	
Mg line	y =	x *	0.0000	+	0.3759	SO4 line	y =
	0.3759	-1.0			0.1033	0.0	0.1033
	0.3759	0.0			0.1033	1.0	
Na+K line	y =	x *	1.7321	+	1.3862	HCO3+CO2	y =
	-0.34581	-1			2.0466	-1.0	0.3145
	3.11829	1			-1.4175	1.0	

<b>Cation intersection equations</b>				<b>Anion intersection equations</b>			
Ca ∩ Mg	0.3759	-0.5981		Cl ∩ SO4	0.1033	0.1071	
Ca ∩ Na+K	0.3631	-0.5907		Cl ∩ HCO	0.1161	0.1146	
Mg ∩ Na+K	0.3759	-0.5833		SO4 ∩ HCO	0.1033	0.1220	
Cationt	0.3717	-0.5907		Aniont	0.1076	0.1146	

<b>Lozenge intersection</b>			
	y	x	
Na+K ∩ SO	0.8504	-0.3094	

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Resource Quality Services

Department of Water Affairs and Forestry.

# W-112

Name		Please enter the concentrations in milligrams per litre in the "Data" worksheet and select the row number here:							7						
Spinet	8	Magnesium	7	Sulphate	6	Chloride	5	Alkalinity	4	Potassium	2	Sodium	1		
Ion	Calcium	99	mg/L	70	mg/L	4.1	mg/L	39	mg/L	540	mg/L	8.1	mg/L	56	mg/L
Valency	2	2	2	2	1	1	2	1	1	1	1	1	1		
AtomicWt	40.08	24.32	96.06	35.45	1.10	96.06	39.10	23.00	39.10	0.21	2.44	23.00	23.00		
Equivalents	4.94	meq/L	5.76	meq/L	0.09	meq/L	1.10	meq/L	11.24	meq/L	0.21	meq/L	2.44	meq/L	
Maucha				Anions			Cations			Balance					
				12.43			25.77			6.83%					
				Total			25.77			meq/L					

FullArea	6574.37							
FullRadius	46.34							
IonRadius	71.08	1468.75	21.78	280.69	2868.56	52.86	621.30	
Angle	7	6	5	4	3	1	0	
StartAngle	315	270	225	180	135	45	0	
IonAngle	337.5	292.5	247.5	202.5	157.5	67.5	22.5	
EndAngle	360	315	270	225	180	90	45	
	x	y	x	y	x	y	x	
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	32.8	-32.8	0.0	-46.3	-32.8	-32.8	0.0	
	65.7	-27.2	31.7	-76.5	-0.5	-1.1	-14.6	
	46.3	0.0	32.8	-32.8	0.0	-46.3	-32.8	
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

Circle	0	46.3	0.0
	22.5	42.8	17.7
	45	32.8	32.8
	67.5	17.7	42.8
	90	0.0	46.3
	112.5	-17.7	42.8
	135	-32.8	32.8
	157.5	-42.8	17.7
	180	-46.3	0.0
	202.5	-42.8	-17.7
	225	-32.8	-32.8
	247.5	-17.7	-42.8
	270	0.0	-46.3
	292.5	17.7	-42.8
	315	32.8	-32.8
	337.5	42.8	-17.7
	360	46.3	0.0

Stiff

W-112\_Q2

Maucha

W-112\_Q2

Collins	0	4
Na	99	7
K	8.1	7
Mg	70	7
Ca	540	7
TAL	548.1	7

Stiff diagram	5	1.1
Height	5.0	-2.64
Ion	5.0	0
	0.0	-4.94
	0.0	0
	-5.0	-5.76
	-5.0	0.0
	5.0	-2.6
	0	-4.9
	-5.0	-5.8
	-5.0	0.1
	0	11.2
	5.0	1.1

Piper

W-112\_Q2

W-112\_Q2

Collins bar	Ca	Mg	Na+K
Cations	99	70	64.1
	TAL	Cl	SO4
Anions	540	39	4.1

Piper diagram

Cations	Ion%	0	38.34%	-38.34%	c	x	y	60° axes
Ca	19.17%	0	38.34%	-38.34%	-0.66	-60.68%	38.69%	0.57%
Mg	22.34%	0	44.68%	-44.68%			-77.66%	99.67%
Na+K	10.25%	-39.75%	20.51%	-20.51%			68.84%	11.03%
Ca+Mg	51.77%		103.53%					

Cation equations	Ca line	y =	x *	1.7321	+	-0.6641
		1.0679	-1.0			
		-0.6641	0.0			

Anion equations	Cl line	y =	x *	1.7321	+	-0.1479
		-0.1479	0.0			
		1.5842	1.0			

Mg line	y =	x *	0.0000	+	0.3869
		0.3869	-1.0		
		0.3869	0.0		

SO4 line	y =	x *	0	+	0.0057
		0.0057	0.0		
		0.0057	1.0		

Na+K line	y =	x *	1.7321	+	1.3768
		-0.35522	-1		
		3.10888	1		

HCO3+CO2	y =	x *	-1.7321	+	0.2206
		1.9526	-1.0		
		-1.5115	1.0		

Cation intersection equations	Ca ∩ Mg	0.3869	-0.6068
	Ca ∩ Na+K	0.3563	-0.5892
	Mg ∩ Na+K	0.3869	-0.5715
	<b>Cation</b>	<b>0.3767</b>	<b>-0.5892</b>

Anion intersection equations	Cl ∩ SO4	0.0057	0.0887
	Cl ∩ HCO	0.0363	0.1064
	SO4 ∩ HCO	0.0057	0.1240
	<b>Anion</b>	<b>0.0159</b>	<b>0.1064</b>

Lozenge intersection

	y	x
Na+K ∩ SO	0.7987	-0.3338

# W-113

Name <b>W-113_Q2</b>								Please enter the concentrations in milligrams per litre in the "Data" worksheet and select the row number here:								8	
Spinet <b>8</b>		Magnesium <b>7</b>		Sulphate <b>6</b>		Chloride <b>5</b>		Alkalinity <b>4</b>		Potassium <b>2</b>		Sodium <b>1</b>					
mg/L <b>78</b>		mg/L <b>63</b>		mg/L <b>44</b>		mg/L <b>31</b>		mg/L <b>430</b>		mg/L <b>8.2</b>		mg/L <b>52</b>					
Valency <b>2</b>		Valency <b>2</b>		Valency <b>2</b>		Valency <b>1</b>		Valency <b>2</b>		Valency <b>1</b>		Valency <b>1</b>					
AtomicWt <b>40.08</b>		AtomicWt <b>24.32</b>		AtomicWt <b>96.06</b>		AtomicWt <b>35.45</b>		AtomicWt <b>96.06</b>		AtomicWt <b>39.10</b>		AtomicWt <b>22.99</b>		AtomicWt <b>23.00</b>			
Equivalents <b>3.89 meq/L</b>		Equivalents <b>5.18 meq/L</b>		Equivalents <b>0.92 meq/L</b>		Equivalents <b>0.87 meq/L</b>		Equivalents <b>8.95 meq/L</b>		Equivalents <b>0.21 meq/L</b>		Equivalents <b>2.26 meq/L</b>		Equivalents <b>2.26 meq/L</b>		Balance <b>6.94%</b>	
Maucha						Anions <b>10.74 meq/L</b>				Cations <b>11.54 meq/L</b>							
								Total <b>22.29 meq/L</b>									

FullArea	6295.82						
FullRadius	45.35						
IonArea	1099.49	1463.53	258.78	247.02	2529.01	59.25	638.74
IonRadius	63.36	84.33	14.91	14.23	145.73	3.41	36.81
Angle	7	6	5	4	3	1	0
StartAngle	315	270	225	180	135	45	0
IonAngle	337.5	292.5	247.5	202.5	157.5	67.5	22.5
EndAngle	360	315	270	225	180	90	45
	x	y	x	y	x	y	x
	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	32.1	-32.1	0.0	-45.3	-32.1	-45.3	0.0
	58.5	-24.2	32.3	-77.9	-5.7	-13.8	-5.4
	45.3	0.0	32.1	-32.1	0.0	-45.3	-32.1
	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Circle	0	45.3	0.0
	22.5	41.9	17.4
	45	32.1	32.1
	67.5	17.4	41.9
	90	0.0	45.3
	112.5	-17.4	41.9
	135	-32.1	32.1
	157.5	-41.9	17.4
	180	-45.3	0.0
	202.5	-41.9	-17.4
	225	-32.1	-32.1
	247.5	-17.4	-41.9
	270	0.0	-45.3
	292.5	17.4	-41.9
	315	32.1	-32.1
	337.5	41.9	-17.4
	360	45.3	0.0

Stiff diagram for W-113\_Q2. X-axis: Cations (meq/L), Y-axis: Anions (meq/L). The plot shows a central point with lines extending to the axes, representing the relative proportions of ions.

Maucha diagram for W-113\_Q2. X-axis: Cations (meq/L), Y-axis: Anions (meq/L). The plot shows a central point with lines extending to the axes, representing the relative proportions of ions.

Collins bar	Ca	Mg	Na+K
Cations	78	63	60.2
TAL	430	31	44
Anions			

Piper diagram for W-113\_Q2. X-axis: Cations (meq/L), Y-axis: Anions (meq/L). The plot shows a central point with lines extending to the axes, representing the relative proportions of ions.

Collins bar for W-113\_Q2. The bar is divided into segments representing the relative proportions of ions: Ca (red), Mg (blue), Na+K (green), TAL (yellow), and Anions (purple).

Stiff diagram	Height	5
	5.0	-2.47
	5.0	0
	0.0	-3.89
	0.0	0
	-5.0	-5.18
	-5.0	0.0
	5.0	-2.5
	0	-3.9
	-5.0	-5.2
	-5.0	0.9
	0	9.0
	5.0	0.9

Cations	Ion%	Ca	17.46%	Mg	23.25%	Na+K	11.09%	Ca+Mg	40.71%
		0	34.93%	0	46.49%	-38.91%	22.17%	103.59%	
		-0.60	-58.17%	40.26%	-76.75%	67.40%			

Anions	Ion%	Cl	3.92%	SO4	4.11%	HCO3+CO2	40.17%	Cl+SO4	8.03%
		0	7.85%	0	8.22%	9.83%	80.34%	96.41%	
		-0.14	11.96%	7.12%	95.89%	17.03%			

Cation equations	Ca line	y = 1.1271x - 0.6050
	Mg line	y = 0.4026x - 0.4026
	Na+K line	y = -0.38405x + 3.08005
Anion equations	Cl line	y = 1.7321x - 0.1359
	SO4 line	y = 0.0712x + 0.0712
	HCO3+CO2	y = -1.7321x + 0.3405

Cation intersection equations	Ca ∩ Mg	0.4026	-0.5817
	Ca ∩ Na+K	0.3715	-0.5638
	Mg ∩ Na+K	0.4026	-0.5458
	<b>Cation</b>	<b>0.3923</b>	<b>-0.5638</b>
Anion intersection equations	Cl ∩ SO4	0.0712	0.1196
	Cl ∩ HCO	0.1023	0.1375
	SO4 ∩ HCO	0.0712	0.1555
	<b>Anion</b>	<b>0.0816</b>	<b>0.1375</b>

Lozenge intersection	y = 0.8443x - 0.2908
----------------------	----------------------

# W-127

Name		Please enter the concentrations in milligrams per litre in the "Data" worksheet and select the row number here:							9				
Spinet	8	Magnesium	7	Sulphate	6	Chloride	5	Alkalinity	4	Potassium	2	Sodium	1
Ion	Calcium	72	mg/L	49	mg/L	38	mg/L	500	mg/L	3.8	mg/L	43	mg/L
Valency	2	2		2		1		2		1		1	
AtomicWt	40.08	24.32		96.06		35.45		96.06		39.10		23.00	
Equivalents	5.99 meq/L	5.92 meq/L		1.02 meq/L		1.07 meq/L		10.41 meq/L		0.10 meq/L		1.87 meq/L	
Maucha						Anions		Cations		Balance			
					12.50 meq/L		13.88 meq/L		9.90%				
							Total		26.38 meq/L				

FullArea	6619.51												
FullRadius	46.50												
IonArea	1502.66	1485.86	256.01	269.00	2612.37	24.39	469.22						
IonRadius	84.44	83.50	14.39	15.12	146.81	1.37	26.37						
Angle	7	6	5	4	3	1	0						
StartAngle	315	270	225	180	135	45	0						
IonAngle	337.5	292.5	247.5	202.5	157.5	67.5	22.5						
EndAngle	360	315	270	225	180	90	45						
	x	y	x	y	x	y	x	y	x	y	x	y	
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	32.9	-32.9	0.0	-46.5	-32.9	-32.9	-46.5	0.0	-32.9	32.9	32.9	46.5	0.0
	78.0	-32.3	32.0	-77.1	-5.5	-13.3	-14.0	-5.8	-135.6	56.2	0.5	1.3	24.4
	46.5	0.0	32.9	-32.9	0.0	-46.5	-32.9	-46.5	0.0	0.0	46.5	32.9	32.9
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Circle	0	46.5	0.0
22.5	43.0	17.8	
45	32.9	32.9	
67.5	17.8	43.0	
90	0.0	46.5	
112.5	-17.8	43.0	
135	-32.9	32.9	
157.5	-43.0	17.8	
180	-46.5	0.0	
202.5	-43.0	-17.8	
225	-32.9	-32.9	
247.5	-17.8	-43.0	
270	0.0	-46.5	
292.5	17.8	-43.0	
315	32.9	-32.9	
337.5	43.0	-17.8	
360	46.5	0.0	

Stiff diagram	Height	5	1.1
	5.0	-1.97	0.0
	5.0	0	0
	0.0	-5.99	10.4
	0.0	0	0
	-5.0	-5.92	1.0
	-5.0	0.0	0.0
	5.0	-2.0	
	0	-6.0	
	-5.0	-5.9	
	-5.0	1.0	
	0	10.4	
	5.0	1.1	

Collins bar	Ca	Mg	Na+K
Cations	120	72	46.8
TAL		Cl	
Anions	500	38	49

Cations	Ion%	0	45.40%	-45.40%	c	x	y	60° axes
Ca	22.70%	0	44.89%	-44.89%	-0.79	-67.85%	38.88%	-77.55%
Mg	22.45%	0	14.91%	-14.91%			73.69%	
Na+K	7.46%	-42.54%	105.21%					
Ca+Mg	45.15%							

Cation equations	Ca line	y =	x *	+	-0.7864
		0.9457	-1.0		
		-0.7864	0.0		
Mg line		y =	x *	+	0.3888
		0.3888	-1.0		
		0.3888	0.0		
Na+K line		y =	x *	+	1.4737
		-0.25831	-1		
		3.20579	1		

Anion equations	Cl line	y =	x *	+	-0.1408
		-0.1408	0.0		
		1.5913	1.0		
SO4 line		y = <td>x *</td> <th>+</th> <th>0.0670</th>	x *	+	0.0670
		0.0670	0.0		
		0.0670	1.0		
HCO3+CO2		y = <td>x * <th>+</th> <th>0.3650</th> </td>	x * <th>+</th> <th>0.3650</th>	+	0.3650
		2.0970	-1.0		
		-1.3671	1.0		

Cation intersection equations	Ca ∩ Mg	0.3888	-0.6785
Ca ∩ Na+K	0.3437	-0.6524	
Mg ∩ Na+K	0.3888	-0.6264	
<b>Cation</b>	<b>0.3738</b>	<b>-0.6524</b>	

Anion intersection equations	Cl ∩ SO4	0.0670	0.1199
Cl ∩ HCO	0.1121	0.1460	
SO4 ∩ HCO	0.0670	0.1720	
<b>Anion</b>	<b>0.0820</b>	<b>0.1460</b>	

Lozenge intersection

	y	x
Na+K ∩ SO	0.9193	-0.3201

**2023 - QUARTER #3**

# W-47

**Name:** W-47\_Q3 10

**Please enter the concentrations in milligrams per litre in the "Data" worksheet and select the row number here:**

Species	1	2	3	4	5	6	7	8
Ion	Calcium	Magnesium	Sulphate	Chloride	Alkalinity	Potassium	Sodium	
mg/L	63	45	58	14	360	4.3	34	
Equivalent	40.08	24.32	96.06	35.45	96.06	39.10	23.00	
Equivalents	3.14 meq/L	3.70 meq/L	1.21 meq/L	0.39 meq/L	7.50 meq/L	0.11 meq/L	1.48 meq/L	
Maucha								
				Anions	Total	Cations	Balance	
				9.10 meq/L	17.53 meq/L	8.43 meq/L	-7.89%	

FullArea	5838.85							
FullRadius	43.67							
IonArea	1047.06	1232.56	402.20	131.54	2496.43	36.63	492.42	
IonRadius	62.65	73.75	24.07	7.87	149.38	2.19	29.46	
Angle	7	6	5	4	3	1	0	
StartAngle	315	270	225	180	135	45	0	
IonAngle	337.5	292.5	247.5	202.5	157.5	67.5	22.5	
EndAngle	360	315	270	225	180	90	45	
x	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
y	30.9	-30.9	0.0	-43.7	-30.9	-30.9	-43.7	0.0
x	57.9	-24.0	28.2	-68.1	-9.2	-22.2	-7.3	-3.0
y	43.7	0.0	30.9	-30.9	0.0	-43.7	-30.9	-43.7
x	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Circle	0	43.7	0.0
0	22.5	40.3	16.7
45	30.9	30.9	30.9
67.5	16.7	40.3	30.9
90	0.0	43.7	30.9
112.5	-16.7	40.3	30.9
135	-30.9	30.9	30.9
157.5	-40.3	16.7	30.9
180	-43.7	0.0	30.9
202.5	-40.3	-16.7	30.9
225	-30.9	-30.9	30.9
247.5	-16.7	-40.3	30.9
270	0.0	-43.7	30.9
292.5	16.7	-40.3	30.9
315	30.9	-30.9	30.9
337.5	40.3	-16.7	30.9
360	43.7	0.0	30.9

**Stiff diagram**

Height	5	
5.0	-1.59	0.4
0.0	0	0
-5.0	-3.70	1.2
-5.0	0.0	0.0
5.0	-1.6	
0	-3.1	
-5.0	-3.7	
-5.0	1.2	
0	7.5	
5.0	0.4	

**Collins bar**

Cations	Ca	Mg	Na+K
63	45	38.3	
TAL	Cl	SO4	
360	14	58	

W-47\_Q3

W-47\_Q3

W-47\_Q3

**Piper diagram**

Cations	Ca	Mg	Na+K					
Ca	17.93%	0	35.87%	-35.87%	-0.62	-56.98%	36.56%	
Mg	21.11%	0	42.22%	-42.22%				
Na+K	9.06%	-40.94%	18.12%	-18.12%				
Ca+Mg	48.10%		96.21%					

Anions	Cl	SO4	HCO3+CO2					
Cl	2.25%	0	4.51%	-0.08	11.39%	11.93%	11.93%	93.11%
SO4	6.89%	0	13.78%					
HCO3+CO2	42.76%	7.24%	85.51%					12.55%
Cl+SO4	9.14%							

Cation equations				Anion equations			
Ca line	y =	x *	-1.7321	Cl line	y =	x *	1.7321
	1.1108	-1.0	+ -0.6212		-0.0780	0.0	+ -0.0780
	-0.6212	0.0			1.6540	1.0	
Mg line	y =	x *	0.0000	SO4 line	y =	x *	0
	0.3656	-1.0	+ 0.3656		0.1193	0.0	+ 0.1193
	0.3656	0.0			0.1193	1.0	
Na+K line	y =	x *	1.7321	HCO3+CO2	y =	x *	-1.7321
	-0.31388	-1	+ 1.4182		1.9830	-1.0	+ 0.2510
	3.15022	1			-1.4811	1.0	

Cation intersection equations				Anion intersection equations			
Ca ∩ Mg	0.3656	-0.5698		Cl ∩ SO4	0.1193	0.1139	
Ca ∩ Na+K	0.3985	-0.5887		Cl ∩ HCO	0.0865	0.0950	
Mg ∩ Na+K	0.3656	-0.6077		SO4 ∩ HCO	0.1193	0.0760	
Cation	0.3766	-0.5887		Anion	0.1084	0.0950	

Lozenge intersection			
Na+K ∩ SO	y	x	
	0.8346	-0.3369	

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# W-112

**Name** W-112\_Q3 11

**Please enter the concentrations in milligrams per litre in the "Data" worksheet and select the row number here:**

<b>Spirit</b>	<b>6</b>	<b>7</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>2</b>	<b>1</b>
<b>Ion Calcium</b>	<b>Magnesium</b>	<b>Sulphate</b>	<b>Chloride</b>	<b>Alkalinity</b>	<b>Potassium</b>	<b>Sodium</b>	
mg/L 100	77 mg/L	6 mg/L	42 mg/L	640 mg/L	6.5 mg/L	52 mg/L	
<b>Valency</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>	
<b>AtomicWt</b>	40.08	24.32	96.06	35.45	96.06	39.10	23.00
<b>Equivalents</b>	4.99 meq/L	6.33 meq/L	0.12 meq/L	1.18 meq/L	13.33 meq/L	0.17 meq/L	2.26 meq/L
<b>Maucha</b>				<b>Anions</b>		<b>Cations</b>	<b>Balance</b>
				14.63 meq/L		13.75 meq/L	-6.44%
				<b>Total</b>			
				28.38 meq/L			

<b>FullArea</b>	6760.93						
<b>FullRadius</b>	46.99						
<b>IonArea</b>	1188.58	1508.29	29.76	282.20	3173.91	39.60	538.59
<b>IonRadius</b>	66.09	83.87	1.65	15.69	176.49	2.20	29.95
<b>Angle</b>	7	6	5	4	3	1	0
<b>StartAngle</b>	315	270	225	180	135	45	0
<b>IonAngle</b>	337.5	292.5	247.5	202.5	157.5	67.5	22.5
<b>EndAngle</b>	360	315	270	225	180	90	45
<b>x</b>		<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33.2	-33.2	0.0	-47.0	-33.2	-33.2	33.2	33.2
61.1	-25.3	32.1	-77.5	-0.6	-1.5	-163.1	67.5
47.0	0.0	33.2	-33.2	0.0	-47.0	-33.2	-47.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

<b>Circle</b>	0	47.0	0.0
	22.5	43.4	18.0
	45	33.2	33.2
	67.5	18.0	43.4
	90	0.0	47.0
	112.5	-18.0	43.4
	135	-33.2	33.2
	157.5	-43.4	18.0
	180	-47.0	0.0
	202.5	-43.4	-18.0
	225	-33.2	-33.2
	247.5	-18.0	-43.4
	270	0.0	-47.0
	292.5	18.0	-43.4
	315	33.2	-33.2
	337.5	43.4	-18.0
	360	47.0	0.0

Stiff

W-112\_Q3

Maucha

W-112\_Q3

<b>Collins</b>	<b>C</b>
	<b>+</b>
	<b>N</b>
	<b>+</b>
	<b>K</b>
	<b>+</b>
	<b>M</b>
	<b>g</b>
	<b>+</b>
	<b>C</b>
	<b>+</b>
	<b>O</b>
	<b>+</b>
	<b>S</b>
	<b>+</b>
	<b>T</b>
	<b>+</b>
	<b>A</b>
	<b>+</b>
	<b>L</b>
	<b>+</b>
	<b>C</b>
	<b>+</b>
	<b>A</b>
	<b>+</b>
	<b>N</b>
	<b>+</b>
	<b>O</b>
	<b>+</b>
	<b>S</b>
	<b>+</b>
	<b>O</b>
	<b>+</b>
	<b>4</b>

<b>Stiff diagram</b>	<b>5</b>
<b>Height</b>	5.0
	-2.43
	1.2
	5.0
	0
	0.0
	-4.99
	13.3
	0.0
	0
	-5.0
	-6.33
	0.1
	-5.0
	0.0
	5.0
	-2.4
	0
	-5.0
	-6.3
	-5.0
	0.1
	0
	13.3
	5.0
	1.2

W-112\_Q3

W-112\_Q3

<b>Collins bar</b>	<b>Ca</b>	<b>Mg</b>	<b>Na+K</b>
<b>Cations</b>	100	77	58.5
	TAL	Cl	SO4
<b>Anions</b>	640	42	6

Cations

Anions

<b>Cations</b>	<b>Ion%</b>	<b>Cation%</b>	<b>-Cation%</b>	<b>c</b>	<b>x</b>	<b>y</b>	
Ca	17.58%	35.16%	-35.16%	-0.61	-57.47%	38.64%	-77.69%
Mg	22.31%	44.62%	-44.62%				
Na+K	8.55%	17.10%	-17.10%				
Ca+Mg	48.44%	96.88%					
	39.89%						

<b>Anions</b>	<b>Cl</b>	<b>SO4</b>	<b>HCO3+CO2</b>	<b>Cl+SO4</b>	<b>Anion%</b>	<b>-Anion%</b>	<b>c</b>	<b>x</b>	<b>y</b>	<b>60° axes</b>
	4.17%	0	8.35%	0	8.35%	-8.35%	-0.14	8.79%	0.76%	
	0.44%	0	0.88%	0	0.88%	-0.88%				
	46.94%	3.06%	93.89%	51.56%	93.89%	-93.89%				99.56%
	51.56%		103.12%	4.61%						5.29%

<b>Cation equations</b>	<b>Anion equations</b>
Ca line	Cl line
y = x * -1.7321 + -0.6090	y = x * 1.7321 + -0.1446
1.1231	-0.1446
-0.6090	1.5875
	1.0
Mg line	SO4 line
y = x * 0.0000 + 0.3864	y = x * 0 + 0.0076
0.3864	0.0076
0.3864	0.0076
	1.0
Na+K line	HCO3+CO2
y = x * 1.7321 + 1.4358	y = x * -1.7321 + 0.1058
-0.29625	1.8379
3.16785	-1.0
	-1.6262
	1.0

<b>Cation intersection equations</b>	<b>Anion intersection equations</b>
Ca ∩ Mg	Cl ∩ SO4
0.3864	0.0076
0.4134	-0.0194
0.3864	0.0076
0.3864	0.0567
<b>Cation</b>	<b>Anion</b>
0.3954	-0.0014
	0.0723

<b>Lozenge intersection</b>
y = x
Na+K ∩ SO
0.7708
-0.3839

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# W-127

Name <b>W-127_Q3</b>		Please enter the concentrations in milligrams per litre in the "Data" worksheet and select the row number here:						13
Spinet	8	7	6	5	4	2	1	
Ion	Calcium	Magnesium	Sulphate	Chloride	Alkalinity	Potassium	Sodium	
mg/L	100	69	51	39	540	0	41	
Valency	2	2	2	1	2	1	1	
AtomicWt	40.08	24.32	96.06	35.45	96.06	39.10	23.00	
Equivalents	4.99 meq/L	5.67 meq/L	1.06 meq/L	1.10 meq/L	11.24 meq/L	0.00 meq/L	1.78 meq/L	
Maucha				Anions	Cations		Balance	
				13.40 meq/L	12.45 meq/L		-7.69%	
				Total	25.85 meq/L			

FullArea	6580.69						
FullRadius	45.36						
IonArea	1270.21	1444.41	270.29	280.04	2861.91	0.00	453.82
IonRadius	71.59	81.41	15.23	15.78	161.30	0.00	25.58
Angle	7	6	5	4	3	1	0
StartAngle	315	270	225	180	135	45	0
IonAngle	337.5	292.5	247.5	202.5	157.5	67.5	22.5
EndAngle	360	315	270	225	180	90	45
	x	y	x	y	x	y	x
	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	32.8	-32.8	0.0	-46.4	-32.8	-46.4	0.0
	66.1	-27.4	31.2	-75.2	-5.8	-14.1	-14.6
	46.4	0.0	32.8	-32.8	0.0	-46.4	-32.8
	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Circle	0	46.4	0.0
	22.5	42.8	17.7
	45	32.8	32.8
	67.5	17.7	42.8
	90	0.0	46.4
	112.5	-17.7	42.8
	135	-32.8	32.8
	157.5	-42.8	17.7
	180	-46.4	0.0
	202.5	-42.8	-17.7
	225	-32.8	-32.8
	247.5	-17.7	-42.8
	270	0.0	-46.4
	292.5	17.7	-42.8
	315	32.8	-32.8
	337.5	42.8	-17.7
	360	46.4	0.0

Collins	Na	Ca	Mg	TAL
	100	69	51	41
	540	39	51	41

Stiff diagram	5
Height	5.0
Ion	5.0
Ion	0.0
Ion	0.0
Ion	-5.0
Ion	-5.0
Ion	5.0
Ion	0
Ion	-5.0
Ion	-5.0
Ion	5.0
Ion	0
Ion	11.2
Ion	5.0

Cations	Ion%	Ca	19.30%	Mg	21.95%	Na+K	43.10%	Ca+Mg	41.25%
		Ca	38.60%	Mg	43.90%	Na+K	13.79%		
		Ca	-38.60%	Mg	-43.90%	Na+K	-13.79%		
		Ca	0.67	Mg	-60.55%	Na+K	38.02%		
		Ca	-0.6686	Mg	-1.0	Na+K	-78.05%		
		Ca	0.3802	Mg	0.0000	Na+K	0.3802		
		Ca	0.3802	Mg	-1.0	Na+K	0.3802		
		Ca	0.3802	Mg	0.0	Na+K	0.3802		

Anions	Ion%	Cl	4.26%	SO4	4.11%	HCO3+CO2	43.49%	Cl+SO4	8.36%
		Cl	8.51%	SO4	8.21%	HCO3+CO2	6.51%		
		Cl	-0.1474	SO4	0.0	HCO3+CO2	1.5846		
		Cl	0.0711	SO4	0.0	HCO3+CO2	0.0711		
		Cl	0.0711	SO4	1.0	HCO3+CO2	0.0711		

Cation equations			
Ca line	y =	x *	-1.7321 + -0.6686
	1.0634	-1.0	-0.6686
	-0.6686	0.0	
Mg line	y =	x *	0.0000 + 0.3802
	0.3802	-1.0	0.3802
	0.3802	0.0	
Na+K line	y =	x *	1.7321 + 1.4932
	-0.23889	-1	3.22521
	3.22521	1	

Anion equations			
Cl line	y =	x *	1.7321 + -0.1474
	-0.1474	0.0	1.5846
	1.5846	1.0	
SO4 line	y =	x *	0 + 0.0711
	0.0711	0.0	0.0711
	0.0711	1.0	
HCO3+CO2	y =	x *	-1.7321 + 0.2255
	1.9576	-1.0	-1.5065
	-1.5065	1.0	

Cation intersection equations			
Ca ∩ Mg	0.3802	-0.6055	
Ca ∩ Na+K	0.4123	-0.6241	
Mg ∩ Na+K	0.3802	-0.6426	
Cation	0.3909	-0.6241	

Anion intersection equations			
Cl ∩ SO4	0.0711	0.1262	
Cl ∩ HCO	0.0391	0.1077	
SO4 ∩ HCO	0.0711	0.0891	
Anion	0.0604	0.1077	

Lozenge intersection			
	y	x	
Na+K ∩ SO	0.8593	-0.3659	

**2023 - QUARTER #4**

# W-47

**Name:** W-47\_Q4 14

**Please enter the concentrations in milligrams per litre in the "Data" worksheet and select the row number here:**

Species	1	2	3	4	5	6	7
Ion	Calcium	Magnesium	Sulphate	Chloride	Alkalinity	Potassium	Sodium
mg/L	69	49	61	13	340	51	38
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Atomwt	40.08	24.32	96.06	35.45	96.06	39.10	23.00
Equivalents	3.44 meq/L	4.03 meq/L	1.27 meq/L	0.37 meq/L	7.08 meq/L	0.13 meq/L	1.65 meq/L
Maucha				Anions	Cations		Balance
				8.72 meq/L	9.26 meq/L		5.83%
				Total		17.97 meq/L	

FullArea	5885.85						
FullRadius	43.85						
IonArea	1127.67	1319.76	415.96	120.10	2318.45	42.72	541.18
IonRadius	67.21	78.65	24.79	7.16	138.17	2.55	32.25
Angle	7	6	5	4	3	1	0
StartAngle	315	270	225	180	135	45	0
IonAngle	337.5	292.5	247.5	202.5	157.5	67.5	22.5
EndAngle	360	315	270	225	180	90	45
x	y	x	y	x	y	x	y
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31.0	-31.0	0.0	-43.8	-31.0	-31.0	-43.8	0.0
62.1	-25.7	30.1	-72.7	-9.5	-22.9	-6.6	-2.7
43.8	0.0	31.0	-31.0	0.0	-43.8	-31.0	-43.8
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Circle	0	43.8	0.0
	22.5	40.5	16.8
	45	31.0	31.0
	67.5	16.8	40.5
	90	0.0	43.8
	112.5	-16.8	40.5
	135	-31.0	31.0
	157.5	-40.5	16.8
	180	-43.8	0.0
	202.5	-40.5	-16.8
	225	-31.0	-31.0
	247.5	-16.8	-40.5
	270	0.0	-43.8
	292.5	16.8	-40.5
	315	31.0	-31.0
	337.5	40.5	-16.8
	360	43.8	0.0

**Stiff diagram**

Height	5	
5.0	-1.78	0.4
5.0	0	0
0.0	-3.44	7.1
0.0	0	0
-5.0	-4.03	1.3
-5.0	0.0	0.0
5.0	-1.8	
0	-3.4	
-5.0	-4.0	
-5.0	1.3	
0	7.1	
5.0	0.4	

**Collins bar**

Cations	Ca	Mg	Na+K
	69	49	43.1
Anions	TAL	Cl	SO4
	340	13	61

**Piper diagram**

**Piper diagram**

**60° axes**

Cations	Ca	19.16%	0	38.32%	-38.32%	-0.66	-60.74%	38.84%	-77.58%	69.42%				
	Mg	22.42%	0	44.85%	-44.85%									
	Na+K	9.92%	-40.08%	19.84%	-19.84%									
	Ca+Mg	51.50%		103.00%										
Anions	Cl	2.04%	0	4.08%										
	SO4	7.07%	0	14.13%										
	HCO3+CO2	39.39%	10.61%	78.78%										
	Cl+SO4	48.50%		97.00%										
	Cl+SO4	9.11%												

**Cation equations**

Ca line	y =	x *	-1.7321	+	-0.6637
	1.0684	-1.0			
	-0.6637	0.0			

**Anion equations**

Cl line	y =	x *	1.7321	+	-0.0707
	-0.0707	0.0			
	1.6614	1.0			

**Mg line**

	y =	x *	0.0000	+	0.3884
	0.3884	-1.0			
	0.3884	0.0			

**SO4 line**

	y =	x *	0	+	0.1224
	0.1224	0.0			
	0.1224	1.0			

**Na+K line**

	y =	x *	1.7321	+	1.3884
	-0.34366	-1			
	3.12044	1			

**HCO3+CO2 line**

	y =	x *	-1.7321	+	0.3675
	2.0986	-1.0			
	-1.3645	1.0			

**Cation intersection equations**

Ca ∩ Mg	0.3884	-0.6074
Ca ∩ Na+K	0.3624	-0.5924
Mg ∩ Na+K	0.3884	-0.5774
Cationt	0.3797	-0.5924

**Anion intersection equations**

Cl ∩ SO4	0.1224	0.1115
Cl ∩ HCO	0.1484	0.1265
SO4 ∩ HCO	0.1224	0.1415
Aniont	0.1311	0.1265

**Lozenge intersection**

	y	x
Na+K ∩ SO	0.8780	-0.2947

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# W-112

**Name** W-112\_Q4      **Please enter the concentrations in milligrams per litre in the "Data" worksheet and select the row number here:**      15

<b>Spirit</b>	<b>6</b>	<b>7</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>2</b>	<b>1</b>
<b>Ion Calcium</b>	<b>Magnesium</b>	<b>Sulphate</b>	<b>Chloride</b>	<b>Alkalinity</b>	<b>Potassium</b>	<b>Sodium</b>	
mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
100	75	6.7	38	560	8.7	58	
<b>Valency</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>	
<b>AtomicWt</b>	40.08	24.32	96.06	35.45	96.06	39.10	23.00
<b>Equivalents</b>	4.99 meq/L	6.17 meq/L	0.14 meq/L	1.07 meq/L	11.66 meq/L	0.22 meq/L	2.52 meq/L
<b>Maucha</b>				<b>Anions</b>	<b>Cations</b>		<b>Balance</b>
				<b>12.87 meq/L</b>	<b>13.90 meq/L</b>		<b>7.42%</b>
				<b>Total</b>			
				<b>26.77 meq/L</b>			

<b>FullArea</b>	6648.14						
<b>FullRadius</b>	45.60						
<b>IonArea</b>	1239.09	1531.54	34.64	266.18	2895.18	55.26	626.26
<b>IonRadius</b>	69.48	85.88	1.94	14.93	162.35	3.10	35.12
<b>Angle</b>	7	6	5	4	3	1	0
<b>StartAngle</b>	315	270	225	180	135	45	0
<b>IonAngle</b>	337.5	292.5	247.5	202.5	157.5	67.5	22.5
<b>EndAngle</b>	360	315	270	225	180	90	45
<b>x</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>y</b>	-33.0	0.0	-46.6	-33.0	-33.0	33.0	33.0
<b>z</b>	64.2	-26.6	32.9	-79.3	-0.7	-1.8	-13.8
<b>z</b>	-46.6	0.0	33.0	-33.0	0.0	-46.6	-33.0
<b>z</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0

<b>Circle</b>	0	46.6	0.0
<b>Circle</b>	22.5	43.1	17.8
<b>Circle</b>	45	33.0	33.0
<b>Circle</b>	67.5	17.8	43.1
<b>Circle</b>	90	0.0	46.6
<b>Circle</b>	112.5	-17.8	43.1
<b>Circle</b>	135	-33.0	33.0
<b>Circle</b>	157.5	-43.1	17.8
<b>Circle</b>	180	-46.6	0.0
<b>Circle</b>	202.5	-43.1	-17.8
<b>Circle</b>	225	-33.0	-33.0
<b>Circle</b>	247.5	-17.8	-43.1
<b>Circle</b>	270	0.0	-46.6
<b>Circle</b>	292.5	17.8	-43.1
<b>Circle</b>	315	33.0	-33.0
<b>Circle</b>	337.5	43.1	-17.8
<b>Circle</b>	360	46.6	0.0

Stiff

Cations      Anions

Maucha

Cations      Anions

<b>Collins bar</b>	Ca	Mg	Na+K
<b>Cations</b>	100	75	66.7
<b>TAL</b>	560	38	6.7
<b>Anions</b>			

Piper

Increasing SO4 and Cl >  
Increasing Ca and Mg >

W-112\_Q4

Piper diagram

SO4

<b>Cations</b>	Ion%	Cation%	-Cation%	c	x	y	
<b>Ca</b>	18.64%	0	37.28%	-37.28%	-0.65	-60.31%	39.90%
<b>Mg</b>	23.04%	0	46.07%	-46.07%			-76.96%
<b>Na+K</b>	10.25%	-39.75%	20.50%	-20.50%			68.85%
<b>Ca+Mg</b>	41.68%		103.85%				

<b>Anions</b>	Cl	SO4	HCO3+CO2	Cl+SO4	Anion%	-Anion%	c	x	y	60° axes
<b>Cl</b>	4.00%	0	8.01%		4.00%	-8.01%	-0.14	8.53%	0.90%	
<b>SO4</b>	0.52%	0	1.04%		0.52%	-1.04%			0.90%	99.48%
<b>HCO3+CO2</b>	43.55%	6.45%	87.10%		43.55%	-87.10%			0.90%	11.17%
<b>Cl+SO4</b>	4.52%				4.52%					

<b>Cation equations</b>				<b>Anion equations</b>			
<b>Ca line</b>	y =	x *		<b>Cl line</b>	y =	x *	
	1.0864	-1.0	-1.7321		-0.1387	1.7321	-0.1387
	-0.6456	0.0	-0.6456		1.5934	1.0	1.0
<b>Mg line</b>	y =	x *		<b>SO4 line</b>	y =	x *	
	0.3990	-1.0	0.0000		0.0090	0.0	0.0090
	0.3990	0.0	0.3990		0.0090	1.0	1.0
<b>Na+K line</b>	y =	x *		<b>HCO3+CO2</b>	y =	x *	
	-0.35512	-1	1.7321		1.9555	-1.0	-1.7321
	3.10899	1	1.3769		-1.5086	1.0	0.2235

<b>Cation intersection equations</b>				<b>Anion intersection equations</b>			
<b>Ca ∩ Mg</b>	0.3990	-0.6031		<b>Cl ∩ SO4</b>	0.0090	0.0853	
<b>Ca ∩ Na+K</b>	0.3656	-0.5839		<b>Cl ∩ HCO</b>	0.0424	0.1046	
<b>Mg ∩ Na+K</b>	0.3990	-0.5646		<b>SO4 ∩ HCO</b>	0.0090	0.1238	
<b>Cation</b>	<b>0.3879</b>	<b>-0.5839</b>		<b>Anion</b>	<b>0.0201</b>	<b>0.1046</b>	

<b>Lozenge intersection</b>			
<b>Na+K ∩ SO</b>	0.8002	-0.3330	

Michael Silberbauer SilberbauerM@dwa.gov.au

Resource Quality Services

Department of Water Affairs and Forestry.





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**APPENDIX H -  
SLUDGE SAMPLE ANALYTICAL RESULTS**

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November 9, 2023

Mr. Jim Schneider  
HF Sinclair - HFPSR  
8505 South Texas Rd  
Anacortes, WA 98221

Dear Mr. Schneider,

On November 2nd, 1 sample was received by our laboratory and assigned our laboratory project number EV23110011. The project was identified as your Solid Waste Program. The sample identification and requested analyses are outlined on the attached chain of custody record.

No abnormalities or nonconformances were observed during the analyses of the project samples.

Please do not hesitate to call me if you have any questions or if I can be of further assistance.

Sincerely,

ALS Laboratory Group

Rob Greer  
Laboratory Director



**CERTIFICATE OF ANALYSIS**

CLIENT:	HF Sinclair - HFPSR 8505 South Texas Rd Anacortes, WA 98221	DATE:	11/9/2023
CLIENT CONTACT:	Jim Schneider	ALS JOB#:	EV23110011
CLIENT PROJECT:	Solid Waste Program	ALS SAMPLE#:	EV23110011-01
CLIENT SAMPLE ID	Biosolids-1123	DATE RECEIVED:	11/02/2023
		COLLECTION DATE:	11/1/2023 8:15:00 AM
		WDOE ACCREDITATION:	C601

**SAMPLE DATA RESULTS**

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS	ANALYSIS
						DATE	BY
TPH-Volatile Range	NWTPH-GX	U	42	1	MG/KG	11/02/2023	DLC
TPH-Diesel Range	NWTPH-DX	13000	180	5	MG/KG	11/06/2023	DHM
TPH-Oil Range	NWTPH-DX	13000	350	5	MG/KG	11/06/2023	DHM
Dichlorodifluoromethane	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
Chloromethane	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
Vinyl Chloride	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
Bromomethane	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
Chloroethane	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
Carbon Tetrachloride	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
Trichlorofluoromethane	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
Carbon Disulfide	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
Acetone	EPA-8260	U	50	1	UG/KG	11/02/2023	DLC
1,1-Dichloroethene	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
Methylene Chloride	EPA-8260	U	48	1	UG/KG	11/02/2023	DLC
Acrylonitrile	EPA-8260	U	50	1	UG/KG	11/02/2023	DLC
Methyl T-Butyl Ether	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
Trans-1,2-Dichloroethene	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
1,1-Dichloroethane	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
2-Butanone	EPA-8260	U	50	1	UG/KG	11/02/2023	DLC
Cis-1,2-Dichloroethene	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
2,2-Dichloropropane	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
Bromochloromethane	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
Chloroform	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
1,1,1-Trichloroethane	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
1,1-Dichloropropene	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
1,2-Dichloroethane	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
Benzene	EPA-8260	U	5.0	1	UG/KG	11/02/2023	DLC
Trichloroethene	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
1,2-Dichloropropane	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
Dibromomethane	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
Bromodichloromethane	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
Trans-1,3-Dichloropropene	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
4-Methyl-2-Pentanone	EPA-8260	U	50	1	UG/KG	11/02/2023	DLC
Toluene	EPA-8260	43	10	1	UG/KG	11/02/2023	DLC
Cis-1,3-Dichloropropene	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
1,1,2-Trichloroethane	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
2-Hexanone	EPA-8260	U	50	1	UG/KG	11/02/2023	DLC
1,3-Dichloropropane	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC



**CERTIFICATE OF ANALYSIS**

<b>CLIENT:</b>	HF Sinclair - HFPSR 8505 South Texas Rd Anacortes, WA 98221	<b>DATE:</b>	11/9/2023
<b>CLIENT CONTACT:</b>	Jim Schneider	<b>ALS JOB#:</b>	EV23110011
<b>CLIENT PROJECT:</b>	Solid Waste Program	<b>ALS SAMPLE#:</b>	EV23110011-01
<b>CLIENT SAMPLE ID</b>	Biosolids-1123	<b>DATE RECEIVED:</b>	11/02/2023
		<b>COLLECTION DATE:</b>	11/1/2023 8:15:00 AM
		<b>WDOE ACCREDITATION:</b>	C601

**SAMPLE DATA RESULTS**

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS	ANALYSIS
						DATE	BY
Tetrachloroethylene	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
Dibromochloromethane	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
1,2-Dibromoethane	EPA-8260	U	5.0	1	UG/KG	11/02/2023	DLC
Chlorobenzene	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
1,1,1,2-Tetrachloroethane	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
Ethylbenzene	EPA-8260	14	10	1	UG/KG	11/02/2023	DLC
m,p-Xylene	EPA-8260	64	20	1	UG/KG	11/02/2023	DLC
Styrene	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
o-Xylene	EPA-8260	15	10	1	UG/KG	11/02/2023	DLC
Bromoform	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
Isopropylbenzene	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
1,1,2,2-Tetrachloroethane	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
1,2,3-Trichloropropane	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
Bromobenzene	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
N-Propyl Benzene	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
2-Chlorotoluene	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
1,3,5-Trimethylbenzene	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
4-Chlorotoluene	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
T-Butyl Benzene	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
1,2,4-Trimethylbenzene	EPA-8260	15	10	1	UG/KG	11/02/2023	DLC
S-Butyl Benzene	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
P-Isopropyltoluene	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
1,3-Dichlorobenzene	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
1,4-Dichlorobenzene	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
N-Butylbenzene	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
1,2-Dichlorobenzene	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
1,2-Dibromo 3-Chloropropane	EPA-8260	U	50	1	UG/KG	11/02/2023	DLC
1,2,4-Trichlorobenzene	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
Hexachlorobutadiene	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
Naphthalene	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
1,2,3-Trichlorobenzene	EPA-8260	U	10	1	UG/KG	11/02/2023	DLC
Pyridine	EPA-8270	U	2000	2	UG/KG	11/09/2023	DBA
N-Nitrosodimethylamine	EPA-8270	U	1200	2	UG/KG	11/09/2023	DBA
Phenol	EPA-8270	U	1800	2	UG/KG	11/09/2023	DBA
Aniline	EPA-8270	U	2100	2	UG/KG	11/09/2023	DBA
Bis(2-Chloroethyl)Ether	EPA-8270	U	4300	2	UG/KG	11/09/2023	DBA
2-Chlorophenol	EPA-8270	U	4400	2	UG/KG	11/09/2023	DBA
1,3-Dichlorobenzene	EPA-8270	U	1200	2	UG/KG	11/09/2023	DBA
1,4-Dichlorobenzene	EPA-8270	U	1100	2	UG/KG	11/09/2023	DBA



**CERTIFICATE OF ANALYSIS**

<b>CLIENT:</b>	HF Sinclair - HFPSR 8505 South Texas Rd Anacortes, WA 98221	<b>DATE:</b>	11/9/2023
<b>CLIENT CONTACT:</b>	Jim Schneider	<b>ALS JOB#:</b>	EV23110011
<b>CLIENT PROJECT:</b>	Solid Waste Program	<b>ALS SAMPLE#:</b>	EV23110011-01
<b>CLIENT SAMPLE ID</b>	Biosolids-1123	<b>DATE RECEIVED:</b>	11/02/2023
		<b>COLLECTION DATE:</b>	11/1/2023 8:15:00 AM
		<b>WDOE ACCREDITATION:</b>	C601

**SAMPLE DATA RESULTS**

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS	ANALYSIS
						DATE	BY
Benzyl Alcohol	EPA-8270	U	2300	2	UG/KG	11/09/2023	DBA
1,2-Dichlorobenzene	EPA-8270	U	1100	2	UG/KG	11/09/2023	DBA
2-Methylphenol	EPA-8270	U	1500	2	UG/KG	11/09/2023	DBA
Bis(2-Chloroisopropyl)Ether	EPA-8270	U	5600	2	UG/KG	11/09/2023	DBA
3&4-Methylphenol	EPA-8270	U	1900	2	UG/KG	11/09/2023	DBA
N-Nitroso-Di-N-Propylamine	EPA-8270	U	4200	2	UG/KG	11/09/2023	DBA
Hexachloroethane	EPA-8270	U	910	2	UG/KG	11/09/2023	DBA
Nitrobenzene	EPA-8270	U	870	2	UG/KG	11/09/2023	DBA
Isophorone	EPA-8270	U	3100	2	UG/KG	11/09/2023	DBA
2-Nitrophenol	EPA-8270	U	1400	2	UG/KG	11/09/2023	DBA
2,4-Dimethylphenol	EPA-8270	U	2900	2	UG/KG	11/09/2023	DBA
Benzoic Acid	EPA-8270	U	32000	2	UG/KG	11/09/2023	DBA
Bis(2-Chloroethoxy)Methane	EPA-8270	U	5400	2	UG/KG	11/09/2023	DBA
2,4-Dichlorophenol	EPA-8270	U	11000	2	UG/KG	11/09/2023	DBA
1,2,4-Trichlorobenzene	EPA-8270	U	3200	2	UG/KG	11/09/2023	DBA
Naphthalene	EPA-8270	U	1200	2	UG/KG	11/09/2023	DBA
4-Chloroaniline	EPA-8270	U	25000	2	UG/KG	11/09/2023	DBA
2,6-Dichlorophenol	EPA-8270	U	8200	2	UG/KG	11/09/2023	DBA
Hexachlorobutadiene	EPA-8270	U	5800	2	UG/KG	11/09/2023	DBA
4-Chloro-3-Methylphenol	EPA-8270	U	14000	2	UG/KG	11/09/2023	DBA
2-Methylnaphthalene	EPA-8270	U	6800	2	UG/KG	11/09/2023	DBA
1-Methylnaphthalene	EPA-8270	U	7900	2	UG/KG	11/09/2023	DBA
Hexachlorocyclopentadiene	EPA-8270	U	1100	2	UG/KG	11/09/2023	DBA
2,4,6-Trichlorophenol	EPA-8270	U	1800	2	UG/KG	11/09/2023	DBA
2,4,5-Trichlorophenol	EPA-8270	U	1800	2	UG/KG	11/09/2023	DBA
2-Chloronaphthalene	EPA-8270	U	1400	2	UG/KG	11/09/2023	DBA
2-Nitroaniline	EPA-8270	U	850	2	UG/KG	11/09/2023	DBA
Acenaphthylene	EPA-8270	U	1100	2	UG/KG	11/09/2023	DBA
Dimethylphthalate	EPA-8270	U	1900	2	UG/KG	11/09/2023	DBA
2,6-Dinitrotoluene	EPA-8270	U	1700	2	UG/KG	11/09/2023	DBA
Acenaphthene	EPA-8270	U	1300	2	UG/KG	11/09/2023	DBA
3-Nitroaniline	EPA-8270	U	26000	2	UG/KG	11/09/2023	DBA
2,4-Dinitrophenol	EPA-8270	U	2400	2	UG/KG	11/09/2023	DBA
4-Nitrophenol	EPA-8270	U	2400	2	UG/KG	11/09/2023	DBA
Dibenzofuran	EPA-8270	U	1400	2	UG/KG	11/09/2023	DBA
2,4-Dinitrotoluene	EPA-8270	U	960	2	UG/KG	11/09/2023	DBA
2,3,4,6-Tetrachlorophenol	EPA-8270	U	2200	2	UG/KG	11/09/2023	DBA
Diethylphthalate	EPA-8270	U	1900	2	UG/KG	11/09/2023	DBA
Fluorene	EPA-8270	U	1600	2	UG/KG	11/09/2023	DBA



**CERTIFICATE OF ANALYSIS**

CLIENT:	HF Sinclair - HFPSR 8505 South Texas Rd Anacortes, WA 98221	DATE:	11/9/2023
CLIENT CONTACT:	Jim Schneider	ALS JOB#:	EV23110011
CLIENT PROJECT:	Solid Waste Program	ALS SAMPLE#:	EV23110011-01
CLIENT SAMPLE ID	Biosolids-1123	DATE RECEIVED:	11/02/2023
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		WDOE ACCREDITATION:	C601

**SAMPLE DATA RESULTS**

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
4-Chlorophenyl-Phenylether	EPA-8270	U	1900	2	UG/KG	11/09/2023	DBA
4-Nitroaniline	EPA-8270	U	5700	2	UG/KG	11/09/2023	DBA
4,6-Dinitro-2-Methylphenol	EPA-8270	U	1300	2	UG/KG	11/09/2023	DBA
N-Nitrosodiphenylamine	EPA-8270	U	1500	2	UG/KG	11/09/2023	DBA
Azobenzene	EPA-8270	U	2000	2	UG/KG	11/09/2023	DBA
4-Bromophenyl-Phenylether	EPA-8270	U	1600	2	UG/KG	11/09/2023	DBA
Hexachlorobenzene	EPA-8270	U	1600	2	UG/KG	11/09/2023	DBA
Pentachlorophenol	EPA-8270	U	6500	2	UG/KG	11/09/2023	DBA
Phenanthrene	EPA-8270	U	1200	2	UG/KG	11/09/2023	DBA
Anthracene	EPA-8270	U	1000	2	UG/KG	11/09/2023	DBA
Carbazole	EPA-8270	U	4800	2	UG/KG	11/09/2023	DBA
Di-N-Butylphthalate	EPA-8270	U	1500	2	UG/KG	11/09/2023	DBA
Fluoranthene	EPA-8270	U	1300	2	UG/KG	11/09/2023	DBA
Pyrene	EPA-8270	U	1300	2	UG/KG	11/09/2023	DBA
Butylbenzylphthalate	EPA-8270	U	1000	2	UG/KG	11/09/2023	DBA
3,3-Dichlorobenzidine	EPA-8270	U	7700	2	UG/KG	11/09/2023	DBA
Benzo[A]Anthracene	EPA-8270	U	1200	2	UG/KG	11/09/2023	DBA
Chrysene	EPA-8270	<b>2700</b>	1400	2	UG/KG	11/09/2023	DBA
Bis(2-Ethylhexyl)Phthalate	EPA-8270	U	990	2	UG/KG	11/09/2023	DBA
Di-N-Octylphthalate	EPA-8270	U	970	2	UG/KG	11/09/2023	DBA
Benzo[B]Fluoranthene	EPA-8270	U	990	2	UG/KG	11/09/2023	DBA
Benzo[K]Fluoranthene	EPA-8270	U	1900	2	UG/KG	11/09/2023	DBA
Benzo[A]Pyrene	EPA-8270	<b>11000</b>	860	2	UG/KG	11/09/2023	DBA
Indeno[1,2,3-Cd]Pyrene	EPA-8270	<b>1400</b>	1100	2	UG/KG	11/09/2023	DBA
Dibenz[A,H]Anthracene	EPA-8270	<b>1500</b>	990	2	UG/KG	11/09/2023	DBA
Benzo[G,H,I]Perylene	EPA-8270	<b>7800</b>	1500	2	UG/KG	11/09/2023	DBA
Mercury	EPA-7471	<b>2.8</b>	0.040	2	MG/KG	11/03/2023	RAL
Mercury (TCLP)	EPA-7470/1311	U	0.00020	1	MG/L	11/06/2023	RAL
Arsenic	EPA-6020	<b>33</b>	0.35	1	MG/KG	11/06/2023	RAL
Barium	EPA-6020	<b>450</b>	0.10	1	MG/KG	11/06/2023	RAL
Cadmium	EPA-6020	<b>0.62</b>	0.11	1	MG/KG	11/06/2023	RAL
Chromium	EPA-6020	<b>59</b>	0.18	1	MG/KG	11/06/2023	RAL
Lead	EPA-6020	<b>17</b>	0.11	1	MG/KG	11/06/2023	RAL
Selenium	EPA-6020	<b>130</b>	1.5	1	MG/KG	11/06/2023	RAL
Silver	EPA-6020	<b>1.3</b>	0.11	1	MG/KG	11/06/2023	RAL
Arsenic (TCLP)	EPA-6020/1311	U	0.031	6.25	MG/L	11/06/2023	RAL
Barium (TCLP)	EPA-6020/1311	<b>0.33</b>	0.031	6.25	MG/L	11/06/2023	RAL
Cadmium (TCLP)	EPA-6020/1311	U	0.031	6.25	MG/L	11/06/2023	RAL
Chromium (TCLP)	EPA-6020/1311	U	0.031	6.25	MG/L	11/06/2023	RAL

**CERTIFICATE OF ANALYSIS**

<b>CLIENT:</b>	HF Sinclair - HFPSR 8505 South Texas Rd Anacortes, WA 98221	<b>DATE:</b>	11/9/2023
<b>CLIENT CONTACT:</b>	Jim Schneider	<b>ALS JOB#:</b>	EV23110011
<b>CLIENT PROJECT:</b>	Solid Waste Program	<b>ALS SAMPLE#:</b>	EV23110011-01
<b>CLIENT SAMPLE ID</b>	Biosolids-1123	<b>DATE RECEIVED:</b>	11/02/2023
		<b>COLLECTION DATE:</b>	11/1/2023 8:15:00 AM
		<b>WDOE ACCREDITATION:</b>	C601

**SAMPLE DATA RESULTS**

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Lead (TCLP)	EPA-6020/1311	U	0.031	6.25	MG/L	11/06/2023	RAL
Selenium (TCLP)	EPA-6020/1311	<b>0.072</b>	0.031	6.25	MG/L	11/06/2023	RAL
Silver (TCLP)	EPA-6020/1311	U	0.031	6.25	MG/L	11/06/2023	RAL

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	<b>65.3</b>	11/02/2023	DLC
C25 5X Dilution	NWTPH-DX	<b>95.5</b>	11/06/2023	DHM
1,2-Dichloroethane-d4	EPA-8260	<b>155 GS1</b>	11/02/2023	DLC
Toluene-d8	EPA-8260	<b>95.6</b>	11/02/2023	DLC
4-Bromofluorobenzene	EPA-8260	<b>119</b>	11/02/2023	DLC
2-Fluorophenol 2X Dilution	EPA-8270	<b>48.3</b>	11/09/2023	DBA
Phenol-d5 2X Dilution	EPA-8270	<b>49.6</b>	11/09/2023	DBA
Nitrobenzene-d5 2X Dilution	EPA-8270	<b>39.7</b>	11/09/2023	DBA
2-Fluorobiphenyl 2X Dilution	EPA-8270	<b>38.8 SUR11</b>	11/09/2023	DBA
2,4,6-Tribromophenol 2X Dilution	EPA-8270	<b>40.7</b>	11/09/2023	DBA
Terphenyl-d14 2X Dilution	EPA-8270	<b>54.3</b>	11/09/2023	DBA

U - Analyte analyzed for but not detected at level above reporting limit.  
 SUR11 - Surrogate outside of control limits due to sporadic marginal failure. No corrective action taken.  
 GS1 - Surrogate outside of control limits due to matrix effect.  
 Chromatogram indicates that it is likely that sample contains weathered diesel and light oil/lube oil.  
 Gasoline range reporting limit raised due to low percent solids in sample.  
 Diesel range product results biased high due to oil range product overlap.



**CERTIFICATE OF ANALYSIS**

CLIENT: HF Sinclair - HFPSR  
 8505 South Texas Rd  
 Anacortes, WA 98221

CLIENT CONTACT: Jim Schneider  
 CLIENT PROJECT: Solid Waste Program

DATE: 11/9/2023  
 ALS SDG#: EV23110011  
 WDOE ACCREDITATION: C601

**LABORATORY BLANK RESULTS**

**MBG-110223S - Batch 203005 - Soil by NWTPH-GX**

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	MG/KG	42	11/02/2023	DLC

U - Analyte analyzed for but not detected at level above reporting limit.

**MB-110223S - Batch 203021 - Soil by NWTPH-DX**

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
TPH-Diesel Range	NWTPH-DX	U	MG/KG	25	11/02/2023	DHM
TPH-Oil Range	NWTPH-DX	U	MG/KG	50	11/02/2023	DHM

U - Analyte analyzed for but not detected at level above reporting limit.

**MB-110223S - Batch 202982 - Soil by EPA-8260**

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Dichlorodifluoromethane	EPA-8260	U	UG/KG	10	11/02/2023	DLC
Chloromethane	EPA-8260	U	UG/KG	10	11/02/2023	DLC
Vinyl Chloride	EPA-8260	U	UG/KG	10	11/02/2023	DLC
Bromomethane	EPA-8260	U	UG/KG	10	11/02/2023	DLC
Chloroethane	EPA-8260	U	UG/KG	10	11/02/2023	DLC
Carbon Tetrachloride	EPA-8260	U	UG/KG	10	11/02/2023	DLC
Trichlorofluoromethane	EPA-8260	U	UG/KG	10	11/02/2023	DLC
Carbon Disulfide	EPA-8260	U	UG/KG	10	11/02/2023	DLC
Acetone	EPA-8260	U	UG/KG	50	11/02/2023	DLC
1,1-Dichloroethene	EPA-8260	U	UG/KG	10	11/02/2023	DLC
Methylene Chloride	EPA-8260	U	UG/KG	20	11/02/2023	DLC
Acrylonitrile	EPA-8260	U	UG/KG	50	11/02/2023	DLC
Methyl T-Butyl Ether	EPA-8260	U	UG/KG	10	11/02/2023	DLC
Trans-1,2-Dichloroethene	EPA-8260	U	UG/KG	10	11/02/2023	DLC
1,1-Dichloroethane	EPA-8260	U	UG/KG	10	11/02/2023	DLC
2-Butanone	EPA-8260	U	UG/KG	50	11/02/2023	DLC
Cis-1,2-Dichloroethene	EPA-8260	U	UG/KG	10	11/02/2023	DLC
2,2-Dichloropropane	EPA-8260	U	UG/KG	10	11/02/2023	DLC
Bromochloromethane	EPA-8260	U	UG/KG	10	11/02/2023	DLC
Chloroform	EPA-8260	U	UG/KG	10	11/02/2023	DLC
1,1,1-Trichloroethane	EPA-8260	U	UG/KG	10	11/02/2023	DLC
1,1-Dichloropropene	EPA-8260	U	UG/KG	10	11/02/2023	DLC
1,2-Dichloroethane	EPA-8260	U	UG/KG	10	11/02/2023	DLC
Benzene	EPA-8260	U	UG/KG	5.0	11/02/2023	DLC
Trichloroethene	EPA-8260	U	UG/KG	10	11/02/2023	DLC



**CERTIFICATE OF ANALYSIS**

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 8505 South Texas Rd  
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CLIENT CONTACT: Jim Schneider  
 CLIENT PROJECT: Solid Waste Program

DATE: 11/9/2023  
 ALS SDG#: EV23110011  
 WDOE ACCREDITATION: C601

**LABORATORY BLANK RESULTS**

**MB-110223S - Batch 202982 - Soil by EPA-8260**

1,2-Dichloropropane	EPA-8260	U	UG/KG	10	11/02/2023	DLC
Dibromomethane	EPA-8260	U	UG/KG	10	11/02/2023	DLC
Bromodichloromethane	EPA-8260	U	UG/KG	10	11/02/2023	DLC
Trans-1,3-Dichloropropene	EPA-8260	U	UG/KG	10	11/02/2023	DLC
4-Methyl-2-Pentanone	EPA-8260	U	UG/KG	50	11/02/2023	DLC
Toluene	EPA-8260	U	UG/KG	10	11/02/2023	DLC
Cis-1,3-Dichloropropene	EPA-8260	U	UG/KG	10	11/02/2023	DLC
1,1,2-Trichloroethane	EPA-8260	U	UG/KG	10	11/02/2023	DLC
2-Hexanone	EPA-8260	U	UG/KG	50	11/02/2023	DLC
1,3-Dichloropropane	EPA-8260	U	UG/KG	10	11/02/2023	DLC
Tetrachloroethylene	EPA-8260	U	UG/KG	10	11/02/2023	DLC
Dibromochloromethane	EPA-8260	U	UG/KG	10	11/02/2023	DLC
1,2-Dibromoethane	EPA-8260	U	UG/KG	5.0	11/02/2023	DLC
Chlorobenzene	EPA-8260	U	UG/KG	10	11/02/2023	DLC
1,1,1,2-Tetrachloroethane	EPA-8260	U	UG/KG	10	11/02/2023	DLC
Ethylbenzene	EPA-8260	U	UG/KG	10	11/02/2023	DLC
m,p-Xylene	EPA-8260	U	UG/KG	20	11/02/2023	DLC
Styrene	EPA-8260	U	UG/KG	10	11/02/2023	DLC
o-Xylene	EPA-8260	U	UG/KG	10	11/02/2023	DLC
Bromoform	EPA-8260	U	UG/KG	10	11/02/2023	DLC
Isopropylbenzene	EPA-8260	U	UG/KG	10	11/02/2023	DLC
1,1,2,2-Tetrachloroethane	EPA-8260	U	UG/KG	10	11/02/2023	DLC
1,2,3-Trichloropropane	EPA-8260	U	UG/KG	10	11/02/2023	DLC
Bromobenzene	EPA-8260	U	UG/KG	10	11/02/2023	DLC
N-Propyl Benzene	EPA-8260	U	UG/KG	10	11/02/2023	DLC
2-Chlorotoluene	EPA-8260	U	UG/KG	10	11/02/2023	DLC
1,3,5-Trimethylbenzene	EPA-8260	U	UG/KG	10	11/02/2023	DLC
4-Chlorotoluene	EPA-8260	U	UG/KG	10	11/02/2023	DLC
T-Butyl Benzene	EPA-8260	U	UG/KG	10	11/02/2023	DLC
1,2,4-Trimethylbenzene	EPA-8260	U	UG/KG	10	11/02/2023	DLC
S-Butyl Benzene	EPA-8260	U	UG/KG	10	11/02/2023	DLC
P-Isopropyltoluene	EPA-8260	U	UG/KG	10	11/02/2023	DLC
1,3-Dichlorobenzene	EPA-8260	U	UG/KG	10	11/02/2023	DLC
1,4-Dichlorobenzene	EPA-8260	U	UG/KG	10	11/02/2023	DLC
N-Butylbenzene	EPA-8260	U	UG/KG	10	11/02/2023	DLC
1,2-Dichlorobenzene	EPA-8260	U	UG/KG	10	11/02/2023	DLC
1,2-Dibromo 3-Chloropropane	EPA-8260	U	UG/KG	50	11/02/2023	DLC
1,2,4-Trichlorobenzene	EPA-8260	U	UG/KG	10	11/02/2023	DLC
Hexachlorobutadiene	EPA-8260	U	UG/KG	10	11/02/2023	DLC
Naphthalene	EPA-8260	U	UG/KG	10	11/02/2023	DLC
1,2,3-Trichlorobenzene	EPA-8260	U	UG/KG	10	11/02/2023	DLC





**CERTIFICATE OF ANALYSIS**

CLIENT: HF Sinclair - HFPSR  
 8505 South Texas Rd  
 Anacortes, WA 98221

CLIENT CONTACT: Jim Schneider  
 CLIENT PROJECT: Solid Waste Program

DATE: 11/9/2023  
 ALS SDG#: EV23110011  
 WDOE ACCREDITATION: C601

**LABORATORY BLANK RESULTS**

**MB-110223S - Batch 202982 - Soil by EPA-8260**

U - Analyte analyzed for but not detected at level above reporting limit.

**MB-110623S - Batch 203208 - Soil by EPA-8270**

ANALYTE	METHOD	RESULTS	UNITS	REPORTING	ANALYSIS	ANALYSIS
				LIMITS	DATE	BY
Pyridine	EPA-8270	U	UG/KG	200	11/06/2023	DBA
N-Nitrosodimethylamine	EPA-8270	U	UG/KG	100	11/06/2023	DBA
Phenol	EPA-8270	U	UG/KG	100	11/06/2023	DBA
Aniline	EPA-8270	U	UG/KG	100	11/06/2023	DBA
Bis(2-Chloroethyl)Ether	EPA-8270	U	UG/KG	250	11/06/2023	DBA
2-Chlorophenol	EPA-8270	U	UG/KG	250	11/06/2023	DBA
1,3-Dichlorobenzene	EPA-8270	U	UG/KG	100	11/06/2023	DBA
1,4-Dichlorobenzene	EPA-8270	U	UG/KG	100	11/06/2023	DBA
Benzyl Alcohol	EPA-8270	U	UG/KG	100	11/06/2023	DBA
1,2-Dichlorobenzene	EPA-8270	U	UG/KG	100	11/06/2023	DBA
2-Methylphenol	EPA-8270	U	UG/KG	100	11/06/2023	DBA
Bis(2-Chloroisopropyl)Ether	EPA-8270	U	UG/KG	250	11/06/2023	DBA
3&4-Methylphenol	EPA-8270	U	UG/KG	100	11/06/2023	DBA
N-Nitroso-Di-N-Propylamine	EPA-8270	U	UG/KG	250	11/06/2023	DBA
Hexachloroethane	EPA-8270	U	UG/KG	100	11/06/2023	DBA
Nitrobenzene	EPA-8270	U	UG/KG	100	11/06/2023	DBA
Isophorone	EPA-8270	U	UG/KG	100	11/06/2023	DBA
2-Nitrophenol	EPA-8270	U	UG/KG	100	11/06/2023	DBA
2,4-Dimethylphenol	EPA-8270	U	UG/KG	100	11/06/2023	DBA
Benzoic Acid	EPA-8270	U	UG/KG	1000	11/06/2023	DBA
Bis(2-Chloroethoxy)Methane	EPA-8270	U	UG/KG	250	11/06/2023	DBA
2,4-Dichlorophenol	EPA-8270	U	UG/KG	500	11/06/2023	DBA
1,2,4-Trichlorobenzene	EPA-8270	U	UG/KG	100	11/06/2023	DBA
Naphthalene	EPA-8270	U	UG/KG	100	11/06/2023	DBA
4-Chloroaniline	EPA-8270	U	UG/KG	1000	11/06/2023	DBA
2,6-Dichlorophenol	EPA-8270	U	UG/KG	250	11/06/2023	DBA
Hexachlorobutadiene	EPA-8270	U	UG/KG	500	11/06/2023	DBA
4-Chloro-3-Methylphenol	EPA-8270	U	UG/KG	500	11/06/2023	DBA
2-Methylnaphthalene	EPA-8270	U	UG/KG	250	11/06/2023	DBA
1-Methylnaphthalene	EPA-8270	U	UG/KG	250	11/06/2023	DBA
Hexachlorocyclopentadiene	EPA-8270	U	UG/KG	100	11/06/2023	DBA
2,4,6-Trichlorophenol	EPA-8270	U	UG/KG	100	11/06/2023	DBA
2,4,5-Trichlorophenol	EPA-8270	U	UG/KG	100	11/06/2023	DBA
2-Chloronaphthalene	EPA-8270	U	UG/KG	100	11/06/2023	DBA
2-Nitroaniline	EPA-8270	U	UG/KG	100	11/06/2023	DBA
Acenaphthylene	EPA-8270	U	UG/KG	100	11/06/2023	DBA



**CERTIFICATE OF ANALYSIS**

CLIENT: HF Sinclair - HFPSR  
 8505 South Texas Rd  
 Anacortes, WA 98221

CLIENT CONTACT: Jim Schneider  
 CLIENT PROJECT: Solid Waste Program

DATE: 11/9/2023  
 ALS SDG#: EV23110011  
 WDOE ACCREDITATION: C601

**LABORATORY BLANK RESULTS**

**MB-110623S - Batch 203208 - Soil by EPA-8270**

Dimethylphthalate	EPA-8270	U	UG/KG	100	11/06/2023	DBA
2,6-Dinitrotoluene	EPA-8270	U	UG/KG	100	11/06/2023	DBA
Acenaphthene	EPA-8270	U	UG/KG	100	11/06/2023	DBA
3-Nitroaniline	EPA-8270	U	UG/KG	1000	11/06/2023	DBA
2,4-Dinitrophenol	EPA-8270	U	UG/KG	100	11/06/2023	DBA
4-Nitrophenol	EPA-8270	U	UG/KG	100	11/06/2023	DBA
Dibenzofuran	EPA-8270	U	UG/KG	100	11/06/2023	DBA
2,4-Dinitrotoluene	EPA-8270	U	UG/KG	100	11/06/2023	DBA
2,3,4,6-Tetrachlorophenol	EPA-8270	U	UG/KG	100	11/06/2023	DBA
Diethylphthalate	EPA-8270	U	UG/KG	100	11/06/2023	DBA
Fluorene	EPA-8270	U	UG/KG	100	11/06/2023	DBA
4-Chlorophenyl-Phenylether	EPA-8270	U	UG/KG	100	11/06/2023	DBA
4-Nitroaniline	EPA-8270	U	UG/KG	250	11/06/2023	DBA
4,6-Dinitro-2-Methylphenol	EPA-8270	U	UG/KG	290	11/06/2023	DBA
N-Nitrosodiphenylamine	EPA-8270	U	UG/KG	500	11/06/2023	DBA
Azobenzene	EPA-8270	U	UG/KG	100	11/06/2023	DBA
4-Bromophenyl-Phenylether	EPA-8270	U	UG/KG	100	11/06/2023	DBA
Hexachlorobenzene	EPA-8270	U	UG/KG	100	11/06/2023	DBA
Pentachlorophenol	EPA-8270	U	UG/KG	500	11/06/2023	DBA
Phenanthrene	EPA-8270	U	UG/KG	100	11/06/2023	DBA
Anthracene	EPA-8270	U	UG/KG	100	11/06/2023	DBA
Carbazole	EPA-8270	U	UG/KG	250	11/06/2023	DBA
Di-N-Butylphthalate	EPA-8270	U	UG/KG	100	11/06/2023	DBA
Fluoranthene	EPA-8270	U	UG/KG	100	11/06/2023	DBA
Pyrene	EPA-8270	U	UG/KG	150	11/06/2023	DBA
Butylbenzylphthalate	EPA-8270	U	UG/KG	100	11/06/2023	DBA
3,3-Dichlorobenzidine	EPA-8270	U	UG/KG	250	11/06/2023	DBA
Benzo[A]Anthracene	EPA-8270	U	UG/KG	100	11/06/2023	DBA
Chrysene	EPA-8270	U	UG/KG	100	11/06/2023	DBA
Bis(2-Ethylhexyl)Phthalate	EPA-8270	U	UG/KG	100	11/06/2023	DBA
Di-N-Octylphthalate	EPA-8270	U	UG/KG	100	11/06/2023	DBA
Benzo[B]Fluoranthene	EPA-8270	U	UG/KG	100	11/06/2023	DBA
Benzo[K]Fluoranthene	EPA-8270	U	UG/KG	100	11/06/2023	DBA
Benzo[A]Pyrene	EPA-8270	U	UG/KG	100	11/06/2023	DBA
Indeno[1,2,3-Cd]Pyrene	EPA-8270	U	UG/KG	100	11/06/2023	DBA
Dibenz[A,H]Anthracene	EPA-8270	U	UG/KG	100	11/06/2023	DBA
Benzo[G,H,I]Perylene	EPA-8270	U	UG/KG	100	11/06/2023	DBA

U - Analyte analyzed for but not detected at level above reporting limit.



**CERTIFICATE OF ANALYSIS**

CLIENT:	HF Sinclair - HFPSR 8505 South Texas Rd Anacortes, WA 98221	DATE:	11/9/2023
CLIENT CONTACT:	Jim Schneider	ALS SDG#:	EV23110011
CLIENT PROJECT:	Solid Waste Program	WDOE ACCREDITATION:	C601

**LABORATORY BLANK RESULTS**

**MBLK-R450970 - Batch R450970 - Soil by EPA-7471**

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Mercury	EPA-7471	U	MG/KG	0.020	11/03/2023	RAL

U - Analyte analyzed for but not detected at level above reporting limit.

**MBLK-R451218 - Batch R451218 - TCLP Extract by EPA-7470**

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Mercury	EPA-7470	U	MG/L	0.00020	11/06/2023	RAL

U - Analyte analyzed for but not detected at level above reporting limit.

**MB-110623S - Batch 203077 - Soil by EPA-6020**

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Arsenic	EPA-6020	U	MG/KG	0.20	11/06/2023	RAL
Barium	EPA-6020	U	MG/KG	0.12	11/06/2023	RAL
Cadmium	EPA-6020	U	MG/KG	0.10	11/06/2023	RAL
Chromium	EPA-6020	U	MG/KG	0.10	11/06/2023	RAL
Lead	EPA-6020	U	MG/KG	0.10	11/06/2023	RAL
Selenium	EPA-6020	U	MG/KG	1.0	11/06/2023	RAL
Silver	EPA-6020	U	MG/KG	0.10	11/06/2023	RAL

U - Analyte analyzed for but not detected at level above reporting limit.

**MBLK-R451315 - Batch R451315 - TCLP Extract by EPA-6020**

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Arsenic	EPA-6020	U	MG/L	0.0050	11/06/2023	RAL
Barium	EPA-6020	U	MG/L	0.0050	11/06/2023	RAL
Cadmium	EPA-6020	U	MG/L	0.0050	11/06/2023	RAL
Chromium	EPA-6020	U	MG/L	0.0050	11/06/2023	RAL
Lead	EPA-6020	U	MG/L	0.0050	11/06/2023	RAL
Selenium	EPA-6020	U	MG/L	0.0050	11/06/2023	RAL
Silver	EPA-6020	U	MG/L	0.0050	11/06/2023	RAL

U - Analyte analyzed for but not detected at level above reporting limit.



**CERTIFICATE OF ANALYSIS**

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 8505 South Texas Rd  
 Anacortes, WA 98221

CLIENT CONTACT: Jim Schneider  
 CLIENT PROJECT: Solid Waste Program

DATE: 11/9/2023  
 ALS SDG#: EV23110011  
 WDOE ACCREDITATION: C601

**LABORATORY CONTROL SAMPLE RESULTS**

**ALS Test Batch ID: 203005 - Soil by NWTPH-GX**

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
TPH-Volatile Range - BS	NWTPH-GX	103			66.5	122.7	11/02/2023	DLC
TPH-Volatile Range - BSD	NWTPH-GX	101	1		66.5	122.7	11/02/2023	DLC

**ALS Test Batch ID: 203021 - Soil by NWTPH-DX**

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
TPH-Diesel Range - BS	NWTPH-DX	92.4			75.5	122.1	11/02/2023	DHM
TPH-Diesel Range - BSD	NWTPH-DX	88.9	4		75.5	122.1	11/02/2023	DHM

**ALS Test Batch ID: 202982 - Soil by EPA-8260**

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
Dichlorodifluoromethane - BS	EPA-8260	82.6			50	150	11/02/2023	DLC
Dichlorodifluoromethane - BSD	EPA-8260	77.9	6		50	150	11/02/2023	DLC
Chloromethane - BS	EPA-8260	83.3			50	150	11/02/2023	DLC
Chloromethane - BSD	EPA-8260	78.8	6		50	150	11/02/2023	DLC
Vinyl Chloride - BS	EPA-8260	87.2			50	150	11/02/2023	DLC
Vinyl Chloride - BSD	EPA-8260	81.5	7		50	150	11/02/2023	DLC
Bromomethane - BS	EPA-8260	88.4			50	150	11/02/2023	DLC
Bromomethane - BSD	EPA-8260	84.7	4		50	150	11/02/2023	DLC
Chloroethane - BS	EPA-8260	91.4			50	150	11/02/2023	DLC
Chloroethane - BSD	EPA-8260	86.0	6		50	150	11/02/2023	DLC
Carbon Tetrachloride - BS	EPA-8260	82.8			50	150	11/02/2023	DLC
Carbon Tetrachloride - BSD	EPA-8260	78.3	6		50	150	11/02/2023	DLC
Trichlorofluoromethane - BS	EPA-8260	85.1			50	150	11/02/2023	DLC
Trichlorofluoromethane - BSD	EPA-8260	79.8	6		50	150	11/02/2023	DLC
Carbon Disulfide - BS	EPA-8260	88.9			50	150	11/02/2023	DLC
Carbon Disulfide - BSD	EPA-8260	83.7	6		50	150	11/02/2023	DLC
Acetone - BS	EPA-8260	95.5			50	150	11/02/2023	DLC
Acetone - BSD	EPA-8260	85.1	11		50	150	11/02/2023	DLC
1,1-Dichloroethene - BS	EPA-8260	89.4			70	130	11/02/2023	DLC
1,1-Dichloroethene - BSD	EPA-8260	83.9	6		70	130	11/02/2023	DLC
Methylene Chloride - BS	EPA-8260	104			50	150	11/02/2023	DLC
Methylene Chloride - BSD	EPA-8260	93.6	10		50	150	11/02/2023	DLC
Acrylonitrile - BS	EPA-8260	90.7			50	150	11/02/2023	DLC
Acrylonitrile - BSD	EPA-8260	85.7	6		50	150	11/02/2023	DLC
Methyl T-Butyl Ether - BS	EPA-8260	94.3			50	150	11/02/2023	DLC
Methyl T-Butyl Ether - BSD	EPA-8260	88.6	6		50	150	11/02/2023	DLC
Trans-1,2-Dichloroethene - BS	EPA-8260	92.8			50	150	11/02/2023	DLC



**CERTIFICATE OF ANALYSIS**

**CLIENT:** HF Sinclair - HFPSR  
8505 South Texas Rd  
Anacortes, WA 98221

**DATE:** 11/9/2023  
**ALS SDG#:** EV23110011  
**WDOE ACCREDITATION:** C601

**CLIENT CONTACT:** Jim Schneider  
**CLIENT PROJECT:** Solid Waste Program

**LABORATORY CONTROL SAMPLE RESULTS**

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
Trans-1,2-Dichloroethene - BSD	EPA-8260	87.8	6		50	150	11/02/2023	DLC
1,1-Dichloroethane - BS	EPA-8260	91.2			50	150	11/02/2023	DLC
1,1-Dichloroethane - BSD	EPA-8260	86.2	6		50	150	11/02/2023	DLC
2-Butanone - BS	EPA-8260	92.4			50	150	11/02/2023	DLC
2-Butanone - BSD	EPA-8260	81.2	13		50	150	11/02/2023	DLC
Cis-1,2-Dichloroethene - BS	EPA-8260	94.2			50	150	11/02/2023	DLC
Cis-1,2-Dichloroethene - BSD	EPA-8260	89.2	5		50	150	11/02/2023	DLC
2,2-Dichloropropane - BS	EPA-8260	94.2			50	150	11/02/2023	DLC
2,2-Dichloropropane - BSD	EPA-8260	88.4	6		50	150	11/02/2023	DLC
Bromochloromethane - BS	EPA-8260	87.2			50	150	11/02/2023	DLC
Bromochloromethane - BSD	EPA-8260	81.8	6		50	150	11/02/2023	DLC
Chloroform - BS	EPA-8260	93.0			50	150	11/02/2023	DLC
Chloroform - BSD	EPA-8260	87.5	6		50	150	11/02/2023	DLC
1,1,1-Trichloroethane - BS	EPA-8260	91.8			50	150	11/02/2023	DLC
1,1,1-Trichloroethane - BSD	EPA-8260	87.4	5		50	150	11/02/2023	DLC
1,1-Dichloropropene - BS	EPA-8260	91.1			50	150	11/02/2023	DLC
1,1-Dichloropropene - BSD	EPA-8260	86.0	6		50	150	11/02/2023	DLC
1,2-Dichloroethane - BS	EPA-8260	83.8			50	150	11/02/2023	DLC
1,2-Dichloroethane - BSD	EPA-8260	77.1	8		50	150	11/02/2023	DLC
Benzene - BS	EPA-8260	84.3			75	138	11/02/2023	DLC
Benzene - BSD	EPA-8260	78.2	8		75	138	11/02/2023	DLC
Trichloroethene - BS	EPA-8260	87.0			75	136	11/02/2023	DLC
Trichloroethene - BSD	EPA-8260	80.6	8		75	136	11/02/2023	DLC
1,2-Dichloropropane - BS	EPA-8260	87.8			50	150	11/02/2023	DLC
1,2-Dichloropropane - BSD	EPA-8260	81.5	7		50	150	11/02/2023	DLC
Dibromomethane - BS	EPA-8260	90.7			50	150	11/02/2023	DLC
Dibromomethane - BSD	EPA-8260	83.6	8		50	150	11/02/2023	DLC
Bromodichloromethane - BS	EPA-8260	90.8			50	150	11/02/2023	DLC
Bromodichloromethane - BSD	EPA-8260	84.4	7		50	150	11/02/2023	DLC
Trans-1,3-Dichloropropene - BS	EPA-8260	97.4			50	150	11/02/2023	DLC
Trans-1,3-Dichloropropene - BSD	EPA-8260	88.5	10		50	150	11/02/2023	DLC
4-Methyl-2-Pentanone - BS	EPA-8260	90.2			50	150	11/02/2023	DLC
4-Methyl-2-Pentanone - BSD	EPA-8260	80.6	11		50	150	11/02/2023	DLC
Toluene - BS	EPA-8260	86.6			71.6	122.1	11/02/2023	DLC
Toluene - BSD	EPA-8260	81.4	6		71.6	122.1	11/02/2023	DLC
Cis-1,3-Dichloropropene - BS	EPA-8260	91.1			50	150	11/02/2023	DLC
Cis-1,3-Dichloropropene - BSD	EPA-8260	84.2	8		50	150	11/02/2023	DLC
1,1,2-Trichloroethane - BS	EPA-8260	98.0			50	150	11/02/2023	DLC
1,1,2-Trichloroethane - BSD	EPA-8260	86.9	12		50	150	11/02/2023	DLC
2-Hexanone - BS	EPA-8260	92.0			50	150	11/02/2023	DLC



**CERTIFICATE OF ANALYSIS**

**CLIENT:** HF Sinclair - HFPSR  
8505 South Texas Rd  
Anacortes, WA 98221

**DATE:** 11/9/2023  
**ALS SDG#:** EV23110011  
**WDOE ACCREDITATION:** C601

**CLIENT CONTACT:** Jim Schneider  
**CLIENT PROJECT:** Solid Waste Program

**LABORATORY CONTROL SAMPLE RESULTS**

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
2-Hexanone - BSD	EPA-8260	82.2	11		50	150	11/02/2023	DLC
1,3-Dichloropropane - BS	EPA-8260	94.3			50	150	11/02/2023	DLC
1,3-Dichloropropane - BSD	EPA-8260	86.1	9		50	150	11/02/2023	DLC
Tetrachloroethylene - BS	EPA-8260	92.0			50	150	11/02/2023	DLC
Tetrachloroethylene - BSD	EPA-8260	84.5	9		50	150	11/02/2023	DLC
Dibromochloromethane - BS	EPA-8260	99.6			50	150	11/02/2023	DLC
Dibromochloromethane - BSD	EPA-8260	91.2	9		50	150	11/02/2023	DLC
1,2-Dibromoethane - BS	EPA-8260	97.9			50	150	11/02/2023	DLC
1,2-Dibromoethane - BSD	EPA-8260	89.3	9		50	150	11/02/2023	DLC
Chlorobenzene - BS	EPA-8260	93.9			79	128	11/02/2023	DLC
Chlorobenzene - BSD	EPA-8260	86.2	9		79	128	11/02/2023	DLC
1,1,1,2-Tetrachloroethane - BS	EPA-8260	96.4			50	150	11/02/2023	DLC
1,1,1,2-Tetrachloroethane - BSD	EPA-8260	89.0	8		50	150	11/02/2023	DLC
Ethylbenzene - BS	EPA-8260	91.1			50	150	11/02/2023	DLC
Ethylbenzene - BSD	EPA-8260	84.3	8		50	150	11/02/2023	DLC
m,p-Xylene - BS	EPA-8260	92.9			50	150	11/02/2023	DLC
m,p-Xylene - BSD	EPA-8260	85.7	8		50	150	11/02/2023	DLC
Styrene - BS	EPA-8260	97.0			50	150	11/02/2023	DLC
Styrene - BSD	EPA-8260	89.4	8		50	150	11/02/2023	DLC
o-Xylene - BS	EPA-8260	93.2			50	150	11/02/2023	DLC
o-Xylene - BSD	EPA-8260	85.6	8		50	150	11/02/2023	DLC
Bromoform - BS	EPA-8260	90.8			50	150	11/02/2023	DLC
Bromoform - BSD	EPA-8260	85.1	6		50	150	11/02/2023	DLC
Isopropylbenzene - BS	EPA-8260	92.8			50	150	11/02/2023	DLC
Isopropylbenzene - BSD	EPA-8260	86.1	8		50	150	11/02/2023	DLC
1,1,2,2-Tetrachloroethane - BS	EPA-8260	101			50	150	11/02/2023	DLC
1,1,2,2-Tetrachloroethane - BSD	EPA-8260	91.6	10		50	150	11/02/2023	DLC
1,2,3-Trichloropropane - BS	EPA-8260	99.2			50	150	11/02/2023	DLC
1,2,3-Trichloropropane - BSD	EPA-8260	90.0	10		50	150	11/02/2023	DLC
Bromobenzene - BS	EPA-8260	101			50	150	11/02/2023	DLC
Bromobenzene - BSD	EPA-8260	93.0	8		50	150	11/02/2023	DLC
N-Propyl Benzene - BS	EPA-8260	95.7			50	150	11/02/2023	DLC
N-Propyl Benzene - BSD	EPA-8260	88.6	8		50	150	11/02/2023	DLC
2-Chlorotoluene - BS	EPA-8260	96.7			50	150	11/02/2023	DLC
2-Chlorotoluene - BSD	EPA-8260	89.4	8		50	150	11/02/2023	DLC
1,3,5-Trimethylbenzene - BS	EPA-8260	97.3			50	150	11/02/2023	DLC
1,3,5-Trimethylbenzene - BSD	EPA-8260	90.8	7		50	150	11/02/2023	DLC
4-Chlorotoluene - BS	EPA-8260	98.0			50	150	11/02/2023	DLC
4-Chlorotoluene - BSD	EPA-8260	90.0	9		50	150	11/02/2023	DLC
T-Butyl Benzene - BS	EPA-8260	99.7			50	150	11/02/2023	DLC



**CERTIFICATE OF ANALYSIS**

**CLIENT:** HF Sinclair - HFPSR  
8505 South Texas Rd  
Anacortes, WA 98221

**DATE:** 11/9/2023  
**ALS SDG#:** EV23110011  
**WDOE ACCREDITATION:** C601

**CLIENT CONTACT:** Jim Schneider  
**CLIENT PROJECT:** Solid Waste Program

**LABORATORY CONTROL SAMPLE RESULTS**

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
T-Butyl Benzene - BSD	EPA-8260	92.1	8		50	150	11/02/2023	DLC
1,2,4-Trimethylbenzene - BS	EPA-8260	97.8			50	150	11/02/2023	DLC
1,2,4-Trimethylbenzene - BSD	EPA-8260	90.6	8		50	150	11/02/2023	DLC
S-Butyl Benzene - BS	EPA-8260	97.2			50	150	11/02/2023	DLC
S-Butyl Benzene - BSD	EPA-8260	89.1	9		50	150	11/02/2023	DLC
P-Isopropyltoluene - BS	EPA-8260	99.3			50	150	11/02/2023	DLC
P-Isopropyltoluene - BSD	EPA-8260	90.9	9		50	150	11/02/2023	DLC
1,3-Dichlorobenzene - BS	EPA-8260	101			50	150	11/02/2023	DLC
1,3-Dichlorobenzene - BSD	EPA-8260	93.0	9		50	150	11/02/2023	DLC
1,4-Dichlorobenzene - BS	EPA-8260	99.0			50	150	11/02/2023	DLC
1,4-Dichlorobenzene - BSD	EPA-8260	91.9	7		50	150	11/02/2023	DLC
N-Butylbenzene - BS	EPA-8260	101			50	150	11/02/2023	DLC
N-Butylbenzene - BSD	EPA-8260	93.6	8		50	150	11/02/2023	DLC
1,2-Dichlorobenzene - BS	EPA-8260	99.1			50	150	11/02/2023	DLC
1,2-Dichlorobenzene - BSD	EPA-8260	90.8	9		50	150	11/02/2023	DLC
1,2-Dibromo 3-Chloropropane - BS	EPA-8260	101			50	150	11/02/2023	DLC
1,2-Dibromo 3-Chloropropane - BSD	EPA-8260	90.1	11		50	150	11/02/2023	DLC
1,2,4-Trichlorobenzene - BS	EPA-8260	115			50	150	11/02/2023	DLC
1,2,4-Trichlorobenzene - BSD	EPA-8260	99.6	15		50	150	11/02/2023	DLC
Hexachlorobutadiene - BS	EPA-8260	107			50	150	11/02/2023	DLC
Hexachlorobutadiene - BSD	EPA-8260	97.1	10		50	150	11/02/2023	DLC
Naphthalene - BS	EPA-8260	97.8			50	150	11/02/2023	DLC
Naphthalene - BSD	EPA-8260	86.5	12		50	150	11/02/2023	DLC
1,2,3-Trichlorobenzene - BS	EPA-8260	108			50	150	11/02/2023	DLC
1,2,3-Trichlorobenzene - BSD	EPA-8260	93.0	15		50	150	11/02/2023	DLC

**ALS Test Batch ID: 203208 - Soil by EPA-8270**

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
Pyridine - BS	EPA-8270	64.2			20	150	11/06/2023	DBA
Pyridine - BSD	EPA-8270	64.0	0		20	150	11/06/2023	DBA
N-Nitrosodimethylamine - BS	EPA-8270	76.7			20	150	11/06/2023	DBA
N-Nitrosodimethylamine - BSD	EPA-8270	77.1	0		20	150	11/06/2023	DBA
Phenol - BS	EPA-8270	82.0			36.1	131	11/06/2023	DBA
Phenol - BSD	EPA-8270	88.9	8		36.1	131	11/06/2023	DBA
Aniline - BS	EPA-8270	74.2			20	150	11/06/2023	DBA
Aniline - BSD	EPA-8270	81.7	10		20	150	11/06/2023	DBA
Bis(2-Chloroethyl)Ether - BS	EPA-8270	68.4			20	150	11/06/2023	DBA
Bis(2-Chloroethyl)Ether - BSD	EPA-8270	70.1	3		20	150	11/06/2023	DBA
2-Chlorophenol - BS	EPA-8270	83.1			59.9	111	11/06/2023	DBA



**CERTIFICATE OF ANALYSIS**

CLIENT: HF Sinclair - HFPSR  
 8505 South Texas Rd  
 Anacortes, WA 98221

CLIENT CONTACT: Jim Schneider  
 CLIENT PROJECT: Solid Waste Program

DATE: 11/9/2023  
 ALS SDG#: EV23110011  
 WDOE ACCREDITATION: C601

**LABORATORY CONTROL SAMPLE RESULTS**

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
2-Chlorophenol - BSD	EPA-8270	89.3	7		59.9	111	11/06/2023	DBA
1,3-Dichlorobenzene - BS	EPA-8270	74.0			20	150	11/06/2023	DBA
1,3-Dichlorobenzene - BSD	EPA-8270	77.8	5		20	150	11/06/2023	DBA
1,4-Dichlorobenzene - BS	EPA-8270	73.1			44.3	122	11/06/2023	DBA
1,4-Dichlorobenzene - BSD	EPA-8270	75.7	4		44.3	122	11/06/2023	DBA
Benzyl Alcohol - BS	EPA-8270	93.4			20	150	11/06/2023	DBA
Benzyl Alcohol - BSD	EPA-8270	102	9		20	150	11/06/2023	DBA
1,2-Dichlorobenzene - BS	EPA-8270	74.8			20	150	11/06/2023	DBA
1,2-Dichlorobenzene - BSD	EPA-8270	79.2	6		20	150	11/06/2023	DBA
2-Methylphenol - BS	EPA-8270	84.5			20	150	11/06/2023	DBA
2-Methylphenol - BSD	EPA-8270	92.9	9		20	150	11/06/2023	DBA
Bis(2-Chloroisopropyl)Ether - BS	EPA-8270	75.7			20	150	11/06/2023	DBA
Bis(2-Chloroisopropyl)Ether - BSD	EPA-8270	81.9	8		20	150	11/06/2023	DBA
3&4-Methylphenol - BS	EPA-8270	86.8			20	150	11/06/2023	DBA
3&4-Methylphenol - BSD	EPA-8270	99.0	13		20	150	11/06/2023	DBA
N-Nitroso-Di-N-Propylamine - BS	EPA-8270	85.3			31.6	134	11/06/2023	DBA
N-Nitroso-Di-N-Propylamine - BSD	EPA-8270	97.9	14		31.6	134	11/06/2023	DBA
Hexachloroethane - BS	EPA-8270	74.9			20	150	11/06/2023	DBA
Hexachloroethane - BSD	EPA-8270	78.4	5		20	150	11/06/2023	DBA
Nitrobenzene - BS	EPA-8270	83.1			20	150	11/06/2023	DBA
Nitrobenzene - BSD	EPA-8270	87.8	5		20	150	11/06/2023	DBA
Isophorone - BS	EPA-8270	68.0			20	150	11/06/2023	DBA
Isophorone - BSD	EPA-8270	73.2	7		20	150	11/06/2023	DBA
2-Nitrophenol - BS	EPA-8270	81.0			20	150	11/06/2023	DBA
2-Nitrophenol - BSD	EPA-8270	86.0	6		20	150	11/06/2023	DBA
2,4-Dimethylphenol - BS	EPA-8270	90.1			20	150	11/06/2023	DBA
2,4-Dimethylphenol - BSD	EPA-8270	97.1	8		20	150	11/06/2023	DBA
Bis(2-Chloroethoxy)Methane - BS	EPA-8270	83.0			20	150	11/06/2023	DBA
Bis(2-Chloroethoxy)Methane - BSD	EPA-8270	87.9	6		20	150	11/06/2023	DBA
2,4-Dichlorophenol - BS	EPA-8270	89.6			20	150	11/06/2023	DBA
2,4-Dichlorophenol - BSD	EPA-8270	96.9	8		20	150	11/06/2023	DBA
1,2,4-Trichlorobenzene - BS	EPA-8270	79.6			44.6	122	11/06/2023	DBA
1,2,4-Trichlorobenzene - BSD	EPA-8270	81.7	3		44.6	122	11/06/2023	DBA
Naphthalene - BS	EPA-8270	79.2			20	150	11/06/2023	DBA
Naphthalene - BSD	EPA-8270	83.5	5		20	150	11/06/2023	DBA
4-Chloroaniline - BS	EPA-8270	70.1			20	150	11/06/2023	DBA
4-Chloroaniline - BSD	EPA-8270	74.4	6		20	150	11/06/2023	DBA
Hexachlorobutadiene - BS	EPA-8270	78.6			20	150	11/06/2023	DBA
Hexachlorobutadiene - BSD	EPA-8270	78.7	0		20	150	11/06/2023	DBA
4-Chloro-3-Methylphenol - BS	EPA-8270	98.0			49.2	135	11/06/2023	DBA





**CERTIFICATE OF ANALYSIS**

CLIENT: HF Sinclair - HFPSR  
 8505 South Texas Rd  
 Anacortes, WA 98221

CLIENT CONTACT: Jim Schneider  
 CLIENT PROJECT: Solid Waste Program

DATE: 11/9/2023  
 ALS SDG#: EV23110011  
 WDOE ACCREDITATION: C601

**LABORATORY CONTROL SAMPLE RESULTS**

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
4-Chloro-3-Methylphenol - BSD	EPA-8270	107	9		49.2	135	11/06/2023	DBA
2-Methylnaphthalene - BS	EPA-8270	84.9			20	150	11/06/2023	DBA
2-Methylnaphthalene - BSD	EPA-8270	90.7	7		20	150	11/06/2023	DBA
1-Methylnaphthalene - BS	EPA-8270	83.2			20	150	11/06/2023	DBA
1-Methylnaphthalene - BSD	EPA-8270	91.0	9		20	150	11/06/2023	DBA
Hexachlorocyclopentadiene - BS	EPA-8270	63.5			20	150	11/06/2023	DBA
Hexachlorocyclopentadiene - BSD	EPA-8270	64.8	2		20	150	11/06/2023	DBA
2,4,6-Trichlorophenol - BS	EPA-8270	80.4			20	150	11/06/2023	DBA
2,4,6-Trichlorophenol - BSD	EPA-8270	84.8	5		20	150	11/06/2023	DBA
2,4,5-Trichlorophenol - BS	EPA-8270	88.1			20	150	11/06/2023	DBA
2,4,5-Trichlorophenol - BSD	EPA-8270	94.6	7		20	150	11/06/2023	DBA
2-Chloronaphthalene - BS	EPA-8270	81.1			20	150	11/06/2023	DBA
2-Chloronaphthalene - BSD	EPA-8270	84.8	5		20	150	11/06/2023	DBA
2-Nitroaniline - BS	EPA-8270	85.2			20	150	11/06/2023	DBA
2-Nitroaniline - BSD	EPA-8270	92.8	9		20	150	11/06/2023	DBA
Acenaphthylene - BS	EPA-8270	85.7			20	150	11/06/2023	DBA
Acenaphthylene - BSD	EPA-8270	91.4	6		20	150	11/06/2023	DBA
Dimethylphthalate - BS	EPA-8270	87.1			20	150	11/06/2023	DBA
Dimethylphthalate - BSD	EPA-8270	93.6	7		20	150	11/06/2023	DBA
2,6-Dinitrotoluene - BS	EPA-8270	87.0			20	150	11/06/2023	DBA
2,6-Dinitrotoluene - BSD	EPA-8270	96.4	10		20	150	11/06/2023	DBA
Acenaphthene - BS	EPA-8270	80.8			49.3	117	11/06/2023	DBA
Acenaphthene - BSD	EPA-8270	85.4	6		49.3	117	11/06/2023	DBA
3-Nitroaniline - BS	EPA-8270	87.6			20	150	11/06/2023	DBA
3-Nitroaniline - BSD	EPA-8270	95.2	8		20	150	11/06/2023	DBA
2,4-Dinitrophenol - BS	EPA-8270	77.2			20	150	11/06/2023	DBA
2,4-Dinitrophenol - BSD	EPA-8270	96.9	23		20	150	11/06/2023	DBA
4-Nitrophenol - BS	EPA-8270	91.5			29.8	137	11/06/2023	DBA
4-Nitrophenol - BSD	EPA-8270	103	12		29.8	137	11/06/2023	DBA
Dibenzofuran - BS	EPA-8270	83.1			20	150	11/06/2023	DBA
Dibenzofuran - BSD	EPA-8270	88.7	7		20	150	11/06/2023	DBA
2,4-Dinitrotoluene - BS	EPA-8270	92.9			55.3	130	11/06/2023	DBA
2,4-Dinitrotoluene - BSD	EPA-8270	103	10		55.3	130	11/06/2023	DBA
2,3,4,6-Tetrachlorophenol - BS	EPA-8270	86.7			20	150	11/06/2023	DBA
2,3,4,6-Tetrachlorophenol - BSD	EPA-8270	97.9	12		20	150	11/06/2023	DBA
Diethylphthalate - BS	EPA-8270	90.5			20	150	11/06/2023	DBA
Diethylphthalate - BSD	EPA-8270	97.7	8		20	150	11/06/2023	DBA
Fluorene - BS	EPA-8270	85.4			20	150	11/06/2023	DBA
Fluorene - BSD	EPA-8270	93.0	9		20	150	11/06/2023	DBA
4-Chlorophenyl-Phenylether - BS	EPA-8270	86.3			20	150	11/06/2023	DBA



**CERTIFICATE OF ANALYSIS**

CLIENT: HF Sinclair - HFPSR  
 8505 South Texas Rd  
 Anacortes, WA 98221

CLIENT CONTACT: Jim Schneider  
 CLIENT PROJECT: Solid Waste Program

DATE: 11/9/2023  
 ALS SDG#: EV23110011  
 WDOE ACCREDITATION: C601

**LABORATORY CONTROL SAMPLE RESULTS**

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
4-Chlorophenyl-Phenylether - BSD	EPA-8270	91.9	6		20	150	11/06/2023	DBA
4-Nitroaniline - BS	EPA-8270	130			20	150	11/06/2023	DBA
4-Nitroaniline - BSD	EPA-8270	139	7		20	150	11/06/2023	DBA
4,6-Dinitro-2-Methylphenol - BS	EPA-8270	94.3			20	150	11/06/2023	DBA
4,6-Dinitro-2-Methylphenol - BSD	EPA-8270	106	12		20	150	11/06/2023	DBA
Azobenzene - BS	EPA-8270	81.6			20	150	11/06/2023	DBA
Azobenzene - BSD	EPA-8270	86.8	6		20	150	11/06/2023	DBA
4-Bromophenyl-Phenylether - BS	EPA-8270	82.1			20	150	11/06/2023	DBA
4-Bromophenyl-Phenylether - BSD	EPA-8270	87.3	6		20	150	11/06/2023	DBA
Hexachlorobenzene - BS	EPA-8270	81.7			20	150	11/06/2023	DBA
Hexachlorobenzene - BSD	EPA-8270	87.4	7		20	150	11/06/2023	DBA
Pentachlorophenol - BS	EPA-8270	92.0			41.3	113	11/06/2023	DBA
Pentachlorophenol - BSD	EPA-8270	104	12		41.3	113	11/06/2023	DBA
Phenanthrene - BS	EPA-8270	82.2			20	150	11/06/2023	DBA
Phenanthrene - BSD	EPA-8270	90.1	9		20	150	11/06/2023	DBA
Anthracene - BS	EPA-8270	78.7			20	150	11/06/2023	DBA
Anthracene - BSD	EPA-8270	86.6	9		20	150	11/06/2023	DBA
Carbazole - BS	EPA-8270	103			20	150	11/06/2023	DBA
Carbazole - BSD	EPA-8270	118	13		20	150	11/06/2023	DBA
Di-N-Butylphthalate - BS	EPA-8270	98.9			20	150	11/06/2023	DBA
Di-N-Butylphthalate - BSD	EPA-8270	107	8		20	150	11/06/2023	DBA
Fluoranthene - BS	EPA-8270	93.2			20	150	11/06/2023	DBA
Fluoranthene - BSD	EPA-8270	106	13		20	150	11/06/2023	DBA
Pyrene - BS	EPA-8270	85.8			57.4	145	11/06/2023	DBA
Pyrene - BSD	EPA-8270	88.4	3		57.4	145	11/06/2023	DBA
Butylbenzylphthalate - BS	EPA-8270	92.7			20	150	11/06/2023	DBA
Butylbenzylphthalate - BSD	EPA-8270	95.8	3		20	150	11/06/2023	DBA
Benzo[A]Anthracene - BS	EPA-8270	87.9			20	150	11/06/2023	DBA
Benzo[A]Anthracene - BSD	EPA-8270	95.6	8		20	150	11/06/2023	DBA
Chrysene - BS	EPA-8270	82.0			20	150	11/06/2023	DBA
Chrysene - BSD	EPA-8270	91.2	11		20	150	11/06/2023	DBA
Bis(2-Ethylhexyl)Phthalate - BS	EPA-8270	96.6			20	150	11/06/2023	DBA
Bis(2-Ethylhexyl)Phthalate - BSD	EPA-8270	101	4		20	150	11/06/2023	DBA
Di-N-Octylphthalate - BS	EPA-8270	93.7			20	150	11/06/2023	DBA
Di-N-Octylphthalate - BSD	EPA-8270	98.9	5		20	150	11/06/2023	DBA
Benzo[B]Fluoranthene - BS	EPA-8270	89.3			20	150	11/06/2023	DBA
Benzo[B]Fluoranthene - BSD	EPA-8270	96.3	8		20	150	11/06/2023	DBA
Benzo[K]Fluoranthene - BS	EPA-8270	82.1			20	150	11/06/2023	DBA
Benzo[K]Fluoranthene - BSD	EPA-8270	89.8	9		20	150	11/06/2023	DBA
Benzo[A]Pyrene - BS	EPA-8270	79.7			20	150	11/06/2023	DBA



**CERTIFICATE OF ANALYSIS**

CLIENT: HF Sinclair - HFPSR  
8505 South Texas Rd  
Anacortes, WA 98221

DATE: 11/9/2023  
ALS SDG#: EV23110011  
WDOE ACCREDITATION: C601

CLIENT CONTACT: Jim Schneider  
CLIENT PROJECT: Solid Waste Program

**LABORATORY CONTROL SAMPLE RESULTS**

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
Benzo[A]Pyrene - BSD	EPA-8270	85.4	7		20	150	11/06/2023	DBA
Indeno[1,2,3-Cd]Pyrene - BS	EPA-8270	97.0			20	150	11/06/2023	DBA
Indeno[1,2,3-Cd]Pyrene - BSD	EPA-8270	104	7		20	150	11/06/2023	DBA
Dibenz[A,H]Anthracene - BS	EPA-8270	89.0			20	150	11/06/2023	DBA
Dibenz[A,H]Anthracene - BSD	EPA-8270	95.3	7		20	150	11/06/2023	DBA
Benzo[G,H,I]Perylene - BS	EPA-8270	88.8			20	150	11/06/2023	DBA
Benzo[G,H,I]Perylene - BSD	EPA-8270	95.4	7		20	150	11/06/2023	DBA

**ALS Test Batch ID: R450970 - Soil by EPA-7471**

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
Mercury - BS	EPA-7471	103			81.8	117	11/03/2023	RAL
Mercury - BSD	EPA-7471	108	5		81.8	117	11/03/2023	RAL

**ALS Test Batch ID: R451218 - TCLP Extract by EPA-7470**

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
Mercury - BS	EPA-7470	105			85	115	11/06/2023	RAL
Mercury - BSD	EPA-7470	108	3		85	115	11/06/2023	RAL

**ALS Test Batch ID: 203077 - Soil by EPA-6020**

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
Arsenic - BS	EPA-6020	99.0			80	120	11/06/2023	RAL
Arsenic - BSD	EPA-6020	98.8	0		80	120	11/06/2023	RAL
Barium - BS	EPA-6020	99.5			80	120	11/06/2023	RAL
Barium - BSD	EPA-6020	99.6	0		80	120	11/06/2023	RAL
Cadmium - BS	EPA-6020	103			80	120	11/06/2023	RAL
Cadmium - BSD	EPA-6020	103	0		80	120	11/06/2023	RAL
Chromium - BS	EPA-6020	98.2			80	120	11/06/2023	RAL
Chromium - BSD	EPA-6020	97.5	1		80	120	11/06/2023	RAL
Lead - BS	EPA-6020	92.3			80	120	11/06/2023	RAL
Lead - BSD	EPA-6020	93.9	2		80	120	11/06/2023	RAL
Selenium - BS	EPA-6020	98.2			80	120	11/06/2023	RAL
Selenium - BSD	EPA-6020	98.8	1		80	120	11/06/2023	RAL
Silver - BS	EPA-6020	98.6			80	120	11/06/2023	RAL
Silver - BSD	EPA-6020	98.4	0		80	120	11/06/2023	RAL



**CERTIFICATE OF ANALYSIS**

CLIENT:	HF Sinclair - HFPSR 8505 South Texas Rd Anacortes, WA 98221	DATE:	11/9/2023
CLIENT CONTACT:	Jim Schneider	ALS SDG#:	EV23110011
CLIENT PROJECT:	Solid Waste Program	WDOE ACCREDITATION:	C601

**LABORATORY CONTROL SAMPLE RESULTS**

**ALS Test Batch ID: R451315 - TCLP Extract by EPA-6020**

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
Arsenic - BS	EPA-6020	97.0			89.1	110	11/06/2023	RAL
Arsenic - BSD	EPA-6020	96.0	1		89.1	110	11/06/2023	RAL
Barium - BS	EPA-6020	97.0			88.5	108	11/06/2023	RAL
Barium - BSD	EPA-6020	98.0	1		88.5	108	11/06/2023	RAL
Cadmium - BS	EPA-6020	102			89.4	109	11/06/2023	RAL
Cadmium - BSD	EPA-6020	101	1		89.4	109	11/06/2023	RAL
Chromium - BS	EPA-6020	98.0			86.2	107	11/06/2023	RAL
Chromium - BSD	EPA-6020	97.0	1		86.2	107	11/06/2023	RAL
Lead - BS	EPA-6020	88.0			87.5	107	11/06/2023	RAL
Lead - BSD	EPA-6020	90.0	2		87.5	107	11/06/2023	RAL
Selenium - BS	EPA-6020	99.0			90.2	113	11/06/2023	RAL
Selenium - BSD	EPA-6020	99.0	0		90.2	113	11/06/2023	RAL
Silver - BS	EPA-6020	101			80	120	11/06/2023	RAL
Silver - BSD	EPA-6020	100	1		80	120	11/06/2023	RAL

APPROVED BY

Rob Greer  
Laboratory Director



**ALS Environmental**  
 8620 Holly Drive, Suite 100  
 Everett, WA 98208  
 Phone (425) 356-2600  
 Fax (425) 356-2626  
 http://www.alsglobal.com

# Chain Of Custody / Laboratory Analysis Request

Date 11/1/2023 Page 1 Of 1

ALS Job# (Laboratory Use Only)  
EN23110011

PROJECT ID: Solid Waste Program				ANALYSIS REQUESTED				OTHER (Specify)			
REPORT TO COMPANY: HF Sinclair PSR				<input type="checkbox"/> NWTPH-HCID							
PROJECT MANAGER: Jim Schneider				<input checked="" type="checkbox"/> NWTPH-DX							
ADDRESS: 8505 South Texas Road				<input checked="" type="checkbox"/> NWTPH-GX							
Anacortes, Washington 98221				BTEX by EPA 8021 <input type="checkbox"/> BTEX by EPA 8260 <input checked="" type="checkbox"/>							
PHONE: 360-333-1563 FAX:				MTBE by EPA 8021 <input type="checkbox"/> MTBE by EPA 8260 <input type="checkbox"/>							
P.O. # 4510511626 E-MAIL: jim.schneider@hfsinclair.com				Halogenated Volatiles by EPA 8260							
INVOICE TO COMPANY: HF Sinclair Accounts Payable				<input checked="" type="checkbox"/> Volatile Organic Compounds by EPA 8260							
ATTENTION:				EDB / EDC by EPA 8260 SIM (water)							
ADDRESS:				EDB / EDC by EPA 8260 (soil)							
SAMPLE I.D.				<input checked="" type="checkbox"/> Semivolatile Organic Compounds by EPA 8270							
DATE				Polycyclic Aromatic Hydrocarbons (PAH) by EPA 8270 SIM							
TIME				PCB by EPA 8082 <input type="checkbox"/> Pesticides by EPA 8081 <input type="checkbox"/>							
TYPE				Metals-MTCA-5 <input type="checkbox"/> RCRA-8 <input type="checkbox"/> Pri Pol <input type="checkbox"/> TAL <input type="checkbox"/>							
LAB#				Metals Other (Specify) RCRA 8							
1. Biosolids-1123				<input checked="" type="checkbox"/> TCLP-Metals <input checked="" type="checkbox"/> VOA <input type="checkbox"/> Semi-Vol <input type="checkbox"/> Pest <input type="checkbox"/> Herbs <input type="checkbox"/>							
11/1/2023 815 Solid 1				NUMBER OF CONTAINERS				4			
				RECEIVED IN GOOD CONDITION?							
2.											
3.											
4.											
5.											
6.											
7.											
8.											
9.											
10.											

SPECIAL INSTRUCTIONS TCLP RCRA metals include: Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, Silver

SIGNATURES (Name, Company, Date, Time):

1. Relinquished By: Suppl. HFS Sinclair 11/2/23 @ 9:55 am

Received By: [Signature]

2. Relinquished By: [Signature]

Received By: \_\_\_\_\_

TURNAROUND REQUESTED in Business Days\*

Organic, Metals & Inorganic Analysis

Fuels & Hydrocarbon Analysis

Standard  10  3  2  1  Same Day

Specify: \_\_\_\_\_ OTHER: \_\_\_\_\_

\*Turnaround request less than standard may incur Rush Charges

# ALS ENVIRONMENTAL

## Sample Receiving Checklist

Client: HF Sinclair PSR

ALS Job #: EV23110011

Project: Solid Waste Program

Received Date: 11/2/23 Received Time: 0955 By: ce

Type of shipping container: Cooler  Box  Other

Shipped via: FedEx Ground  UPS  Mail  Courier  Hand Delivered   
FedEx Express

	<u>Yes</u>	<u>No</u>	<u>N/A</u>
Were custody seals on outside of shipping container?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
If yes, how many? _____ Where? _____			
Custody seal date: _____ Seal name: _____			

Was Chain of Custody properly filled out (ink, signed, dated, etc.)?

Did all bottles have labels?

Did all bottle labels and tags agree with Chain of Custody?

Were samples received within hold time?

Did all bottles arrive in good condition (unbroken, etc.)?

Was sufficient amount of sample sent for the tests indicated?

Was correct preservation added to samples?

If no, Sample Control added preservative to the following:

<u>Sample Number</u>	<u>Reagent</u>	<u>Analyte</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____

\*Low cut

Were VOA vials checked for absence of air bubbles?

Bubbles present in sample #: \_\_\_\_\_

Temperature of cooler upon receipt: 6.9<sup>cc</sup>  Cold  Cool  Ambient  N/A

Explain any discrepancies: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Was client contacted? \_\_\_\_\_ Who was called? \_\_\_\_\_ By whom? \_\_\_\_\_ Date: \_\_\_\_\_

Outcome of call: \_\_\_\_\_  
\_\_\_\_\_