

April 30, 2024

Gayle Garbush
Permit Administrator
Department of Ecology
Southwest Region Office – WQ
PO Box 47775
Olympia, WA 98504-7775

Re: State Waste Discharge Permit No. ST0006255 Renewal Application – NuStar Terminals Operations Partnership L.P., 5420 NW Fruit Valley Road in Vancouver, WA

Dear Ms. Garbush,

Attached is the permit application to renew the NuStar Terminals Operation Partnership L.P. (Nustar), existing State Waste Discharge Permit No. ST0006255 for the Vancouver Annex facility (located at 5420 NW Fruit Valley Road in Vancouver, WA), which expires on April 30, 2025. The submittal consists of the following:

- 1) Application for a State Waste Discharge Permit to Discharge Industrial Wastewater to Ground Water by Land Treatment or Application (Form ECY-040-179)
- 2) Attachment A.8: State Waste Discharge Permit No. ST0006255
- 3) Attachment C.2: Plant Operational Characteristics
- 4) Attachment C.7: Additional Incidental Materials
- 5) Attachment E.4: Results of Effluent Testing
- 6) Attachment G.3: USGS Topographical Map, Groundwater Monitoring Wells Maps, and Regional Well Logs
- 7) Attachment G.4: Soils Description
- 8) Attachment G.5: Local Geology and Hydrology
- 9) Attachment H.8: Stormwater Drainage Map

If you have any questions about this submittal, please do not hesitate to contact me (206-445-8152; Jeff.Hibner@nustarenergy.com).

Sincerely,



Jeff Hibner
Terminal Manager

SECTION B. PRODUCT INFORMATION

1. Briefly describe all manufacturing processes and products, and/or commercial activities at this facility. Provide the applicable Standard Industrial Category (SIC) and the North American Industry Classification System (NAICS) Code(s) for each activity (see *North American Industrial Classification System*, 2007 ed.). You can find the 1997 NAICS codes and the corresponding 1987 Standard Industry Category (SIC) codes at (www.dhs.gov/r003).

Description: No manufacturing processes are conducted at this site. This facility serves only as bulk storage and a distribution terminal for jet fuel, jet fuel components, and jet fuel additives for a single customer. The facility's operations and products stored onsite have not significantly changed in 15 years and the facility has just signed a contract to renew its services for the customer. All materials stored onsite are finished products owned by the customer. SIC 4226 and NAICS 493190.

2. List raw materials and products:

Type	RAW MATERIALS	Quantity
<i>Potatoes (Example)</i>		<i>20 million tons per year</i>
There are no raw materials onsite. This is a specialty warehouse for a variety of finished jet fuel products owned by a single customer. Volumes and types of products vary.		Maximum Total Storage Capacity: 438,412 bbl
Type	PRODUCTS	Quantity
<i>French fries (Example)</i>		<i>10 million pounds per year</i>
Not a process facility; no products processed onsite.		

SECTION C. PLANT OPERATIONAL CHARACTERISTICS

1. For each process listed in B.1 that generates wastewater, list the process, assign the waste stream a name and ID #, and describe whether it is a batch or continuous flow.

Process	Waste Stream Name	Waste Stream ID#	Batch (B) or Continuous (C) Process
<i>Receiving raw potatoes (Example)</i>	<i>Mud Water</i>	<i>1</i>	<i>C</i>
Noncontact stormwater	Noncontact stormwater	1	Batch

2. On a separate sheet, produce a schematic drawing showing production processes and water flow through the facility and wastewater treatment devices (*label as attachment C2*). The drawing should indicate the source of intake water and the operations contributing wastewater to the effluent and should label the treatment units. Construct the water balance by showing average flows between intakes, operations, treatment units, and points of discharge to land. If a water balance cannot be determined (*e.g., for certain mining activities*), provide a description of the nature and amount of any sources of water and any collection or treatment measures.

Please see facility description in Attachment C2.

3. What is the highest daily discharge flow from the processing facility: NA gallons per day
 (Specify the time period for the value given)
- What is the highest daily discharge flow to the sprayfields/infiltration basin: inches/acre/month OR
 (Specify the time period for the value given) 488,000 gpd (max capacity of surge pond; discharge event began May 3, 2023)
- What is the highest average monthly discharge flow (daily flows averaged over a month) from the processing facility: NA gallons/day?
 (Specify the time period for the value given)
- What is the highest average monthly discharge flow to the sprayfields: inches/acre/month OR
 (Specify the time period for the value given) 1,786,000 gal/month (max monthly discharge in 2023 (May))

4. Describe any planned wastewater treatment or sprayfield/infiltration improvements and the schedule for the improvements or changes. (*Use additional sheets, if necessary and label as attachment C4.*)

There are no planned treatment or infiltration improvements. Note: The highest daily discharge flow is calculated from the 24-hour, 6-month design storm event. The “average monthly discharge flow to the sprayfields” is not applicable, so we have replaced this with the calculated discharge flow to the

Infiltration Pond. This metric does not include volume of contact water from the truck rack area or tank bottoms, which is collected and transported off site for disposal.

5. If ~~production processes~~ stormwater infiltration is subject to seasonal variations in stormwater precipitation*, provide the following information. List discharge for each wastestream in gallons or million gallons per month. The combined value for each month should equal the estimated total monthly flow. Please indicate the proper unit by checking one of the following boxes:

gallons per day gallons per month million gallons per month

Waste Stream ID#	MONTHS											
	J	F	M	A	M	J	J	A	S	O	N	D
#1 (Example)	1000	1000	1000	1000	6000	2000	2000	2000	1000	1000	5000	4000
Total stormwater infiltration across site for average rainfall year*	1.17	0.96	1.17	0.57	0.42	0.35	0.13	0.17	0.38	1.09	1.32	1.40
Estimated total gallons	1.17	0.96	1.17	0.57	0.42	0.35	0.13	0.17	0.38	1.09	1.32	1.40

6. If this is a discharge from the processing facility to a storage or evaporative lagoon, what is the size of the lagoon (give square footage for the bottom of the lagoon and the total volume of the lagoon at full operating depth). 10,000 square feet; 10 million gallons (Example)

Stormwater that is not infiltrated within its drainage basin (i.e., stormwater collected in a lined/concrete containment area) is directed to the lined stormwater detention pond /fire system pond. The top part of the pond can be characterized as a rectangle with a surface area of approximately 68,250 square feet; the bottom of the pond can be characterized as a pyramid with an area of approximately 39,788 square feet. The stormwater detention pond / fire system pond has an estimated capacity of about 3.6 million gallons. Facility history has shown the stormwater detention pond to flow only occasionally into the adjacent surge pond (which is an additional infiltration area). Typically, the surge pond, which has an estimated capacity 488,000 gallons, remains empty except immediately following overflow discharges from the stormwater detention pond.

7. Check the applicable box. Is this a discharge to a sprayfield or an infiltration bed ? Provide the average gallons per acre per day proposed for each month in the following table.

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept.	Oct	Nov	Dec
Estimated gallons per acre per day*	2,802	2,306	2,811	1,371	1,007	850	308	409	918	2,612	3,172	3,363

*The infiltration data for #5 and 7 are based on the water balance conducted as part of the 2022 NuStarTerminals AKART Report. The water balance was calculated for the average water year (October 1 to September 30) from rainfall depth reported at the Portland International Airport (PDX) from 2000-

2020. The total containment area used for calculating the infiltration rate in gallons per acre per day is 13.41 acres, which includes the area for each of Containment Areas 1-7 (minus the external floating roof areas) and the areas of the stormwater detention and surge ponds.

8. How many hours a day does this facility typically operate? 8.5
 How many days a week does this facility typically operate? 5
 How many weeks per year does this facility typically operate? 52
9. List all incidental materials such as oil, paint, grease, solvents, and cleaners that are used or stored on site (list only those with quantities greater than 10 gallons for liquids and 50-pound quantities for solids). For solvents and solvent-based cleaners, include a copy of the material safety data sheet for each material and estimate the quantity used. *Use additional sheets, if necessary and label as attachment C.7.*

Materials/Quantity Stored: The facility stores fire foam (approximately 575 gallons) for emergency response. The safety data sheet for this material is provided in Attachment C.7.

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| 10. | Some types of facilities are required to have spill or waste control plans. Does this facility have: | Yes | No |
| | a. A spill prevention, control, and countermeasure plan (40 CFR 112)? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| | b. An Oil Spill Contingency Plan (chapter 173-182 WAC)? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| | c. An emergency response plan (per WAC 173-303-350)? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| | d. A runoff, spillage, or leak control plan (per WAC 173-216-110(f))? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| | e. Any spill or pollution prevention plan required by local, state, or federal authorities? If yes specify: <u>Washington Combined Plan (SPCC)</u> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| | f. A solid waste control plan? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

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SECTION E. WASTEWATER INFORMATION

1. How are the water intake and effluent flows measured?

Intake: “Intake” or water generation at this site is exclusively from precipitation and flow is not measured onsite (data from local climate/weather stations are used as needed for determining input flow rates).

Effluent “Effluent” discharges are either evaporated or infiltrated across the site (excepting at the truck rack and tank bottom water, which are collected and hauled offsite for disposal). Flow rates are calculated from published precipitation rates.

2. Describe the collection method for the samples analyzed below. (*i.e.*, grab, 24-hour composite). Applicants must collect grab samples (not composites) for analysis of pH, temperature, cyanide, total phenols, residual chlorine, oil and grease, fecal coliform (including *E. coli*), and Enterococci (previously known as fecal streptococcus at § 122.26 (d)(2)(iii)(A)(3)), or volatile organics.

Stormwater is sampled according to permit requirements at Outfalls 001, 002, 003, 004, and 005, which represent the different drainage areas across the site. Grab samples are collected and analyzed for the parameters required in the permit, including total petroleum hydrocarbons and BTEX (benzene, toluene, ethylbenzene, and xylenes) parameters. Sampling data is summarized below for monitored parameters.

3. Has the effluent been analyzed for any other parameters than those identified in question E.4.? YES NO
If yes, attach results and label as attachment E.4. This data must clearly show the date, method, and location of sampling. (*Note: Ecology may require additional testing.*)

4. Provide measurements or range of measurements for treated wastewater prior to discharge to the POTW for the parameters with an “X” in the left column. If you obtain the application from the internet, contact Ecology’s regional office to see if testing for a subset of these parameters is permissible. All analyses (except pH) must be conducted by a laboratory registered or accredited by Ecology (WAC 173-216-125). If this is an application for permit renewal, provide data for the last year for those parameters that are routinely measured. For parameters measured only for this application, place the values under “Maximum.” Report the values with units as specified in the parameter name or in the detection level.

The Permittee must use the specified analytical methods, detection limits (DLs) and quantitation levels (QLs) in the following table unless Ecology approves an alternate method, or the method used produces measurable results in the sample and EPA has listed it as an EPA approved method in 40 CFR Part 136. If the Permittee uses an alternative method as allowed above, it must report the test method, DL, and QL on the discharge monitoring report or in the required report.

Note: The facility's sampling program includes collection of samples from water being released from any lined containment areas and individual infiltration area. Samples are analyzed for TPH and BTEX in compliance with permit requirements. Other analytes (such as residual chlorine and fecal coliform) are not applicable to the water source and site use and are not required to be monitored; therefore, analytical data for these parameters are not provided.

Outfall 001 (Stormwater Detention Pond prior to discharge to the Surge Pond) – data from 2023

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Outfall 002 (T4001) – data from 2023
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Outfall 003 (T5503) – data from 2023

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Outfall 004 – data from 2023

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Outfall 005 (Discharge to Surge Pond from Containment Area 7) – data from 2023

□□	Parameter	Measurement Values			Number of Analyses	Analytical Method Std. Methods 19 th ,20 th edition or EPA	Detection Limit/Quantitation Level
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1. Sum of NWTPH-Gx and NWTPH-Dx.
2. Sum of benzene, toluene, ethylbenzene, and total xylenes.
3. Detection Limit/ Quantitation Level not reported in lab data. See lab data sheets for sample results and reporting limits.

Detection level (DL) or detection limit means the minimum concentration of an analyte (substance) that can be measured and reported with a 99% confidence that the analyte concentration is greater than zero as determined by the procedure given in 40 CFR part 136, Appendix B.

Quantitation Level (QL) also known as Minimum Level of Quantitation (ML) – The lowest level at which the entire analytical system must give a recognizable signal and acceptable calibration point for the analyte. It is equivalent to the concentration of the lowest calibration standard, assuming that the lab has used all method-specified sample weights, volumes, and cleanup procedures. The QL is calculated by multiplying the MDL by 3.18 and rounding the result to the number nearest to (1, 2, or 5) x 10ⁿ, where n is an integer. (64 FR 30417).

ALSO GIVEN AS:

The smallest detectable concentration of analyte greater than the Detection Limit (DL) where the accuracy (precision & bias) achieves the objectives of the intended purpose. (Report of the Federal Advisory Committee on Detection and Quantitation Approaches and Uses in Clean Water Act Programs Submitted to the US Environmental Protection Agency December 2007).

Note: Detected metals concentrations have consistently been below MTCA A Cleanup Levels and MCLs (which are applicable as there is no potential for stormwater to impact surface water). Other analyses have included SVOCs (EPA Method 8270D) and VOCs (EPA Method 8260C), both of which were non-detect for all analytes.

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5. Does this facility use any of the following chemicals as raw materials in production, produce them as part of the manufacturing process, or are they present in the wastewater? (*The number following the chemical name is the Chemical Abstract Service (CAS) reference number to aid in identifying the compound.*) YES NO

If yes, specify how the chemical is used and the quantity used or produced (*Use additional sheets, if necessary and label as attachment E5.*): Petroleum products are stored on-site, but water has been tested for VOCs and SVOCs with no detections.

Acrylamide/79-06-1	Nitrofurazone/59-87-0	Heptachlor/76-44-8
Acrylonitrile/107-13-1	N-nitrosodiethanolamine/ 1116-54-7	Heptachlor epoxide/1024-57-3
Aldrin/309-00-2	N-nitrosodiethylamine/55-18-5	Hexachlorobenzene/118-74-1
Aniline/62-53-3	N-nitrosodimethylamine/62-75-9	Hexachlorocyclohexane (alpha)/319-84-6
Aramite/140-57-8	N-nitrosodiphenylamine/86-30-6	Hexachlorocyclohexane (tech.)/608-73-1
Arsenic/7440-38-2	N-nitroso-di-n-propylamine/ 621-64-7	Hexachlorodibenzo-p-dioxin, mix/19408-74-3
Azobenzene/103-33-3	N-nitrosopyrrolidine/930-55-2	Hydrazine/hydrazine sulfate/ 302-01-2
Benzene/71-43-2	N-nitroso-di-n-butylamine/ 924-16-3	Lindane/58-89-9
Benzidine/92-87-5	N-nitroso-n-methylethylamine/10595-95-6	2 Methylaniiline/100-61-8
Benzo(a)pyrene/50-32-8	PAH/NA	2 Methylaniiline hydrochloride/636-21-5
Benzotrichloride/98-07-7	PBBs/NA	4,4' Methylene bis(N,N- dimethyl)aniiline/101-61-1
Benzyl chloride/100-44-7	PCBs/1336-36-3	Methylene chloride (dichloromethane)/75-09-2
Bis(chloroethyl)ether/111-44-4	1,2 Dichloropropane/78-87-5	Mirex/2385-85-5
Bis(chloromethyl)ether/542-88-1	1,3 Dichloropropene/542-75-6	O-phenylenediamine/106-50-3
Bis(2-ethylhexyl) phthalate/ 117-81-7	Dichlorvos/62-73-7	Propylene oxide/75-56-9
Bromodichloromethane/75-27-4	Dieldrin/60-57-1	2,3,7,8-Tetrachlorodibenzo-p-dioxin/1746-01-6
Bromoform/75-25-2	3,3' Dimethoxybenzidine/119-90-4	Tetrachloroethylene/127-18-4
Carbazole/86-74-8	3,3 Dimethylbenzidine/119-93-7	2,4 Toluenediamine/95-80-7
Carbon tetrachloride/56-23-5	1,2 Dimethylhydrazine/540-73-8	o-Toluidine/95-53-4
Chlordane/57-74-9	2,4 Dinitrotoluene/121-14-2	Toxaphene/8001-35-2
Chlorodibromomethane/124-48-1	2,6 Dinitrotoluene/606-20-2	Trichloroethylene/79-01-6
Chloroform/67-66-3	1,4 Dioxane/123-91-1	2,4,6-Trichlorophenol/88-06-2
Chlorthalonil/1897-45-6	1,2 Diphenylhydrazine/122-66-7	Trimethyl phosphate/512-56-1
2,4-D/94-75-7	Endrin/72-20-8	Vinyl chloride/75-01-4
DDT/50-29-3	Epichlorohydrin/106-89-8	
Diallate/2303-16-4	Ethyl acrylate/140-88-5	
1,2 Dibromoethane/106-93-4	Ethylene dibromide/106-93-4	
1,4 Dichlorobenzene/106-46-7	Ethylene thioureae/96-45-7	
3,3' Dichlorobenzidine/91-94-1	Folpet/133-07-3	
1,1 Dichloroethane/75-34-3	Furmecyclox/60568-05-0	
1,2 Dichloroethane/107-06-2		

Note: Petroleum-related compounds included on this list (e.g., benzene) may be present at the facility, but not as a raw material, are not part of a manufacturing process, and have not generally been detected in stormwater monitoring that has been conducted at the facility.

6. Are any other pesticides, herbicides, or fungicides used at this facility? YES NO
If yes, specify the material and quantity used.

7. Are there other pollutants that you know of or believe to be present? YES NO
If yes, specify the pollutants and their concentration if known
(attach laboratory analyses if available). DON'T KNOW

Parameter	Units	Range of Measurements	Number of Analyses	Analytical Method	Detection Limit
M					
D					

Note: Sixteen groundwater monitoring wells are present at the facility associated with a MTCA Cleanup Action being completed under an Agreed Order. Sampling of these wells for stormwater quality parameters is not included in the MTCA scope of work (has included TPH and VOCs). Monitoring wells associated with the MTCA Cleanup Action are not appropriate for use to assess impacts from stormwater and have therefore the data from that monitoring is not provided. It is expected discharge monitored at Outfalls 001 through 005 are representative of stormwater quality in the various drainage basins at the facility and that stormwater infiltration at this site should not affect the quality of the groundwater in this area.

As shown in Attachment G.4, the native soil beneath the terminal is fine grained and extremely poorly drained. In the western portion of the facility, depth to first encountered groundwater has ranged from 8 to 22 feet bgs since 2014, and in the eastern portion of the facility, near the former and current truck loading rack, depth to groundwater has ranged from approximately 20 to 32 feet bgs since 2002. Depth to first groundwater varies seasonally, with the shallower depths generally encountered between December and June and the deeper depths encountered between July and November. On average, depth to groundwater is approximately 11 feet beneath the undeveloped grass and shrub covered land west of the bermed containment areas; approximately 15 feet beneath Containment Areas 1-4, 6, and 7; and approximately 30 feet beneath Containment Area 5 and the grass/orchard covered land southeast of the truck loading rack. Stormwater infiltration studies (most recently, *Additional Soil Infiltration Testing and Stormwater Detention Monitoring NuStar Vancouver Annex*, GeoEngineers, December 2023) at this site have shown that the infiltration rates in the facility's Containment Areas ranged from 0.01 to 0.15 ft/day. The average infiltration rate at depths of 6 inches in the surge pond was 0.34 ft/day and the average infiltration rate in the Orchard area at depths of 2 and 3 feet was 0.10 ft/day. Per the infiltration studies, it is the opinion of the facility's engineering consultant that there should be no relationship between the stormwater and groundwater monitoring data at this site and therefore the groundwater monitoring well data has not been provided with this application.

SECTION G. SITE ASSESSMENT

The local library and local city or county planning offices may be helpful in providing the information required in this section. You may consult the Department of Ecology Water Resources Program to help identify wells within one mile of your site.

1. Land Application Sites: Provide the information below for each land application site. Provide the latitude/longitude (approximate center of the site; NAD83/WGS84 reference datum.) Attach a copy of the contract(s) authorizing use of any private land(s) used for each treatment site. Add table rows as necessary.

Legal Description (section/township/range) Section 16/Township 2N/Range 1E			
Latitude	Longitude	Acreage	Owner
45.6619	-122.6959	31.12	NUSTAR TERMINALS OPERATIONS PARTNERSHIP L.P.
Legal Description (section/township/range)			
Latitude	Longitude	Acreage	Owner
Legal Description (section/township/range)			
Latitude	Longitude	Acreage	Owner
Legal Description (section/township/range)			
Latitude	Longitude	Acreage	Owner

2. If this is a new discharge, list all environmental control permits or approvals needed for this project; for example, SEPA review, engineering reports, hydrogeologic reports, or air emissions permits.

Not applicable. No additional permit required for stormwater infiltrate within the site. Stormwater infiltration is entirely within the subject facility.

3. Attach an original United States Geological Survey (USGS) 7.5-minute topographic map and aerial photograph(s) from an internet mapping site that shows the processing facility and sprayfield site(s). **USGS topographical maps are available from the Department of Natural Resources (360 902-1234), Metsker Maps (206 588-5222), some local bookstores, and internet sites.** Show the following on this map:
 - a. Location and name of internal and adjacent streets.
 - b. Surface water drainage systems within ¼ mile of the site.
 - c. All wells within 1 mile of the site.
 - d. Wastewater discharge points.
 - e. Land uses and zoning adjacent to the wastewater application site.
 - f. Groundwater gradient.
4. Describe the soils on the site using information from local soil survey reports. **Soils information is available from your local County Conservation District or from information contained in the sites hydrogeologic report.** *(Submit on separate sheet and label as attachment G.4.)*
5. Describe the local geology and hydrogeology within one mile of the site. Include any groundwater quality data. **The local library or local Soil Conservation Service may have this information.** *(Submit on separate sheet and label as attachment G.5.)*
6. List the names and addresses of contractors or consultants who provided information and cite sources of information by title and author.

Consultant:

Ashworth Leininger Group
601 E. Daily Drive, Suite 302, Camarillo, California

Resources:

NuStar Terminals AKART Report All Known, Available, and Reasonable Methods of Prevention, Control, and Treatment, Vancouver Annex Facility, Maul Foster & Alongi Inc., January 2022.

Additional Soil infiltration Testing and Stormwater Detention Monitoring NuStar Vancouver Annex, GeoEngineers, December 2023.

Additional Investigation Summary Report and Pilot Study Work Plan NuStar Vancouver Annex Terminal Vancouver, Washington, Apex Company, August 2, 2017.

City of Vancouver Zoning Map B-3.

Soil Survey of Clark County, Washington. November 1972.

Clark County Soils ArcGIS Map Viewer,

https://gis.clark.wa.gov/arcgisfed/rest/services/ClarkView_Public/SoilsWWHMGroup/MapServer

SECTION H. STORMWATER

1. Do you have coverage under the Washington State Industrial Stormwater NPDES General permit? YES NO
If yes, please list the permit number here. _____
- If no, have you applied for coverage under the Washington State Industrial Stormwater NPDES general permit? YES NO

Note: If you answered "no" to both questions above, complete the following questions 2 through 8.

2. Describe the size of the stormwater collection area.
- a. Unpaved area 474,804 (including lined containments) sq.ft.
 - b. Paved area 109,336 (lined areas generating runoff) sq.ft.
 - c. Other collection areas (roofs) 37,399 (roofs) sq.ft.
3. Does your facility's stormwater discharge to: (*Check all that apply*)
- Storm sewer system; name of storm sewer system (*operator*):
 - Sanitary sewer
 - Directly to surface waters of Washington State (*e.g., river, lake, creek, estuary, ocean*).
Specify waterbody name _____
 - Indirectly to surface waters of Washington State (*i.e., flows over adjacent properties first*).
 - Directly to ground waters of Washington State via:
 - Dry well
 - Drainfield
 - Other (Infiltration Pond for lined containment area and direct infiltration for remaining containment areas)
4. Areas with industrial activities at facility: (*check all that apply*)
- Manufacturing building
 - Material handling
 - Material storage
 - Hazardous waste treatment, storage, or disposal (*refers to RCRA, Subtitle C facilities only*)
 - Waste treatment, storage, or disposal
 - Application or disposal of wastewaters
 - Storage and maintenance of material handling equipment
 - Vehicle maintenance
 - Areas where significant materials remain
 - Access roads and rail lines for shipping and receiving

Other _____

5. Material handling/management practices

a. Types of materials handled and/or stored outdoors: (*check all that apply*)

Solvents

Hazardous wastes

Scrap metal

Acids or alkalis

Petroleum or petrochemical products

Paints/coatings

Plating products

Woodtreating products

Pesticides

Other (*please list*): _____

b. Identify existing management practices employed to reduce pollutants in industrial storm water discharges: (*check all that apply*)

Oil/water separator (OWS)

Detention facilities

Containment

Infiltration basins

Spill prevention

Operational BMPs

Surface leachate collection

Vegetation management

Overhead coverage

Other (*please list*): 1) Stormwater that is manually drained off the top of the external floating roofs covering tanks #4001 and #5503 are sent through the GAC system, monitored, then discharged through Outfalls 002 and 003, respectively. 2) OWS only used to treat contact stormwater (e.g., from truck rack and tank bottoms that is collected and transported off-site for disposal.

6. Attach a map showing stormwater drainage/collection areas, disposal areas and discharge points. This may be a hand drawn map if no other site map is available. Label this as attachment H.8.

Stormwater containment and infiltration areas are shown in Attachment H.8.

Note: Stormwater in the lined containment area is inspected prior to release, and it is managed through the infiltration pond. The remaining containment areas across the facility infiltrate stormwater in place, except for at the truck rack and tank bottom water for which storm water are collected and transported off-site for disposal. Noncontact stormwater from the tank roofs is inspected and released to the ground within the unlined containment area for infiltration if there is no evidence of impacts (in accordance with NuStar Normal operating Procedure NOP-VAN-25). Contact water within the tanks (tank bottom water) is collected and transported off-site for disposal. The unlined containment berms have a total footprint area of about 240,000 square feet and a storage capacity of 19.3 million gallons, which is in excess of the largest tank volume containment in each area plus the design storm rainfall volume. A historical release of petroleum products near the infiltration pond has resulted in impacts to groundwater that is being managed under Ecology oversight.

SECTION I. OTHER INFORMATION

1. Describe liquid or solid wastes generated that are not disposed of in the waste stream(s) and describe the method of disposal. For each type of waste, provide type of waste, name, address, and phone number of hauler.

CCS, 55 International Way, Longview, WA 98632, 360.423.6316, contact stormwater waste

Telluric Enterprises, <https://www.telluric-ent.us/>, 503.505.1995, contact stormwater waste

Clean Harbors, <https://www.cleanharbors.com/>, 877.215.9730, hazardous and nonhazardous waste

2. Describe any storage areas used for raw materials, products, and wastes.

This facility has a total of 17 tanks available for products storage. Contacted stormwater is stored in facility storage tanks (truck rack stormwater runoff is stored in the oil/ water separator tanks and tank bottom water is drawn directly from the tank). Storage tanks are within secondary containments (7 containment areas total) capable to contain the largest tank volume within the corresponding containment.

Summary of attachments that may be required for this application:

(Please check those attachments that are included)

- C.2. Production schematic flow diagram and water balance
- C.4. Wastewater treatment improvements
- C.7. Additional incidental materials
- E.4. Additional results of effluent testing
- G.1. Copies of land use contracts
- G.3. USGS topographical map
- G.4. Soils description
- G.5. Local geology and hydrology
- H.8. Stormwater drainage map

If you need this document in a format for the visually impaired, call the Water Quality Program at 360-407-6600. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.

Attachment A.8:
State Waste Discharge Permit No. ST0006255



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 M0di0i000i00 0 0000 April 0, 2020
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 M0di0i000i00 0 0000 000030, 2022
 M0di0i000i00 0 0000 0000r00, 2024

STATE WASTE DISCHARGE PERMIT NUMBER ST 6255

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NuStar Terminals Operations Partnership L.P.
5420 Northwest Fruit Valley Road
Vancouver, WA 98660

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Andrew Kelen _____

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TABLE OF CONTENTS

SUMMARY OF PERMIT REPORT SUBMITTALS..... 4

SPECIAL CONDITIONS 5

1 A M
A i
M r i l l i r i

2 M M
A r M i r i
r d r M i r i
p l i d A l i l r d r
r r A r d i i

3 A M
A i r M i r i p r
r i i l d d l
r d i
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A d d i t i o n a l M i r i r i
p r i r i d l i 2
r p r i 4
M i r i i p i r i 4

4 A A M A 4
A p r d r 4

A A
A l i d d l i
r d i

A A M A M A
A A A

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A p i l l r l d i l d i r
p i l l r l d p

M

GENERAL CONDITIONS 19

A M

2

3 M A 20

4 A A M A 20

A A A 20

M A A A A 20

A M 20

A M 2

A A M 2

0 MA 2

M 2

APPENDIX A 22

SUMMARY OF PERMIT REPORT SUBMITTALS

This table provides a summary of the permit report submittals for the current reporting period. The table includes the permit section, the submittal description, the frequency of submittals, and the first submittal date.

Permit Section	Submittal	Frequency	First Submittal Date
3A	Initial Major Project	Quarterly	January 1, 2020
3B	Project Re-evaluation	Annually	
4B	Project Re-evaluation	Annually	
00	Application for Re-evaluation	Quarterly	March 1, 2024
00	Project Re-evaluation	Quarterly	January 1, 2020
00	Project Re-evaluation	Quarterly	January 1, 2020
00	AAO Report	Quarterly	March 1, 2020
00	Project Re-evaluation	Quarterly	March 1, 2023
00	Project Re-evaluation	Quarterly	March 1, 2024
00	Project Re-evaluation	Annually	
04	Project Application for Re-evaluation	Annually	
00	Project Re-evaluation	Annually	
00	Project Re-evaluation	Annually	
00	Project Re-evaluation	Annually	
00	Project Re-evaluation	Annually	

Medicine 3, 2022

Medicine 2024

Stormwater Monitoring Requirement ^a				
Parameter	Unit	Frequency	Sample type	Note
ppm	mg/L	00r0rl0	0r0 ^d	
00d	0000	00r0rl0	0r0 ^d	
000	0000	00r0rl0	0r0 ^d	
pH	0000	00r0rl0	0r0 ^d	
0000	00ll00p 0000 00p00	00r0rl0	00i000 00000 pr0pi000	
<p>^a 0r 0000ll 000 0r0000 004 00p0i0d 0d0 02A</p> <p>^b 0r 00r000r 000r 0r00p0d 010, 000ld 0000r0d 000000 0000r00i00p0i00000 000, 00r00r0, 00000li00 000i0ri00p0i0000 00 000000r000 0r 1001 00ll 00 0000r0d 000000000000</p> <p>^c 00r0rl0 00i0ri00 p0ri0d 0r 0000r0 0r0000 M00, April 0r0000 000, 010 0r00000p00 0r 0d 0000r 0r0000 0000 0r00r0rl0M00r0d0000000000 d00 00000 0000 00ll00i00 0000r0rl0 00i0ri00p0ri0d, starting July 1, 2020</p> <p>^d 0r00 000000i0di0d01 00p0ll000d 00r 0000i000, 0r 1000, p0ri0d</p> <p>^e 0000r0i0000 00r p0r000i000000000000 0i0 00 0d 0i0i0 00 p0 000010000 00000r00p0 010000</p>				

00 0r00d00r M0i0ri00

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- 0 M0 00
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Table 2: Monitoring Parameters

Parameter	Unit	Frequency	Sample type	Note
Temperature	°C	Hourly	Water	Field
pH		Hourly	Water	Field
Dissolved Oxygen	%	Hourly	Water	Field
Water Level	m	Hourly	Water	Field
Flow	m ³ /s	Hourly	Water	
Velocity	m/s	Hourly	Water	
Water Temperature	°C	Hourly	Water	
Water Level	m	Hourly	Water	
<p>^a Applied to all monitoring points in the 2020 monitoring period. Additional monitoring points may be added as needed.</p> <p>^b Temperature shall be recorded at 0.0 m depth.</p> <p>^c Hourly monitoring period for the 2020 monitoring period, April 1, 2020 to July 1, 2020. Hourly monitoring period for the 2021 monitoring period shall be from April 1, 2021 to July 1, 2021.</p> <p>^d Water level shall be recorded at 0.0 m depth, 1 m, 2 m, 3 m, 4 m, 5 m, 6 m, 7 m, 8 m, 9 m, 10 m, 11 m, 12 m, 13 m, 14 m, 15 m, 16 m, 17 m, 18 m, 19 m, 20 m, 21 m, 22 m, 23 m, 24 m, 25 m, 26 m, 27 m, 28 m, 29 m, 30 m, 31 m, 32 m, 33 m, 34 m, 35 m, 36 m, 37 m, 38 m, 39 m, 40 m, 41 m, 42 m, 43 m, 44 m, 45 m, 46 m, 47 m, 48 m, 49 m, 50 m, 51 m, 52 m, 53 m, 54 m, 55 m, 56 m, 57 m, 58 m, 59 m, 60 m, 61 m, 62 m, 63 m, 64 m, 65 m, 66 m, 67 m, 68 m, 69 m, 70 m, 71 m, 72 m, 73 m, 74 m, 75 m, 76 m, 77 m, 78 m, 79 m, 80 m, 81 m, 82 m, 83 m, 84 m, 85 m, 86 m, 87 m, 88 m, 89 m, 90 m, 91 m, 92 m, 93 m, 94 m, 95 m, 96 m, 97 m, 98 m, 99 m, 100 m.</p>				

1. The monitoring parameters listed in this table shall be recorded at the specified locations and depths. The monitoring period shall be from April 1, 2020 to July 1, 2020. The monitoring period for the 2021 monitoring period shall be from April 1, 2021 to July 1, 2021. The monitoring period for the 2022 monitoring period shall be from April 1, 2022 to July 1, 2022. The monitoring period for the 2023 monitoring period shall be from April 1, 2023 to July 1, 2023. The monitoring period for the 2024 monitoring period shall be from April 1, 2024 to July 1, 2024. The monitoring period for the 2025 monitoring period shall be from April 1, 2025 to July 1, 2025. The monitoring period for the 2026 monitoring period shall be from April 1, 2026 to July 1, 2026. The monitoring period for the 2027 monitoring period shall be from April 1, 2027 to July 1, 2027. The monitoring period for the 2028 monitoring period shall be from April 1, 2028 to July 1, 2028. The monitoring period for the 2029 monitoring period shall be from April 1, 2029 to July 1, 2029. The monitoring period for the 2030 monitoring period shall be from April 1, 2030 to July 1, 2030.

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2. Groundwater Quality Standards

Groundwater quality standards are established to protect public health and the environment. These standards are based on the latest scientific information and are designed to be protective of the most vulnerable populations. The standards are expressed in terms of maximum contaminant levels (MCLs) and maximum contaminant levels as groundwater (MCL-GW).

Groundwater quality standards are established in the *Implementation Guidance for the Ground Water Quality Standards*, published in 2000.

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3. Accreditation

Accreditation is a process by which an organization is recognized as meeting certain standards of quality. Accreditation is a process by which an organization is recognized as meeting certain standards of quality. Accreditation is a process by which an organization is recognized as meeting certain standards of quality.

3. Accreditation of Environmental Laboratories

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1. Introduction

The purpose of this report is to provide a comprehensive overview of the current state of the market and to identify key trends and opportunities for growth.

This report is intended for senior management and is based on a thorough analysis of industry data and expert insights.

- 1. Executive Summary
- 2. Introduction
- 3. Market Overview
- 4. Key Findings
- 5. Recommendations

2. Market Overview

The market is characterized by rapid technological advancement and increasing competition. Key drivers of growth include digital transformation and consumer demand for personalized experiences.

Key challenges include talent shortages and high operational costs, which may impact profitability in the short term.

3. Key Findings

The primary findings of this analysis are as follows:

- 1. Market growth is projected to continue at a steady pace over the next five years.
- 2. Digital marketing spend is expected to increase significantly, driven by the need for targeted advertising.
- 3. Sustainability is becoming a key differentiator for brands, with consumers increasingly favoring eco-friendly products.
- 4. Innovation in AI and automation will continue to reshape the industry landscape.

4. Recommendations

Based on the findings, the following recommendations are proposed:

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Section A

Article 4

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Article 5

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A company provides a service to its customers.

The company's revenue is derived from the sale of its products.

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CONVENTIONAL POLLUTANTS

Pollutant	CAS Number (if available)	Recommended Analytical Protocol	Detection (DL) ¹ µg/L unless specified	Quantitation Level (QL) ² µg/L unless specified
Ammonia		Method 200		2
Ammonia, total		Method 200 ³		2
Ammonium		Method 221, 222	NA	As indicated in the standard procedure
Oil and grease		4 A	400	1,000
pH		Method 400 ⁴	NA	NA
Total suspended solids		Method 240		1

NONCONVENTIONAL POLLUTANTS

Pollutant & CAS No. (if available)	CAS Number (if available)	Recommended Analytical Protocol	Detection (DL) ¹ µg/L unless specified	Quantitation Level (QL) ² µg/L unless specified
Aluminum, total		Method 2320		1

NONCONVENTIONAL POLLUTANTS

Pollutant & CAS No. (if available)	CAS Number (if available)	Recommended Analytical Protocol	Detection (DL) ¹ µg/L unless specified	Quantitation Level (QL) ² µg/L unless specified
Aluminum, total	42000	200	20	0
Ammonia, total		M4003000 000000		20
Chloride	440303	200	0	20
Calcium, total		A 402020		2
Copper	440420	200	20	00
Dissolved oxygen		M220		0
Fluoride		M400000000 M400		planned lithium drip
Iron, total		M4000		00
Lead, total	440444	200	00	02
Manganese		M220		0 Iron
Nitrate		M4000000		02
Oil		diagnostic drip		
Phosphate	440440	M4000	20	00

NONCONVENTIONAL POLLUTANTS

Pollutant & CAS No. (if available)	CAS Number (if available)	Recommended Analytical Protocol	Detection (DL) ¹ µg/L unless specified	Quantitation Level (QL) ² µg/L unless specified
Trichloroethylene, TCE		M2340		200
Trichloroethylene, TCE	43829	200	2	0
Methylene chloride, DCE	43824	200	0	0
Methylene chloride, DCE	43824	200	0	0
Methylene chloride, DCE	43824	200	0	0
Perchloroethylene, PCE		M400 3		00
Perchloroethylene, PCE		M400 3 M400 3 3		300
1,1,1,2-Tetrachloroethane, TCA		1	20	20
1,1,1,2-Tetrachloroethane, TCA		1	20	20
Perfluorobenzene, PFBE		M 400 3 M400 3	3	0
Perfluorobenzene, PFBE		M220		3 pr 3 pr r

<i>PRIORITY POLLUTANTS</i>	<i>PP #</i>	<i>CAS Number (if available)</i>	<i>Recommended Analytical Protocol</i>	<i>Detection (DL)¹ µg/L unless specified</i>	<i>Quantitation Level (QL)² µg/L unless specified</i>
METALS, CYANIDE & TOTAL PHENOLS					
Aluminum, total	4	440300	200	0.3	0
Arsenic, total		440302	200	0	0
Barium, total		440400	200	0	0
Bismuth, total		440430	200	0.0	0.2
Cadmium, total		440420	M300r	0.3	0.2
Cadmium, soluble		440403	200	0.2	0
Copper, total	20	440000	200	0.4	2.0
Cobalt, total	22	430020	200	0	0
Mercury, total	23	430000	30	0.0002	0.000
Chromium, total	24	440020	200	0	0
Lead, total	25	440200	200	0	0
Nickel, total	26	440220	200	0.04	0.2
Vanadium, total	27	440200	200	0.0	0.3

<i>PRIORITY POLLUTANTS</i>	PP #	CAS Number (if available)	Recommended Analytical Protocol	Detection (DL) ¹ <i>µg/L unless specified</i>	Quantitation Level (QL) ² <i>µg/L unless specified</i>
METALS, CYANIDE & TOTAL PHENOLS					
Iron, total	2	440	200	0	2
Cadmium, total	2	2	33		0
Cadmium, as Acid equivalent	2		M400		0
Cadmium, as Acid equivalent Asilid	2		M400		0
Lead, total			A 420		0

<i>PRIORITY POLLUTANTS</i>	PP #	CAS Number (if available)	Recommended Analytical Protocol	Detection (DL) ¹ <i>µg/L unless specified</i>	Quantitation Level (QL) ² <i>µg/L unless specified</i>
ACID COMPOUNDS					
2,4,6-trichlorophenol	24		2	3	
2,4-dichlorophenol	3	2032	2	2	
2,4-dichlorophenol	34	0	2	2	

<i>PRIORITY POLLUTANTS</i>	PP #	CAS Number (if available)	Recommended Analytical Protocol	Detection (DL)¹ <i>µg/L unless specified</i>	Quantitation Level (QL)² <i>µg/L unless specified</i>
ACID COMPOUNDS					
4,4'-dichlorodiphenyl ether (4,4'-DDO)	0	34120	20002	24	2
2,4-dichlorophenol		200	200	42	2
2-nitrophenol			200	3	0
4-nitrophenol		0002	200	24	2
chlorophenol (4-chlorophenol)	22	000	200	30	0
phenol	4		200	3	0
phenol		00002	200		4
2,4,6-trichlorophenol	2	0002	200	2	

<i>PRIORITY POLLUTANTS</i>	PP #	CAS Number (if available)	Recommended Analytical Protocol	Detection (DL) ¹ <i>µg/L unless specified</i>	Quantitation Level (QL) ² <i>µg/L unless specified</i>
VOLATILE COMPOUNDS					
Ace	2	002	24		0
Ace	3	003	24	0	20
	4	432	24	44	32
Chloro	4	22	24	4	4
Chloro		23	24	2	4
Chloro		000	24	0	0
Chloro		003	24	0	20
2-Chloro		000	24	0	20
Chloro	23	0003	24		4
Chloro		244	24	3	3
2-Chloro	2	000	24		
3-Chloro	2	403	24		
4-Chloro	2	04	24	44	

<i>PRIORITY POLLUTANTS</i>	PP #	CAS Number (if available)	Recommended Analytical Protocol	Detection (DL)¹ <i>µg/L unless specified</i>	Quantitation Level (QL)² <i>µg/L unless specified</i>
VOLATILE COMPOUNDS					
Chloroform	4	7082	24	2	1
Bromochloroform	3	10894	24	4	4
Dibromochloroform	0	10890	24	2	4
Bromoform	2	7520	24	2	4
Dibromomethane	32	7526	24	10	10
1,1,1-Trichloroethane 1,1,2-Dichloroethane ⁶	33	7081	24	10	10
Perchloroethylene	3	10044	24	2	2
Methylene chloride	4	7513	24	10	10
Methylene chloride	4	7513	24	10	2
Methylene chloride	44	7510	24	2	4
1,1,2,2-Tetrachloroethane	1	7894	24	1	20
Trichloroethylene	1	7083	24	4	2
1,1,1-Trichloroethane	1	7083	24	10	10

<i>PRIORITY POLLUTANTS</i>	PP #	CAS Number (if available)	Recommended Analytical Protocol	Detection (DL) ¹ <i>µg/L unless specified</i>	Quantitation Level (QL) ² <i>µg/L unless specified</i>
VOLATILE COMPOUNDS					
2,4,6-trichlorophenol	30	8880	24		4
1,2,4-trichlorobenzene			24	3	4
1,2,3-trichlorobenzene	4	8800	24	0	0
1,1,1-trichloroethane		7000	24		
1,1,1-trichloroethene		7004	24 M 200	0	20

<i>PRIORITY POLLUTANTS</i>	PP #	CAS Number (if available)	Recommended Analytical Protocol	Detection (DL) ¹ <i>µg/L unless specified</i>	Quantitation Level (QL) ² <i>µg/L unless specified</i>
BASE/NEUTRAL COMPOUNDS (compounds in bold are Ecology PBTs)					
Ammonia		332	2		
Ammonium		20	2	3	0
Ammonia		202	2		

<i>PRIORITY POLLUTANTS</i>	PP #	CAS Number (if available)	Recommended Analytical Protocol	Detection (DL) ¹ <i>µg/L unless specified</i>	Quantitation Level (QL) ² <i>µg/L unless specified</i>
BASE/NEUTRAL COMPOUNDS (compounds in bold are Ecology PBTs)					
1,2-dichlorobenzene	1	95-63-0	2	44	32
1,2-dichloroethane	1	107-06-2	2	2	1
1,2-dichloropropane	2	78-87-5	2	1	23
1,2,3,4-dichlorobenzene	4	2081-2	0 2	4	4
Benzo(j)fluoranthene ⁷		205-82-3	2	0	0
1,2,3,4-dichlorodiphenyl ether	1	2010	0 2	2	1
Benzo(r,s,t)pentaphene		189-55-9	2	3	0
1,2,3-trichlorobenzene	3	1032	0 2	2	1
1,2,3-trichloropropane	1	10124	0 2	4	2
1,2-dichloroethoxybenzene	43	101	2	3	1
1,2-dichloroethylbenzene	1	144	2	1	1
1,2-dichloroisopropylbenzene	42	3332	2	0	0
1,2-diethylhexylbenzene	1	101	2	2	1

<i>PRIORITY POLLUTANTS</i>	PP #	CAS Number (if available)	Recommended Analytical Protocol	Detection (DL) ¹ <i>µg/L unless specified</i>	Quantitation Level (QL) ² <i>µg/L unless specified</i>
BASE/NEUTRAL COMPOUNDS (compounds in bold are Ecology PBTs)					
4-chlorophenyl phenyl ether	4	00003	2		
2-chlorophenyl phenyl ether	20		2		
4-chlorophenyl phenyl ether	40	00023	2	42	2
chlorophenyl		200	02	2	
Dibenzo (a,h)acridine		226-36-8	0M2M	2	00
Dibenzo (a,j)acridine		224-42-0	0M2M	2	00
1,2,3,4-dibenzohydroquinone	2	303	2	2	
Dibenzo(a,e)pyrene		2004	0M2M	2	00
Dibenzo(a,h)pyrene		00040	2M	2	00
3,3'-dichlorodiphenyl ether	2	00040	002		4
1-chlorophenyl	0	402	2		
1-chlorophenyl phenyl ether		3003	2		4
1-chlorophenyl phenyl ether		442	2	2	

<i>PRIORITY POLLUTANTS</i>	PP #	CAS Number (if available)	Recommended Analytical Protocol	Detection (DL) ¹ <i>µg/L unless specified</i>	Quantitation Level (QL) ² <i>µg/L unless specified</i>
BASE/NEUTRAL COMPOUNDS (compounds in bold are Ecology PBTs)					
2,4-dichlorodiphenyl ether	3	2242	02		
2,4-dichlorodiphenyl ether	3	0202	02		
1,2-dichlorobenzene		40	2	2	
2,2,4-trimethylpentane (isooctane)	3	22	2	0	20
1,2-dichlorobenzene	3	20440	2	2/2	
1,2-dichlorobenzene	0	3	2		
1,2-dichlorobenzene		4	2/2		
1,2-dichlorobenzene	2	3	2	0	2
1,2-dichlorobenzene	3	44	2/2	2/0	4/0
1,2-dichlorobenzene	2	2	2		4
1,2,3-cd	3	33	0/2	3	
1,2,3-cd	4		2	2/2	
3-Methyl cholanthrene		56-49-5	2	2/0	0
1,2,3-cd		203	2		4

<i>PRIORITY POLLUTANTS</i>	PP #	CAS Number (if available)	Recommended Analytical Protocol	Detection (DL) ¹ <i>µg/L unless specified</i>	Quantitation Level (QL) ² <i>µg/L unless specified</i>
BASE/NEUTRAL COMPOUNDS (compounds in bold are Ecology PBTs)					
ir	2	3	2		
ir di l i	2	2	0 2	2 0	4 0
ir di pr p l i	3	2 4	0 2	0	0
ir dip l i	2	30	2	0	2 0
Perylene		198-55-0	2		
ir	2	0	2	4	2
r	4	2 00 0	2		
2,4 r l r		20 2	2		

<i>PRIORITY POLLUTANT</i>	PP #	CAS Number (if available)	Recommended Analytical Protocol	Detection (DL) ¹ <i>µg/L unless specified</i>	Quantitation Level (QL) ² <i>µg/L unless specified</i>
DIOXIN					
2,3, r l r di i i 2,3, r	2	4 0	3	3 p	p

<i>PRIORITY POLLUTANTS</i>	PP #	CAS Number (if available)	Recommended Analytical Protocol	Detection (DL) ¹ <i>µg/L unless specified</i>	Quantitation Level (QL) ² <i>µg/L unless specified</i>
PESTICIDES/PCBs					
Aldrin	01	30002	03	40	2
pp	02	344	03	30	10
	03	3	03	10	
	04		03	40	2
d	0	3	03	10	2
lrd ⁸		4	03	4	42
4,4	2	023	03	2	3
4,4	3	2	03	40	2
4,4	4	24	03		33
idrin	0	0	03	20	10
ppd			03	4	42
		3323	03	40	2
		030	03		

**Attachment C.2:
Plant Operational Characteristics**

Attachment C.2: Plant Operational Characteristics

The NuStar Vancouver Annex Terminal is a bulk storage and distribution facility for jet fuel, jet fuel components, and jet fuel additives. The scaled site map, attached below, illustrates significant facility features, including the direction of stormwater drainage, stormwater collection and conveyance features, paved areas, buildings, and each of the sampling locations. The sampling locations are identified by unique identifying outfall numbers consistent with Permit No. 6255, which covers the NuStar office building, nearby storage buildings, associated driveways and parking areas, the covered truck loading rack, the additive tank farm consisting of seven large above ground storage tanks (ASTs) contained in four containment areas, a 42,000-gallon transmix AST, smaller ASTs containing fuel additives and central pipeline containment areas, and the stormwater detention pond and the surge pond. The large ASTs are used to store jet fuel and range in capacity from 1,680,000 to 4,599,378 gallons. A system of above- and below-ground pipelines connects the ASTs to the main product transfer pipeline and truck loading rack. Two 12-inch pipelines connect the Annex to the main transfer facility located approximately 2.2 miles west at the Port of Vancouver on the Columbia River. An earthen berm separates the AST and pipeline containment areas and evaporative/infiltration basins from the surrounding on- and off-site parcels. The facility includes approximately four acres of undeveloped grass and shrub covered land west of the bermed containment areas.

There is no surface water outfall at the evaporation/infiltration area. The small amount of rainfall that collects in the oil/water separator (OWS) and external floating roof (EFR) tank bottoms and the covered truck loading rack is removed by a third-party contractor for offsite disposal (the OWS is only used to treat contact stormwater that is then hauled offsite). Otherwise, stormwater generated from different areas of the facility are handled as follows:

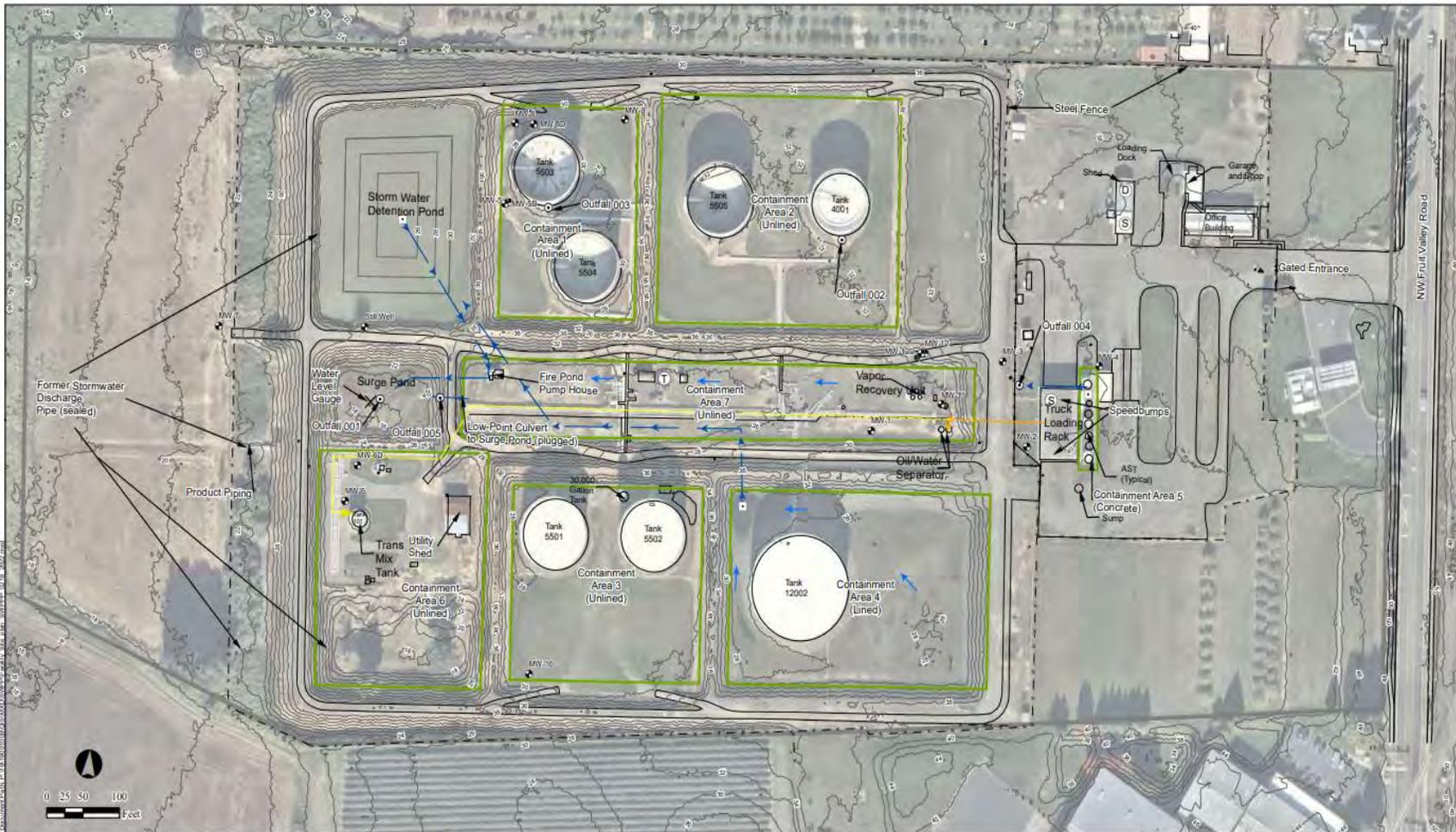
- Containment Area 4 is constructed with an HDPE liner and low-point drain. Following inspection, accumulated stormwater is pumped to the stormwater detention pond via underground piping. The lined stormwater detention pond holds water year-round. There is an unlined overflow basin adjacent to the reservoir that is connected to the stormwater detention pond by above- and below-ground piping. If needed, terminal personnel can manually discharge water from the reservoir into this overflow basin during large storm events (hence its name, “surge pond”) for infiltration. Stormwater monitored at Outfall 001 is the stormwater accumulating inside the stormwater detention pond which is discharged to the surge pond.
- Containment Area 5 is constructed of concrete and is equipped with a low-point drain. Following inspection, accumulated stormwater is manually drained onto the ground west of the truck rack and monitored as discharge through Outfall 004.
- Stormwater from the central pipeline area (Containment Area 7) generally puddles, evaporates, and/or infiltrates. All stormwater accumulations are inspected for petroleum sheen. If needed, accumulated stormwater within Containment Area 7 can be manually discharged to the surge pond. Prior to discharge to the surge pond, this stormwater is monitored as discharge through Outfall 005.

- Following inspection, stormwater from the external floating roofs is manually discharged onto the ground inside Containment Areas 1 and 2. Stormwater that is manually drained off the top of the EFR covering tank #4001 is monitored as discharge through Outfall 002. Stormwater that is manually drained off the top of the EFR covering tank #5503 is monitored as discharge through Outfall 003. Stormwater that is manually drained off the top of the EFRs covering tanks #4001 and #5503 are sent through the GAC system, monitored, then discharged through Outfalls 002 and 003, respectively.

- Containment Areas 1, 2, 3, and 6 are generally flat and any stormwater that accumulates is inspected and allowed to evaporate and/or infiltrate.

- Any stormwater that accumulates inside the covered truck loading rack area drains to the oil/water separators pending offsite disposal.

- Stormwater that falls on building roofs and paved surfaces outside of the bermed containment areas (e.g., the eastern portion of the facility and perimeter access road) sheet flows onto adjacent unpaved surfaces.



Notes:
 Base map completed from a number of sources including but not limited to: Figure VAN1-21-002 provided by NuStar (1/18/2017) and a Monitoring Well Survey by Statewide Land Surveying, Inc (10/30/2007).
 Locations of roads and containments are approximate.
 Source:
 Aerial from Mapbox.

- Groundwater Monitoring Well Location (MW-5D, MW-6D, MW-8D, and MW-12D are Deep Monitoring Well Locations)
- Low Point Drain
- Stormwater Monitoring Point/Outfall
- Drum Storage
- Spill Kit
- Transformer
- Buried Stormwater Conveyance Piping and Flow Direction
- Direction of Process Water Drainage
- Direction of Stormwater Drainage
- Direction of Process Water Drainage in the Event of a Spill
- Steel Fence
- Secondary Containment
- Facility Boundary
- 2-Foot Contour (NAVD88)

Facility Map

NuStar Terminals Operations Partnership, L.P. - Annex Terminal
 Vancouver, Washington

2/18/2022 Drawn by: ES Checked by: IM

**Attachment C.7:
Additional Incidental Materials**



Safety Data Sheet

This safety data sheet complies with the requirements of: 2012 OSHA Hazard Communication Standard (29CFR 1910.1200)

Product name ANSULITE ARC 3% or 6% AR-AFFF CONCENTRATE

1. Identification

1.1. Product Identifier

Product name ANSULITE ARC 3% or 6% AR-AFFF CONCENTRATE

1.2. Other means of identification

Product code 069282
Synonyms None
Chemical Family No information available

1.3. Recommended use of the chemical and restrictions on use

Recommended use Fire extinguishing agent
Uses advised against Consumer use

1.4. Details of the Supplier of the Safety Data Sheet

Company Name Tyco Fire Protection Products
One Stanton Street
Marinette, WI 54143-2542
Telephone: 715-735-7411

Contact point Product Stewardship at 1-715-735-7411
E-mail address psra@tycofp.com

1.5. Emergency Telephone Number

Emergency telephone CHEMTREC 800-424-9300 or 703-527-3887

2. Hazards Identification

Classification

OSHA Regulatory Status

This product is not considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

2.2. Label Elements

The product contains no substances which at their given concentration, are considered to be hazardous to health

Precautionary Statements

2.3. Hazards Not Otherwise Classified (HNOC)

Not Applicable.

2.4. OTHER INFORMATION

Unknown Acute Toxicity 5.3056% of the mixture consists of ingredient(s) of unknown toxicity

3. Composition/information on Ingredients

Revision date 25-May-2015

Version 25



Product code 069282

/ Product name ANSULITE ARC /
3% or 6% AR-AFFF
CONCENTRATE

PAGE 2 / 9

3.1. Mixture

The following component(s) in this product are considered hazardous under applicable OSHA(USA)

Chemical name	CAS No	weight-%
2-(2-Butoxyethoxy)ethanol	112-34-5	3 - 7
Lauryl Imino Propionate, Sodium Salt	14960-06-6	1 - 5

4. First aid measures

4.1. Description of first aid measures

Eye Contact	Rinse thoroughly with plenty of water for at least 15 minutes, lifting lower and upper eyelids. Consult a physician.
Skin contact	Wash skin with soap and water. Get medical attention if irritation develops and persists.
Inhalation	Remove to fresh air. If breathing is difficult, give oxygen. (Get medical attention immediately if symptoms occur.).
Ingestion	Rinse mouth. Do not induce vomiting without medical advice. If swallowed, call a poison control center or physician immediately.

4.2. Most Important Symptoms and Effects, Both Acute and Delayed

Symptoms No information available.

4.3. Indication of Any Immediate Medical Attention and Special Treatment Needed

Note to physicians Treat symptomatically.

5. Fire-fighting measures

5.1. Suitable Extinguishing Media

Product is extinguishing agent. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

5.2. Unsuitable Extinguishing Media

None.

5.3. Specific Hazards Arising from the Chemical

None known.

Hazardous Combustion Products Carbon oxides, Fluorinated oxides, Nitrogen oxides (NOx), Oxides of sulfur

5.4. Explosion Data

Sensitivity to Mechanical Impact None.

Sensitivity to Static Discharge None.

Revision date 25-May-2015

Version 25



Product code 069282

Product name ANSULITE ARC /
3% or 6% AR-AFFF
CONCENTRATE

PAGE 3 / 9

5.5. Protective Equipment and Precautions for Firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal Precautions Ensure adequate ventilation, especially in confined areas.

For emergency responders Use personal protection recommended in Section 8.

6.2. Environmental Precautions

Environmental Precautions Prevent further leakage or spillage if safe to do so. Prevent entry into waterways, sewers, basements or confined areas. See Section 12 for additional Ecological Information.

6.3. Methods and material for containment and cleaning up

Methods for Containment Prevent further leakage or spillage if safe to do so.

Methods for Cleaning Up Pick up and transfer to properly labeled containers.

7. Handling and Storage

7.1. Precautions for Safe Handling

Advice on safe handling Avoid contact with skin and eyes. Handle in accordance with good industrial hygiene and safety practice.

7.2. Conditions for safe storage, including any incompatibilities

Storage Conditions Keep containers tightly closed in a dry, cool and well-ventilated place.

Incompatible Materials Strong oxidizing agents. Strong acids. Strong bases.

8. Exposure Controls/Personal Protection

8.1. Control Parameters

Exposure guidelines

Chemical name	ACGIH TLV	OSHA PEL	NIOSH IDLH
2-(2-Butoxyethoxy)ethanol 112-34-5	TWA: 10 ppm inhalable fraction and vapor	-	-

ACGIH (American Conference of Governmental Industrial Hygienists) OSHA (Occupational Safety and Health Administration of the US Department of Labor) NIOSH IDLH Immediately Dangerous to Life or Health

8.2. Appropriate Engineering Controls

Engineering controls Showers
Eyewash stations
Ventilation systems.

8.3. Individual protection measures, such as personal protective equipment

Eye/Face Protection Avoid contact with eyes. Tight sealing safety goggles.

Revision date 25-May-2015

Version 25



Product code 069282

/ Product name ANSULITE ARC /
3% or 6% AR-AFFF
CONCENTRATE

PAGE 4 / 9

Skin and Body Protection	Wear protective gloves and protective clothing.
Respiratory Protection	If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.
Ventilation	Use local exhaust or general dilution ventilation to control exposure with applicable limits

8.4. General hygiene considerations

Do not eat, drink or smoke when using this product. Handle in accordance with good industrial hygiene and safety practice.

9. Physical and Chemical Properties

9.1. Information on basic physical and chemical properties

Physical State	Liquid	Color	Amber
Odor	Characteristic		
odor threshold	No data available		
Property	VALUES	Remarks • Method	
pH	No data available		
Melting point/freezing point	No data available		
Boiling point / boiling range	100 °C / 212 °F		
Flash Point	> 100 °C / > 212 °F		
Evaporation Rate	No data available		
flammability (solid, gas)	No data available		
Flammability limit in air			
Upper flammability limit:	No data available		
Lower flammability limit:	No data available		
Vapor Pressure	No data available		
Vapor Density	No data available		
Specific gravity	No data available		
Water Solubility	No data available		
Solubility in Other Solvents	No data available		
Partition coefficient	No data available		
Autoignition Temperature	No data available		
Decomposition Temperature	No data available		
Kinematic viscosity	No data available		
density	1.03		

10. Stability and Reactivity

10.1. Chemical Stability

Stable under recommended storage conditions.

10.2. Reactivity

No data available

Revision date 25-May-2015

Version 25



Product code 069282

/ Product name ANSULITE ARC /
3% or 6% AR-AFFF
CONCENTRATE

PAGE 5 / 9

10.3. Possibility of hazardous reactions

None under normal processing.

hazardous polymerization Hazardous polymerization does not occur.

10.4. Conditions to Avoid

Extremes of temperature and direct sunlight.

10.5. Incompatible Materials

Strong oxidizing agents. Strong acids. Strong bases.

10.6. Hazardous decomposition products

Carbon oxides. Nitrogen oxides (NOx). Oxides of sulfur. Fluorinated oxides.

11. Toxicological Information

11.1. Information on Likely Routes of Exposure

Product information	no data available
INHALATION	no data available.
Eye Contact	no data available.
Skin contact	no data available.
INGESTION	no data available.

Acute Toxicity

Chemical name	Oral LD50	dermal LD50	Inhalation LC50
2-(2-Butoxyethoxy)ethanol 112-34-5	= 3384 mg/kg (Rat)	= 2700 mg/kg (Rabbit)	-

11.2. Information on Toxicological Effects

Symptoms No information available.

11.3. Delayed and immediate effects as well as chronic effects from short and long-term exposure

sensitization	No information available.
Germ Cell Mutagenicity	No information available
carcinogenicity	No information available.
Reproductive Toxicity	No information available.
STOT - Single Exposure	No information available.
STOT - Repeated Exposure	No information available.
Aspiration Hazard	No information available.

11.4. Numerical Measures of Toxicity - Product information

The following values are calculated based on chapter 3.1 of the GHS document mg/kg

Revision date 25-May-2015

Version 25



Product code 069282

Product name ANSULITE ARC /
3% or 6% AR-AFFF
CONCENTRATE

PAGE 6 / 9

12. Ecological Information

12.1. ecotoxicity

Not classified

0% of the mixture consists of components(s) of unknown hazards to the aquatic environment

Chemical name	Algae/aquatic plants	Fish	Crustacea
2-(2-Butoxyethoxy)ethanol 112-34-5	EC50 96 h > 100 mg/L Desmodesmus subspicatus	LC50 96 h = 1300 mg/L Lepomis macrochirus static	EC50 24 h = 2850 mg/L Daphnia magna EC50 48 h > 100 mg/L Daphnia magna
2-Methyl-2,4-pentanediol 107-41-5	-	LC50 96 h 10500 - 11000 mg/L Pimephales promelas flow-through LC50 96 h = 10000 mg/L Lepomis macrochirus static LC50 96 h = 8690 mg/L Pimephales promelas flow-through LC50 96 h = 10700 mg/L Pimephales promelas static	EC50 48 h 2700 - 3700 mg/L Daphnia magna
t-Butanol 75-65-0	EC50 72 h > 1000 mg/L Desmodesmus subspicatus	LC50 96 h 6130 - 6700 mg/L Pimephales promelas flow-through	EC50 48 h = 933 mg/L Daphnia magna EC50 48 h 4607 - 6577 mg/L Daphnia magna Static
Sodium chloride 7647-14-5	-	LC50 96 h 5560 - 6080 mg/L Lepomis macrochirus flow-through LC50 96 h = 12946 mg/L Lepomis macrochirus static LC50 96 h 6020 - 7070 mg/L Pimephales promelas static LC50 96 h = 7050 mg/L Pimephales promelas semi-static LC50 96 h 6420 - 6700 mg/L Pimephales promelas static LC50 96 h 4747 - 7824 mg/L Oncorhynchus mykiss flow-through	EC50 48 h = 1000 mg/L Daphnia magna EC50 48 h 340.7 - 469.2 mg/L Daphnia magna Static
n-Butanol 71-36-3	EC50 72 h > 500 mg/L Desmodesmus subspicatus EC50 96 h > 500 mg/L Desmodesmus subspicatus	LC50 96 h = 1910000 µg/L Pimephales promelas static LC50 96 h 100000 - 500000 µg/L Lepomis macrochirus static LC50 96 h = 1740 mg/L Pimephales promelas flow-through LC50 96 h 1730 - 1910 mg/L Pimephales promelas static	EC50 48 h = 1983 mg/L Daphnia magna EC50 48 h 1897 - 2072 mg/L Daphnia magna Static
Sodium Hydrogen Carbonate 144-55-8	EC50 120 h = 650 mg/L Nitzschia linearis	LC50 96 h 8250 - 9000 mg/L Lepomis macrochirus static	EC50 48 h = 2350 mg/L Daphnia magna
Hexamethylenetetramine 100-97-0	-	LC50 96 h 44600 - 55600 mg/L Pimephales promelas flow-through	EC50 48 h 29868 - 43390 mg/L Daphnia magna
Methylene chloride 75-09-2	EC50 96 h > 500 mg/L Pseudokirchneriella subcapitata EC50 72 h > 500 mg/L Pseudokirchneriella subcapitata	LC50 96 h 140.8 - 277.8 mg/L Pimephales promelas flow-through LC50 96 h 262 - 855 mg/L Pimephales promelas static LC50 96 h = 193 mg/L Lepomis macrochirus static LC50 96 h = 193 mg/L Lepomis macrochirus flow-through	EC50 48 h 1532 - 1847 mg/L Daphnia magna Static EC50 48 h = 190 mg/L Daphnia magna



Product code 069282

/ Product name ANSULITE ARC /
3% or 6% AR-AFFF
CONCENTRATE

PAGE 7 / 9

1,3-Dichloropropene 542-75-6	EC50 96 h 2.45 - 6.45 mg/L Pseudokirchneriella subcapitata EC50 72 h 3.12 - 10.5 mg/L Pseudokirchneriella subcapitata	LC50 96 h 1.52 - 2.68 mg/L Pimephales promelas static LC50 96 h 0.211 - 0.271 mg/L Pimephales promelas flow-through LC50 96 h 3.1 - 4.9 mg/L Oncorhynchus mykiss static LC50 96 h = 4.5 mg/L Oncorhynchus mykiss semi-static LC50 96 h = 2 mg/L Oncorhynchus mykiss LC50 96 h 5.1 - 6.8 mg/L Lepomis macrochirus static	EC50 48 h 0.063 - 0.129 mg/L Daphnia magna Static EC50 48 h = 0.09 mg/L Daphnia magna
---------------------------------	--	---	---

12.2. Persistence and Degradability

No information available.

12.3. Bioaccumulation

No information available.

12.4. Other Adverse Effects

No information available

13. Disposal Considerations

13.1. Waste Treatment Methods

Disposal of wastes

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Contaminated Packaging

Do not reuse container.

14. Transport Information

DOT NOT REGULATED

TDG NOT REGULATED

MEX NOT REGULATED

ICAO (air) NOT REGULATED

IATA NOT REGULATED

IMDG NOT REGULATED

15. Regulatory Information

15.1. International Inventories

TSCA Complies
DSL/NDSL Complies

Revision date 25-May-2015

Version 25



Product code 069282

/ Product name ANSULITE ARC /
3% or 6% AR-AFFF
CONCENTRATE

PAGE 8 / 9

ENCS	Does not comply
IECSC	Does not comply
KECL	Does not comply
PICCS	Does not comply
AICS	Complies

Legend:

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
 DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
 ENCS - Japan Existing and New Chemical Substances
 IECSC - China Inventory of Existing Chemical Substances
 KECL - Korean Existing and Evaluated Chemical Substances
 PICCS - Philippines Inventory of Chemicals and Chemical Substances
 AICS - Australian Inventory of Chemical Substances

15.2. US Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

Chemical name	SARA 313 - Threshold Values %
2-(2-Butoxyethoxy)ethanol - 112-34-5	1.0

SARA 311/312 Hazard Categories

Acute Health Hazard	No
Chronic health hazard	No
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

CWA (Clean Water Act)

This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

CERCLA

This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material

15.3. US State Regulations

California Proposition 65

This product contains the following Proposition 65 chemicals

Chemical name	California Proposition 65
Methylene chloride - 75-09-2	Carcinogen
1,3-Dichloropropene - 542-75-6	Carcinogen

U.S. State Right-to-Know Regulations

Chemical name	New Jersey	Massachusetts	Pennsylvania
2-(2-Butoxyethoxy)ethanol 112-34-5	X	-	X



Product code 069282

/ Product name ANSULITE ARC /
3% or 6% AR-AFFF
CONCENTRATE

PAGE 9 / 9

1-(3-Chloroallyl)-3,5,7-triaza-1-azoni a Adamantane chloride 4080-31-3	X	-	-
Hexamethylenetetramine 100-97-0	X	-	-
Methylene chloride 75-09-2	X	X	X
1,3-Dichloropropene 542-75-6	X	X	X

16. Other information, including date of preparation of the last revision

NFPA Health Hazards 0 flammability 0 Instability 0 Physical and chemical properties -
HMIS Health Hazards 0 flammability 0 Physical Hazards 0 Personal Protection X

Revision date 25-May-2015

Revision note
No information available

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

End of Safety Data Sheet

Revision date 25-May-2015

Version 25

**Attachment E.4:
Results of Effluent Testing**



ANALYTICAL REPORT

Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

Thursday, January 19, 2023

Kurt Harrington
GeoEngineers - Portland
5820 S Kelly Ave Unit B
Portland, OR 97239

RE: A3A0137 - Nustar Vannex - SW1Q23 - [none]

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

Enclosed are the results of analyses for work order A3A0137, which was received by the laboratory on 1/3/2023 at 2:35:00PM.

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

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

Cooler Receipt Information

(See Cooler Receipt Form for details)

Default Cooler 3.1 degC

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

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



Apex Laboratories

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Darrell Auvil, Client Services Manager



ANALYTICAL REPORT

Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

GeoEngineers - Portland 5820 S Kelly Ave Unit B Portland, OR 97239	Project: Nustar Vannex - SW1Q23 Project Number: [none] Project Manager: Kurt Harrington	Report ID: A3A0137 - 01 19 23 1204
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ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
OF-003	A3A0137-01	Water	01/03/23 12:10	01/03/23 14:35
OF-002	A3A0137-02	Water	01/03/23 13:00	01/03/23 14:35
OF-004	A3A0137-03	Water	01/03/23 13:45	01/03/23 14:35

Apex Laboratories

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Darrell Auvil, Client Services Manager



ANALYTICAL REPORT

Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

GeoEngineers - Portland 5820 S Kelly Ave Unit B Portland, OR 97239	Project: Nustar Vannex - SW1Q23 Project Number: [none] Project Manager: Kurt Harrington	Report ID: A3A0137 - 01 19 23 1204
---	--	--

ANALYTICAL REPORT FOR SAMPLES

FIELD DATA (Provided by Sampler)

Lab Number	Sample Name	<u>Conductivity</u>	<u>pH</u>	<u>@Temp(C)</u>	<u>Flow</u> (gal/min)	<u>Residual Cl</u> (mg/L)	<u>Turbidity</u> (NTU)
A3A0137-01	OF-003	---	7.0	8.3	---	---	---
A3A0137-02	OF-002	---	7.3	8.3	---	---	---
A3A0137-03	OF-004	---	6.8	7.3	---	---	---

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ANALYTICAL SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
OF-003 (A3A0137-01)			Matrix: Water			Batch: 23A0401		
Diesel	ND	---	0.0762	mg/L	1	01/13/23 08:42	NWTPH-Dx LL	
Oil	ND	---	0.152	mg/L	1	01/13/23 08:42	NWTPH-Dx LL	
<i>Surrogate: o-Terphenyl (Surr)</i>		<i>Recovery: 105 %</i>		<i>Limits: 50-150 %</i>		<i>1</i>	<i>01/13/23 08:42</i>	<i>NWTPH-Dx LL</i>
OF-002 (A3A0137-02)			Matrix: Water			Batch: 23A0401		
Diesel	ND	---	0.0762	mg/L	1	01/13/23 09:06	NWTPH-Dx LL	
Oil	ND	---	0.152	mg/L	1	01/13/23 09:06	NWTPH-Dx LL	
<i>Surrogate: o-Terphenyl (Surr)</i>		<i>Recovery: 86 %</i>		<i>Limits: 50-150 %</i>		<i>1</i>	<i>01/13/23 09:06</i>	<i>NWTPH-Dx LL</i>
OF-004 (A3A0137-03)			Matrix: Water			Batch: 23A0401		
Diesel	ND	---	0.0762	mg/L	1	01/13/23 09:29	NWTPH-Dx LL	
Oil	ND	---	0.152	mg/L	1	01/13/23 09:29	NWTPH-Dx LL	
<i>Surrogate: o-Terphenyl (Surr)</i>		<i>Recovery: 105 %</i>		<i>Limits: 50-150 %</i>		<i>1</i>	<i>01/13/23 09:29</i>	<i>NWTPH-Dx LL</i>

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---	--	--

ANALYTICAL SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
OF-003 (A3A0137-01)			Matrix: Water			Batch: 23A0019		
Gasoline Range Organics	ND	---	0.100	mg/L	1	01/03/23 20:50	NWTPH-Gx (MS)	
<i>Surrogate: 4-Bromofluorobenzene (Sur)</i>			<i>Recovery: 97 %</i>	<i>Limits: 50-150 %</i>	<i>1</i>	<i>01/03/23 20:50</i>	<i>NWTPH-Gx (MS)</i>	
<i>1,4-Difluorobenzene (Sur)</i>			<i>111 %</i>	<i>50-150 %</i>	<i>1</i>	<i>01/03/23 20:50</i>	<i>NWTPH-Gx (MS)</i>	
OF-002 (A3A0137-02)			Matrix: Water			Batch: 23A0019		
Gasoline Range Organics	ND	---	0.100	mg/L	1	01/03/23 21:18	NWTPH-Gx (MS)	
<i>Surrogate: 4-Bromofluorobenzene (Sur)</i>			<i>Recovery: 97 %</i>	<i>Limits: 50-150 %</i>	<i>1</i>	<i>01/03/23 21:18</i>	<i>NWTPH-Gx (MS)</i>	
<i>1,4-Difluorobenzene (Sur)</i>			<i>110 %</i>	<i>50-150 %</i>	<i>1</i>	<i>01/03/23 21:18</i>	<i>NWTPH-Gx (MS)</i>	
OF-004 (A3A0137-03)			Matrix: Water			Batch: 23A0019		
Gasoline Range Organics	ND	---	0.100	mg/L	1	01/03/23 21:45	NWTPH-Gx (MS)	
<i>Surrogate: 4-Bromofluorobenzene (Sur)</i>			<i>Recovery: 100 %</i>	<i>Limits: 50-150 %</i>	<i>1</i>	<i>01/03/23 21:45</i>	<i>NWTPH-Gx (MS)</i>	
<i>1,4-Difluorobenzene (Sur)</i>			<i>110 %</i>	<i>50-150 %</i>	<i>1</i>	<i>01/03/23 21:45</i>	<i>NWTPH-Gx (MS)</i>	

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---	--	--

ANALYTICAL SAMPLE RESULTS

BTEX Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
OF-003 (A3A0137-01)			Matrix: Water			Batch: 23A0019		
Benzene	ND	---	0.200	ug/L	1	01/03/23 20:50	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	01/03/23 20:50	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	01/03/23 20:50	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	01/03/23 20:50	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 103 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>01/03/23 20:50</i>	<i>EPA 8260D</i>
<i>Toluene-d8 (Surr)</i>		<i>102 %</i>		<i>80-120 %</i>		<i>1</i>	<i>01/03/23 20:50</i>	<i>EPA 8260D</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>103 %</i>		<i>80-120 %</i>		<i>1</i>	<i>01/03/23 20:50</i>	<i>EPA 8260D</i>
OF-002 (A3A0137-02)			Matrix: Water			Batch: 23A0019		
Benzene	ND	---	0.200	ug/L	1	01/03/23 21:18	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	01/03/23 21:18	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	01/03/23 21:18	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	01/03/23 21:18	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 103 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>01/03/23 21:18</i>	<i>EPA 8260D</i>
<i>Toluene-d8 (Surr)</i>		<i>101 %</i>		<i>80-120 %</i>		<i>1</i>	<i>01/03/23 21:18</i>	<i>EPA 8260D</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>103 %</i>		<i>80-120 %</i>		<i>1</i>	<i>01/03/23 21:18</i>	<i>EPA 8260D</i>
OF-004 (A3A0137-03)			Matrix: Water			Batch: 23A0019		
Benzene	ND	---	0.200	ug/L	1	01/03/23 21:45	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	01/03/23 21:45	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	01/03/23 21:45	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	01/03/23 21:45	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 103 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>01/03/23 21:45</i>	<i>EPA 8260D</i>
<i>Toluene-d8 (Surr)</i>		<i>101 %</i>		<i>80-120 %</i>		<i>1</i>	<i>01/03/23 21:45</i>	<i>EPA 8260D</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>104 %</i>		<i>80-120 %</i>		<i>1</i>	<i>01/03/23 21:45</i>	<i>EPA 8260D</i>

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GeoEngineers - Portland 5820 S Kelly Ave Unit B Portland, OR 97239	Project: Nustar Vannex - SW1Q23 Project Number: [none] Project Manager: Kurt Harrington	Report ID: A3A0137 - 01 19 23 1204
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ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 200.8 (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes	
OF-003 (A3A0137-01)					Matrix: Water				
Batch: 23A0436									
Arsenic	0.0176	---	0.00100	mg/L	1	01/13/23 19:36	EPA 200.8		
Barium	0.0104	---	0.00200	mg/L	1	01/13/23 19:36	EPA 200.8		
Copper	ND	---	0.00200	mg/L	1	01/13/23 19:36	EPA 200.8		
Lead	ND	---	0.000200	mg/L	1	01/13/23 19:36	EPA 200.8		
Zinc	ND	---	0.00400	mg/L	1	01/13/23 19:36	EPA 200.8		
OF-002 (A3A0137-02)					Matrix: Water				
Batch: 23A0436									
Arsenic	0.0870	---	0.00100	mg/L	1	01/13/23 19:43	EPA 200.8		
Barium	0.0640	---	0.00200	mg/L	1	01/13/23 19:43	EPA 200.8		
Copper	ND	---	0.00200	mg/L	1	01/13/23 19:43	EPA 200.8		
Lead	ND	---	0.000200	mg/L	1	01/13/23 19:43	EPA 200.8		
Zinc	ND	---	0.00400	mg/L	1	01/13/23 19:43	EPA 200.8		
OF-004 (A3A0137-03)					Matrix: Water				
Batch: 23A0436									
Arsenic	ND	---	0.00100	mg/L	1	01/13/23 19:48	EPA 200.8		
Barium	0.00209	---	0.00200	mg/L	1	01/13/23 19:48	EPA 200.8		
Copper	0.00282	---	0.00200	mg/L	1	01/13/23 19:48	EPA 200.8		
Lead	0.000243	---	0.000200	mg/L	1	01/13/23 19:48	EPA 200.8		
Zinc	0.0743	---	0.00400	mg/L	1	01/13/23 19:48	EPA 200.8		

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QUALITY CONTROL (QC) SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23A0401 - EPA 3510C (Fuels/Acid Ext.)						Water						
Blank (23A0401-BLK1)			Prepared: 01/12/23 10:52 Analyzed: 01/13/23 07:52									
<u>NWTPH-Dx LL</u>												
Diesel	ND	---	0.0800	mg/L	1	---	---	---	---	---	---	
Oil	ND	---	0.160	mg/L	1	---	---	---	---	---	---	
<i>Surr: o-Terphenyl (Surr)</i>		<i>Recovery: 94 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
LCS (23A0401-BS1)			Prepared: 01/12/23 10:52 Analyzed: 01/13/23 08:13									
<u>NWTPH-Dx LL</u>												
Diesel	0.520	---	0.0800	mg/L	1	0.500	---	104	36-132%	---	---	
<i>Surr: o-Terphenyl (Surr)</i>		<i>Recovery: 101 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
LCS Dup (23A0401-BSD1)			Prepared: 01/12/23 10:52 Analyzed: 01/13/23 08:33									
<u>NWTPH-Dx LL</u>												
Diesel	0.478	---	0.0800	mg/L	1	0.500	---	96	36-132%	9	30%	Q-19
<i>Surr: o-Terphenyl (Surr)</i>		<i>Recovery: 93 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						

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QUALITY CONTROL (QC) SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23A0019 - EPA 5030C						Water						
Blank (23A0019-BLK1)			Prepared: 01/03/23 10:56 Analyzed: 01/03/23 13:29									
<u>NWTPH-Gx (MS)</u>												
Gasoline Range Organics	ND	---	0.100	mg/L	1	---	---	---	---	---	---	
<i>Surr: 4-Bromofluorobenzene (Sur)</i>		<i>Recovery: 92 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
<i>1,4-Difluorobenzene (Sur)</i>		<i>106 %</i>		<i>50-150 %</i>		<i>"</i>						
LCS (23A0019-BS2)			Prepared: 01/03/23 10:56 Analyzed: 01/03/23 13:02									
<u>NWTPH-Gx (MS)</u>												
Gasoline Range Organics	0.519	---	0.100	mg/L	1	0.500	---	104	80-120%	---	---	
<i>Surr: 4-Bromofluorobenzene (Sur)</i>		<i>Recovery: 97 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
<i>1,4-Difluorobenzene (Sur)</i>		<i>104 %</i>		<i>50-150 %</i>		<i>"</i>						
Duplicate (23A0019-DUP1)			Prepared: 01/03/23 10:56 Analyzed: 01/03/23 18:05									
<u>QC Source Sample: Non-SDG (A2L1089-01)</u>												
Gasoline Range Organics	ND	---	0.100	mg/L	1	---	ND	---	---	---	30%	
<i>Surr: 4-Bromofluorobenzene (Sur)</i>		<i>Recovery: 97 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
<i>1,4-Difluorobenzene (Sur)</i>		<i>110 %</i>		<i>50-150 %</i>		<i>"</i>						

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QUALITY CONTROL (QC) SAMPLE RESULTS

BTEX Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23A0019 - EPA 5030C						Water						
Blank (23A0019-BLK1)			Prepared: 01/03/23 10:56 Analyzed: 01/03/23 13:29									
<u>EPA 8260D</u>												
Benzene	ND	---	0.200	ug/L	1	---	---	---	---	---	---	
Toluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Ethylbenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Xylenes, total	ND	---	1.50	ug/L	1	---	---	---	---	---	---	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 101 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>102 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>104 %</i>		<i>80-120 %</i>		<i>"</i>						
LCS (23A0019-BS1)						Prepared: 01/03/23 10:56 Analyzed: 01/03/23 12:26						
<u>EPA 8260D</u>												
Benzene	18.7	---	0.200	ug/L	1	20.0	---	94	80-120%	---	---	
Toluene	18.0	---	1.00	ug/L	1	20.0	---	90	80-120%	---	---	
Ethylbenzene	19.3	---	0.500	ug/L	1	20.0	---	96	80-120%	---	---	
Xylenes, total	57.3	---	1.50	ug/L	1	60.0	---	96	80-120%	---	---	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 99 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>100 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>93 %</i>		<i>80-120 %</i>		<i>"</i>						
Duplicate (23A0019-DUP1)						Prepared: 01/03/23 10:56 Analyzed: 01/03/23 18:05						
<u>QC Source Sample: Non-SDG (A2L1089-01)</u>												
Benzene	ND	---	0.200	ug/L	1	---	ND	---	---	---	30%	
Toluene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Ethylbenzene	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Xylenes, total	ND	---	1.50	ug/L	1	---	ND	---	---	---	30%	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 102 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>102 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>102 %</i>		<i>80-120 %</i>		<i>"</i>						
Matrix Spike (23A0019-MS1)						Prepared: 01/03/23 10:56 Analyzed: 01/04/23 00:30						
<u>QC Source Sample: Non-SDG (A2L1091-01)</u>												
<u>EPA 8260D</u>												
Benzene	41400	---	400	ug/L	2000	40000	ND	103	79-120%	---	---	

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QUALITY CONTROL (QC) SAMPLE RESULTS

BTEX Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes	
Batch 23A0019 - EPA 5030C						Water							
Matrix Spike (23A0019-MS1)			Prepared: 01/03/23 10:56 Analyzed: 01/04/23 00:30						T-02				
QC Source Sample: Non-SDG (A2L1091-01)													
Toluene	38700	---	2000	ug/L	2000	40000	ND	97	80-121%	---	---		
Ethylbenzene	42200	---	1000	ug/L	2000	40000	ND	105	79-121%	---	---		
Xylenes, total	124000	---	3000	ug/L	2000	120000	ND	104	79-121%	---	---		
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 100 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>							
<i>Toluene-d8 (Surr)</i>		<i>99 %</i>		<i>80-120 %</i>		<i>"</i>							
<i>4-Bromofluorobenzene (Surr)</i>		<i>91 %</i>		<i>80-120 %</i>		<i>"</i>							

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ORELAP ID: OR100062

GeoEngineers - Portland 5820 S Kelly Ave Unit B Portland, OR 97239	Project: Nustar Vannex - SW1Q23 Project Number: [none] Project Manager: Kurt Harrington	Report ID: A3A0137 - 01 19 23 1204
---	--	--

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 200.8 (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23A0436 - EPA 3015A						Water						
Blank (23A0436-BLK1)			Prepared: 01/13/23 07:15 Analyzed: 01/13/23 18:31									
<u>EPA 200.8</u>												
Arsenic	ND	---	0.00100	mg/L	1	---	---	---	---	---	---	
Barium	ND	---	0.00200	mg/L	1	---	---	---	---	---	---	
Copper	ND	---	0.00200	mg/L	1	---	---	---	---	---	---	
Lead	ND	---	0.000200	mg/L	1	---	---	---	---	---	---	
Blank (23A0436-BLK2)			Prepared: 01/13/23 07:15 Analyzed: 01/16/23 19:07									
<u>EPA 200.8</u>												
Zinc	ND	---	0.00400	mg/L	1	---	---	---	---	---	---	Q-16
LCS (23A0436-BS1)			Prepared: 01/13/23 07:15 Analyzed: 01/13/23 18:36									
<u>EPA 200.8</u>												
Arsenic	0.0567	---	0.00100	mg/L	1	0.0556	---	102	85-115%	---	---	
Barium	0.0589	---	0.00200	mg/L	1	0.0556	---	106	85-115%	---	---	
Copper	0.0575	---	0.00200	mg/L	1	0.0556	---	103	85-115%	---	---	
Lead	0.0575	---	0.000200	mg/L	1	0.0556	---	103	85-115%	---	---	
Zinc	0.0578	---	0.00400	mg/L	1	0.0556	---	104	85-115%	---	---	
Duplicate (23A0436-DUP1)			Prepared: 01/13/23 07:15 Analyzed: 01/13/23 18:46									
<u>QC Source Sample: Non-SDG (A3A0121-01)</u>												
Arsenic	ND	---	0.00100	mg/L	1	---	ND	---	---	---	20%	
Barium	0.00451	---	0.00200	mg/L	1	---	0.00440	---	---	2	20%	
Copper	0.306	---	0.00200	mg/L	1	---	0.303	---	---	0.8	20%	
Lead	ND	---	0.000200	mg/L	1	---	ND	---	---	---	20%	
Duplicate (23A0436-DUP3)			Prepared: 01/13/23 07:15 Analyzed: 01/17/23 12:57									
<u>QC Source Sample: Non-SDG (A3A0121-01RE2)</u>												
Zinc	0.00517	---	0.00400	mg/L	1	---	0.00561	---	---	8	20%	Q-16
Matrix Spike (23A0436-MS1)			Prepared: 01/13/23 07:15 Analyzed: 01/13/23 19:06									
<u>QC Source Sample: Non-SDG (A3A0128-01)</u>												
<u>EPA 200.8</u>												
Arsenic	0.107	---	0.00100	mg/L	1	0.0556	0.0484	105	70-130%	---	---	

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Darrell Auvil, Client Services Manager



ANALYTICAL REPORT

Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

GeoEngineers - Portland 5820 S Kelly Ave Unit B Portland, OR 97239	Project: Nustar Vannex - SW1Q23 Project Number: [none] Project Manager: Kurt Harrington	Report ID: A3A0137 - 01 19 23 1204
---	--	--

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 200.8 (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23A0436 - EPA 3015A						Water						
Matrix Spike (23A0436-MS1)			Prepared: 01/13/23 07:15 Analyzed: 01/13/23 19:06									
QC Source Sample: Non-SDG (A3A0128-01)												
Barium	0.107	---	0.00200	mg/L	1	0.0556	0.0483	105	70-130%	---	---	
Copper	0.0583	---	0.00200	mg/L	1	0.0556	ND	105	70-130%	---	---	
Lead	0.0571	---	0.000200	mg/L	1	0.0556	0.000604	102	70-130%	---	---	
Zinc	0.0626	---	0.00400	mg/L	1	0.0556	ND	113	70-130%	---	---	
Matrix Spike (23A0436-MS2)			Prepared: 01/13/23 07:15 Analyzed: 01/13/23 19:31									
QC Source Sample: Non-SDG (A3A0130-02)												
EPA 200.8												
Arsenic	0.103	---	0.00100	mg/L	1	0.0556	0.0469	100	70-130%	---	---	
Barium	0.106	---	0.00200	mg/L	1	0.0556	0.0487	103	70-130%	---	---	
Copper	0.0568	---	0.00200	mg/L	1	0.0556	ND	102	70-130%	---	---	
Lead	0.0565	---	0.000200	mg/L	1	0.0556	0.000606	101	70-130%	---	---	
Zinc	0.0579	---	0.00400	mg/L	1	0.0556	0.00203	101	70-130%	---	---	

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GeoEngineers - Portland 5820 S Kelly Ave Unit B Portland, OR 97239	Project: Nustar Vannex - SW1Q23 Project Number: [none] Project Manager: Kurt Harrington	Report ID: A3A0137 - 01 19 23 1204
---	--	---

SAMPLE PREPARATION INFORMATION

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Prep: EPA 3510C (Fuels/Acid Ext.)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 23A0401</u>							
A3A0137-01	Water	NWTPH-Dx LL	01/03/23 12:10	01/12/23 10:52	1050mL/2mL	1000mL/2mL	0.95
A3A0137-02	Water	NWTPH-Dx LL	01/03/23 13:00	01/12/23 10:52	1050mL/2mL	1000mL/2mL	0.95
A3A0137-03	Water	NWTPH-Dx LL	01/03/23 13:45	01/12/23 10:52	1050mL/2mL	1000mL/2mL	0.95

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Prep: EPA 5030C

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 23A0019</u>							
A3A0137-01	Water	NWTPH-Gx (MS)	01/03/23 12:10	01/03/23 17:00	5mL/5mL	5mL/5mL	1.00
A3A0137-02	Water	NWTPH-Gx (MS)	01/03/23 13:00	01/03/23 17:00	5mL/5mL	5mL/5mL	1.00
A3A0137-03	Water	NWTPH-Gx (MS)	01/03/23 13:45	01/03/23 17:00	5mL/5mL	5mL/5mL	1.00

BTEX Compounds by EPA 8260D

Prep: EPA 5030C

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 23A0019</u>							
A3A0137-01	Water	EPA 8260D	01/03/23 12:10	01/03/23 17:00	5mL/5mL	5mL/5mL	1.00
A3A0137-02	Water	EPA 8260D	01/03/23 13:00	01/03/23 17:00	5mL/5mL	5mL/5mL	1.00
A3A0137-03	Water	EPA 8260D	01/03/23 13:45	01/03/23 17:00	5mL/5mL	5mL/5mL	1.00

Total Metals by EPA 200.8 (ICPMS)

Prep: EPA 3015A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 23A0436</u>							
A3A0137-01	Water	EPA 200.8	01/03/23 12:10	01/13/23 07:15	45mL/50mL	45mL/50mL	1.00
A3A0137-02	Water	EPA 200.8	01/03/23 13:00	01/13/23 07:15	45mL/50mL	45mL/50mL	1.00
A3A0137-03	Water	EPA 200.8	01/03/23 13:45	01/13/23 07:15	45mL/50mL	45mL/50mL	1.00

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Darrell Auvil, Client Services Manager



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ORELAP ID: OR100062

GeoEngineers - Portland 5820 S Kelly Ave Unit B Portland, OR 97239	Project: Nustar Vannex - SW1Q23 Project Number: [none] Project Manager: Kurt Harrington	Report ID: A3A0137 - 01 19 23 1204
---	--	--

QUALIFIER DEFINITIONS

Client Sample and Quality Control (QC) Sample Qualifier Definitions:

Apex Laboratories

- Q-16** Reanalysis of an original Batch QC sample.
- Q-19** Blank Spike Duplicate (BSD) sample analyzed in place of Matrix Spike/Duplicate samples due to limited sample amount available for analysis.
- T-02** This Batch QC sample was analyzed outside of the method specified 12 hour analysis window. Results are estimated.

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GeoEngineers - Portland 5820 S Kelly Ave Unit B Portland, OR 97239	Project: Nustar Vannex - SW1Q23 Project Number: [none] Project Manager: Kurt Harrington	Report ID: A3A0137 - 01 19 23 1204
---	--	--

REPORTING NOTES AND CONVENTIONS:

Abbreviations:

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported
- RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

Detection Limits: Limit of Detection (LOD)

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

Reporting Limits: Limit of Quantitation (LOQ)

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

Reporting Conventions:

- Basis: Results for soil samples are generally reported on a 100% dry weight basis.
The Result Basis is listed following the units as " dry", " wet", or " " (blank) designation.
- " dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")
See Percent Solids section for details of dry weight analysis.
- " wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
- " " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

QC Source:

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

Miscellaneous Notes:

- " --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- " *** " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Blanks:

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to ½ the Reporting Limit (RL).
-For Blank hits falling between ½ the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.
For further details, please request a copy of this document.

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ANALYTICAL REPORT

Apex Laboratories, LLC

6700 S.W. Sandburg Street
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503-718-2323
ORELAP ID: OR100062

Table with 3 columns: Client/Address, Project/Manager, and Report ID. Client: GeoEngineers - Portland, 5820 S Kelly Ave Unit B, Portland, OR 97239. Project: Nustar Vannex - SW1Q23, Project Number: [none], Project Manager: Kurt Harrington. Report ID: A3A0137 - 01 19 23 1204.

REPORTING NOTES AND CONVENTIONS (Cont.):

Blanks (Cont.):

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

Preparation Notes:

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

Sampling and Preservation Notes:

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

Apex Laboratories

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Darrell Auvil, Client Services Manager



ANALYTICAL REPORT

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6700 S.W. Sandburg Street
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503-718-2323
ORELAP ID: OR100062

Table with 3 columns: Client/Location, Project/Manager, and Report ID. Client: GeoEngineers - Portland, 5820 S Kelly Ave Unit B, Portland, OR 97239. Project: Nustar Vannex - SW1Q23, Project Number: [none], Project Manager: Kurt Harrington. Report ID: A3A0137 - 01 19 23 1204.

LABORATORY ACCREDITATION INFORMATION

ORELAP Certification ID: OR100062 (Primary Accreditation) -
EPA ID: OR01039

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

Apex Laboratories

Table header with columns: Matrix, Analysis, TNI_ID, Analyte, TNI_ID, Accreditation

All reported analytes are included in Apex Laboratories' current ORELAP scope.

Secondary Accreditations

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

Subcontract Laboratory Accreditations

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

Field Testing Parameters

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

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Darrell Auvil, Client Services Manager



ANALYTICAL REPORT

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ORELAP ID: OR100062

GeoEngineers - Portland 5820 S Kelly Ave Unit B Portland, OR 97239	Project: Nustar Vannex - SW1Q23 Project Number: [none] Project Manager: Kurt Harrington	Report ID: A3A0137 - 01 19 23 1204
---	---	--

APEX LABS
6700 SW Sandburg St., Tigard, OR 97223 Ph: 503-718-2323

CHAIN OF CUSTODY

Company: GeoEngineers Project Mgr: Kurt Harrington Project Name: Nustar Vannex - SW1Q23

Address: _____ Phone: _____ Email: harrington@geoengineers.com

Lab # A3A0137 COC 1 of 1

SAMPLE ID	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-BCID	NWTPH-DX	NWTPH-GX	8260 BTEX	8260 RBDM VOCs	8260 Halo VOCs	8260 VOCs Full List	8270 SIM PAHs	8270 Semi-Vols Full List	8082 PCBs	8081 Pesticides	RCRA Metals (8)	Priority Metals (13)	Al, Sh, Cd, Cr, Fe, Hg, Mn, Ni, Pb, Se, Tl, V, Zn	TOTAL DISS. SOL. (TCLP)	TCLP Metals (8)	Hold Sample	Frozen Archive	
																							ANALYSIS REQUEST
OF-003	1/3	12:00	W	1		✓		✓															
OF-002	1/3	13:00		1		↓		↓															
OF-004	1/3	13:45		1		↓		↓															
TB								H															

RELINQUISHED BY: Signature: [Signature] Date: 1/3/23
 Printed Name: Jon W. Harrington Time: 14:55
 Company: Geo Eng

RECEIVED BY: Signature: [Signature] Date: 1/3/23
 Printed Name: Eric Dyer Time: 14:55
 Company: APEX LABS

SPECIAL INSTRUCTIONS:
1 day TAT on Gr, BTEX
Standard on others
Field parameters measured using Hoch handheld
calibrated to mfg. specs 1/3/23

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Darrell Auvil, Client Services Manager



ANALYTICAL REPORT

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GeoEngineers - Portland 5820 S Kelly Ave Unit B Portland, OR 97239	Project: Nustar Vannex - SW1Q23 Project Number: [none] Project Manager: Kurt Harrington	Report ID: A3A0137 - 01 19 23 1204
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APEX LABS COOLER RECEIPT FORM

Client: GeoEngineers Element WO#: A3A 0137

Project/Project #: Nustar Vannex SW 1Q23

Delivery Info:
 Date/time received: 1/3/23 @ 1455 By: EST

Delivered by: Apex Client ESS FedEx UPS Radio Morgan SDS Evergreen Other

Cooler Inspection Date/time inspected: 1/3/23 @ 1458 By: EST

Chain of Custody included? Yes No

Signed/dated by client? Yes No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	<u>3.1</u>						
Custody seals? (Y/N)	<u>N</u>						
Received on ice? (Y/N)	<u>Y</u>						
Temp. blanks? (Y/N)	<u>Y</u>						
Ice type: (Gel/Real/Other)	<u>Real</u>						
Condition (In/Out):	<u>In</u>						

Cooler out of temp? (Y/N) Possible reason why: _____

Green dots applied to out of temperature samples? Yes No

Out of temperature samples form initiated? Yes No

Sample Inspection: Date/time inspected: 1.3.23 @ 1505 By: DSS

All samples intact? Yes No Comments: 1

Bottle labels/COCs agree? Yes No Comments: _____

COC/container discrepancies form initiated? Yes No

Containers/volumes received appropriate for analysis? Yes No Comments: _____

Do VOA vials have visible headspace? Yes No NA

Comments: _____

Water samples: pH checked: Yes No NA pH appropriate? Yes No NA

Comments: _____

Additional information: # 3223

 Labeled by: DSS Witness: [Signature] Cooler Inspected by: DSS Form Y-003 R-00

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ANALYTICAL REPORT

Apex Laboratories, LLC

6700 S.W. Sandburg Street
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503-718-2323
ORELAP ID: OR100062

Monday, April 24, 2023

Kurt Harrington
GeoEngineers - Portland
5820 S Kelly Ave Unit B
Portland, OR 97239

RE: A3D0951 - Nustar Vannex - SW2Q23 - [none]

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

Enclosed are the results of analyses for work order A3D0951, which was received by the laboratory on 4/7/2023 at 12:20:00PM.

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

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

Cooler Receipt Information

(See Cooler Receipt Form for details)

Default Cooler 4.8 degC

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

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



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ANALYTICAL REPORT

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ORELAP ID: OR100062

GeoEngineers - Portland 5820 S Kelly Ave Unit B Portland, OR 97239	Project: Nustar Vannex - SW2Q23 Project Number: [none] Project Manager: Kurt Harrington	Report ID: A3D0951 - 04 24 23 1612
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ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
Det. Pond	A3D0951-01	Water	04/07/23 10:20	04/07/23 12:20

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GeoEngineers - Portland 5820 S Kelly Ave Unit B Portland, OR 97239	Project: <u>Nustar Vannex - SW2Q23</u> Project Number: [none] Project Manager: Kurt Harrington	Report ID: A3D0951 - 04 24 23 1612
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ANALYTICAL REPORT FOR SAMPLES

FIELD DATA (Provided by Sampler)

Lab Number	Sample Name	<u>Conductivity</u>	<u>pH</u>	<u>@Temp(C)</u>	<u>Flow</u> (gal/min)	<u>Residual Cl</u> (mg/L)	<u>Turbidity</u> (NTU)
A3D0951-01	Det. Pond	---	7.9	12.2	---	---	---

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---	--	---

ANALYTICAL SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
Det. Pond (A3D0951-01)			Matrix: Water			Batch: 23D0697		
Diesel	ND	---	0.0825	mg/L	1	04/19/23 14:42	NWTPH-Dx LL	
Oil	ND	---	0.165	mg/L	1	04/19/23 14:42	NWTPH-Dx LL	
<i>Surrogate: o-Terphenyl (Surr)</i>		<i>Recovery: 99 %</i>		<i>Limits: 50-150 %</i>		<i>1</i>	<i>04/19/23 14:42</i>	<i>NWTPH-Dx LL</i>

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GeoEngineers - Portland 5820 S Kelly Ave Unit B Portland, OR 97239	Project: Nustar Vannex - SW2Q23 Project Number: [none] Project Manager: Kurt Harrington	Report ID: A3D0951 - 04 24 23 1612
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ANALYTICAL SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
Det. Pond (A3D0951-01RE1)			Matrix: Water			Batch: 23D0310		
Gasoline Range Organics	ND	---	0.100	mg/L	1	04/10/23 21:09	NWTPH-Gx (MS)	
<i>Surrogate: 4-Bromofluorobenzene (Sur)</i>		<i>Recovery: 97 %</i>		<i>Limits: 50-150 %</i>		<i>1</i>	<i>04/10/23 21:09</i>	<i>NWTPH-Gx (MS)</i>
<i>1,4-Difluorobenzene (Sur)</i>		<i>97 %</i>		<i>50-150 %</i>		<i>1</i>	<i>04/10/23 21:09</i>	<i>NWTPH-Gx (MS)</i>

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ANALYTICAL REPORT

Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

GeoEngineers - Portland 5820 S Kelly Ave Unit B Portland, OR 97239	Project: Nustar Vannex - SW2Q23 Project Number: [none] Project Manager: Kurt Harrington	Report ID: A3D0951 - 04 24 23 1612
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ANALYTICAL SAMPLE RESULTS

BTEX Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
Det. Pond (A3D0951-01RE1)			Matrix: Water			Batch: 23D0310		
Benzene	ND	---	0.200	ug/L	1	04/10/23 21:09	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	04/10/23 21:09	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	04/10/23 21:09	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	04/10/23 21:09	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 107 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>04/10/23 21:09</i>	<i>EPA 8260D</i>
<i>Toluene-d8 (Surr)</i>		<i>98 %</i>		<i>80-120 %</i>		<i>1</i>	<i>04/10/23 21:09</i>	<i>EPA 8260D</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>114 %</i>		<i>80-120 %</i>		<i>1</i>	<i>04/10/23 21:09</i>	<i>EPA 8260D</i>

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ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 200.8 (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes	
Det. Pond (A3D0951-01)					Matrix: Water				
Batch: 23D0702									
Arsenic	ND	---	0.00100	mg/L	1	04/18/23 18:54	EPA 200.8		
Barium	0.0106	---	0.00200	mg/L	1	04/18/23 18:54	EPA 200.8		
Copper	ND	---	0.00200	mg/L	1	04/18/23 18:54	EPA 200.8		
Lead	0.000220	---	0.000200	mg/L	1	04/18/23 18:54	EPA 200.8		
Det. Pond (A3D0951-01RE1)					Matrix: Water				
Batch: 23D0702									
Zinc	ND	---	0.00400	mg/L	1	04/19/23 14:29	EPA 200.8		

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QUALITY CONTROL (QC) SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23D0697 - EPA 3510C (Fuels/Acid Ext.)						Water						
Blank (23D0697-BLK1)			Prepared: 04/18/23 09:13 Analyzed: 04/19/23 08:12									
<u>NWTPH-Dx LL</u>												
Diesel	ND	---	0.0800	mg/L	1	---	---	---	---	---	---	
Oil	ND	---	0.160	mg/L	1	---	---	---	---	---	---	
<i>Surr: o-Terphenyl (Surr)</i>		<i>Recovery: 86 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
LCS (23D0697-BS1)			Prepared: 04/18/23 09:13 Analyzed: 04/19/23 08:36									
<u>NWTPH-Dx LL</u>												
Diesel	0.368	---	0.0800	mg/L	1	0.500	---	74	36-132%	---	---	
<i>Surr: o-Terphenyl (Surr)</i>		<i>Recovery: 84 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
LCS Dup (23D0697-BSD1)			Prepared: 04/18/23 09:13 Analyzed: 04/19/23 09:00									Q-19
<u>NWTPH-Dx LL</u>												
Diesel	0.344	---	0.0800	mg/L	1	0.500	---	69	36-132%	7	30%	
<i>Surr: o-Terphenyl (Surr)</i>		<i>Recovery: 87 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						

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QUALITY CONTROL (QC) SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23D0257 - EPA 5030C						Water						
Blank (23D0257-BLK1)			Prepared: 04/07/23 09:36 Analyzed: 04/07/23 11:41									
<u>NWTPH-Gx (MS)</u>												
Gasoline Range Organics	ND	---	0.100	mg/L	1	---	---	---	---	---	---	
<i>Surr: 4-Bromofluorobenzene (Sur)</i>		<i>Recovery: 96 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
<i>1,4-Difluorobenzene (Sur)</i>		<i>99 %</i>		<i>50-150 %</i>		<i>"</i>						
LCS (23D0257-BS2)			Prepared: 04/07/23 09:36 Analyzed: 04/07/23 10:35									
<u>NWTPH-Gx (MS)</u>												
Gasoline Range Organics	0.472	---	0.100	mg/L	1	0.500	---	94	80-120%	---	---	
<i>Surr: 4-Bromofluorobenzene (Sur)</i>		<i>Recovery: 95 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
<i>1,4-Difluorobenzene (Sur)</i>		<i>96 %</i>		<i>50-150 %</i>		<i>"</i>						
Duplicate (23D0257-DUP1)			Prepared: 04/07/23 09:36 Analyzed: 04/07/23 18:45									
<u>QC Source Sample: Non-SDG (A3D0891-01)</u>												
Gasoline Range Organics	ND	---	10.0	mg/L	100	---	ND	---	---	---	30%	
<i>Surr: 4-Bromofluorobenzene (Sur)</i>		<i>Recovery: 89 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
<i>1,4-Difluorobenzene (Sur)</i>		<i>87 %</i>		<i>50-150 %</i>		<i>"</i>						

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GeoEngineers - Portland 5820 S Kelly Ave Unit B Portland, OR 97239	Project: Nustar Vannex - SW2Q23 Project Number: [none] Project Manager: Kurt Harrington	Report ID: A3D0951 - 04 24 23 1612
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QUALITY CONTROL (QC) SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23D0310 - EPA 5030C						Water						
Blank (23D0310-BLK1)			Prepared: 04/10/23 12:00 Analyzed: 04/10/23 14:50									
<u>NWTPH-Gx (MS)</u>												
Gasoline Range Organics	ND	---	0.100	mg/L	1	---	---	---	---	---	---	
<i>Surr: 4-Bromofluorobenzene (Sur)</i>		<i>Recovery: 94 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
<i>1,4-Difluorobenzene (Sur)</i>		<i>96 %</i>		<i>50-150 %</i>		<i>"</i>						
LCS (23D0310-BS2)			Prepared: 04/10/23 12:00 Analyzed: 04/10/23 14:22									
<u>NWTPH-Gx (MS)</u>												
Gasoline Range Organics	0.423	---	0.100	mg/L	1	0.500	---	85	80-120%	---	---	
<i>Surr: 4-Bromofluorobenzene (Sur)</i>		<i>Recovery: 98 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
<i>1,4-Difluorobenzene (Sur)</i>		<i>94 %</i>		<i>50-150 %</i>		<i>"</i>						
Duplicate (23D0310-DUP1)			Prepared: 04/10/23 13:14 Analyzed: 04/10/23 16:38									
<u>QC Source Sample: Non-SDG (A3D0859-01)</u>												
Gasoline Range Organics	ND	---	1.00	mg/L	10	---	0.523	---	---	***	30%	
<i>Surr: 4-Bromofluorobenzene (Sur)</i>		<i>Recovery: 96 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
<i>1,4-Difluorobenzene (Sur)</i>		<i>96 %</i>		<i>50-150 %</i>		<i>"</i>						

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QUALITY CONTROL (QC) SAMPLE RESULTS

BTEX Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23D0257 - EPA 5030C						Water						
Blank (23D0257-BLK1)			Prepared: 04/07/23 09:36 Analyzed: 04/07/23 11:41									
<u>EPA 8260D</u>												
Benzene	ND	---	0.200	ug/L	1	---	---	---	---	---	---	
Toluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Ethylbenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Xylenes, total	ND	---	1.50	ug/L	1	---	---	---	---	---	---	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 99 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>99 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>103 %</i>		<i>80-120 %</i>		<i>"</i>						
LCS (23D0257-BS1)						Prepared: 04/07/23 09:36 Analyzed: 04/07/23 10:13						
<u>EPA 8260D</u>												
Benzene	19.7	---	0.200	ug/L	1	20.0	---	99	80-120%	---	---	
Toluene	20.1	---	1.00	ug/L	1	20.0	---	100	80-120%	---	---	
Ethylbenzene	22.0	---	0.500	ug/L	1	20.0	---	110	80-120%	---	---	
Xylenes, total	70.4	---	1.50	ug/L	1	60.0	---	117	80-120%	---	---	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 95 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>97 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>98 %</i>		<i>80-120 %</i>		<i>"</i>						
Duplicate (23D0257-DUP1)						Prepared: 04/07/23 09:36 Analyzed: 04/07/23 18:45						
<u>QC Source Sample: Non-SDG (A3D0891-01)</u>												
Benzene	ND	---	20.0	ug/L	100	---	12.0	---	---	---	*** 30%	
Toluene	ND	---	100	ug/L	100	---	ND	---	---	---	---	30%
Ethylbenzene	ND	---	50.0	ug/L	100	---	ND	---	---	---	---	30%
Xylenes, total	ND	---	150	ug/L	100	---	ND	---	---	---	---	30%
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 96 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>97 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>109 %</i>		<i>80-120 %</i>		<i>"</i>						
Matrix Spike (23D0257-MS2)						Prepared: 04/07/23 09:36 Analyzed: 04/07/23 22:28						
<u>QC Source Sample: Non-SDG (A3D0949-01)</u>												
<u>EPA 8260D</u>												
Benzene	19.1	---	0.200	ug/L	1	20.0	ND	95	79-120%	---	---	

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GeoEngineers - Portland 5820 S Kelly Ave Unit B Portland, OR 97239	Project: Nustar Vannex - SW2Q23 Project Number: [none] Project Manager: Kurt Harrington	Report ID: A3D0951 - 04 24 23 1612
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QUALITY CONTROL (QC) SAMPLE RESULTS

BTEX Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23D0257 - EPA 5030C						Water						
Matrix Spike (23D0257-MS2)						Prepared: 04/07/23 09:36 Analyzed: 04/07/23 22:28						T-02
QC Source Sample: Non-SDG (A3D0949-01)												
Toluene	20.4	---	1.00	ug/L	1	20.0	ND	102	80-121%	---	---	
Ethylbenzene	22.3	---	0.500	ug/L	1	20.0	ND	112	79-121%	---	---	
Xylenes, total	76.7	---	1.50	ug/L	1	60.0	2.77	123	79-121%	---	---	Q-01
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 97 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>94 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>112 %</i>		<i>80-120 %</i>		<i>"</i>						

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QUALITY CONTROL (QC) SAMPLE RESULTS

BTEX Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23D0310 - EPA 5030C						Water						
Blank (23D0310-BLK1)			Prepared: 04/10/23 12:00 Analyzed: 04/10/23 14:50									
<u>EPA 8260D</u>												
Benzene	ND	---	0.200	ug/L	1	---	---	---	---	---	---	
Toluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Ethylbenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Xylenes, total	ND	---	1.50	ug/L	1	---	---	---	---	---	---	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 106 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>97 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>116 %</i>		<i>80-120 %</i>		<i>"</i>						
LCS (23D0310-BS1)						Prepared: 04/10/23 12:00 Analyzed: 04/10/23 13:34						
<u>EPA 8260D</u>												
Benzene	18.5	---	0.200	ug/L	1	20.0	---	92	80-120%	---	---	
Toluene	17.8	---	1.00	ug/L	1	20.0	---	89	80-120%	---	---	
Ethylbenzene	17.7	---	0.500	ug/L	1	20.0	---	89	80-120%	---	---	
Xylenes, total	53.9	---	1.50	ug/L	1	60.0	---	90	80-120%	---	---	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 104 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>96 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>101 %</i>		<i>80-120 %</i>		<i>"</i>						
Duplicate (23D0310-DUP1)						Prepared: 04/10/23 13:14 Analyzed: 04/10/23 16:38						
<u>QC Source Sample: Non-SDG (A3D0859-01)</u>												
Benzene	ND	---	2.00	ug/L	10	---	ND	---	---	---	30%	
Toluene	ND	---	10.0	ug/L	10	---	ND	---	---	---	30%	
Ethylbenzene	ND	---	5.00	ug/L	10	---	ND	---	---	---	30%	
Xylenes, total	ND	---	15.0	ug/L	10	---	ND	---	---	---	30%	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 105 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>98 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>113 %</i>		<i>80-120 %</i>		<i>"</i>						
Matrix Spike (23D0310-MS1)						Prepared: 04/10/23 13:14 Analyzed: 04/10/23 23:24						
<u>QC Source Sample: Non-SDG (A3D0963-05)</u>												
<u>EPA 8260D</u>												
Benzene	204	---	2.00	ug/L	10	200	ND	102	79-120%	---	---	

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QUALITY CONTROL (QC) SAMPLE RESULTS

BTEX Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23D0310 - EPA 5030C						Water						
Matrix Spike (23D0310-MS1)						Prepared: 04/10/23 13:14 Analyzed: 04/10/23 23:24						
QC Source Sample: Non-SDG (A3D0963-05)												
Toluene	190	---	10.0	ug/L	10	200	ND	95	80-121%	---	---	
Ethylbenzene	192	---	5.00	ug/L	10	200	ND	96	79-121%	---	---	
Xylenes, total	575	---	15.0	ug/L	10	600	ND	96	79-121%	---	---	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 106 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>95 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>100 %</i>		<i>80-120 %</i>		<i>"</i>						

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Tigard, OR 97223
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ORELAP ID: OR100062

GeoEngineers - Portland 5820 S Kelly Ave Unit B Portland, OR 97239	Project: Nustar Vannex - SW2Q23 Project Number: [none] Project Manager: Kurt Harrington	Report ID: A3D0951 - 04 24 23 1612
---	--	--

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 200.8 (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23D0702 - EPA 3015A						Water						
Blank (23D0702-BLK1)			Prepared: 04/18/23 10:22 Analyzed: 04/18/23 18:10									
<u>EPA 200.8</u>												
Arsenic	ND	---	0.00100	mg/L	1	---	---	---	---	---	---	
Barium	ND	---	0.00200	mg/L	1	---	---	---	---	---	---	
Copper	ND	---	0.00200	mg/L	1	---	---	---	---	---	---	
Lead	ND	---	0.000200	mg/L	1	---	---	---	---	---	---	
Blank (23D0702-BLK2)			Prepared: 04/18/23 10:22 Analyzed: 04/19/23 14:24									
<u>EPA 200.8</u>												
Zinc	ND	---	0.00400	mg/L	1	---	---	---	---	---	---	Q-16
LCS (23D0702-BS1)			Prepared: 04/18/23 10:22 Analyzed: 04/18/23 18:15									
<u>EPA 200.8</u>												
Arsenic	0.0535	---	0.00100	mg/L	1	0.0556	---	96	85-115%	---	---	
Barium	0.0558	---	0.00200	mg/L	1	0.0556	---	100	85-115%	---	---	
Copper	0.0535	---	0.00200	mg/L	1	0.0556	---	96	85-115%	---	---	
Lead	0.0572	---	0.000200	mg/L	1	0.0556	---	103	85-115%	---	---	
Zinc	0.0551	---	0.0224	mg/L	1	0.0556	---	99	85-115%	---	---	
Duplicate (23D0702-DUP1)			Prepared: 04/18/23 10:22 Analyzed: 04/18/23 18:39									
<u>QC Source Sample: Non-SDG (A3D0935-01)</u>												
Arsenic	ND	---	0.00100	mg/L	1	---	ND	---	---	---	20%	
Barium	0.0110	---	0.00200	mg/L	1	---	0.0102	---	---	8	20%	
Copper	0.00588	---	0.00200	mg/L	1	---	0.00564	---	---	4	20%	
Lead	0.00303	---	0.000200	mg/L	1	---	0.00292	---	---	3	20%	
Zinc	0.0652	---	0.0224	mg/L	1	---	0.0656	---	---	0.5	20%	
Matrix Spike (23D0702-MS1)			Prepared: 04/18/23 10:22 Analyzed: 04/18/23 18:44									
<u>QC Source Sample: Non-SDG (A3D0935-01)</u>												
<u>EPA 200.8</u>												
Arsenic	0.0536	---	0.00100	mg/L	1	0.0556	ND	96	70-130%	---	---	
Barium	0.0683	---	0.00200	mg/L	1	0.0556	0.0102	105	70-130%	---	---	
Copper	0.0586	---	0.00200	mg/L	1	0.0556	0.00564	95	70-130%	---	---	
Lead	0.0595	---	0.000200	mg/L	1	0.0556	0.00292	102	70-130%	---	---	

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Darrell Auvil, Client Services Manager



ANALYTICAL REPORT

Apex Laboratories, LLC

6700 S.W. Sandburg Street
 Tigard, OR 97223
 503-718-2323
 ORELAP ID: OR100062

GeoEngineers - Portland 5820 S Kelly Ave Unit B Portland, OR 97239	Project: <u>Nustar Vannex - SW2Q23</u> Project Number: [none] Project Manager: Kurt Harrington	Report ID: A3D0951 - 04 24 23 1612
---	---	--

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 200.8 (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23D0702 - EPA 3015A						Water						
Matrix Spike (23D0702-MS1)			Prepared: 04/18/23 10:22 Analyzed: 04/18/23 18:44									
QC Source Sample: Non-SDG (A3D0935-01)												
Zinc	0.121	---	0.0224	mg/L	1	0.0556	0.0656	100	70-130%	---	---	

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GeoEngineers - Portland 5820 S Kelly Ave Unit B Portland, OR 97239	Project: Nustar Vannex - SW2Q23 Project Number: [none] Project Manager: Kurt Harrington	Report ID: A3D0951 - 04 24 23 1612
---	--	---

SAMPLE PREPARATION INFORMATION

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Prep: EPA 3510C (Fuels/Acid Ext.)					Sample	Default	RL Prep
Lab Number	Matrix	Method	Sampled	Prepared	Initial/Final	Initial/Final	Factor
<u>Batch: 23D0697</u>							
A3D0951-01	Water	NWTPH-Dx LL	04/07/23 10:20	04/18/23 11:07	970mL/2mL	1000mL/2mL	1.03

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Prep: EPA 5030C					Sample	Default	RL Prep
Lab Number	Matrix	Method	Sampled	Prepared	Initial/Final	Initial/Final	Factor
<u>Batch: 23D0310</u>							
A3D0951-01RE1	Water	NWTPH-Gx (MS)	04/07/23 10:20	04/10/23 13:14	5mL/5mL	5mL/5mL	1.00

BTEX Compounds by EPA 8260D

Prep: EPA 5030C					Sample	Default	RL Prep
Lab Number	Matrix	Method	Sampled	Prepared	Initial/Final	Initial/Final	Factor
<u>Batch: 23D0310</u>							
A3D0951-01RE1	Water	EPA 8260D	04/07/23 10:20	04/10/23 13:14	5mL/5mL	5mL/5mL	1.00

Total Metals by EPA 200.8 (ICPMS)

Prep: EPA 3015A					Sample	Default	RL Prep
Lab Number	Matrix	Method	Sampled	Prepared	Initial/Final	Initial/Final	Factor
<u>Batch: 23D0702</u>							
A3D0951-01	Water	EPA 200.8	04/07/23 10:20	04/18/23 10:22	45mL/50mL	45mL/50mL	1.00
A3D0951-01RE1	Water	EPA 200.8	04/07/23 10:20	04/18/23 10:22	45mL/50mL	45mL/50mL	1.00

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503-718-2323
ORELAP ID: OR100062

GeoEngineers - Portland

5820 S Kelly Ave Unit B
Portland, OR 97239

Project: **Nustar Vannex - SW2Q23**

Project Number: [none]

Project Manager: Kurt Harrington

Report ID:

A3D0951 - 04 24 23 1612

QUALIFIER DEFINITIONS

Client Sample and Quality Control (QC) Sample Qualifier Definitions:

Apex Laboratories

- Q-01** Spike recovery and/or RPD is outside acceptance limits.
- Q-16** Reanalysis of an original Batch QC sample.
- Q-19** Blank Spike Duplicate (BSD) sample analyzed in place of Matrix Spike/Duplicate samples due to limited sample amount available for analysis.
- T-02** This Batch QC sample was analyzed outside of the method specified 12 hour analysis window. Results are estimated.

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GeoEngineers - Portland 5820 S Kelly Ave Unit B Portland, OR 97239	Project: Nustar Vannex - SW2Q23 Project Number: [none] Project Manager: Kurt Harrington	Report ID: A3D0951 - 04 24 23 1612
---	--	--

REPORTING NOTES AND CONVENTIONS:

Abbreviations:

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported
- RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

Detection Limits: Limit of Detection (LOD)

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

Reporting Limits: Limit of Quantitation (LOQ)

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

Reporting Conventions:

- Basis: Results for soil samples are generally reported on a 100% dry weight basis.
The Result Basis is listed following the units as " dry", " wet", or " " (blank) designation.
- " dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")
See Percent Solids section for details of dry weight analysis.
- " wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
- " " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

QC Source:

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

Miscellaneous Notes:

- " --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- " *** " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Blanks:

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to ½ the Reporting Limit (RL).
-For Blank hits falling between ½ the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.
For further details, please request a copy of this document.

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Darrell Auvil, Client Services Manager



ANALYTICAL REPORT

Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

Table with 3 columns: Client info (GeoEngineers - Portland), Project info (Project: Nustar Vannex - SW2Q23), and Report ID (A3D0951 - 04 24 23 1612)

REPORTING NOTES AND CONVENTIONS (Cont.):

Blanks (Cont.):

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

Preparation Notes:

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

Sampling and Preservation Notes:

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

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Handwritten signature of Darrell Auvil

Darrell Auvil, Client Services Manager



ANALYTICAL REPORT

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

Table with 3 columns: Client/Location, Project, and Report ID. Client: GeoEngineers - Portland, 5820 S Kelly Ave Unit B, Portland, OR 97239. Project: Nustar Vannex - SW2Q23, Project Number: [none], Project Manager: Kurt Harrington. Report ID: A3D0951 - 04 24 23 1612.

LABORATORY ACCREDITATION INFORMATION

ORELAP Certification ID: OR100062 (Primary Accreditation) -
EPA ID: OR01039

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

Apex Laboratories

Table header with columns: Matrix, Analysis, TNI_ID, Analyte, TNI_ID, Accreditation

All reported analytes are included in Apex Laboratories' current ORELAP scope.

Secondary Accreditations

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

Subcontract Laboratory Accreditations

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

Field Testing Parameters

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

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Handwritten signature of Darrell Auvil

Darrell Auvil, Client Services Manager



ANALYTICAL REPORT

Apex Laboratories, LLC

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GeoEngineers - Portland 5820 S Kelly Ave Unit B Portland, OR 97239	Project: Nustar Vannex - SW2Q23 Project Number: [none] Project Manager: Kurt Harrington	Report ID: A3D0951 - 04 24 23 1612
---	--	--

APEX LABS COOLER RECEIPT FORM

Client: GeoEngineers Element WO#: A3 00951

Project/Project #: Nustar Vannex SW 2Q23

Delivery Info:
Date/time received: 4/2/23 @ 1220 By: KMS
Delivered by: Apex Client ESS FedEx UPS Radio Morgan SDS Evergreen Other

Cooler Inspection Date/time inspected: 4/2/23 @ 1220 By: KMS
Chain of Custody included? Yes No 5417
Signed/dated by client? Yes No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	<u>4.8</u>						
Custody seals? (Y/N)	<u>N</u>						
Received on ice? (Y/N)	<u>Y</u>						
Temp. blanks? (Y/N)	<u>N</u>						
Ice type: (Gel/Real/Other)	<u>Real</u>						
Condition (In/Out):	<u>In</u>						

Cooler out of temp? (Y/N) Possible reason why: _____
Green dots applied to out of temperature samples? Yes No
Out of temperature samples form initiated? Yes No

Sample Inspection: Date/time inspected: 4/2/23 @ 1300 By: DJS
All samples intact? Yes No Comments: _____
Bottle labels/COCs agree? Yes No Comments: _____
COC/container discrepancies form initiated? Yes No
Containers/volumes received appropriate for analysis? Yes No Comments: _____
Do VOA vials have visible headspace? Yes No NA
Comments: _____
Water samples: pH checked: Yes No NA pH appropriate? Yes No NA
Comments: _____

Additional information: _____

Labeled by: DJS Witness: [Signature] Cooler Inspected by: [Signature]

Form Y-003 R-00

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ANALYTICAL REPORT

Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

Monday, April 24, 2023

Kurt Harrington
GeoEngineers - Portland
5820 S Kelly Ave Unit B
Portland, OR 97239

RE: A3D0953 - Nustar Vannex - SW2Q23 - [none]

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

Enclosed are the results of analyses for work order A3D0953, which was received by the laboratory on 4/7/2023 at 12:20:00PM.

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

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

Cooler Receipt Information

(See Cooler Receipt Form for details)

Default Cooler 4.8 degC

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

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



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Darrell Auvil, Client Services Manager



ANALYTICAL REPORT

Apex Laboratories, LLC

6700 S.W. Sandburg Street
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503-718-2323
ORELAP ID: OR100062

GeoEngineers - Portland 5820 S Kelly Ave Unit B Portland, OR 97239	Project: <u>Nustar Vannex - SW2Q23</u> Project Number: [none] Project Manager: Kurt Harrington	Report ID: A3D0953 - 04 24 23 1459
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ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
OF-002	A3D0953-01	Water	04/07/23 09:50	04/07/23 12:20

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GeoEngineers - Portland 5820 S Kelly Ave Unit B Portland, OR 97239	Project: <u>Nustar Vannex - SW2Q23</u> Project Number: [none] Project Manager: Kurt Harrington	Report ID: A3D0953 - 04 24 23 1459
---	---	--

ANALYTICAL REPORT FOR SAMPLES

FIELD DATA (Provided by Sampler)

Lab Number	Sample Name	<u>Conductivity</u>	<u>pH</u>	<u>@Temp(C)</u>	<u>Flow</u> (gal/min)	<u>Residual Cl</u> (mg/L)	<u>Turbidity</u> (NTU)
A3D0953-01	OF-002	---	7.3	11.5	---	---	---

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---	--	---

ANALYTICAL SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
OF-002 (A3D0953-01)				Matrix: Water		Batch: 23D0697		
Diesel	ND	---	0.0769	mg/L	1	04/19/23 15:48	NWTPH-Dx LL	
Oil	ND	---	0.154	mg/L	1	04/19/23 15:48	NWTPH-Dx LL	
<i>Surrogate: o-Terphenyl (Surr)</i>		<i>Recovery: 109 %</i>		<i>Limits: 50-150 %</i>		<i>1</i>	<i>04/19/23 15:48</i>	<i>NWTPH-Dx LL</i>

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GeoEngineers - Portland 5820 S Kelly Ave Unit B Portland, OR 97239	Project: Nustar Vannex - SW2Q23 Project Number: [none] Project Manager: Kurt Harrington	Report ID: A3D0953 - 04 24 23 1459
---	--	---

ANALYTICAL SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
OF-002 (A3D0953-01RE1)				Matrix: Water		Batch: 23D0310		
Gasoline Range Organics	ND	---	0.100	mg/L	1	04/10/23 21:36	NWTPH-Gx (MS)	
<i>Surrogate: 4-Bromofluorobenzene (Sur)</i>		<i>Recovery: 96 %</i>		<i>Limits: 50-150 %</i>		<i>1</i>	<i>04/10/23 21:36</i>	<i>NWTPH-Gx (MS)</i>
<i>1,4-Difluorobenzene (Sur)</i>		<i>94 %</i>		<i>50-150 %</i>		<i>1</i>	<i>04/10/23 21:36</i>	<i>NWTPH-Gx (MS)</i>

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---	--	--

ANALYTICAL SAMPLE RESULTS

BTEX Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
OF-002 (A3D0953-01RE1)			Matrix: Water			Batch: 23D0310		
Benzene	ND	---	0.200	ug/L	1	04/10/23 21:36	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	04/10/23 21:36	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	04/10/23 21:36	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	04/10/23 21:36	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 105 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>04/10/23 21:36</i>	<i>EPA 8260D</i>
<i>Toluene-d8 (Surr)</i>		<i>97 %</i>		<i>80-120 %</i>		<i>1</i>	<i>04/10/23 21:36</i>	<i>EPA 8260D</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>113 %</i>		<i>80-120 %</i>		<i>1</i>	<i>04/10/23 21:36</i>	<i>EPA 8260D</i>

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ANALYTICAL REPORT

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503-718-2323
ORELAP ID: OR100062

GeoEngineers - Portland 5820 S Kelly Ave Unit B Portland, OR 97239	Project: Nustar Vannex - SW2Q23 Project Number: [none] Project Manager: Kurt Harrington	Report ID: A3D0953 - 04 24 23 1459
---	--	---

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 200.8 (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes	
OF-002 (A3D0953-01)		Matrix: Water							
Batch: 23D0702									
Arsenic	0.0171	---	0.00100	mg/L	1	04/18/23 18:59	EPA 200.8		
Barium	0.0605	---	0.00200	mg/L	1	04/18/23 18:59	EPA 200.8		
Copper	ND	---	0.00200	mg/L	1	04/18/23 18:59	EPA 200.8		
Lead	ND	---	0.000200	mg/L	1	04/18/23 18:59	EPA 200.8		
Zinc	0.127	---	0.0224	mg/L	1	04/18/23 18:59	EPA 200.8		

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Darrell Auvil, Client Services Manager



ANALYTICAL REPORT

Apex Laboratories, LLC

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 503-718-2323
 ORELAP ID: OR100062

GeoEngineers - Portland 5820 S Kelly Ave Unit B Portland, OR 97239	Project: Nustar Vannex - SW2Q23 Project Number: [none] Project Manager: Kurt Harrington	Report ID: A3D0953 - 04 24 23 1459
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QUALITY CONTROL (QC) SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23D0697 - EPA 3510C (Fuels/Acid Ext.)						Water						
Blank (23D0697-BLK1)			Prepared: 04/18/23 09:13 Analyzed: 04/19/23 08:12									
<u>NWTPH-Dx LL</u>												
Diesel	ND	---	0.0800	mg/L	1	---	---	---	---	---	---	
Oil	ND	---	0.160	mg/L	1	---	---	---	---	---	---	
<i>Surr: o-Terphenyl (Surr)</i>		<i>Recovery: 86 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
LCS (23D0697-BS1)			Prepared: 04/18/23 09:13 Analyzed: 04/19/23 08:36									
<u>NWTPH-Dx LL</u>												
Diesel	0.368	---	0.0800	mg/L	1	0.500	---	74	36-132%	---	---	
<i>Surr: o-Terphenyl (Surr)</i>		<i>Recovery: 84 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
LCS Dup (23D0697-BSD1)			Prepared: 04/18/23 09:13 Analyzed: 04/19/23 09:00 Q-19									
<u>NWTPH-Dx LL</u>												
Diesel	0.344	---	0.0800	mg/L	1	0.500	---	69	36-132%	7	30%	
<i>Surr: o-Terphenyl (Surr)</i>		<i>Recovery: 87 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						

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QUALITY CONTROL (QC) SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23D0257 - EPA 5030C						Water						
Blank (23D0257-BLK1)			Prepared: 04/07/23 09:36 Analyzed: 04/07/23 11:41									
<u>NWTPH-Gx (MS)</u>												
Gasoline Range Organics	ND	---	0.100	mg/L	1	---	---	---	---	---	---	
<i>Surr: 4-Bromofluorobenzene (Sur)</i>		<i>Recovery: 96 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
<i>1,4-Difluorobenzene (Sur)</i>		<i>99 %</i>		<i>50-150 %</i>		<i>"</i>						
LCS (23D0257-BS2)			Prepared: 04/07/23 09:36 Analyzed: 04/07/23 10:35									
<u>NWTPH-Gx (MS)</u>												
Gasoline Range Organics	0.472	---	0.100	mg/L	1	0.500	---	94	80-120%	---	---	
<i>Surr: 4-Bromofluorobenzene (Sur)</i>		<i>Recovery: 95 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
<i>1,4-Difluorobenzene (Sur)</i>		<i>96 %</i>		<i>50-150 %</i>		<i>"</i>						
Duplicate (23D0257-DUP1)			Prepared: 04/07/23 09:36 Analyzed: 04/07/23 18:45									
<u>QC Source Sample: Non-SDG (A3D0891-01)</u>												
Gasoline Range Organics	ND	---	10.0	mg/L	100	---	ND	---	---	---	30%	
<i>Surr: 4-Bromofluorobenzene (Sur)</i>		<i>Recovery: 89 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
<i>1,4-Difluorobenzene (Sur)</i>		<i>87 %</i>		<i>50-150 %</i>		<i>"</i>						

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---	--	--

QUALITY CONTROL (QC) SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23D0310 - EPA 5030C						Water						
Blank (23D0310-BLK1)			Prepared: 04/10/23 12:00 Analyzed: 04/10/23 14:50									
<u>NWTPH-Gx (MS)</u>												
Gasoline Range Organics	ND	---	0.100	mg/L	1	---	---	---	---	---	---	
<i>Surr: 4-Bromofluorobenzene (Sur)</i>		<i>Recovery: 94 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
<i>1,4-Difluorobenzene (Sur)</i>		<i>96 %</i>		<i>50-150 %</i>		<i>"</i>						
LCS (23D0310-BS2)			Prepared: 04/10/23 12:00 Analyzed: 04/10/23 14:22									
<u>NWTPH-Gx (MS)</u>												
Gasoline Range Organics	0.423	---	0.100	mg/L	1	0.500	---	85	80-120%	---	---	
<i>Surr: 4-Bromofluorobenzene (Sur)</i>		<i>Recovery: 98 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
<i>1,4-Difluorobenzene (Sur)</i>		<i>94 %</i>		<i>50-150 %</i>		<i>"</i>						
Duplicate (23D0310-DUP1)			Prepared: 04/10/23 13:14 Analyzed: 04/10/23 16:38									
<u>QC Source Sample: Non-SDG (A3D0859-01)</u>												
Gasoline Range Organics	ND	---	1.00	mg/L	10	---	0.523	---	---	***	30%	
<i>Surr: 4-Bromofluorobenzene (Sur)</i>		<i>Recovery: 96 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
<i>1,4-Difluorobenzene (Sur)</i>		<i>96 %</i>		<i>50-150 %</i>		<i>"</i>						

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QUALITY CONTROL (QC) SAMPLE RESULTS

BTEX Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23D0257 - EPA 5030C						Water						
Blank (23D0257-BLK1)			Prepared: 04/07/23 09:36 Analyzed: 04/07/23 11:41									
<u>EPA 8260D</u>												
Benzene	ND	---	0.200	ug/L	1	---	---	---	---	---	---	
Toluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Ethylbenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Xylenes, total	ND	---	1.50	ug/L	1	---	---	---	---	---	---	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 99 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>99 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>103 %</i>		<i>80-120 %</i>		<i>"</i>						
LCS (23D0257-BS1)			Prepared: 04/07/23 09:36 Analyzed: 04/07/23 10:13									
<u>EPA 8260D</u>												
Benzene	19.7	---	0.200	ug/L	1	20.0	---	99	80-120%	---	---	
Toluene	20.1	---	1.00	ug/L	1	20.0	---	100	80-120%	---	---	
Ethylbenzene	22.0	---	0.500	ug/L	1	20.0	---	110	80-120%	---	---	
Xylenes, total	70.4	---	1.50	ug/L	1	60.0	---	117	80-120%	---	---	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 95 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>97 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>98 %</i>		<i>80-120 %</i>		<i>"</i>						
Duplicate (23D0257-DUP1)			Prepared: 04/07/23 09:36 Analyzed: 04/07/23 18:45									
<u>QC Source Sample: Non-SDG (A3D0891-01)</u>												
Benzene	ND	---	20.0	ug/L	100	---	12.0	---	---	---	*** 30%	
Toluene	ND	---	100	ug/L	100	---	ND	---	---	---	---	30%
Ethylbenzene	ND	---	50.0	ug/L	100	---	ND	---	---	---	---	30%
Xylenes, total	ND	---	150	ug/L	100	---	ND	---	---	---	---	30%
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 96 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>97 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>109 %</i>		<i>80-120 %</i>		<i>"</i>						
Matrix Spike (23D0257-MS2)			Prepared: 04/07/23 09:36 Analyzed: 04/07/23 22:28									
<u>QC Source Sample: Non-SDG (A3D0949-01)</u>												
<u>EPA 8260D</u>												
Benzene	19.1	---	0.200	ug/L	1	20.0	ND	95	79-120%	---	---	

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 ORELAP ID: OR100062

GeoEngineers - Portland 5820 S Kelly Ave Unit B Portland, OR 97239	Project: Nustar Vannex - SW2Q23 Project Number: [none] Project Manager: Kurt Harrington	Report ID: A3D0953 - 04 24 23 1459
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QUALITY CONTROL (QC) SAMPLE RESULTS

BTEX Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23D0257 - EPA 5030C						Water						
Matrix Spike (23D0257-MS2)						Prepared: 04/07/23 09:36 Analyzed: 04/07/23 22:28						T-02
QC Source Sample: Non-SDG (A3D0949-01)												
Toluene	20.4	---	1.00	ug/L	1	20.0	ND	102	80-121%	---	---	
Ethylbenzene	22.3	---	0.500	ug/L	1	20.0	ND	112	79-121%	---	---	
Xylenes, total	76.7	---	1.50	ug/L	1	60.0	2.77	123	79-121%	---	---	Q-01
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 97 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>94 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>112 %</i>		<i>80-120 %</i>		<i>"</i>						

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QUALITY CONTROL (QC) SAMPLE RESULTS

BTEX Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23D0310 - EPA 5030C						Water						
Blank (23D0310-BLK1)			Prepared: 04/10/23 12:00 Analyzed: 04/10/23 14:50									
<u>EPA 8260D</u>												
Benzene	ND	---	0.200	ug/L	1	---	---	---	---	---	---	
Toluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Ethylbenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Xylenes, total	ND	---	1.50	ug/L	1	---	---	---	---	---	---	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 106 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>97 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>116 %</i>		<i>80-120 %</i>		<i>"</i>						
LCS (23D0310-BS1)			Prepared: 04/10/23 12:00 Analyzed: 04/10/23 13:34									
<u>EPA 8260D</u>												
Benzene	18.5	---	0.200	ug/L	1	20.0	---	92	80-120%	---	---	
Toluene	17.8	---	1.00	ug/L	1	20.0	---	89	80-120%	---	---	
Ethylbenzene	17.7	---	0.500	ug/L	1	20.0	---	89	80-120%	---	---	
Xylenes, total	53.9	---	1.50	ug/L	1	60.0	---	90	80-120%	---	---	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 104 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>96 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>101 %</i>		<i>80-120 %</i>		<i>"</i>						
Duplicate (23D0310-DUP1)			Prepared: 04/10/23 13:14 Analyzed: 04/10/23 16:38									
<u>QC Source Sample: Non-SDG (A3D0859-01)</u>												
Benzene	ND	---	2.00	ug/L	10	---	ND	---	---	---	30%	
Toluene	ND	---	10.0	ug/L	10	---	ND	---	---	---	30%	
Ethylbenzene	ND	---	5.00	ug/L	10	---	ND	---	---	---	30%	
Xylenes, total	ND	---	15.0	ug/L	10	---	ND	---	---	---	30%	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 105 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>98 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>113 %</i>		<i>80-120 %</i>		<i>"</i>						
Matrix Spike (23D0310-MS1)			Prepared: 04/10/23 13:14 Analyzed: 04/10/23 23:24									
<u>QC Source Sample: Non-SDG (A3D0963-05)</u>												
<u>EPA 8260D</u>												
Benzene	204	---	2.00	ug/L	10	200	ND	102	79-120%	---	---	

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QUALITY CONTROL (QC) SAMPLE RESULTS

BTEX Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23D0310 - EPA 5030C						Water						
Matrix Spike (23D0310-MS1)						Prepared: 04/10/23 13:14 Analyzed: 04/10/23 23:24						
QC Source Sample: Non-SDG (A3D0963-05)												
Toluene	190	---	10.0	ug/L	10	200	ND	95	80-121%	---	---	
Ethylbenzene	192	---	5.00	ug/L	10	200	ND	96	79-121%	---	---	
Xylenes, total	575	---	15.0	ug/L	10	600	ND	96	79-121%	---	---	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 106 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>95 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>100 %</i>		<i>80-120 %</i>		<i>"</i>						

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QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 200.8 (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23D0702 - EPA 3015A						Water						
Blank (23D0702-BLK1)			Prepared: 04/18/23 10:22 Analyzed: 04/18/23 18:10									
<u>EPA 200.8</u>												
Arsenic	ND	---	0.00100	mg/L	1	---	---	---	---	---	---	
Barium	ND	---	0.00200	mg/L	1	---	---	---	---	---	---	
Copper	ND	---	0.00200	mg/L	1	---	---	---	---	---	---	
Lead	ND	---	0.000200	mg/L	1	---	---	---	---	---	---	
Blank (23D0702-BLK2)			Prepared: 04/18/23 10:22 Analyzed: 04/19/23 14:24									
<u>EPA 200.8</u>												
Zinc	ND	---	0.00400	mg/L	1	---	---	---	---	---	---	Q-16
LCS (23D0702-BS1)			Prepared: 04/18/23 10:22 Analyzed: 04/18/23 18:15									
<u>EPA 200.8</u>												
Arsenic	0.0535	---	0.00100	mg/L	1	0.0556	---	96	85-115%	---	---	
Barium	0.0558	---	0.00200	mg/L	1	0.0556	---	100	85-115%	---	---	
Copper	0.0535	---	0.00200	mg/L	1	0.0556	---	96	85-115%	---	---	
Lead	0.0572	---	0.000200	mg/L	1	0.0556	---	103	85-115%	---	---	
Zinc	0.0551	---	0.0224	mg/L	1	0.0556	---	99	85-115%	---	---	
Duplicate (23D0702-DUP1)			Prepared: 04/18/23 10:22 Analyzed: 04/18/23 18:39									
<u>QC Source Sample: Non-SDG (A3D0935-01)</u>												
Arsenic	ND	---	0.00100	mg/L	1	---	ND	---	---	---	20%	
Barium	0.0110	---	0.00200	mg/L	1	---	0.0102	---	---	8	20%	
Copper	0.00588	---	0.00200	mg/L	1	---	0.00564	---	---	4	20%	
Lead	0.00303	---	0.000200	mg/L	1	---	0.00292	---	---	3	20%	
Zinc	0.0652	---	0.0224	mg/L	1	---	0.0656	---	---	0.5	20%	
Matrix Spike (23D0702-MS1)			Prepared: 04/18/23 10:22 Analyzed: 04/18/23 18:44									
<u>QC Source Sample: Non-SDG (A3D0935-01)</u>												
<u>EPA 200.8</u>												
Arsenic	0.0536	---	0.00100	mg/L	1	0.0556	ND	96	70-130%	---	---	
Barium	0.0683	---	0.00200	mg/L	1	0.0556	0.0102	105	70-130%	---	---	
Copper	0.0586	---	0.00200	mg/L	1	0.0556	0.00564	95	70-130%	---	---	
Lead	0.0595	---	0.000200	mg/L	1	0.0556	0.00292	102	70-130%	---	---	

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ORELAP ID: OR100062

GeoEngineers - Portland 5820 S Kelly Ave Unit B Portland, OR 97239	Project: <u>Nustar Vannex - SW2Q23</u> Project Number: [none] Project Manager: Kurt Harrington	Report ID: A3D0953 - 04 24 23 1459
---	---	---

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 200.8 (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23D0702 - EPA 3015A						Water						
Matrix Spike (23D0702-MS1)			Prepared: 04/18/23 10:22 Analyzed: 04/18/23 18:44									
<u>QC Source Sample: Non-SDG (A3D0935-01)</u>												
Zinc	0.121	---	0.0224	mg/L	1	0.0556	0.0656	100	70-130%	---	---	

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ANALYTICAL REPORT

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GeoEngineers - Portland 5820 S Kelly Ave Unit B Portland, OR 97239	Project: Nustar Vannex - SW2Q23 Project Number: [none] Project Manager: Kurt Harrington	Report ID: A3D0953 - 04 24 23 1459
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SAMPLE PREPARATION INFORMATION

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Prep: EPA 3510C (Fuels/Acid Ext.)					Sample	Default	RL Prep
Lab Number	Matrix	Method	Sampled	Prepared	Initial/Final	Initial/Final	Factor
<u>Batch: 23D0697</u>							
A3D0953-01	Water	NWTPH-Dx LL	04/07/23 09:50	04/18/23 11:07	1040mL/2mL	1000mL/2mL	0.96

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Prep: EPA 5030C					Sample	Default	RL Prep
Lab Number	Matrix	Method	Sampled	Prepared	Initial/Final	Initial/Final	Factor
<u>Batch: 23D0310</u>							
A3D0953-01RE1	Water	NWTPH-Gx (MS)	04/07/23 09:50	04/10/23 13:14	5mL/5mL	5mL/5mL	1.00

BTEX Compounds by EPA 8260D

Prep: EPA 5030C					Sample	Default	RL Prep
Lab Number	Matrix	Method	Sampled	Prepared	Initial/Final	Initial/Final	Factor
<u>Batch: 23D0310</u>							
A3D0953-01RE1	Water	EPA 8260D	04/07/23 09:50	04/10/23 13:14	5mL/5mL	5mL/5mL	1.00

Total Metals by EPA 200.8 (ICPMS)

Prep: EPA 3015A					Sample	Default	RL Prep
Lab Number	Matrix	Method	Sampled	Prepared	Initial/Final	Initial/Final	Factor
<u>Batch: 23D0702</u>							
A3D0953-01	Water	EPA 200.8	04/07/23 09:50	04/18/23 10:22	45mL/50mL	45mL/50mL	1.00

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QUALIFIER DEFINITIONS

Client Sample and Quality Control (QC) Sample Qualifier Definitions:

Apex Laboratories

- Q-01** Spike recovery and/or RPD is outside acceptance limits.
- Q-16** Reanalysis of an original Batch QC sample.
- Q-19** Blank Spike Duplicate (BSD) sample analyzed in place of Matrix Spike/Duplicate samples due to limited sample amount available for analysis.
- T-02** This Batch QC sample was analyzed outside of the method specified 12 hour analysis window. Results are estimated.

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---	--	---

REPORTING NOTES AND CONVENTIONS:

Abbreviations:

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported
- RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

Detection Limits: Limit of Detection (LOD)

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

Reporting Limits: Limit of Quantitation (LOQ)

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

Reporting Conventions:

- Basis: Results for soil samples are generally reported on a 100% dry weight basis.
The Result Basis is listed following the units as " dry", " wet", or " " (blank) designation.
- " dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")
See Percent Solids section for details of dry weight analysis.
- " wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
- " " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

QC Source:

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

Miscellaneous Notes:

- " --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- " *** " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Blanks:

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to ½ the Reporting Limit (RL).
-For Blank hits falling between ½ the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.
For further details, please request a copy of this document.

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Table with 3 columns: Client/Address, Project/Manager, and Report ID. Client: GeoEngineers - Portland, 5820 S Kelly Ave Unit B, Portland, OR 97239. Project: Nustar Vannex - SW2Q23, Project Number: [none], Project Manager: Kurt Harrington. Report ID: A3D0953 - 04 24 23 1459.

REPORTING NOTES AND CONVENTIONS (Cont.):

Blanks (Cont.):

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

Preparation Notes:

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

Sampling and Preservation Notes:

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

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Darrell Auvil, Client Services Manager



ANALYTICAL REPORT

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Table with 3 columns: Client/Location, Project/Manager, and Report ID. Client: GeoEngineers - Portland, 5820 S Kelly Ave Unit B, Portland, OR 97239. Project: Nustar Vannex - SW2Q23, Project Number: [none], Project Manager: Kurt Harrington. Report ID: A3D0953 - 04 24 23 1459.

LABORATORY ACCREDITATION INFORMATION

ORELAP Certification ID: OR100062 (Primary Accreditation) -
EPA ID: OR01039

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

Apex Laboratories

Table header with columns: Matrix, Analysis, TNI_ID, Analyte, TNI_ID, Accreditation

All reported analytes are included in Apex Laboratories' current ORELAP scope.

Secondary Accreditations

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

Subcontract Laboratory Accreditations

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

Field Testing Parameters

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

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APEX LABS COOLER RECEIPT FORM

Client: GeoEngineers Element WO#: A3D0953

Project/Project #: Nustar Vannex SW 2Q23

Delivery Info:
 Date/time received: 4/17/23 @ 1220 By: KMS
 Delivered by: Apex Client ESS FedEx UPS Radio Morgan SDS Evergreen Other

Cooler Inspection Date/time inspected: 4/17/23 @ 1220 By: KMS
 Chain of Custody included? Yes No 4/17
 Signed/dated by client? Yes No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	<u>4.8</u>						
Custody seals? (Y/N)	<u>N</u>						
Received on ice? (Y/N)	<u>Y</u>						
Temp. blanks? (Y/N)	<u>N</u>						
Ice type: (Gel/Real/Other)	<u>Real</u>						
Condition (In/Out):	<u>In</u>						

Cooler out of temp? (Y/N) Possible reason why: Y
 Green dots applied to out of temperature samples? Yes No
 Out of temperature samples form initiated? Yes No
Sample Inspection: Date/time inspected: 4/17/23 @ 1323 By: RAM
 All samples intact? Yes No Comments: _____
 Bottle labels/COCs agree? Yes No Comments: _____
 COC/container discrepancies form initiated? Yes No
 Containers/volumes received appropriate for analysis? Yes No Comments: _____
 Do VOA vials have visible headspace? Yes No NA RAM 4/17/23
 Comments: _____
 Water samples: pH checked: Yes No NA pH appropriate? Yes No NA
 Comments: _____
Additional information: _____

 Labeled by: RAM Witness: W Cooler Inspected by: KMS



ANALYTICAL REPORT

Apex Laboratories, LLC

6700 S.W. Sandburg Street
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503-718-2323
ORELAP ID: OR100062

Tuesday, April 18, 2023

Kurt Harrington
GeoEngineers - Portland
5820 S Kelly Ave Unit B
Portland, OR 97239

RE: A3D0726 - Nustar Vannex - SW2Q23 - [none]

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

Enclosed are the results of analyses for work order A3D0726, which was received by the laboratory on 4/3/2023 at 12:46:00PM.

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

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

Cooler Receipt Information

(See Cooler Receipt Form for details)

Default Cooler 5.2 degC

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

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



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GeoEngineers - Portland 5820 S Kelly Ave Unit B Portland, OR 97239	Project: <u>Nustar Vannex - SW2Q23</u> Project Number: [none] Project Manager: Kurt Harrington	Report ID: A3D0726 - 04 18 23 1719
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ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
OF-003	A3D0726-01	Water	04/03/23 09:30	04/03/23 12:46
OF-004	A3D0726-02	Water	04/03/23 10:10	04/03/23 12:46

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---	---	---

ANALYTICAL REPORT FOR SAMPLES

FIELD DATA (Provided by Sampler)

Lab Number	Sample Name	<u>Conductivity</u>	<u>pH</u>	<u>@Temp(C)</u>	<u>Flow</u> (gal/min)	<u>Residual Cl</u> (mg/L)	<u>Turbidity</u> (NTU)
A3D0726-01	OF-003	---	7.6	10.0	---	---	---
A3D0726-02	OF-004	---	8.3	5.3	---	---	---

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ANALYTICAL SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
OF-003 (A3D0726-01)				Matrix: Water		Batch: 23D0549		
Diesel	ND	---	0.0755	mg/L	1	04/13/23 21:59	NWTPH-Dx LL	
Oil	ND	---	0.151	mg/L	1	04/13/23 21:59	NWTPH-Dx LL	
<i>Surrogate: o-Terphenyl (Surr)</i>		<i>Recovery: 75 %</i>		<i>Limits: 50-150 %</i>		<i>1</i>	<i>04/13/23 21:59</i>	<i>NWTPH-Dx LL</i>
OF-004 (A3D0726-02)				Matrix: Water		Batch: 23D0549		
Diesel	ND	---	0.0755	mg/L	1	04/13/23 22:20	NWTPH-Dx LL	
Oil	ND	---	0.151	mg/L	1	04/13/23 22:20	NWTPH-Dx LL	
<i>Surrogate: o-Terphenyl (Surr)</i>		<i>Recovery: 79 %</i>		<i>Limits: 50-150 %</i>		<i>1</i>	<i>04/13/23 22:20</i>	<i>NWTPH-Dx LL</i>

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---	--	--

ANALYTICAL SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
OF-003 (A3D0726-01)				Matrix: Water		Batch: 23D0057		
Gasoline Range Organics	ND	---	0.100	mg/L	1	04/04/23 01:48	NWTPH-Gx (MS)	
<i>Surrogate: 4-Bromofluorobenzene (Sur)</i>		<i>Recovery: 95 %</i>		<i>Limits: 50-150 %</i>		<i>1</i>	<i>04/04/23 01:48</i>	<i>NWTPH-Gx (MS)</i>
<i>1,4-Difluorobenzene (Sur)</i>		<i>104 %</i>		<i>50-150 %</i>		<i>1</i>	<i>04/04/23 01:48</i>	<i>NWTPH-Gx (MS)</i>
OF-004 (A3D0726-02)				Matrix: Water		Batch: 23D0057		
Gasoline Range Organics	ND	---	0.100	mg/L	1	04/04/23 02:16	NWTPH-Gx (MS)	
<i>Surrogate: 4-Bromofluorobenzene (Sur)</i>		<i>Recovery: 95 %</i>		<i>Limits: 50-150 %</i>		<i>1</i>	<i>04/04/23 02:16</i>	<i>NWTPH-Gx (MS)</i>
<i>1,4-Difluorobenzene (Sur)</i>		<i>103 %</i>		<i>50-150 %</i>		<i>1</i>	<i>04/04/23 02:16</i>	<i>NWTPH-Gx (MS)</i>

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ANALYTICAL SAMPLE RESULTS

BTEX Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
OF-003 (A3D0726-01)			Matrix: Water			Batch: 23D0057		
Benzene	ND	---	0.200	ug/L	1	04/04/23 01:48	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	04/04/23 01:48	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	04/04/23 01:48	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	04/04/23 01:48	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>			<i>Recovery: 101 %</i>	<i>Limits: 80-120 %</i>	<i>1</i>	<i>04/04/23 01:48</i>	<i>EPA 8260D</i>	
<i>Toluene-d8 (Surr)</i>			<i>102 %</i>	<i>80-120 %</i>	<i>1</i>	<i>04/04/23 01:48</i>	<i>EPA 8260D</i>	
<i>4-Bromofluorobenzene (Surr)</i>			<i>108 %</i>	<i>80-120 %</i>	<i>1</i>	<i>04/04/23 01:48</i>	<i>EPA 8260D</i>	
OF-004 (A3D0726-02)			Matrix: Water			Batch: 23D0057		
Benzene	ND	---	0.200	ug/L	1	04/04/23 02:16	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	04/04/23 02:16	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	04/04/23 02:16	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	04/04/23 02:16	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>			<i>Recovery: 103 %</i>	<i>Limits: 80-120 %</i>	<i>1</i>	<i>04/04/23 02:16</i>	<i>EPA 8260D</i>	
<i>Toluene-d8 (Surr)</i>			<i>101 %</i>	<i>80-120 %</i>	<i>1</i>	<i>04/04/23 02:16</i>	<i>EPA 8260D</i>	
<i>4-Bromofluorobenzene (Surr)</i>			<i>108 %</i>	<i>80-120 %</i>	<i>1</i>	<i>04/04/23 02:16</i>	<i>EPA 8260D</i>	

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ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 200.8 (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
OF-003 (A3D0726-01)		Matrix: Water						
Batch: 23D0362								
Arsenic	0.00473	---	0.00100	mg/L	1	04/11/23 14:34	EPA 200.8	
Barium	0.0299	---	0.00200	mg/L	1	04/11/23 14:34	EPA 200.8	
Copper	ND	---	0.00200	mg/L	1	04/11/23 14:34	EPA 200.8	
Lead	ND	---	0.000200	mg/L	1	04/11/23 14:34	EPA 200.8	
Zinc	0.0383	---	0.00400	mg/L	1	04/11/23 14:34	EPA 200.8	B-02
OF-004 (A3D0726-02)		Matrix: Water						
Batch: 23D0362								
Arsenic	ND	---	0.00100	mg/L	1	04/11/23 14:39	EPA 200.8	
Barium	0.00238	---	0.00200	mg/L	1	04/11/23 14:39	EPA 200.8	
Copper	0.00465	---	0.00200	mg/L	1	04/11/23 14:39	EPA 200.8	
Lead	0.000286	---	0.000200	mg/L	1	04/11/23 14:39	EPA 200.8	
Zinc	0.0443	---	0.00400	mg/L	1	04/11/23 14:39	EPA 200.8	B-02

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---	--	--

QUALITY CONTROL (QC) SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23D0549 - EPA 3510C (Fuels/Acid Ext.)						Water						
Blank (23D0549-BLK1)			Prepared: 04/13/23 14:33 Analyzed: 04/13/23 20:57									
<u>NWTPH-Dx LL</u>												
Diesel	ND	---	0.0800	mg/L	1	---	---	---	---	---	---	
Oil	ND	---	0.160	mg/L	1	---	---	---	---	---	---	
<i>Surr: o-Terphenyl (Surr)</i>		<i>Recovery: 85 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
LCS (23D0549-BS1)			Prepared: 04/13/23 14:33 Analyzed: 04/13/23 21:18									
<u>NWTPH-Dx LL</u>												
Diesel	0.340	---	0.0800	mg/L	1	0.500	---	68	36-132%	---	---	
<i>Surr: o-Terphenyl (Surr)</i>		<i>Recovery: 88 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
LCS Dup (23D0549-BSD1)			Prepared: 04/13/23 14:33 Analyzed: 04/13/23 21:38 Q-19									
<u>NWTPH-Dx LL</u>												
Diesel	0.351	---	0.0800	mg/L	1	0.500	---	70	36-132%	3	30%	
<i>Surr: o-Terphenyl (Surr)</i>		<i>Recovery: 90 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						

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Darrell Auvil, Client Services Manager



ANALYTICAL REPORT

Apex Laboratories, LLC

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503-718-2323
ORELAP ID: OR100062

GeoEngineers - Portland 5820 S Kelly Ave Unit B Portland, OR 97239	Project: Nustar Vannex - SW2Q23 Project Number: [none] Project Manager: Kurt Harrington	Report ID: A3D0726 - 04 18 23 1719
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QUALITY CONTROL (QC) SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23D0057 - EPA 5030C						Water						
Blank (23D0057-BLK1)			Prepared: 04/03/23 14:41 Analyzed: 04/04/23 00:27									
<u>NWTPH-Gx (MS)</u>												
Gasoline Range Organics	ND	---	0.100	mg/L	1	---	---	---	---	---	---	
<i>Surr: 4-Bromofluorobenzene (Sur)</i>		<i>Recovery: 95 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
<i>1,4-Difluorobenzene (Sur)</i>		<i>103 %</i>		<i>50-150 %</i>		<i>"</i>						
LCS (23D0057-BS2)			Prepared: 04/03/23 14:41 Analyzed: 04/04/23 00:00									
<u>NWTPH-Gx (MS)</u>												
Gasoline Range Organics	0.512	---	0.100	mg/L	1	0.500	---	102	80-120%	---	---	
<i>Surr: 4-Bromofluorobenzene (Sur)</i>		<i>Recovery: 98 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
<i>1,4-Difluorobenzene (Sur)</i>		<i>102 %</i>		<i>50-150 %</i>		<i>"</i>						
Duplicate (23D0057-DUP1)			Prepared: 04/03/23 14:41 Analyzed: 04/04/23 05:52									
<u>QC Source Sample: Non-SDG (A3C1025-02)</u>												
Gasoline Range Organics	0.861	---	0.500	mg/L	5	---	0.972	---	---	12	30%	F-12
<i>Surr: 4-Bromofluorobenzene (Sur)</i>		<i>Recovery: 96 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
<i>1,4-Difluorobenzene (Sur)</i>		<i>105 %</i>		<i>50-150 %</i>		<i>"</i>						
Duplicate (23D0057-DUP2)			Prepared: 04/03/23 14:41 Analyzed: 04/04/23 09:29									
<u>QC Source Sample: Non-SDG (A3C1150-29)</u>												
Gasoline Range Organics	ND	---	2.00	mg/L	20	---	ND	---	---	---	30%	
<i>Surr: 4-Bromofluorobenzene (Sur)</i>		<i>Recovery: 97 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
<i>1,4-Difluorobenzene (Sur)</i>		<i>105 %</i>		<i>50-150 %</i>		<i>"</i>						

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QUALITY CONTROL (QC) SAMPLE RESULTS

BTEX Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23D0057 - EPA 5030C						Water						
Blank (23D0057-BLK1)			Prepared: 04/03/23 14:41 Analyzed: 04/04/23 00:27									
<u>EPA 8260D</u>												
Benzene	ND	---	0.200	ug/L	1	---	---	---	---	---	---	
Toluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Ethylbenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Xylenes, total	ND	---	1.50	ug/L	1	---	---	---	---	---	---	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 102 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>101 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>108 %</i>		<i>80-120 %</i>		<i>"</i>						
LCS (23D0057-BS1)			Prepared: 04/03/23 14:41 Analyzed: 04/03/23 23:33									
<u>EPA 8260D</u>												
Benzene	19.9	---	0.200	ug/L	1	20.0	---	100	80-120%	---	---	
Toluene	19.7	---	1.00	ug/L	1	20.0	---	99	80-120%	---	---	
Ethylbenzene	20.0	---	0.500	ug/L	1	20.0	---	100	80-120%	---	---	
Xylenes, total	61.1	---	1.50	ug/L	1	60.0	---	102	80-120%	---	---	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 101 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>99 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>96 %</i>		<i>80-120 %</i>		<i>"</i>						
Duplicate (23D0057-DUP1)			Prepared: 04/03/23 14:41 Analyzed: 04/04/23 05:52									
<u>QC Source Sample: Non-SDG (A3C1025-02)</u>												
Benzene	ND	---	1.00	ug/L	5	---	ND	---	---	---	30%	
Toluene	ND	---	5.00	ug/L	5	---	ND	---	---	---	30%	
Ethylbenzene	ND	---	2.50	ug/L	5	---	ND	---	---	---	30%	
Xylenes, total	ND	---	7.50	ug/L	5	---	ND	---	---	---	30%	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 104 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>101 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>111 %</i>		<i>80-120 %</i>		<i>"</i>						
Duplicate (23D0057-DUP2)			Prepared: 04/03/23 14:41 Analyzed: 04/04/23 09:29									
<u>QC Source Sample: Non-SDG (A3C1150-29)</u>												
Benzene	ND	---	4.00	ug/L	20	---	ND	---	---	---	30%	
Toluene	ND	---	20.0	ug/L	20	---	ND	---	---	---	30%	

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---	--	---

QUALITY CONTROL (QC) SAMPLE RESULTS

BTEX Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23D0057 - EPA 5030C						Water						
Duplicate (23D0057-DUP2)			Prepared: 04/03/23 14:41 Analyzed: 04/04/23 09:29									
QC Source Sample: Non-SDG (A3C1150-29)												
Ethylbenzene	ND	---	10.0	ug/L	20	---	ND	---	---	---	30%	
Xylenes, total	ND	---	30.0	ug/L	20	---	ND	---	---	---	30%	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 102 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>101 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>109 %</i>		<i>80-120 %</i>		<i>"</i>						
Matrix Spike (23D0057-MS1)						Prepared: 04/03/23 14:41 Analyzed: 04/04/23 07:13						
QC Source Sample: Non-SDG (A3D0727-01)												
EPA 8260D												
Benzene	315	---	2.00	ug/L	10	200	110	102	79-120%	---	---	
Toluene	652	---	10.0	ug/L	10	200	469	91	80-121%	---	---	
Ethylbenzene	254	---	5.00	ug/L	10	200	54.7	100	79-121%	---	---	
Xylenes, total	1170	---	15.0	ug/L	10	600	559	102	79-121%	---	---	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 100 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>98 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>94 %</i>		<i>80-120 %</i>		<i>"</i>						

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QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 200.8 (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23D0362 - EPA 3015A						Water						
Blank (23D0362-BLK1)			Prepared: 04/11/23 06:49 Analyzed: 04/11/23 13:10									
<u>EPA 200.8</u>												
Arsenic	ND	---	0.00100	mg/L	1	---	---	---	---	---	---	
Barium	ND	---	0.00200	mg/L	1	---	---	---	---	---	---	
Copper	ND	---	0.00200	mg/L	1	---	---	---	---	---	---	
Lead	ND	---	0.000200	mg/L	1	---	---	---	---	---	---	
Zinc	ND	---	0.00400	mg/L	1	---	---	---	---	---	---	B-02
<hr/>												
LCS (23D0362-BS1)			Prepared: 04/11/23 06:49 Analyzed: 04/11/23 13:15									
<u>EPA 200.8</u>												
Arsenic	0.0545	---	0.00100	mg/L	1	0.0556	---	98	85-115%	---	---	
Barium	0.0593	---	0.00200	mg/L	1	0.0556	---	107	85-115%	---	---	
Copper	0.0581	---	0.00200	mg/L	1	0.0556	---	105	85-115%	---	---	
Lead	0.0548	---	0.000200	mg/L	1	0.0556	---	99	85-115%	---	---	
Zinc	0.0620	---	0.00400	mg/L	1	0.0556	---	112	85-115%	---	---	B-02
<hr/>												
Duplicate (23D0362-DUP1)			Prepared: 04/11/23 06:49 Analyzed: 04/11/23 13:25									
<u>QC Source Sample: Non-SDG (A3D0714-01)</u>												
Arsenic	ND	---	0.00100	mg/L	1	---	ND	---	---	---	20%	
Barium	0.00643	---	0.00200	mg/L	1	---	0.00621	---	---	4	20%	
Copper	ND	---	0.00200	mg/L	1	---	ND	---	---	---	20%	
Lead	ND	---	0.000200	mg/L	1	---	0.000117	---	---	***	20%	
Zinc	0.137	---	0.00400	mg/L	1	---	0.135	---	---	2	20%	B-02
<hr/>												
Matrix Spike (23D0362-MS1)			Prepared: 04/11/23 06:49 Analyzed: 04/11/23 13:30									
<u>QC Source Sample: Non-SDG (A3D0714-01)</u>												
<u>EPA 200.8</u>												
Arsenic	0.0550	---	0.00100	mg/L	1	0.0556	ND	99	70-130%	---	---	
Barium	0.0660	---	0.00200	mg/L	1	0.0556	0.00621	108	70-130%	---	---	
Copper	0.0586	---	0.00200	mg/L	1	0.0556	ND	106	70-130%	---	---	
Lead	0.0555	---	0.000200	mg/L	1	0.0556	0.000117	100	70-130%	---	---	
Zinc	0.193	---	0.00400	mg/L	1	0.0556	0.135	105	70-130%	---	---	B-02
<hr/>												
Matrix Spike (23D0362-MS2)			Prepared: 04/11/23 06:49 Analyzed: 04/11/23 13:40									

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QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 200.8 (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23D0362 - EPA 3015A						Water						
Matrix Spike (23D0362-MS2)						Prepared: 04/11/23 06:49 Analyzed: 04/11/23 13:40						
<u>QC Source Sample: Non-SDG (A3D0714-02)</u>												
<u>EPA 200.8</u>												
Arsenic	0.0535	---	0.00100	mg/L	1	0.0556	0.000762	95	70-130%	---	---	
Barium	0.0715	---	0.00200	mg/L	1	0.0556	0.0119	107	70-130%	---	---	
Copper	0.0587	---	0.00200	mg/L	1	0.0556	0.00274	101	70-130%	---	---	
Lead	0.0543	---	0.000200	mg/L	1	0.0556	0.000317	97	70-130%	---	---	
Zinc	0.101	---	0.00400	mg/L	1	0.0556	0.0403	109	70-130%	---	---	B-02

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SAMPLE PREPARATION INFORMATION

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Prep: EPA 3510C (Fuels/Acid Ext.)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 23D0549</u>							
A3D0726-01	Water	NWTPH-Dx LL	04/03/23 09:30	04/13/23 14:33	1060mL/2mL	1000mL/2mL	0.94
A3D0726-02	Water	NWTPH-Dx LL	04/03/23 10:10	04/13/23 14:33	1060mL/2mL	1000mL/2mL	0.94

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Prep: EPA 5030C

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 23D0057</u>							
A3D0726-01	Water	NWTPH-Gx (MS)	04/03/23 09:30	04/03/23 14:41	5mL/5mL	5mL/5mL	1.00
A3D0726-02	Water	NWTPH-Gx (MS)	04/03/23 10:10	04/03/23 14:41	5mL/5mL	5mL/5mL	1.00

BTEX Compounds by EPA 8260D

Prep: EPA 5030C

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 23D0057</u>							
A3D0726-01	Water	EPA 8260D	04/03/23 09:30	04/03/23 14:41	5mL/5mL	5mL/5mL	1.00
A3D0726-02	Water	EPA 8260D	04/03/23 10:10	04/03/23 14:41	5mL/5mL	5mL/5mL	1.00

Total Metals by EPA 200.8 (ICPMS)

Prep: EPA 3015A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 23D0362</u>							
A3D0726-01	Water	EPA 200.8	04/03/23 09:30	04/11/23 06:49	45mL/50mL	45mL/50mL	1.00
A3D0726-02	Water	EPA 200.8	04/03/23 10:10	04/11/23 06:49	45mL/50mL	45mL/50mL	1.00

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QUALIFIER DEFINITIONS

Client Sample and Quality Control (QC) Sample Qualifier Definitions:

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- B-02** Analyte detected in an associated blank at a level between one-half the MRL and the MRL. (See Notes and Conventions below.)
- F-12** The result for this hydrocarbon range is primarily due to the presence of individual analyte peaks in the quantitation range. No fuel pattern detected.
- Q-19** Blank Spike Duplicate (BSD) sample analyzed in place of Matrix Spike/Duplicate samples due to limited sample amount available for analysis.

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REPORTING NOTES AND CONVENTIONS:

Abbreviations:

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported
- RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

Detection Limits: Limit of Detection (LOD)

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

Reporting Limits: Limit of Quantitation (LOQ)

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

Reporting Conventions:

- Basis: Results for soil samples are generally reported on a 100% dry weight basis.
The Result Basis is listed following the units as " dry", " wet", or " " (blank) designation.
- " dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")
See Percent Solids section for details of dry weight analysis.
- " wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
- " " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

QC Source:

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

Miscellaneous Notes:

- " --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- " *** " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Blanks:

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to ½ the Reporting Limit (RL).
-For Blank hits falling between ½ the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.
For further details, please request a copy of this document.

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503-718-2323
ORELAP ID: OR100062

Table with 3 columns: Client/Project info, Project details, and Report ID. Client: GeoEngineers - Portland, Project: Nustar Vannex - SW2Q23, Report ID: A3D0726 - 04 18 23 1719.

REPORTING NOTES AND CONVENTIONS (Cont.):

Blanks (Cont.):

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

Preparation Notes:

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

Sampling and Preservation Notes:

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

Apex Laboratories

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Handwritten signature of Darrell Auvil

Darrell Auvil, Client Services Manager



ANALYTICAL REPORT

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

Table with 3 columns: Client/Location, Project, and Report ID. Client: GeoEngineers - Portland, 5820 S Kelly Ave Unit B, Portland, OR 97239. Project: Nustar Vannex - SW2Q23, Project Number: [none], Project Manager: Kurt Harrington. Report ID: A3D0726 - 04 18 23 1719.

LABORATORY ACCREDITATION INFORMATION

ORELAP Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

Apex Laboratories

Table header with columns: Matrix, Analysis, TNI_ID, Analyte, TNI_ID, Accreditation

All reported analytes are included in Apex Laboratories' current ORELAP scope.

Secondary Accreditations

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

Subcontract Laboratory Accreditations

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

Field Testing Parameters

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

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Darrell Auvil, Client Services Manager



ANALYTICAL REPORT

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503-718-2323
ORELAP ID: OR100062

GeoEngineers - Portland 5820 S Kelly Ave Unit B Portland, OR 97239	Project: Nustar Vannex - SW2Q23 Project Number: [none] Project Manager: Kurt Harrington	Report ID: A3D0726 - 04 18 23 1719
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APEX LABS COOLER RECEIPT FORM

Client: Geo Engineers Element WO#: A3 D0726

Project/Project #: Nustar Vannex SW 2023

Delivery Info:
 Date/time received: 4-3-23 @ 1246 By: DJS
 Delivered by: Apex Client ESS FedEx UPS Radio Morgan SDS Evergreen Other _____

Cooler Inspection Date/time inspected: 4-3-23 @ 1250 By: DJS
 Chain of Custody included? Yes No _____
 Signed/dated by client? Yes No _____

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	<u>5.2</u>	_____	_____	_____	_____	_____	_____
Custody seals? (Y/N)	<u>N</u>	_____	_____	_____	_____	_____	_____
Received on ice? (Y/N)	<u>Y</u>	_____	_____	_____	_____	_____	_____
Temp. blanks? (Y/N)	<u>Y</u>	_____	_____	_____	_____	_____	_____
Ice type: (Gel/Real/Other)	<u>Real</u>	_____	_____	_____	_____	_____	_____
Condition (In/Out):	<u>In</u>	_____	_____	_____	_____	_____	_____

Cooler out of temp? (Y/N) Possible reason why: _____
 Green dots applied to out of temperature samples? Yes No
 Out of temperature samples form initiated? Yes No
Sample Inspection: Date/time inspected: 4/3/23 @ 12:50 By: KAM
 All samples intact? Yes No _____ Comments: _____

 Bottle labels/COCs agree? Yes No _____ Comments: _____

 COC/container discrepancies form initiated? Yes _____ No
 Containers/volumes received appropriate for analysis? Yes No _____ Comments: _____

 Do VOA vials have visible headspace? Yes _____ No _____ NA
 Comments: _____
 Water samples: pH checked: Yes No _____ NA _____ pH appropriate? Yes No _____ NA _____
 Comments: _____

Additional information:

 Labeled by: KAM Witness: RMP Cooler Inspected by: KAM Form Y-003 R-00

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Darrell Auvil, Client Services Manager



ANALYTICAL REPORT

AMENDED REPORT

Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

Wednesday, October 4, 2023

Kurt Harrington
GeoEngineers
4000 Kruse Way Place, Bldg 3 Suite 200
Lake Oswego, OR 97035

RE: A311408 - Nustar Vancouver Annex - SW - [none]

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

Enclosed are the results of analyses for work order A311408, which was received by the laboratory on 9/25/2023 at 2:00:00PM.

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

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

Cooler Receipt Information	
<u>Acceptable Receipt Temperature is less than, or equal to, 6 degC (not frozen), or received on ice the same day as sampling.</u>	
(See Cooler Receipt Form for details)	
<u>Cooler#1 2.0 degC</u>	<u>Cooler#2 4.7 degC</u>

This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.
All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.



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Darrell Auvil, Client Services Manager



ANALYTICAL REPORT

AMENDED REPORT

Apex Laboratories, LLC

6700 S.W. Sandburg Street
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503-718-2323
ORELAP ID: OR100062

GeoEngineers 4000 Kruse Way Place, Bldg 3 Suite 200 Lake Oswego, OR 97035	Project: <u>Nustar Vancouver Annex - SW</u> Project Number: [none] Project Manager: Kurt Harrington	Report ID: A3I1408 - 10 04 23 1217
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ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
OF-004	A3I1408-01	Water	09/25/23 08:30	09/25/23 14:00
OF-003	A3I1408-02	Water	09/25/23 09:10	09/25/23 14:00
OF-002	A3I1408-03	Water	09/25/23 10:15	09/25/23 14:00

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Darrell Auvil, Client Services Manager



ANALYTICAL REPORT

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ORELAP ID: OR100062

GeoEngineers 4000 Kruse Way Place, Bldg 3 Suite 200 Lake Oswego, OR 97035	Project: Nustar Vancouver Annex - SW Project Number: [none] Project Manager: Kurt Harrington	Report ID: A3I1408 - 10 04 23 1217
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ANALYTICAL CASE NARRATIVE

A3I1408 **Apex Laboratories**

Amended Report Revision 1:

Change to Project Name-

This report supersedes all previous reports.

The final report has been amended to change the project name from, "Nustar Vancouver Main - SW" to, "Nustar Vancouver Annex - SW"

Darrell Auvil
Project Manager
10/4/2023

Apex Laboratories

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Darrell Auvil, Client Services Manager



ANALYTICAL REPORT

AMENDED REPORT

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503-718-2323
ORELAP ID: OR100062

GeoEngineers 4000 Kruse Way Place, Bldg 3 Suite 200 Lake Oswego, OR 97035	Project: Nustar Vancouver Annex - SW Project Number: [none] Project Manager: Kurt Harrington	Report ID: A3I1408 - 10 04 23 1217
--	---	---

ANALYTICAL SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
OF-004 (A3I1408-01)			Matrix: Water			Batch: 23I0983		
Diesel	0.420	---	0.0762	mg/L	1	09/29/23 22:05	NWTPH-Dx LL	F-11
Oil	ND	---	0.152	mg/L	1	09/29/23 22:05	NWTPH-Dx LL	
<i>Surrogate: o-Terphenyl (Surr)</i>			<i>Recovery: 86 %</i>	<i>Limits: 50-150 %</i>	<i>1</i>	<i>09/29/23 22:05</i>	<i>NWTPH-Dx LL</i>	
OF-003 (A3I1408-02)			Matrix: Water			Batch: 23I0880		
Diesel	ND	---	0.0755	mg/L	1	09/28/23 03:22	NWTPH-Dx LL	
Oil	ND	---	0.151	mg/L	1	09/28/23 03:22	NWTPH-Dx LL	
<i>Surrogate: o-Terphenyl (Surr)</i>			<i>Recovery: 75 %</i>	<i>Limits: 50-150 %</i>	<i>1</i>	<i>09/28/23 03:22</i>	<i>NWTPH-Dx LL</i>	
OF-002 (A3I1408-03)			Matrix: Water			Batch: 23I0880		
Diesel	ND	---	0.0755	mg/L	1	09/28/23 03:45	NWTPH-Dx LL	
Oil	ND	---	0.151	mg/L	1	09/28/23 03:45	NWTPH-Dx LL	
<i>Surrogate: o-Terphenyl (Surr)</i>			<i>Recovery: 80 %</i>	<i>Limits: 50-150 %</i>	<i>1</i>	<i>09/28/23 03:45</i>	<i>NWTPH-Dx LL</i>	

Apex Laboratories

Darrell Auvil, Client Services Manager

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ANALYTICAL REPORT

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6700 S.W. Sandburg Street
 Tigard, OR 97223
 503-718-2323
 ORELAP ID: OR100062

GeoEngineers 4000 Kruse Way Place, Bldg 3 Suite 200 Lake Oswego, OR 97035	Project: Nustar Vancouver Annex - SW Project Number: [none] Project Manager: Kurt Harrington	Report ID: A3I1408 - 10 04 23 1217
--	---	---

ANALYTICAL SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
			Matrix: Water			Batch: 23I0826		
OF-004 (A3I1408-01)								
Gasoline Range Organics	ND	---	0.100	mg/L	1	09/27/23 18:44	NWTPH-Gx (MS)	
<i>Surrogate: 4-Bromofluorobenzene (Sur)</i>			<i>Recovery: 92 %</i>	<i>Limits: 50-150 %</i>	<i>1</i>	<i>09/27/23 18:44</i>	<i>NWTPH-Gx (MS)</i>	
<i>1,4-Difluorobenzene (Sur)</i>			<i>106 %</i>	<i>50-150 %</i>	<i>1</i>	<i>09/27/23 18:44</i>	<i>NWTPH-Gx (MS)</i>	
			Matrix: Water			Batch: 23I0825		
OF-003 (A3I1408-02)								
Gasoline Range Organics	ND	---	0.100	mg/L	1	09/26/23 22:01	NWTPH-Gx (MS)	
<i>Surrogate: 4-Bromofluorobenzene (Sur)</i>			<i>Recovery: 93 %</i>	<i>Limits: 50-150 %</i>	<i>1</i>	<i>09/26/23 22:01</i>	<i>NWTPH-Gx (MS)</i>	
<i>1,4-Difluorobenzene (Sur)</i>			<i>104 %</i>	<i>50-150 %</i>	<i>1</i>	<i>09/26/23 22:01</i>	<i>NWTPH-Gx (MS)</i>	
			Matrix: Water			Batch: 23I0825		
OF-002 (A3I1408-03)								
Gasoline Range Organics	ND	---	0.100	mg/L	1	09/26/23 20:30	NWTPH-Gx (MS)	
<i>Surrogate: 4-Bromofluorobenzene (Sur)</i>			<i>Recovery: 92 %</i>	<i>Limits: 50-150 %</i>	<i>1</i>	<i>09/26/23 20:30</i>	<i>NWTPH-Gx (MS)</i>	
<i>1,4-Difluorobenzene (Sur)</i>			<i>103 %</i>	<i>50-150 %</i>	<i>1</i>	<i>09/26/23 20:30</i>	<i>NWTPH-Gx (MS)</i>	

Apex Laboratories

Darrell Auvil, Client Services Manager

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ANALYTICAL REPORT

AMENDED REPORT

Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

GeoEngineers 4000 Kruse Way Place, Bldg 3 Suite 200 Lake Oswego, OR 97035	Project: Nustar Vancouver Annex - SW Project Number: [none] Project Manager: Kurt Harrington	Report ID: A311408 - 10 04 23 1217
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ANALYTICAL SAMPLE RESULTS

BTEX Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
OF-004 (A311408-01)			Matrix: Water			Batch: 2310826		
Benzene	ND	---	0.200	ug/L	1	09/27/23 18:44	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	09/27/23 18:44	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	09/27/23 18:44	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	09/27/23 18:44	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 106 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>09/27/23 18:44</i>	<i>EPA 8260D</i>
<i>Toluene-d8 (Surr)</i>		<i>102 %</i>		<i>80-120 %</i>		<i>1</i>	<i>09/27/23 18:44</i>	<i>EPA 8260D</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>100 %</i>		<i>80-120 %</i>		<i>1</i>	<i>09/27/23 18:44</i>	<i>EPA 8260D</i>
OF-003 (A311408-02)			Matrix: Water			Batch: 2310825		
Benzene	ND	---	0.200	ug/L	1	09/26/23 22:01	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	09/26/23 22:01	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	09/26/23 22:01	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	09/26/23 22:01	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 104 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>09/26/23 22:01</i>	<i>EPA 8260D</i>
<i>Toluene-d8 (Surr)</i>		<i>101 %</i>		<i>80-120 %</i>		<i>1</i>	<i>09/26/23 22:01</i>	<i>EPA 8260D</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>101 %</i>		<i>80-120 %</i>		<i>1</i>	<i>09/26/23 22:01</i>	<i>EPA 8260D</i>
OF-002 (A311408-03)			Matrix: Water			Batch: 2310825		
Benzene	ND	---	0.200	ug/L	1	09/26/23 20:30	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	09/26/23 20:30	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	09/26/23 20:30	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	09/26/23 20:30	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 103 %</i>		<i>Limits: 80-120 %</i>		<i>1</i>	<i>09/26/23 20:30</i>	<i>EPA 8260D</i>
<i>Toluene-d8 (Surr)</i>		<i>102 %</i>		<i>80-120 %</i>		<i>1</i>	<i>09/26/23 20:30</i>	<i>EPA 8260D</i>
<i>4-Bromofluorobenzene (Surr)</i>		<i>100 %</i>		<i>80-120 %</i>		<i>1</i>	<i>09/26/23 20:30</i>	<i>EPA 8260D</i>

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Darrell Auvil, Client Services Manager



ANALYTICAL REPORT

AMENDED REPORT

Apex Laboratories, LLC

6700 S.W. Sandburg Street
 Tigard, OR 97223
 503-718-2323
 ORELAP ID: OR100062

GeoEngineers 4000 Kruse Way Place, Bldg 3 Suite 200 Lake Oswego, OR 97035	Project: Nustar Vancouver Annex - SW Project Number: [none] Project Manager: Kurt Harrington	Report ID: A3I1408 - 10 04 23 1217
--	---	---

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 200.8 (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes	
OF-004 (A3I1408-01)		Matrix: Water							
Batch: 23I0844									
Arsenic	ND	---	0.00100	mg/L	1	09/27/23 03:01	EPA 200.8		
Barium	0.00732	---	0.00200	mg/L	1	09/27/23 03:01	EPA 200.8		
Copper	0.00618	---	0.00200	mg/L	1	09/27/23 03:01	EPA 200.8		
Lead	0.000334	---	0.000200	mg/L	1	09/27/23 03:01	EPA 200.8		
Zinc	0.136	---	0.00400	mg/L	1	09/27/23 03:01	EPA 200.8		
OF-003 (A3I1408-02)		Matrix: Water							
Batch: 23I0844									
Arsenic	0.00414	---	0.00100	mg/L	1	09/27/23 03:06	EPA 200.8		
Barium	0.0692	---	0.00200	mg/L	1	09/27/23 03:06	EPA 200.8		
Copper	ND	---	0.00200	mg/L	1	09/27/23 03:06	EPA 200.8		
Lead	0.000524	---	0.000200	mg/L	1	09/27/23 03:06	EPA 200.8		
Zinc	0.326	---	0.00400	mg/L	1	09/27/23 03:06	EPA 200.8		
OF-002 (A3I1408-03)		Matrix: Water							
Batch: 23I0844									
Arsenic	0.0144	---	0.00100	mg/L	1	09/27/23 03:12	EPA 200.8		
Barium	0.188	---	0.00200	mg/L	1	09/27/23 03:12	EPA 200.8		
Copper	ND	---	0.00200	mg/L	1	09/27/23 03:12	EPA 200.8		
Lead	0.00229	---	0.000200	mg/L	1	09/27/23 03:12	EPA 200.8		
Zinc	0.0917	---	0.00400	mg/L	1	09/27/23 03:12	EPA 200.8		

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Darrell Auvil, Client Services Manager

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ANALYTICAL REPORT

AMENDED REPORT

Apex Laboratories, LLC

6700 S.W. Sandburg Street

Tigard, OR 97223

503-718-2323

ORELAP ID: OR100062

GeoEngineers 4000 Kruse Way Place, Bldg 3 Suite 200 Lake Oswego, OR 97035	Project: Nustar Vancouver Annex - SW Project Number: [none] Project Manager: Kurt Harrington	Report ID: A3I1408 - 10 04 23 1217
--	---	---

QUALITY CONTROL (QC) SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes	
Batch 23I0880 - EPA 3510C (Fuels/Acid Ext.)						Water							
Blank (23I0880-BLK1)			Prepared: 09/27/23 10:21 Analyzed: 09/27/23 19:36										
<u>NWTPH-Dx LL</u>													
Diesel	ND	---	0.0800	mg/L	1	---	---	---	---	---	---		
Oil	ND	---	0.160	mg/L	1	---	---	---	---	---	---		
<i>Surr: o-Terphenyl (Surr)</i>		<i>Recovery: 85 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>							
LCS (23I0880-BS1)						Prepared: 09/27/23 10:21 Analyzed: 09/27/23 20:00							
<u>NWTPH-Dx LL</u>													
Diesel	0.328	---	0.0800	mg/L	1	0.500	---	66	36-132%	---	---		
<i>Surr: o-Terphenyl (Surr)</i>		<i>Recovery: 86 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>							
LCS Dup (23I0880-BSD1)						Prepared: 09/27/23 10:21 Analyzed: 09/27/23 20:23							Q-19
<u>NWTPH-Dx LL</u>													
Diesel	0.370	---	0.0800	mg/L	1	0.500	---	74	36-132%	12	30%		
<i>Surr: o-Terphenyl (Surr)</i>		<i>Recovery: 95 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>							
Batch 23I0983 - EPA 3510C (Fuels/Acid Ext.)						Water							
Blank (23I0983-BLK1)			Prepared: 09/29/23 06:45 Analyzed: 09/29/23 20:24										
<u>NWTPH-Dx LL</u>													
Diesel	ND	---	0.0800	mg/L	1	---	---	---	---	---	---		
Oil	ND	---	0.160	mg/L	1	---	---	---	---	---	---		
<i>Surr: o-Terphenyl (Surr)</i>		<i>Recovery: 87 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>							
LCS (23I0983-BS1)						Prepared: 09/29/23 06:45 Analyzed: 09/29/23 20:44							
<u>NWTPH-Dx LL</u>													
Diesel	0.277	---	0.0800	mg/L	1	0.500	---	55	36-132%	---	---		
<i>Surr: o-Terphenyl (Surr)</i>		<i>Recovery: 89 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>							
LCS Dup (23I0983-BSD1)						Prepared: 09/29/23 06:45 Analyzed: 09/29/23 21:04							Q-19
<u>NWTPH-Dx LL</u>													
Diesel	0.276	---	0.0800	mg/L	1	0.500	---	55	36-132%	0.6	30%		
<i>Surr: o-Terphenyl (Surr)</i>		<i>Recovery: 92 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>							

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Darrell Auvil, Client Services Manager



ANALYTICAL REPORT

AMENDED REPORT

Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

GeoEngineers 4000 Kruse Way Place, Bldg 3 Suite 200 Lake Oswego, OR 97035	Project: Nustar Vancouver Annex - SW Project Number: [none] Project Manager: Kurt Harrington	Report ID: A311408 - 10 04 23 1217
--	---	--

QUALITY CONTROL (QC) SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 2310825 - EPA 5030C						Water						
Blank (2310825-BLK1)			Prepared: 09/26/23 09:56 Analyzed: 09/26/23 16:00									
<u>NWTPH-Gx (MS)</u>												
Gasoline Range Organics	ND	---	0.100	mg/L	1	---	---	---	---	---	---	
<i>Surr: 4-Bromofluorobenzene (Sur)</i>		<i>Recovery: 91 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
<i>1,4-Difluorobenzene (Sur)</i>		<i>102 %</i>		<i>50-150 %</i>		<i>"</i>						
LCS (2310825-BS2)			Prepared: 09/26/23 09:56 Analyzed: 09/26/23 15:37									
<u>NWTPH-Gx (MS)</u>												
Gasoline Range Organics	0.452	---	0.100	mg/L	1	0.500	---	90	80-120%	---	---	
<i>Surr: 4-Bromofluorobenzene (Sur)</i>		<i>Recovery: 92 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
<i>1,4-Difluorobenzene (Sur)</i>		<i>102 %</i>		<i>50-150 %</i>		<i>"</i>						
Duplicate (2310825-DUP1)			Prepared: 09/26/23 09:56 Analyzed: 09/26/23 17:30									
<u>QC Source Sample: Non-SDG (A311141-05)</u>												
Gasoline Range Organics	ND	---	0.100	mg/L	1	---	ND	---	---	---	30%	
<i>Surr: 4-Bromofluorobenzene (Sur)</i>		<i>Recovery: 93 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
<i>1,4-Difluorobenzene (Sur)</i>		<i>105 %</i>		<i>50-150 %</i>		<i>"</i>						
Duplicate (2310825-DUP2)			Prepared: 09/26/23 09:56 Analyzed: 09/26/23 22:23									
<u>QC Source Sample: OF-003 (A311408-02)</u>												
<u>NWTPH-Gx (MS)</u>												
Gasoline Range Organics	ND	---	0.100	mg/L	1	---	ND	---	---	---	30%	
<i>Surr: 4-Bromofluorobenzene (Sur)</i>		<i>Recovery: 93 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
<i>1,4-Difluorobenzene (Sur)</i>		<i>104 %</i>		<i>50-150 %</i>		<i>"</i>						

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503-718-2323
ORELAP ID: OR100062

GeoEngineers 4000 Kruse Way Place, Bldg 3 Suite 200 Lake Oswego, OR 97035	Project: <u>Nustar Vancouver Annex - SW</u> Project Number: [none] Project Manager: Kurt Harrington	Report ID: A3I1408 - 10 04 23 1217
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QUALITY CONTROL (QC) SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23I0826 - EPA 5030C						Water						
Blank (23I0826-BLK1)			Prepared: 09/27/23 09:00 Analyzed: 09/27/23 13:19									
<u>NWTPH-Gx (MS)</u>												
Gasoline Range Organics	ND	---	0.100	mg/L	1	---	---	---	---	---	---	
<i>Surr: 4-Bromofluorobenzene (Sur)</i>		<i>Recovery: 91 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
<i>1,4-Difluorobenzene (Sur)</i>		<i>104 %</i>		<i>50-150 %</i>		<i>"</i>						
LCS (23I0826-BS2)			Prepared: 09/27/23 09:00 Analyzed: 09/27/23 12:57									
<u>NWTPH-Gx (MS)</u>												
Gasoline Range Organics	0.457	---	0.100	mg/L	1	0.500	---	91	80-120%	---	---	
<i>Surr: 4-Bromofluorobenzene (Sur)</i>		<i>Recovery: 91 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
<i>1,4-Difluorobenzene (Sur)</i>		<i>103 %</i>		<i>50-150 %</i>		<i>"</i>						
Duplicate (23I0826-DUP1)			Prepared: 09/27/23 09:00 Analyzed: 09/27/23 20:37									
<u>QC Source Sample: Non-SDG (A3I1247-01)</u>												
Gasoline Range Organics	3.01	---	0.500	mg/L	5	---	3.21	---	---	7	30%	
<i>Surr: 4-Bromofluorobenzene (Sur)</i>		<i>Recovery: 90 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
<i>1,4-Difluorobenzene (Sur)</i>		<i>99 %</i>		<i>50-150 %</i>		<i>"</i>						

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503-718-2323

ORELAP ID: OR100062

GeoEngineers 4000 Kruse Way Place, Bldg 3 Suite 200 Lake Oswego, OR 97035	Project: Nustar Vancouver Annex - SW Project Number: [none] Project Manager: Kurt Harrington	Report ID: A311408 - 10 04 23 1217
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QUALITY CONTROL (QC) SAMPLE RESULTS

BTEX Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 2310825 - EPA 5030C												
Water												
Blank (2310825-BLK1)												
Prepared: 09/26/23 09:56 Analyzed: 09/26/23 16:00												
EPA 8260D												
Benzene	ND	---	0.200	ug/L	1	---	---	---	---	---	---	
Toluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Ethylbenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Xylenes, total	ND	---	1.50	ug/L	1	---	---	---	---	---	---	
<i>Surr: 1,4-Difluorobenzene (Surr) Recovery: 102 % Limits: 80-120 % Dilution: 1x</i>												
<i>Toluene-d8 (Surr) 102 % 80-120 % "</i>												
<i>4-Bromofluorobenzene (Surr) 101 % 80-120 % "</i>												
LCS (2310825-BS1)												
Prepared: 09/26/23 09:56 Analyzed: 09/26/23 15:08												
EPA 8260D												
Benzene	21.3	---	0.200	ug/L	1	20.0	---	106	80-120%	---	---	
Toluene	21.0	---	1.00	ug/L	1	20.0	---	105	80-120%	---	---	
Ethylbenzene	22.0	---	0.500	ug/L	1	20.0	---	110	80-120%	---	---	
Xylenes, total	67.8	---	1.50	ug/L	1	60.0	---	113	80-120%	---	---	
<i>Surr: 1,4-Difluorobenzene (Surr) Recovery: 103 % Limits: 80-120 % Dilution: 1x</i>												
<i>Toluene-d8 (Surr) 100 % 80-120 % "</i>												
<i>4-Bromofluorobenzene (Surr) 95 % 80-120 % "</i>												
Duplicate (2310825-DUP1)												
Prepared: 09/26/23 09:56 Analyzed: 09/26/23 17:30												
QC Source Sample: Non-SDG (A311141-05)												
Benzene	ND	---	0.200	ug/L	1	---	ND	---	---	---	30%	
Toluene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Ethylbenzene	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Xylenes, total	ND	---	1.50	ug/L	1	---	ND	---	---	---	30%	
<i>Surr: 1,4-Difluorobenzene (Surr) Recovery: 105 % Limits: 80-120 % Dilution: 1x</i>												
<i>Toluene-d8 (Surr) 102 % 80-120 % "</i>												
<i>4-Bromofluorobenzene (Surr) 101 % 80-120 % "</i>												
Duplicate (2310825-DUP2)												
Prepared: 09/26/23 09:56 Analyzed: 09/26/23 22:23												
QC Source Sample: OF-003 (A311408-02)												
EPA 8260D												
Benzene	ND	---	0.200	ug/L	1	---	ND	---	---	---	30%	

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503-718-2323

ORELAP ID: OR100062

GeoEngineers 4000 Kruse Way Place, Bldg 3 Suite 200 Lake Oswego, OR 97035	Project: <u>Nustar Vancouver Annex - SW</u> Project Number: [none] Project Manager: Kurt Harrington	Report ID: A311408 - 10 04 23 1217
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QUALITY CONTROL (QC) SAMPLE RESULTS

BTEX Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 2310825 - EPA 5030C						Water						
Duplicate (2310825-DUP2)			Prepared: 09/26/23 09:56 Analyzed: 09/26/23 22:23									
QC Source Sample: OF-003 (A311408-02)												
Toluene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Ethylbenzene	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Xylenes, total	ND	---	1.50	ug/L	1	---	ND	---	---	---	30%	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 104 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>102 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>100 %</i>		<i>80-120 %</i>		<i>"</i>						

Matrix Spike (2310825-MS1)						Prepared: 09/26/23 09:56 Analyzed: 09/26/23 21:16						
QC Source Sample: Non-SDG (A311402-02)												
EPA 8260D												
Benzene	22.5	---	0.200	ug/L	1	20.0	ND	113	79-120%	---	---	
Toluene	22.2	---	1.00	ug/L	1	20.0	ND	111	80-121%	---	---	
Ethylbenzene	23.1	---	0.500	ug/L	1	20.0	ND	116	79-121%	---	---	
Xylenes, total	71.2	---	1.50	ug/L	1	60.0	ND	119	79-121%	---	---	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 102 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>98 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>94 %</i>		<i>80-120 %</i>		<i>"</i>						

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Darrell Auvil, Client Services Manager



ANALYTICAL REPORT

AMENDED REPORT

Apex Laboratories, LLC

6700 S.W. Sandburg Street

Tigard, OR 97223

503-718-2323

ORELAP ID: OR100062

GeoEngineers 4000 Kruse Way Place, Bldg 3 Suite 200 Lake Oswego, OR 97035	Project: <u>Nustar Vancouver Annex - SW</u> Project Number: [none] Project Manager: Kurt Harrington	Report ID: A3I1408 - 10 04 23 1217
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QUALITY CONTROL (QC) SAMPLE RESULTS

BTEX Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 2310826 - EPA 5030C												
Water												
Blank (2310826-BLK1)												
						Prepared: 09/27/23 09:00 Analyzed: 09/27/23 13:19						
EPA 8260D												
Benzene	ND	---	0.200	ug/L	1	---	---	---	---	---	---	
Toluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Ethylbenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Xylenes, total	ND	---	1.50	ug/L	1	---	---	---	---	---	---	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 104 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>103 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>102 %</i>		<i>80-120 %</i>		<i>"</i>						

LCS (2310826-BS1)												
						Prepared: 09/27/23 09:00 Analyzed: 09/27/23 12:01						
EPA 8260D												
Benzene	21.8	---	0.200	ug/L	1	20.0	---	109	80-120%	---	---	
Toluene	21.3	---	1.00	ug/L	1	20.0	---	106	80-120%	---	---	
Ethylbenzene	22.1	---	0.500	ug/L	1	20.0	---	110	80-120%	---	---	
Xylenes, total	67.9	---	1.50	ug/L	1	60.0	---	113	80-120%	---	---	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 103 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>100 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>93 %</i>		<i>80-120 %</i>		<i>"</i>						

Duplicate (2310826-DUP1)												
						Prepared: 09/27/23 09:00 Analyzed: 09/27/23 20:37						
QC Source Sample: Non-SDG (A3I1247-01)												
Benzene	138	---	1.00	ug/L	5	---	150	---	---	9	30%	
Toluene	ND	---	5.00	ug/L	5	---	ND	---	---	---	30%	
Ethylbenzene	28.6	---	2.50	ug/L	5	---	31.4	---	---	9	30%	
Xylenes, total	20.2	---	7.50	ug/L	5	---	22.2	---	---	10	30%	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 101 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>100 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>100 %</i>		<i>80-120 %</i>		<i>"</i>						

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Tigard, OR 97223

503-718-2323

ORELAP ID: OR100062

GeoEngineers 4000 Kruse Way Place, Bldg 3 Suite 200 Lake Oswego, OR 97035	Project: Nustar Vancouver Annex - SW Project Number: [none] Project Manager: Kurt Harrington	Report ID: A311408 - 10 04 23 1217
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QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 200.8 (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 2310844 - EPA 3015A						Water						
Blank (2310844-BLK1)			Prepared: 09/26/23 12:57 Analyzed: 09/27/23 02:04									
<u>EPA 200.8</u>												
Arsenic	ND	---	0.00100	mg/L	1	---	---	---	---	---	---	---
Barium	ND	---	0.00200	mg/L	1	---	---	---	---	---	---	---
Copper	ND	---	0.00200	mg/L	1	---	---	---	---	---	---	---
Lead	ND	---	0.000200	mg/L	1	---	---	---	---	---	---	---
Zinc	ND	---	0.00400	mg/L	1	---	---	---	---	---	---	---
LCS (2310844-BS1)												
										Prepared: 09/26/23 12:57 Analyzed: 09/27/23 02:09		
<u>EPA 200.8</u>												
Arsenic	0.0533	---	0.00100	mg/L	1	0.0556	---	96	85-115%	---	---	---
Barium	0.0569	---	0.00200	mg/L	1	0.0556	---	102	85-115%	---	---	---
Copper	0.0571	---	0.00200	mg/L	1	0.0556	---	103	85-115%	---	---	---
Lead	0.0569	---	0.000200	mg/L	1	0.0556	---	102	85-115%	---	---	---
Zinc	0.0563	---	0.00400	mg/L	1	0.0556	---	101	85-115%	---	---	---
Duplicate (2310844-DUP1)												
										Prepared: 09/26/23 12:57 Analyzed: 09/27/23 02:20		
<u>QC Source Sample: Non-SDG (A311283-01)</u>												
Arsenic	ND	---	0.00100	mg/L	1	---	ND	---	---	---	20%	---
Barium	0.141	---	0.00200	mg/L	1	---	0.137	---	---	3	20%	---
Copper	ND	---	0.00200	mg/L	1	---	ND	---	---	---	20%	---
Lead	ND	---	0.000200	mg/L	1	---	ND	---	---	---	20%	---
Zinc	ND	---	0.00400	mg/L	1	---	ND	---	---	---	20%	---
Matrix Spike (2310844-MS1)												
										Prepared: 09/26/23 12:57 Analyzed: 09/27/23 02:25		
<u>QC Source Sample: Non-SDG (A311283-01)</u>												
<u>EPA 200.8</u>												
Arsenic	0.0546	---	0.00100	mg/L	1	0.0556	ND	98	70-130%	---	---	---
Barium	0.196	---	0.00200	mg/L	1	0.0556	0.137	107	70-130%	---	---	---
Copper	0.0547	---	0.00200	mg/L	1	0.0556	ND	98	70-130%	---	---	---
Lead	0.0557	---	0.000200	mg/L	1	0.0556	ND	100	70-130%	---	---	---
Zinc	0.0573	---	0.00400	mg/L	1	0.0556	ND	103	70-130%	---	---	---

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ORELAP ID: OR100062

GeoEngineers 4000 Kruse Way Place, Bldg 3 Suite 200 Lake Oswego, OR 97035	Project: Nustar Vancouver Annex - SW Project Number: [none] Project Manager: Kurt Harrington	Report ID: A311408 - 10 04 23 1217
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SAMPLE PREPARATION INFORMATION

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Prep: EPA 3510C (Fuels/Acid Ext.)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 2310880</u>							
A311408-02	Water	NWTPH-Dx LL	09/25/23 09:10	09/27/23 10:22	1060mL/2mL	1000mL/2mL	0.94
A311408-03	Water	NWTPH-Dx LL	09/25/23 10:15	09/27/23 10:22	1060mL/2mL	1000mL/2mL	0.94
<u>Batch: 2310983</u>							
A311408-01	Water	NWTPH-Dx LL	09/25/23 08:30	09/29/23 06:45	1050mL/2mL	1000mL/2mL	0.95

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Prep: EPA 5030C

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 2310825</u>							
A311408-02	Water	NWTPH-Gx (MS)	09/25/23 09:10	09/26/23 10:00	5mL/5mL	5mL/5mL	1.00
A311408-03	Water	NWTPH-Gx (MS)	09/25/23 10:15	09/26/23 10:00	5mL/5mL	5mL/5mL	1.00
<u>Batch: 2310826</u>							
A311408-01	Water	NWTPH-Gx (MS)	09/25/23 08:30	09/27/23 13:13	5mL/5mL	5mL/5mL	1.00

BTEX Compounds by EPA 8260D

Prep: EPA 5030C

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 2310825</u>							
A311408-02	Water	EPA 8260D	09/25/23 09:10	09/26/23 10:00	5mL/5mL	5mL/5mL	1.00
A311408-03	Water	EPA 8260D	09/25/23 10:15	09/26/23 10:00	5mL/5mL	5mL/5mL	1.00
<u>Batch: 2310826</u>							
A311408-01	Water	EPA 8260D	09/25/23 08:30	09/27/23 13:13	5mL/5mL	5mL/5mL	1.00

Total Metals by EPA 200.8 (ICPMS)

Prep: EPA 3015A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 2310844</u>							
A311408-01	Water	EPA 200.8	09/25/23 08:30	09/26/23 12:57	45mL/50mL	45mL/50mL	1.00
A311408-02	Water	EPA 200.8	09/25/23 09:10	09/26/23 12:57	45mL/50mL	45mL/50mL	1.00
A311408-03	Water	EPA 200.8	09/25/23 10:15	09/26/23 12:57	45mL/50mL	45mL/50mL	1.00

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ANALYTICAL REPORT

AMENDED REPORT

Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

GeoEngineers	Project: <u>Nustar Vancouver Annex - SW</u>	Report ID:
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: [none]	A3I1408 - 10 04 23 1217
Lake Oswego, OR 97035	Project Manager: Kurt Harrington	

QUALIFIER DEFINITIONS

Client Sample and Quality Control (QC) Sample Qualifier Definitions:

Apex Laboratories

- A-01** Due to spiking error, not all Batch QC samples were reported. The batch is accepted based on the recoveries of the Blank Spike (BS).
- F-11** The hydrocarbon pattern indicates possible weathered diesel, mineral oil, or a contribution from a related component.
- Q-19** Blank Spike Duplicate (BSD) sample analyzed in place of Matrix Spike/Duplicate samples due to limited sample amount available for analysis.

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Darrell Auvil, Client Services Manager



ANALYTICAL REPORT

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ORELAP ID: OR100062

GeoEngineers 4000 Kruse Way Place, Bldg 3 Suite 200 Lake Oswego, OR 97035	Project: <u>Nustar Vancouver Annex - SW</u> Project Number: [none] Project Manager: Kurt Harrington	Report ID: A3I1408 - 10 04 23 1217
--	---	---

REPORTING NOTES AND CONVENTIONS:

Abbreviations:

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported
- RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

Detection Limits: Limit of Detection (LOD)

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

Reporting Limits: Limit of Quantitation (LOQ)

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

Reporting Conventions:

Basis: Results for soil samples are generally reported on a 100% dry weight basis.
The Result Basis is listed following the units as " dry", " wet", or " " (blank) designation.

- " dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")
See Percent Solids section for details of dry weight analysis.
- " wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
- " " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

Results for Volatiles analyses on soils and sediments that are reported on a "dry weight" basis include the water miscible solvent (WMS) correction referenced in the EPA 8000 Method guidance documents. Solid and Liquid samples reported on an "As Received" basis do not have the WMS correction applied, as dry weight was not performed.

QC Source:

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

Miscellaneous Notes:

- " --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- " *** " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

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ANALYTICAL REPORT

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Table with 3 columns: GeoEngineers (4000 Kruse Way Place, Bldg 3 Suite 200, Lake Oswego, OR 97035), Project (Nustar Vancouver Annex - SW), Project Number (none), Project Manager (Kurt Harrington), Report ID (A3I1408 - 10 04 23 1217)

REPORTING NOTES AND CONVENTIONS (Cont.):

Blanks:

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 1/2 the Reporting Limit (RL).
-For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.
For further details, please request a copy of this document.
-Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.
'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level, if results are not reported to the MDL.

Preparation Notes:

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

Sampling and Preservation Notes:

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

Apex Laboratories

Handwritten signature of Darrell Auvil

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Darrell Auvil, Client Services Manager



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GeoEngineers 4000 Kruse Way Place, Bldg 3 Suite 200 Lake Oswego, OR 97035	Project: Nustar Vancouver Annex - SW Project Number: [none] Project Manager: Kurt Harrington	Report ID: A3I1408 - 10 04 23 1217
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LABORATORY ACCREDITATION INFORMATION

ORELAP Certification ID: OR100062 (Primary Accreditation) -
EPA ID: OR01039

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

Apex Laboratories

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation
--------	----------	--------	---------	--------	---------------

All reported analytes are included in Apex Laboratories' current ORELAP scope.

Secondary Accreditations

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

Subcontract Laboratory Accreditations

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

Field Testing Parameters

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

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Darrell Auvil, Client Services Manager



ANALYTICAL REPORT

AMENDED REPORT

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ORELAP ID: OR100062

GeoEngineers 4000 Kruse Way Place, Bldg 3 Suite 200 Lake Oswego, OR 97035	Project: Nustar Vancouver Annex - SW Project Number: [none] Project Manager: Kurt Harrington	Report ID: A311408 - 10 04 23 1217
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APEX LABS COOLER RECEIPT FORM

Client: Geo Engineers Element WO#: A3 I1408

Project/Project #: NS VAN MAN SW 3Q

Delivery Info:

Date/time received: 9/25/23 @ 1400 By: Rhp

Delivered by: Apex Client ESS FedEx UPS Radio Morgan SDS Evergreen Other

Cooler Inspection Date/time inspected: 9/25/23 @ 1400 By: Rhp

Chain of Custody included? Yes No

Signed/dated by client? Yes No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	<u>2.0</u>	<u>4.7</u>					
Custody seals? (Y/N)	<u>N</u>	<u>N</u>					
Received on ice? (Y/N)	<u>Y</u>	<u>Y</u>					
Temp. blanks? (Y/N)	<u>Y</u>	<u>Y</u>					
Ice type: (Gel/Real/Other)	<u>Real</u>	<u>Real</u>					
Condition (In/Out):	<u>IN</u>	<u>IN</u>					

Cooler out of temp? (Y/N) Possible reason why: _____

Green dots applied to out of temperature samples? Yes No

Out of temperature samples form initiated? Yes No

Sample Inspection: Date/time inspected: 9/25/23 @ 1540 By: JS

All samples intact? Yes No Comments: _____

Bottle labels/COCs agree? Yes No Comments: Time on 1/6 containers reads 2:40 JS 9/25/23

COC/container discrepancies form initiated? Yes No

Containers/volumes received appropriate for analysis? Yes No Comments: _____

Do VOA vials have visible headspace? Yes No NA

Comments: _____

Water samples: pH checked: Yes No NA pH appropriate? Yes No NA pH ID: A231172

Comments: _____

Additional information: _____

Labeled by: JS

Witness: AW

Cooler Inspected by: JS

Form Y-003 R-01

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ANALYTICAL REPORT

Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

Wednesday, December 20, 2023

Kurt Harrington
GeoEngineers - Portland
5820 S Kelly Ave Unit B
Portland, OR 97239

RE: A3L0883 - Nustar Vancouver Annex - SW - 4Q23

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

Enclosed are the results of analyses for work order A3L0883, which was received by the laboratory on 12/5/2023 at 6:20:00PM.

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

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

Cooler Receipt Information	
<u>Acceptable Receipt Temperature is less than, or equal to, 6 degC (not frozen), or received on ice the same day as sampling.</u>	
(See Cooler Receipt Form for details)	
<u>Default Cooler</u>	4.6 degC

This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.
All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.



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Darrell Auvil, Client Services Manager



ANALYTICAL REPORT

Apex Laboratories, LLC

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ORELAP ID: OR100062

GeoEngineers - Portland 5820 S Kelly Ave Unit B Portland, OR 97239	Project: <u>Nustar Vancouver Annex - SW</u> Project Number: 4Q23 Project Manager: Kurt Harrington	Report ID: A3L0883 - 12 20 23 1745
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ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
OF-005	A3L0883-01	Water	12/05/23 14:05	12/05/23 18:20

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GeoEngineers - Portland 5820 S Kelly Ave Unit B Portland, OR 97239	Project: <u>Nustar Vancouver Annex - SW</u> Project Number: 4Q23 Project Manager: Kurt Harrington	Report ID: A3L0883 - 12 20 23 1745
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ANALYTICAL REPORT FOR SAMPLES

FIELD DATA (Provided by Sampler)

Lab Number	Sample Name	pH	<u>@Temp</u> (C)	<u>Turbidity</u> (NTU)	<u>Residual Cl</u> (mg/L)	<u>Conductivity</u> (umho)	<u>DO</u> (mg/L)	<u>Flow</u> (gal/min)
A3L0883-01	OF-005	7.88	---	---	---	---	---	---

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---	--	---

ANALYTICAL SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
OF-005 (A3L0883-01)				Matrix: Water		Batch: 23L0203		DCNT
Diesel	ND	---	0.0800	mg/L	1	12/07/23 00:45	NWTPH-Dx LL	
Oil	ND	---	0.160	mg/L	1	12/07/23 00:45	NWTPH-Dx LL	
<i>Surrogate: o-Terphenyl (Surr)</i>		<i>Recovery: 88 %</i>		<i>Limits: 50-150 %</i>		<i>1</i>	<i>12/07/23 00:45</i>	<i>NWTPH-Dx LL</i>

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 503-718-2323
 ORELAP ID: OR100062

GeoEngineers - Portland 5820 S Kelly Ave Unit B Portland, OR 97239	Project: <u>Nustar Vancouver Annex - SW</u> Project Number: 4Q23 Project Manager: Kurt Harrington	Report ID: A3L0883 - 12 20 23 1745
---	--	---

ANALYTICAL SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
OF-005 (A3L0883-01)			Matrix: Water			Batch: 23L0160		
Gasoline Range Organics	ND	---	0.100	mg/L	1	12/06/23 12:51	NWTPH-Gx (MS)	
<i>Surrogate: 4-Bromofluorobenzene (Sur)</i>		<i>Recovery:</i>	<i>105 %</i>	<i>Limits:</i>	<i>50-150 %</i>	<i>1</i>	<i>12/06/23 12:51</i>	<i>NWTPH-Gx (MS)</i>
<i>1,4-Difluorobenzene (Sur)</i>			<i>108 %</i>	<i>50-150 %</i>	<i>1</i>	<i>12/06/23 12:51</i>	<i>NWTPH-Gx (MS)</i>	

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GeoEngineers - Portland 5820 S Kelly Ave Unit B Portland, OR 97239	Project: <u>Nustar Vancouver Annex - SW</u> Project Number: 4Q23 Project Manager: Kurt Harrington	Report ID: A3L0883 - 12 20 23 1745
---	--	---

ANALYTICAL SAMPLE RESULTS

BTEX Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
OF-005 (A3L0883-01)			Matrix: Water			Batch: 23L0160		
Benzene	ND	---	0.200	ug/L	1	12/06/23 12:51	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	12/06/23 12:51	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	12/06/23 12:51	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	12/06/23 12:51	EPA 8260D	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>			<i>Recovery: 112 %</i>	<i>Limits: 80-120 %</i>	<i>1</i>	<i>12/06/23 12:51</i>	<i>EPA 8260D</i>	
<i>Toluene-d8 (Surr)</i>			<i>99 %</i>	<i>80-120 %</i>	<i>1</i>	<i>12/06/23 12:51</i>	<i>EPA 8260D</i>	
<i>4-Bromofluorobenzene (Surr)</i>			<i>97 %</i>	<i>80-120 %</i>	<i>1</i>	<i>12/06/23 12:51</i>	<i>EPA 8260D</i>	

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GeoEngineers - Portland 5820 S Kelly Ave Unit B Portland, OR 97239	Project: <u>Nustar Vancouver Annex - SW</u> Project Number: 4Q23 Project Manager: Kurt Harrington	Report ID: A3L0883 - 12 20 23 1745
---	--	---

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 200.8 (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes	
OF-005 (A3L0883-01)		Matrix: Water							
Batch: 23L0721									
Arsenic	0.00104	---	0.00100	mg/L	1	12/19/23 19:29	EPA 200.8		
Barium	0.0173	---	0.00200	mg/L	1	12/19/23 19:29	EPA 200.8		
Copper	0.00481	---	0.00200	mg/L	1	12/19/23 19:29	EPA 200.8		
Lead	0.00339	---	0.000200	mg/L	1	12/19/23 19:29	EPA 200.8		
Zinc	0.0218	---	0.00400	mg/L	1	12/19/23 19:29	EPA 200.8		

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---	--	---

QUALITY CONTROL (QC) SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23L0203 - EPA 3510C (Fuels/Acid Ext.)						Water						
Blank (23L0203-BLK1)						Prepared: 12/06/23 10:13 Analyzed: 12/06/23 21:03						
<u>NWTPH-Dx LL</u>												
Diesel	ND	---	0.0800	mg/L	1	---	---	---	---	---	---	
Oil	ND	---	0.160	mg/L	1	---	---	---	---	---	---	
<i>Surr: o-Terphenyl (Surr)</i>		<i>Recovery: 88 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
LCS (23L0203-BS1)						Prepared: 12/06/23 10:13 Analyzed: 12/06/23 21:23						
<u>NWTPH-Dx LL</u>												
Diesel	0.339	---	0.0800	mg/L	1	0.500	---	68	36-132%	---	---	
<i>Surr: o-Terphenyl (Surr)</i>		<i>Recovery: 83 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
LCS Dup (23L0203-BS1)						Prepared: 12/06/23 10:13 Analyzed: 12/06/23 21:43						
<u>NWTPH-Dx LL</u>												
Diesel	0.355	---	0.0800	mg/L	1	0.500	---	71	36-132%	5	30%	Q-19
<i>Surr: o-Terphenyl (Surr)</i>		<i>Recovery: 86 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						

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---	--	---

QUALITY CONTROL (QC) SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23L0160 - EPA 5030C						Water						
Blank (23L0160-BLK1)			Prepared: 12/05/23 12:54 Analyzed: 12/06/23 07:26									
<u>NWTPH-Gx (MS)</u>												
Gasoline Range Organics	ND	---	0.100	mg/L	1	---	---	---	---	---	---	
<i>Surr: 4-Bromofluorobenzene (Sur)</i>		<i>Recovery: 106 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
<i>1,4-Difluorobenzene (Sur)</i>		<i>108 %</i>		<i>50-150 %</i>		<i>"</i>						
LCS (23L0160-BS2)			Prepared: 12/05/23 12:54 Analyzed: 12/06/23 06:59									
<u>NWTPH-Gx (MS)</u>												
Gasoline Range Organics	0.447	---	0.100	mg/L	1	0.500	---	89	80-120%	---	---	
<i>Surr: 4-Bromofluorobenzene (Sur)</i>		<i>Recovery: 98 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
<i>1,4-Difluorobenzene (Sur)</i>		<i>98 %</i>		<i>50-150 %</i>		<i>"</i>						
Duplicate (23L0160-DUP1)			Prepared: 12/05/23 18:00 Analyzed: 12/06/23 10:36									
<u>QC Source Sample: Non-SDG (A3L0869-01)</u>												
Gasoline Range Organics	37.1	---	10.0	mg/L	100	---	38.5	---	---	4	30%	F-12
<i>Surr: 4-Bromofluorobenzene (Sur)</i>		<i>Recovery: 103 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
<i>1,4-Difluorobenzene (Sur)</i>		<i>108 %</i>		<i>50-150 %</i>		<i>"</i>						

Apex Laboratories

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Darrell Auvil, Client Services Manager



ANALYTICAL REPORT

Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

GeoEngineers - Portland 5820 S Kelly Ave Unit B Portland, OR 97239	Project: Nustar Vancouver Annex - SW Project Number: 4Q23 Project Manager: Kurt Harrington	Report ID: A3L0883 - 12 20 23 1745
---	---	--

QUALITY CONTROL (QC) SAMPLE RESULTS

BTEX Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23L0160 - EPA 5030C						Water						
Blank (23L0160-BLK1)			Prepared: 12/05/23 12:54 Analyzed: 12/06/23 07:26									
<u>EPA 8260D</u>												
Benzene	ND	---	0.200	ug/L	1	---	---	---	---	---	---	
Toluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Ethylbenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Xylenes, total	ND	---	1.50	ug/L	1	---	---	---	---	---	---	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 111 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>99 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>98 %</i>		<i>80-120 %</i>		<i>"</i>						
LCS (23L0160-BS1)			Prepared: 12/05/23 12:54 Analyzed: 12/06/23 06:32									
<u>EPA 8260D</u>												
Benzene	20.6	---	0.200	ug/L	1	20.0	---	103	80-120%	---	---	
Toluene	19.5	---	1.00	ug/L	1	20.0	---	98	80-120%	---	---	
Ethylbenzene	20.7	---	0.500	ug/L	1	20.0	---	104	80-120%	---	---	
Xylenes, total	63.6	---	1.50	ug/L	1	60.0	---	106	80-120%	---	---	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 103 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>96 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>96 %</i>		<i>80-120 %</i>		<i>"</i>						
Duplicate (23L0160-DUP1)			Prepared: 12/05/23 18:00 Analyzed: 12/06/23 10:36									
<u>QC Source Sample: Non-SDG (A3L0869-01)</u>												
Benzene	ND	---	20.0	ug/L	100	---	ND	---	---	---	30%	
Toluene	1410	---	100	ug/L	100	---	1430	---	---	2	30%	
Ethylbenzene	746	---	50.0	ug/L	100	---	754	---	---	1	30%	
Xylenes, total	414	---	150	ug/L	100	---	429	---	---	4	30%	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 111 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>98 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>101 %</i>		<i>80-120 %</i>		<i>"</i>						
Matrix Spike (23L0160-MS1)			Prepared: 12/05/23 18:00 Analyzed: 12/06/23 11:30									
<u>QC Source Sample: Non-SDG (A3L0869-02)</u>												
<u>EPA 8260D</u>												
Benzene	2180	---	20.0	ug/L	100	2000	ND	109	79-120%	---	---	

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ANALYTICAL REPORT

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503-718-2323
ORELAP ID: OR100062

GeoEngineers - Portland 5820 S Kelly Ave Unit B Portland, OR 97239	Project: <u>Nustar Vancouver Annex - SW</u> Project Number: 4Q23 Project Manager: Kurt Harrington	Report ID: A3L0883 - 12 20 23 1745
---	--	---

QUALITY CONTROL (QC) SAMPLE RESULTS

BTEX Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23L0160 - EPA 5030C						Water						
Matrix Spike (23L0160-MS1)						Prepared: 12/05/23 18:00 Analyzed: 12/06/23 11:30						
<u>QC Source Sample: Non-SDG (A3L0869-02)</u>												
Toluene	2590	---	100	ug/L	100	2000	472	106	80-121%	---	---	
Ethylbenzene	2170	---	50.0	ug/L	100	2000	35.0	107	79-121%	---	---	
Xylenes, total	7190	---	150	ug/L	100	6000	258	116	79-121%	---	---	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>		<i>Recovery: 103 %</i>		<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>		<i>96 %</i>		<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>		<i>96 %</i>		<i>80-120 %</i>		<i>"</i>						

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Darrell Auvil, Client Services Manager



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---	--	---

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 200.8 (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23L0721 - EPA 3015A												
Water												
Blank (23L0721-BLK1) Prepared: 12/19/23 10:14 Analyzed: 12/19/23 19:18												
<u>EPA 200.8</u>												
Arsenic	ND	---	0.00100	mg/L	1	---	---	---	---	---	---	
Barium	ND	---	0.00200	mg/L	1	---	---	---	---	---	---	
Copper	ND	---	0.00200	mg/L	1	---	---	---	---	---	---	
Lead	ND	---	0.000200	mg/L	1	---	---	---	---	---	---	
Zinc	ND	---	0.00400	mg/L	1	---	---	---	---	---	---	
LCS (23L0721-BS1) Prepared: 12/19/23 10:14 Analyzed: 12/19/23 19:23												
<u>EPA 200.8</u>												
Arsenic	0.0546	---	0.00100	mg/L	1	0.0556	---	98	85-115%	---	---	
Barium	0.0558	---	0.00200	mg/L	1	0.0556	---	100	85-115%	---	---	
Copper	0.0554	---	0.00200	mg/L	1	0.0556	---	100	85-115%	---	---	
Lead	0.0546	---	0.000200	mg/L	1	0.0556	---	98	85-115%	---	---	
Zinc	0.0544	---	0.00400	mg/L	1	0.0556	---	98	85-115%	---	---	
Duplicate (23L0721-DUP1) Prepared: 12/19/23 10:14 Analyzed: 12/19/23 19:34												
<u>QC Source Sample: OF-005 (A3L0883-01)</u>												
<u>EPA 200.8</u>												
Arsenic	0.00105	---	0.00100	mg/L	1	---	0.00104	---	---	0.8	20%	
Barium	0.0172	---	0.00200	mg/L	1	---	0.0173	---	---	0.5	20%	
Copper	0.00501	---	0.00200	mg/L	1	---	0.00481	---	---	4	20%	
Lead	0.00339	---	0.000200	mg/L	1	---	0.00339	---	---	0.02	20%	
Zinc	0.0220	---	0.00400	mg/L	1	---	0.0218	---	---	1	20%	
Matrix Spike (23L0721-MS1) Prepared: 12/19/23 10:14 Analyzed: 12/19/23 19:45												
<u>QC Source Sample: Non-SDG (A3L0905-01)</u>												
<u>EPA 200.8</u>												
Arsenic	0.0552	---	0.00100	mg/L	1	0.0556	ND	99	70-130%	---	---	
Barium	0.0663	---	0.00200	mg/L	1	0.0556	0.0102	101	70-130%	---	---	
Copper	0.0591	---	0.00200	mg/L	1	0.0556	0.00249	102	70-130%	---	---	
Lead	0.0558	---	0.000200	mg/L	1	0.0556	0.000467	100	70-130%	---	---	
Zinc	0.0614	---	0.00400	mg/L	1	0.0556	0.00607	100	70-130%	---	---	

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---	--	---

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 200.8 (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23L0721 - EPA 3015A						Water						
Matrix Spike (23L0721-MS2)						Prepared: 12/19/23 10:14 Analyzed: 12/19/23 20:06						
<u>QC Source Sample: Non-SDG (A3L0906-01)</u>												
<u>EPA 200.8</u>												
Arsenic	0.0555	---	0.00100	mg/L	1	0.0556	0.000795	98	70-130%	---	---	
Barium	0.0903	---	0.00200	mg/L	1	0.0556	0.0344	101	70-130%	---	---	
Copper	0.0824	---	0.00200	mg/L	1	0.0556	0.0264	101	70-130%	---	---	
Lead	0.0682	---	0.000200	mg/L	1	0.0556	0.0135	98	70-130%	---	---	
Zinc	0.905	---	0.00400	mg/L	1	0.0556	0.821	152	70-130%	---	---	Q-04, Q-65

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SAMPLE PREPARATION INFORMATION

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Prep: EPA 3510C (Fuels/Acid Ext.)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 23L0203</u>							
A3L0883-01	Water	NWTPH-Dx LL	12/05/23 14:05	12/06/23 10:13	1000mL/2mL	1000mL/2mL	1.00

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Prep: EPA 5030C

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 23L0160</u>							
A3L0883-01	Water	NWTPH-Gx (MS)	12/05/23 14:05	12/05/23 19:00	5mL/5mL	5mL/5mL	1.00

BTEX Compounds by EPA 8260D

Prep: EPA 5030C

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 23L0160</u>							
A3L0883-01	Water	EPA 8260D	12/05/23 14:05	12/05/23 19:00	5mL/5mL	5mL/5mL	1.00

Total Metals by EPA 200.8 (ICPMS)

Prep: EPA 3015A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 23L0721</u>							
A3L0883-01	Water	EPA 200.8	12/05/23 14:05	12/19/23 10:14	45mL/50mL	45mL/50mL	1.00

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GeoEngineers - Portland

5820 S Kelly Ave Unit B
Portland, OR 97239

Project: **Nustar Vancouver Annex - SW**

Project Number: **4Q23**

Project Manager: **Kurt Harrington**

Report ID:

A3L0883 - 12 20 23 1745

QUALIFIER DEFINITIONS

Client Sample and Quality Control (QC) Sample Qualifier Definitions:

Apex Laboratories

- DCNT** Sample decanted due to the presence of sediment. Sample bottle not rinsed with solvent.
- F-12** The result for this hydrocarbon range is primarily due to the presence of individual analyte peaks in the quantitation range. No fuel pattern detected.
- Q-04** Spike recovery and/or RPD is outside control limits due to a non-homogeneous sample matrix.
- Q-19** Blank Spike Duplicate (BSD) sample analyzed in place of Matrix Spike/Duplicate samples due to limited sample amount available for analysis.
- Q-65** Spike recovery is estimated due to the high analyte concentration of the source sample.

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---	--	---

REPORTING NOTES AND CONVENTIONS:

Abbreviations:

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported
- RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

Detection Limits: Limit of Detection (LOD)

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

Reporting Limits: Limit of Quantitation (LOQ)

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

Reporting Conventions:

Basis: Results for soil samples are generally reported on a 100% dry weight basis.
The Result Basis is listed following the units as " dry", " wet", or " " (blank) designation.

- " dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")
See Percent Solids section for details of dry weight analysis.
- " wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
- " " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

Results for Volatiles analyses on soils and sediments that are reported on a "dry weight" basis include the water miscible solvent (WMS) correction referenced in the EPA 8000 Method guidance documents. Solid and Liquid samples reported on an "As Received" basis do not have the WMS correction applied, as dry weight was not performed.

QC Source:

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

Miscellaneous Notes:

- " --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- " *** " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

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Project: Nustar Vancouver Annex - SW

Project Number: 4Q23

Project Manager: Kurt Harrington

Report ID:

A3L0883 - 12 20 23 1745

REPORTING NOTES AND CONVENTIONS (Cont.):

Blanks:

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 1/2 the Reporting Limit (RL).

-For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.

-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.

For further details, please request a copy of this document.

-Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level, if results are not reported to the MDL.

Preparation Notes:

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

Sampling and Preservation Notes:

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

Apex Laboratories

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Darrell Auvil, Client Services Manager



ANALYTICAL REPORT

Apex Laboratories, LLC
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Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

Table with 3 columns: Client info (GeoEngineers - Portland), Project info (Project: Nustar Vancouver Annex - SW), and Report ID (A3L0883 - 12 20 23 1745).

LABORATORY ACCREDITATION INFORMATION

ORELAP Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

Apex Laboratories

Table header with columns: Matrix, Analysis, TNI_ID, Analyte, TNI_ID, Accreditation

All reported analytes are included in Apex Laboratories' current ORELAP scope.

Secondary Accreditations

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

Subcontract Laboratory Accreditations

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

Field Testing Parameters

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

Handwritten signature of Darrell Auvil

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GeoEngineers - Portland Project: **Nustar Vancouver Annex - SW**
5820 S Kelly Ave Unit B Project Number: **4Q23**
Portland, OR 97239 Project Manager: **Kurt Harrington** **Report ID:**
A3L0883 - 12 20 23 1745

CHAIN OF CUSTODY

Lab # **A3L0883** COC ___ of ___

APEX LABS
6700 SW Sandburg St., Tigard, OR 97223 Ph: 503-718-2323

Company: **GeoEngineers** Project Mgr: **Kurt Harrington** Project Name: **4Q23 SW (Vancouver)** Project #: _____
Address: **5820 S Kelly Ave, Portland, OR** Email: **kharrington@geoeng.com** Email # _____

Sampled by: **SKL** Phone: _____

Site Location: State **WA** County _____

SAMPLE ID: **OF-005**

DATE	TIME	MATRIX	# OF CONTAINERS	NWPH-CID	NWPH-D	NWPH-G	8260 BTEX	8260 RBDM VOCs	8260 Halo VOCs	8260 VOCs Full List	8270 SIM PAHs	8270 Sema-Vols Full List	8082 PCBs	8081 Pesticides	RCRA Metals (8)	Priority Metals (13)	Al, Sb, Cr, Co, Ni, Pb, Se, Ag, Na, Tl, V, TC1P	TC1P Metals (8)	TC1P DISS	TC1P	Hold Sample	Frozen Archive
12/12/23	11:00 AM	W6	6		X	X																

SPECIAL INSTRUCTIONS:
* PH measured in field at time of sample using Cullen PETS-50 probe calibrated at 4.71 and 10.50 on 12/1/23.

TAT Requested (circle) 1 Day 2 Day 3 Day 5 Day Standard Other: _____

Standard Turn Around Time (TAT) = 10 Business Days

SAMPLES ARE HELD FOR 30 DAYS

RELINQUISHED BY:	RECEIVED BY:
Signature: Sam Russell Date: 12/15/23	Signature: Missy Wilbur Date: 12/15/23
Printed Name: Sam Russell Time: 18:20	Printed Name: Missy Wilbur Time: 18:20
Company: GeoEngineers	Company: Apex

Form Y-002 R-00

Apex Laboratories

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Darrell Auvil, Client Services Manager



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ORELAP ID: OR100062

GeoEngineers - Portland 5820 S Kelly Ave Unit B Portland, OR 97239	Project: Nustar Vancouver Annex - SW Project Number: 4Q23 Project Manager: Kurt Harrington	Report ID: A3L0883 - 12 20 23 1745
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APEX LABS COOLER RECEIPT FORM

Client: GeoEngineers Element WO#: A3L0883

Project/Project #: 4Q23 SW (Vannet)

Delivery Info:
 Date/time received: 12/5/23 @ 18:20 By: AAW
 Delivered by: Apex Client ESS FedEx UPS Radio Morgan SDS Evergreen Other _____

Cooler Inspection Date/time inspected: 12/5/23 @ 18:20 By: AAW
 Chain of Custody included? Yes No _____
 Signed/dated by client? Yes No _____

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	<u>4.6</u>						
Custody seals? (Y/N)	<u>N</u>						
Received on ice? (Y/N)	<u>Y</u>						
Temp. blanks? (Y/N)	<u>N</u>						
Ice type: (Gel/Real/Other)	<u>Real</u>						
Condition (In/Out):	<u>In</u>						

Cooler out of temp? (Y/~~N~~) Possible reason why: _____
 Green dots applied to out of temperature samples? Yes/~~No~~
 Out of temperature samples form initiated? Yes/~~No~~

Sample Inspection: Date/time inspected: 12/5/23 @ 18:46 By: ZAM
 All samples intact? Yes No _____ Comments: _____

Bottle labels/COCs agree? Yes No _____ Comments: _____

COC/container discrepancies form initiated? Yes _____ No
 Containers/volumes received appropriate for analysis? Yes No _____ Comments: _____

Do VOA vials have visible headspace? Yes _____ No NA ZAM 12/5/23
 Comments: _____

Water samples: pH checked: Yes No _____ NA _____ pH appropriate? Yes No _____ NA _____ pH ID: A23E172
 Comments: _____

Additional information:

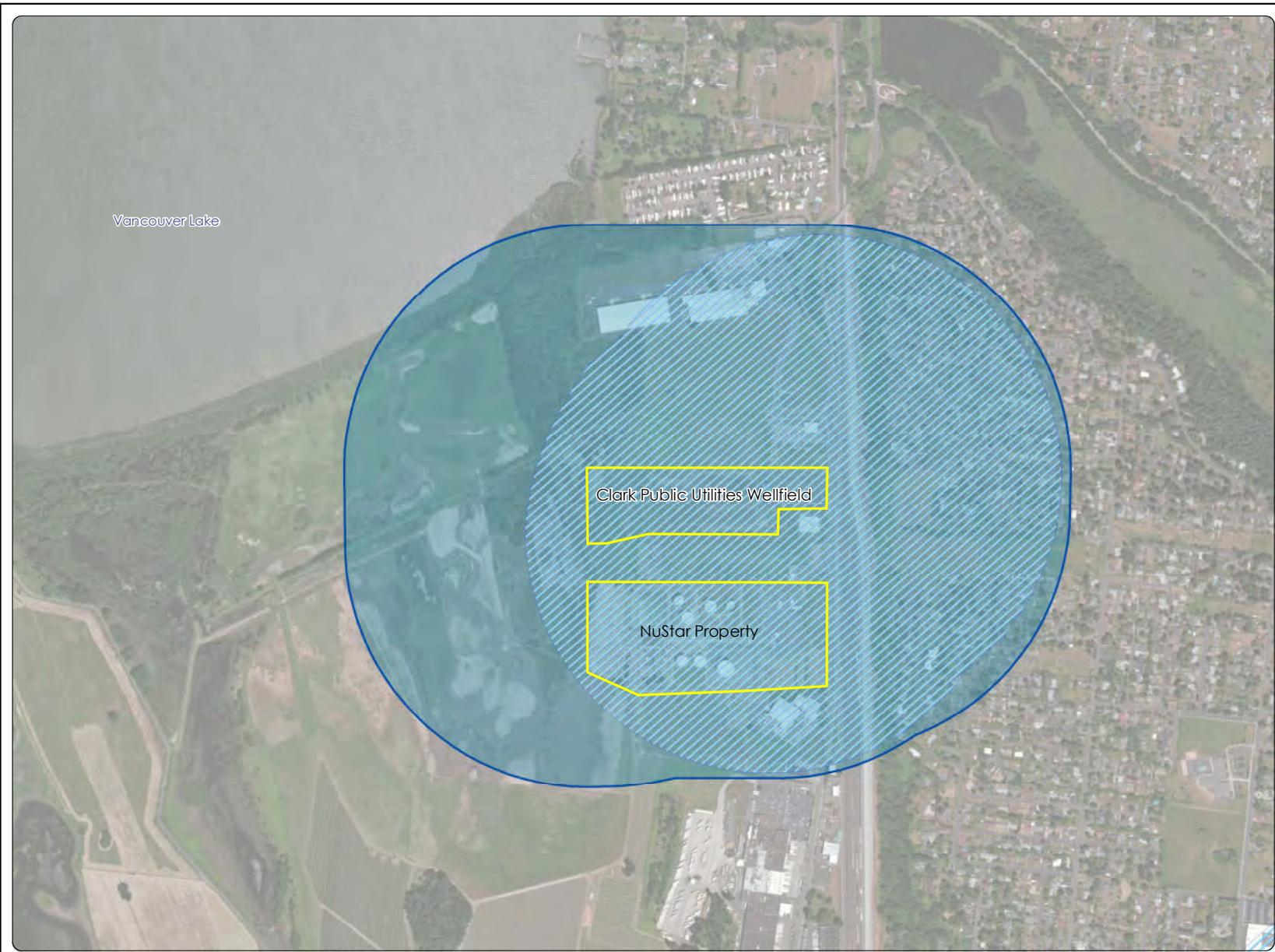
Labeled by: ZAM Witness: AAW Cooler Inspected by: ZAM Form Y-003 R-01 -

Apex Laboratories

The results in this report apply to the samples analyzed in accordance with the chain of custody document(s) and updated by any subsequent written communications. This analytical report must be reproduced in its entirety.

Darrell Auvil, Client Services Manager

**Attachment G.3:
USGS Topographical Map, Groundwater Monitoring Wells
Maps, and Regional Well Logs**



**Figure 1
Special Wellhead
Protection Area**

NuStar Terminals Operations
Partnership L.P.
Vancouver Annex Facility
5420 NW Fruit Valley Road
Vancouver, WA 98660

Legend

- Property Boundary
- 1,900' City of Vancouver
- Special Wellhead Protection Area Boundary (from GIS data)
- 1,900' radius from CPU Property



Source:
Aerial photograph obtained from Esri.
Tax lot data obtained from Clark County GIS.

Regional Water Well Logs

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

File Original with Department of Ecology
Second Copy - Owner's Copy
Third Copy - Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Notice of Intent W159523
UNIQUE WELL I.D.# AKS-795

Water Right Permit No. _____

318106

PAGE 1

(1) OWNER: Name Clark Public Utilities Address PO Box 8900 Vancouver, WA 98668

(2) LOCATION OF WELL: County Clark NE 1/4 NW 1/4 Sec. 16 T. 2 N.R. 1E WM

(2a) STREET ADDRESS OF WELL: (or nearest address) 5900 NW Fruit Valley Rd Vancouver, WA 98660
TAX PARCEL NO.: 147361000

(3) PROPOSED USE: Domestic Industrial Municipal
 Irrigation Test Well Other
 DeWater

(4) TYPE OF WORK: Owner's number of well (if more than one) TW-7
 New Well Method: Dug Bored
 Deepened Cable Driven
 Reconditioned Rotary Jetted
 Decommission

(5) DIMENSIONS: Diameter of well 12 inches
Drilled 605 feet. Depth of completed well 590 feet.

(6) CONSTRUCTION DETAILS
Casing Installed:
 Welded 16 " Diam. from 0 ft. to 360 ft.
 Liner installed 12 " Diam. from 12 ft. to 400 ft.
 Threaded Diam. from _____ ft. to _____ ft.

Perforations: Yes No
Type of perforator used _____
SIZE of perforations _____ in. by _____ in.
perforations from _____ ft. to _____ ft.

Screens: Yes No K-Pac Location _____
Manufacturer's Name Johnson
Type 304 stainless Model No. _____
Diam. 8-inch Slot Size 60 from 390 ft. to 461 ft.
Diam. 8-inch Slot Size 60 from 521 ft. to 582 ft.

Gravel/Filter packed: Yes No Size of gravel/sand #6-10
Material placed from 360 ft. to 590 ft.

Surface seal: Yes No To what depth? 38 ft.
Material used in seal Ben foam
Did any strata contain unusable water? Yes No
Type of water? _____ Depth of strata _____
Method of sealing strata off _____

(7) PUMP: Manufacturer's Name _____
Type: _____ H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level 20 ft.
Static level 2016 ft. below top of well Date 12/11/03
Artesian pressure _____ lbs. per square inch Date _____
Artesian water is controlled by _____
(Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes No If yes, by whom? P66 (Mather & Sons)
Yield: 100 gal./min. with 99.55 ft. drawdown after 72 hrs.
Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)
Time Water Level Time Water Level Time Water Level
2 36.5 20 30.65 60 27.9
5 34.1 29 29.74 80 27.17
10 32.36 41 28.87 110 26.37
Date of test 3/13/07
Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.
Airtest _____ gal./min. with _____ ft. drawdown after _____ hrs.
Artesian flow _____ g.p.m. Date _____
Temperature of water _____ Was a chemical analysis made? Yes No

(10) WELL LOG or DECOMMISSIONING PROCEDURE DESCRIPTION
Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information. Indicate all water encountered.

MATERIAL	FROM	TO
Brown silt	0	30
Brown sand & silt	30	37
Gray gravelly fine sand w/ silt interbeds	37	41
Gray fine sand w/ sea shell & gravel	41	50
Brownish-black fine sand	50	65
Brownish-black cobbly m-c sand & gravel	65	72
Brown gravelly m-c sand	72	101
Brown fine sand w/ some gravel	101	107
Brown gravelly fine sand grading to m-c sand & gravel	107	116
Brown m-c sand w/ silt interbeds	116	119
Brown sand, gravel & cobbles	119	138
Brown slightly sandy gravel & cobbles	138	142
Brown slightly silty gravel & cobbles w/ fine sand	142	167
Brown gravel & cobbles w/ fine sand	167	180
Gray silt bound cemented sand & gravel	180	250
Gray very silt bound sand & gravel	250	255
Clay clay	255	269
Gray silty slightly gravelly fine sand	269	272
Greenish-gray clay	272	321
Greenish-gray sandy silt w/ some gravel	321	342
Greenish gray silty clay	342	349

Work Started 10/9/03 Completed 12/09/03

WELL CONSTRUCTION CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

Type or Print Name Tony Fernback License No. 1094
(Licensed Driller/Engineer)

Trainee Name _____ License No. _____

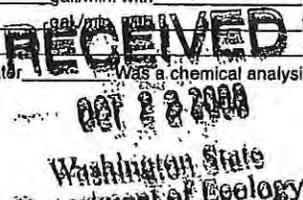
Drilling Company Holt & Phillips
(Signed) Tony Fernback License No. 1094
(Licensed Driller/Engineer)

Address PO Box 1989, Milton WA 98354

Contractor's Registration No. BOARTLC 941RA Date 9-15-08

(USE ADDITIONAL SHEETS IF NECESSARY)

Ecology is an Equal Opportunity and Affirmative Action employer. For special accommodation needs, contact the Water Resources Program at (360) 407-6600. The TDD number is (360) 407-6006.



The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

File Original with
Department of Ecology
Second Copy - Owner's Copy
Third Copy - Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

PAGE 2

Notice of Intent W159523

UNIQUE WELL I.D. # AKS-795

Water Right Permit No. _____

(1) OWNER: Name Clark Public Utilities Address PO Box 8900 Vancouver WA 98668

(2) LOCATION OF WELL: County Clark NE 1/4 NW 1/4 Sec 16 T 2 N.R. 1E WM

(2a) STREET ADDRESS OF WELL: (or nearest address) _____

TAX PARCEL NO.: 147361000

(3) PROPOSED USE: Domestic Irrigation Industrial Test Well Municipal DeWater Other

(4) TYPE OF WORK: Owner's number of well (if more than one) TW-7
 New Well Method: _____
 Deepened Dug Bored
 Reconditioned Cable Driven
 Decommission Rotary Jetted

(5) DIMENSIONS: Diameter of well 12 inches
 Drilled 605 feet. Depth of completed well 590 ft.

(6) CONSTRUCTION DETAILS

Casing Installed:
 Welded _____ ft. to _____ ft.
 Liner installed _____ ft. to _____ ft.
 Threaded _____ ft. to _____ ft.

Perforations: Yes No
 Type of perforator used _____
 SIZE of perforations _____ in. by _____ in.
 _____ perforations from _____ ft. to _____ ft.

Screens: Yes No R-Pac Location _____
 Manufacturer's Name _____
 Type _____ Model No. _____
 Diam. _____ Slot Size _____ from _____ ft. to _____ ft.
 Diam. _____ Slot Size _____ from _____ ft. to _____ ft.

Gravel/Filter packed: Yes No Size of gravel/sand _____
 Material placed from _____ ft. to _____ ft.

Surface seal: Yes No To what depth? _____ ft.
 Material used in seal _____
 Did any strata contain unusable water? Yes No
 Type of water? _____ Depth of strata _____
 Method of sealing strata off _____

(7) PUMP: Manufacturer's Name _____
 Type: _____ H.P. _____

(8) WATER LEVELS: Land-surface elevation above mean sea level _____ ft.
 Static level _____ ft. below top of well Date _____
 Artesian pressure _____ lbs. per square inch Date _____
 Artesian water is controlled by _____
 (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
 Was a pump test made? Yes No If yes, by whom? _____
 Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
 Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
 Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
 Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test _____
 Bailor test _____ gal./min. with _____ ft. drawdown after _____ hrs.
 Airtest _____ gal./min. with _____ ft. drawdown after _____ hrs.
 Artesian flow _____ g.p.m. Date _____
 Temperature of water _____ Was a chemical analysis made? Yes No

(10) WELL LOG or DECOMMISSIONING PROCEDURE DESCRIPTION
 Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information. Indicate all water encountered.

MATERIAL	FROM	TO
Brown silty clay	349	356
Black sand stone	356	368
Gray sandy silt w/ scattered gravel	368	374
Brown silty fine sand	374	387
Brown fine sand	387	450
Gray fine sand w/ minor gravel & wood frags	450	468
Greenish-gray silty clay	468	493
Gray silty fine sand w/ silt interbeds	493	516
Gray fine sand w/ wood frags	516	582
Greenish-gray clay	582	605

RECEIVED

OCT 22 2008

Washington State
Department of Ecology

Work Started 10/9/03 Completed 12/09/03

WELL CONSTRUCTION CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

Type or Print Name Tony Ferenback License No. 1094
 (Licensed Driller/Engineer)

Trainee Name _____ License No. _____

Drilling Company Hart Drilling
 (Signed) [Signature] License No. 1094
 (Licensed Driller/Engineer)

Address PO Box 1890, Milton WA 98351

Contractor's Registration No. BOARTLC941RA Date 9-15-08

(USE ADDITIONAL SHEETS IF NECESSARY)

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JAN 26 2015

Page 1/2

WA State Department of Ecology (S) CURRENT

WATER WELL REPORT

Original & 1st copy - Ecology, 2nd copy - owner, 3rd copy - driller



Construction/Decommission ("x" in circle)

- Construction
Decommission ORIGINAL INSTALLATION
Notice of Intent Number

PROPOSED USE: Domestic, Industrial, Municipal, DeWater, Irrigation, Test Well, Other
TYPE OF WORK: New well, Reconditioned, Deepened
DIMENSIONS: Diameter of well, Depth of completed well
CONSTRUCTION DETAILS: Casing, Installed, Perforations
PUMP: Manufacturer's Name, Type
WATER LEVELS: Land-surface elevation, Static level, Artesian pressure
WELL TESTS: Drawdown, Pump test, Recovery data, Bailer test, Airstest, Artesian flow, Temperature of water

Notice of Intent No. WE 18705
Unique Ecology Well ID Tag No. BIP-845
Water Right Permit No. 62-30381
Property Owner Name Clark Public Utilities
Well Street Address 5906 NW Fruit Valley Rd
City Vancouver County Clark
Location NW 1/4 - 1/4 NE 1/4 Sec 16 T2N R 1E
Lat/Long Lat Deg 45, Lat Min/Sec 39' 49.92"
Long Deg 122, Long Min/Sec 41' 40.71"
Tax Parcel No. (Required) 147383-000

CONSTRUCTION OR DECOMMISSION PROCEDURE
Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated...
Table with columns: MATERIAL, FROM, TO
Rows: Brown silt, Brown fine silty sand, Dark gray fine sand (water), Gray coarse sand, Gray med sand, gravel, cobbles, Brown coarse sand, Brown coarse sand & gravel, Blue-green and gray silty sand w/ medium gravel & trace green binder, Cemented medium sand, and gravel, green binder, Green silty sandy clay, Light blue sticky clay, Blue-green dense clay w/ lenses of fine sand & siltstone, Yellowish-brown clay, Blue sticky clay, Light blue clay w/ siltstone layers, Dark grey-green silt, Brown clay, Gray dense clay, Black sand stone, Greenish-gray sticky clay, Greenish-gray clay, Greenish-gray silty fine sand, Brown silty fine sand, Brown silty very fine sand w/ minor gravel, Brown fine sand, Gray silt

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards.
Driller/Engineer/Trainee Signature
Driller or trainee License No.
IF TRAINEE: Driller's License No.
Driller's Signature:

Drilling Company Half Services Inc
Address
City, State, Zip
Contractor's Registration No. Date

ECY 050-1-20 (Rev 02-2010) To request ADA accommodation including materials in a format for the visually impaired, call Ecology Water Resources Program at 360-407-6872.

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report

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JAN 26 2015

Page 2/2

WA State Department of Ecology (SWHO)

WATER WELL REPORT



Construction/Decommission ("x" in circle)

Construction Decommission ORIGINAL INSTALLATION Notice of Intent Number

PROPOSED USE: Domestic Industrial Municipal DeWater Irrigation Test Well Other TYPE OF WORK: Owner's number of well (if more than one) PW-4 DIMENSIONS: Diameter of well 20 inches, drilled 612 ft. CONSTRUCTION DETAILS: Casing 16" Welded 20' Dia from 100 ft to 432' Installed: 16" Liner installed 16" Dia from 468 ft to 542' Perforations: No Type of perforator used SIZE of perfs 1/2 in. and no. of perfs from 1 ft. to 1 ft. Screens: Yes No K-Pac Location Manufacturer's Name Johnson Type stainless steel Model No. Diam. 16" Slot size 40 from 428 ft. to 468 ft. Gravel/Filter packed: Yes No Size of gravel/sand 8 x 12 sand Materials placed from 401 ft. to 612 ft. Surface Seal: Yes No To what depth? 60 ft. Material used in seal cement 0-25' bentonite 25-60' Did any strata contain unusable water? No Yes No Type of water? Depth of strata Method of sealing strata off PUMP: Manufacturer's Name Type: I.P. WATER LEVELS: Land-surface elevation above mean sea level 30 ft. Static level 9.9 ft. below top of well Date 12/17/14 Artesian pressure lbs. per square inch. Date Artesian water is controlled by (cap, valve, etc.) WELL TESTS: Drawdown is amount water level is lowered below static level Was a pump test made? Yes No If yes, by whom? Rob Mathers SA Yield: 261.2 gal./min. with 10.4 ft. drawdown after 8 hrs. Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level) Time Water Level Time Water Level Time Water Level 2 67.68 16 56.51 35 53.74 4 61.26 21 53.48 38 53.66 10 58.13 30 54.46 54 52.55 Date of test Bailer test gal./min. with ft. drawdown after hrs. Airtest gal./min. with stem set at ft. for hrs. Artesian flow g.p.m. Date Temperature of water 12.6 C Was a chemical analysis made? Yes No

Notice of Intent No. WE18705 Unique Ecology Well ID Tag No. BIP-845 Water Right Permit No. 62-30381 Property Owner Name Clark Public Util. Inc. Well Street Address 5806 NW Fruit Valley Rd City Vancouver County Clark Location NW 1/4-1/4 NE 1/4 Sec 6 Twp 2 N R 1 E EWM or WWM Lat/Long Lat Deg 45 Lat Min/Sec 39' 49.92" Long Deg 122 Long Min/Sec 41' 40.71" Tax Parcel No. (Required) 147383-000

CONSTRUCTION OR DECOMMISSION PROCEDURE Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information. (USE ADDITIONAL SHEETS IF NECESSARY)

MATERIAL	FROM	TO
Gray fine Sand	447	469
Greenish gray shaly Clay	469	497
Greenish gray silty w/ fine sand interbed	497	527
Gray silty very fine Sand w/ wood	527	532
Gray slightly silty very fine Sand w/ wood	532	542
Gray fine Sand	542	609
Greenish-gray Clay	609	612

Start Date 7/28/14 Completed Date 12/18/14

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief. Driller/Engineer/Trainee Signature Randy Holt Driller or trainee License No. 1099 IF TRAINEE: Driller's License No. Driller's Signature:

Drilling Company Holt Services Inc Address 10621 Todd Rd E City, State, Zip Edgewood WA 98372 Contractor's Registration No. HOLTSSI89856 Date 1-21-15

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

File Original and First Copy with
Department of Ecology
Second Copy - Owner's Copy
Third Copy - Driller's Copy

WATER WELL REPORT

Application No.

STATE OF WASHINGTON

Permit No.

(1) **OWNER:** Name Hal Firestone Address 4236 NW. Fruit Vally Rd. Vancouver, Wa. 98660

(2) **LOCATION OF WELL:** County Clark - NE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 16 T. 2 N., R. 1E W.M.

Bearing and distance from section or subdivision corner

(3) **PROPOSED USE:** Domestic Industrial Municipal
Irrigation Test Well Other

(4) **TYPE OF WORK:** Owner's number of well (if more than one)
New well Method: Dug Bored
Deepened Cable Driven
Reconditioned Rotary Jetted

(5) **DIMENSIONS:** Diameter of well 10 inches.
Drilled 65 ft. Depth of completed well 65 ft.

(6) **CONSTRUCTION DETAILS:**
Casing installed: 10 " Diam. from 0 ft. to 49 ft.
Threaded Tail 58 " Diam. from 58 ft. to 65 ft.
Welded " Diam. from ft. to ft.

Perforations: Yes No
Type of perforator used.....
SIZE of perforations in. by in.
..... perforations from ft. to ft.
..... perforations from ft. to ft.
..... perforations from ft. to ft.

Screens: Yes No
Manufacturer's Name Johnson
Type Stainless steel Model No.
Diam. 6 Slot size 30 from 42 ft. to 58 ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes No Sand Packed # 8 Monterey
Gravel placed from 49 ft. to 65 ft.

Surface seal: Yes No To what depth? 20 ft.
Material used in seal Bentonite & hole plug
Did any strata contain unusable water? Yes No
Type of water? Depth of strata.....
Method of sealing strata off.....

(7) **PUMP:** Manufacturer's Name.....
Type: HP.

(8) **WATER LEVELS:** Land-surface elevation above mean sea level..... ft.
Static level 27 ft. below top of well Date 12-22-87
Artesian pressure lbs. per square inch Date.....
Artesian water is controlled by..... (Cap, valve, etc.)

(9) **WELL TESTS:** Drawdown is amount water level is lowered below static level.
Was a pump test made? Yes No If yes, by whom? Johnson
Yield: 75 gal./min. with 4'10 ft. drawdown after 1 hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test.....
Bailer test..... gal./min. with..... ft. drawdown after..... hrs.
Artesian flow..... g.p.m. Date.....
Temperature of water..... Was a chemical analysis made? Yes No

(10) WELL LOG:

Formation: Describes by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Brown top soil	0	2
Brown sticky clay	2	17
Brown sandy fine sand	17	30
Greyish fine sand, water	30	45
Greyish blue heaving sand	45	58
Fine packed sand	58	65

RECEIVED
JAN 11 AM 11:55
HANSEN DRILLING CO. INC.
S & H DIVISION OF HILL

Work started Dec. 15, 1987 Completed Dec. 22, 1987

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Hansen Drilling Co., Inc.
(Person, firm, or corporation) (Type or print)

Address 6711 NE. 58th Ave. Vancouver, Wa. 98661
0221 Murnett Johnson

[Signed] Murnett Johnson
(Well Driller)

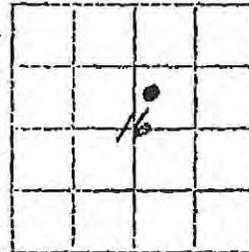
License No. C-51 Date Dec. 23, 1987

HANSED*377NT

App'l. 4884
 Per. 4597
 Cert. 3880
 WELL LOG

STATE OF WASHINGTON
 DEPARTMENT OF CONSERVATION
 DIVISION OF WATER RESOURCES

Record by Driller
 Source Driller's Record



Location: State of WASHINGTON
 County Clark
 Area
 Map

1/4 1/4 sec 16 T 2 N, R 1 E

Diagram of Section

Drilling Co. R. J. Strasser Drilling Co.

Address 8110 S.E. Sunset Lane, Portland, Ore.

Method of Drilling drilled Date Dec. 13, 191958

Owner Pacific Supply Cooperative

Address Walla Walla, Washington

Land surface, datum ft above
below

SWL: 17' Date _____, 19____ Dims: _____

CORRELATION	MATERIAL	From (feet)	To (feet)
-------------	----------	-------------	-----------

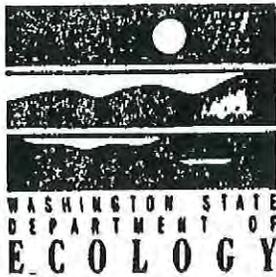
(Transcribe driller's terminology literally but paraphrase as necessary, in parentheses. If material water-bearing, so state and record static level if reported. Give depths in feet below land-surface datum unless otherwise indicated. Correlate with stratigraphic column, if feasible. Following log of materials, list all casings, perforations, screens, etc.)

	Cooling water for refinery process units & domestic supply		
	Topsoil	0	9
	Sand, fine	9	36
	Sand, coarse, some clay & gravel	36	57
	Sand, & gravel, some binder	57	84
	Sand, & gravel (water bearing)	84	103
	Sand, fine yellow	103	110
	Casing: 80" from 0' to 110'		
	Yield: 2800 gpm with 41' DD after 12 hrs.		
	Pump: 130 H.P. electric turbine		

Turn up

Sheet _____ of _____ sheets

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.



UNIQUE WELL I.D. NUMBER A A B 7 5 6
X Y Z 1 2 3

CLR024

WELL TAGGING FORM

Date of Field Visit 1-29-93 By Chuck Lehotsky, Joe Cason

RECORD VERIFICATION

- Well Report available (please attach)
- Well Report not available
- Verification inconclusive

WELL OWNERSHIP, IF DIFFERENT FROM WELL REPORT

Title — First Name — Last Name CENEX
 Street address 5420 Fruit Valley Road
 City Vancouver State WA 98660

LOCATION OF WELL, IF DIFFERENT FROM WELL REPORT

Well Address Same as above
 City — County —
 T. 2 N. R. 1 E. WM Sec. 16 NE ¼ of the NW ¼

Latitude 45 ° 39 ' 41 "
 Longitude 122 ° 41 ' 42 "

- GPS
- Topographic Map
- Survey
- Computer generated

Elevation at land surface 23 (feet) meters (circle one)

- Digital Altimeter
- Topographic Map
- Other —

Additional information, if available:

- Location marked on topographic map (please attach)
- Location marked on air photo (please attach)

WELL CHARACTERISTICS

Physical Description of Well (size of casing, type of well, housing, etc.): 80"-diameter well with large electric turbine installed on concrete pad atop well. 8"-diameter access port exists on east side of well.

Location of Well Identification Tag: strapped to outside of 8"-diameter access port.

Was Supplemental Tag needed for ease of identifying well?

NO

YES

If yes, where was tag placed? _____

Scale 1:24,000 (1"=2,000')

D	C	B	A
E	F	G	H
M	L	K	J
N	P	Q	R

Indicate the location of the well within the Section by drawing a dot at that point.

SECTION 16

COMMENTS: _____

FOR ECOLOGY WATER RESOURCES PROGRAM USE ONLY

Water Right # _____

Date Issued _____

Circle one: Application Permit Certificate Claim Exempt

The Department of Ecology does NOT Warrant the Data and/or the Information on this Well Report.

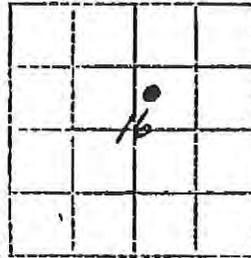
The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

Appl. 4884
 Per. 4597
 Cert. 3880
 WELL LOG

STATE OF WASHINGTON
 DEPARTMENT OF CONSERVATION
 DIVISION OF WATER RESOURCES

CLR 024

Record by Driller
 Source Driller's Record



Location, State of WASHINGTON
 County Clark
 Area _____
 Map _____

$\frac{1}{4}$ sec 16 T. 2 N. R. 1 E.
 Drilling Co. R. J. Strasser Drilling Co.

Diagram of Section

Address 8110 S.E. Sunset Lane, Portland, Ore.
 Method of Drilling drilled Date Dec. 13, 191958
 Owner Pacific Supply Cooperative
 Address Walla Walla, Washington

Land surface, datum _____ ft. ^{above} / _{below} _____
 SWL: 17' Date _____ 19____ Dims: _____

CORRELATION	MATERIAL	From (feet)	To (feet)
-------------	----------	-------------	-----------

(Transcribe driller's terminology literally but paraphrase as necessary, in parentheses if material water-bearing, so state and record static level if reported. Give depths in feet below land-surface datum unless otherwise indicated. Correlate with stratigraphic column, if feasible. Following log of materials, list all casings perforations, screens, etc.)

	Cooling water for refinery process units & domestic supply		
	Topsoil	0	9
	Sand, fine	9	36
	Sand, coarse, some clay & gravel	36	57
	Sand, & gravel, some binder	57	84
	Sand, & gravel (water bearing)	84	103
	Sand, fine yellow	103	110
	Casing: 80" from 0' to 110'		
	Yield: 2800 gpm with 41' DD after 12 hrs.		
	Pump: 130 H.P. electric turbine		

Vancouver Quadrangle

The Department of Ecology does NOT Warrant the Data and/or the Information on this Well Report.

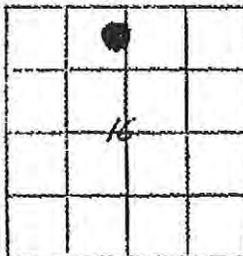


(STATE OF WASHINGTON)
 DEPARTMENT OF CONSERVATION
 AND DEVELOPMENT

WELL LOG No. Appl. #4836

Date April 9, 1951

Record by well driller
 Source driller's record



Location: State of WASHINGTON
 County Clark

Area
 NE 1/4 NW 1/4 sec. 16 T. 2 N., R. 1 E.

Drilling Co. George L. Zent
 Address Vancouver, Wash.

Method of Drilling Date 19

Owner Wm. H. Brown
 Address Vancouver, Wash.

Land surface, datum ft above below

CONSU- LATION	MATERIAL	THICKNESS (feet)	DEPTH (feet)
------------------	----------	---------------------	-----------------

(Transcribe driller's terminology literally but paraphrase as necessary, in parentheses. If material water-bearing, so state and record static level if reported. Give depths in feet below land-surface datum unless otherwise indicated. Correlate with stratigraphic column, if feasible. Following log of materials, list all casings, perforations, screens, etc.)

	Soil	2	2
	Sandy clay	18	20
	Fine sand	6	26
	Coarse sand & water	22	48
	PUMP TEST:		
	Dim. 46'x10"		
	SWL: 20 ft.		
	DD: 3 ft.		
	Yield: 96 g.p.m.		
	Type & size of pump: 5 h.p. centri.		
	Type & size of motor: 5 hp 3 phase electric		
	CASING: 24" diam. 1/2" in dredge pipe from 0 to 27 ft.		
	10" diam. DD tubing from 15 to 48-6"		
	Perforations: 10" pipe torch cut perforations from 22 to 42 ft.		

Turn up

Sheet of sheets

(STATE OF WASHINGTON)
 DEPARTMENT OF CONSERVATION
 AND DEVELOPMENT

WELL LOG No. Appl. #4836

Date April 9, 1951

Record by Well driller

Source driller's record

Location: State of WASHINGTON

County Clark

Area

NE 1/4 NW 1/4 sec 16 T 2 N, R 1 E

Drilling Co. George L. Zeht

Address Vancouver, Wash.

Method of Drilling Date 19

Owner Wm. H. Brown

Address Vancouver, Wash.

Land surface, datum ft. above below

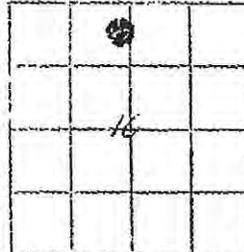


Diagram of Section

CORRE- L-TION	MATERIAL	THICKNESS (feet)	DEPTH (feet)
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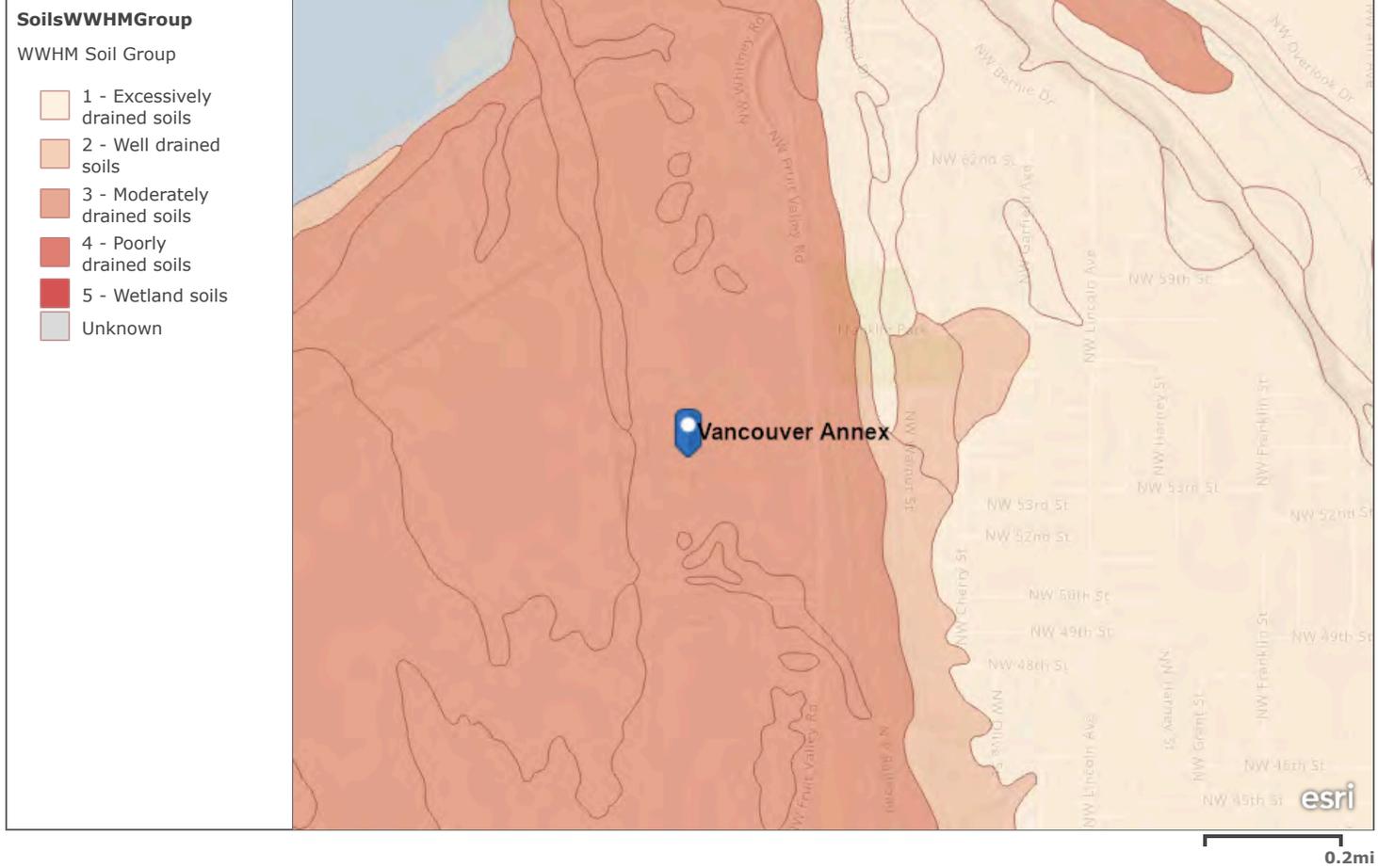
(Transcribe driller's terminology literally but paraphrase as necessary, in parentheses. If material water-bearing, so state and record static level if reported. Give depths in feet below land-surface datum unless otherwise indicated. Correlate with stratigraphic column, if feasible. Following log of materials, list all casings, perforations, screens, etc.)

	Soil	2	2
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	Dim. 46"x10"		
	SWI: 20 ft.		
	DD: 3 ft.		
	Yield: 96 g.p.m.		
	Type & size of pump: 5 h.p. centri.		
	Type & size of motor: 5 hp 3 phase electric		
	CASING: 24" diam. 1/4" in dredge pipe from 0 to 27 ft.		
	10" diam. DD tubing from 15 to 46'6"		
	Perforations: 10" pipe torch cut perforations from 28 to 42 ft.		

Attachment G.4:
Soils Description, including Excerpts from *Soil Survey of Clark County, Washington (November 1972)*

Full report available at:
<https://s3.wp.wsu.edu/uploads/sites/2079/2018/12/1972-Soil-Survey-of-Clark-County.pdf>

My Map



Esri, NASA, NGA, USGS, FEMA | Esri Community Maps Contributors, County of Clark, WA, Oregon Metro, Oregon State Parks, State of Oregon GEO, WA State Parks GIS, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, US Census Bureau, USDA, USFWS | <http://gis.clark.wa.gov/gishome/Metadata/?pid=metadata.layer&dbID=1117>

This is a scanned version of the text of the original Soil Survey report of Clark County, Washington issued November 1972. Original tables and maps were deleted. There may be references in the text that refer to a table that is not in this document.

Updated tables were generated from the NRCS National Soil Information System (NASIS). The soil map data has been digitized and may include some updated information. These are available from <http://soildatamart.nrcs.usda.gov>.

Please contact the State Soil Scientist, Natural Resources Conservation Service (formerly Soil Conservation Service) for additional information.

SOIL SURVEY OF CLARK COUNTY, WASHINGTON

BY DALE A. McGEE, SOIL CONSERVATION SERVICE

SOILS SURVEYED BY DALE A. McGEE, RUDOLPH W. MAYKO, WILLARD A. CALL, CARL J. McMURPHY, AND JOHN G. KRAUTSCHEID, SOIL CONSERVATION SERVICE.

UNITED STATES DEPARTMENT OF AGRICULTURE, IN COOPERATION WITH THE WASHINGTON AGRICULTURAL EXPERIMENT STATION

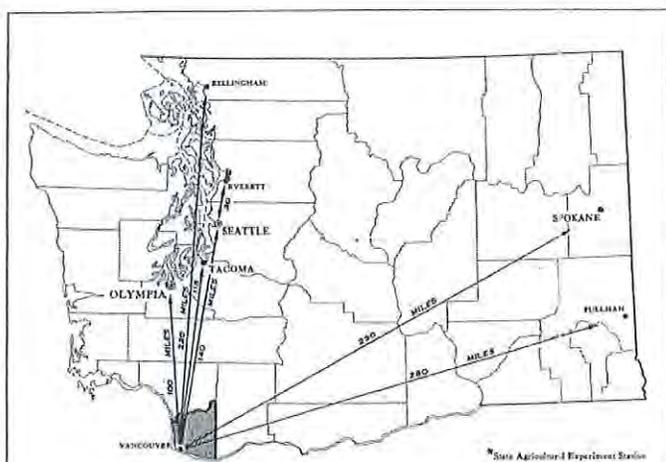


Figure 1.-Location of Clark County in Washington.

CLARK COUNTY is in the southwestern part of the State of Washington (fig. 1). The Columbia River forms its southern and western borders. It is bounded on the north by the Lewis River and on the east by Skamania County.

The land area comprises about 400,000 acres, or about 630 square miles. The population is approximately 101,000. The largest city, Vancouver, population 34,500, is the county seat and is 100 miles south of Olympia, the State capital. Vancouver is along the north shore of the Columbia River, opposite Portland, Oregon.

Economic development in Clark County is diversified. Farming is important, but it is secondary in value of total products to industrial products, which include lumber, pulp, paper, aluminum, carborundum, and chemicals. About 42 percent of the county is cleared and in farmland; the rest is forested or logged-off land. Most of the farmland lies in the central, western, and southwestern parts of the county. This area is composed of terraces and terrace plains, about 30 to 800 feet above sea level. The northern and eastern parts of the county are forested foothills and mountains of the Cascade Range. In these areas farming is confined to the larger valleys. Much of the cleared land is in hay and pasture.

Dairying is the most important farm enterprise in the county; it accounts for more than 40 percent of the value of farm products sold. Ranking second and third are livestock and poultry. Other important farm products are vegetables, berries, and orchard fruits.

The county lies in a long structural basin (Willamette-Puget Trough) between the Pacific Coast ranges to the west and the parallel Cascade Range to the east. The Columbia River, the major trunk stream of the Pacific Northwest, flows through the Cascade Range, borders Clark County as it crosses the trough, then passes through the Pacific Coast ranges into the Pacific Ocean to the west.

The western part of the county consists of a series of gently rolling alluvial terraces that form plains and benches rising steplike from the present level of the Columbia River. The elevations in these areas range from a few feet to more than 800 feet above sea level. The eastern part of the county consists of high old alluvial terraces against volcanic foothills and mountains of the western slopes of the Cascade Range. Along the eastern margin of the county, some of the higher peaks rise to an elevation of nearly 4,000 feet. Mountain ridges 2,000 to 3,000 feet in elevation are common. Much of this area is very steep, and a fall of 1,000 feet within a lateral distance of half a mile is not uncommon. The mountainous terrain is heavily dissected by streams that originate in this area and to the east. Most of the important streams that drain the county flow in a westerly direction. The more prominent streams are: the North Fork of the Lewis River; the East Fork of the Lewis River; the Washougal and Little Washougal Rivers; and Lacamas, Salmon, Big Tree, Cedar, Canyon, Mason, and Lockwood Creeks.

How This Survey Was Made

Soil scientists made this survey to learn what kinds of soil are in Clark County, where they are located, and how they can be used. The soil scientists went into the county knowing they likely would find many soils they had already seen and perhaps some they had not. They observed the steepness, length, and shape of slopes, the

Hesson clay loam, 30 to 55 percent slopes (HcF).-This soil is similar to Hesson clay loam, 0 to 8 percent slopes, except that the surface layer is 2 to 4 inches thinner. Included in mapping were some areas where the surface layer is gravelly clay loam. This soil occurs on terrace breaks that lead into valleys. The slopes are long. Surface runoff is rapid to very rapid, and the erosion hazard is severe to very severe where the surface is left bare.

This soil is too steep for cultivation, but it is suited to timber. (Capability unit VIe-3; woodland suitability group 3rH4; wildlife site 7)

Hesson very stony silty clay loam, 3 to 30 percent slopes (HhE).-This soil is in areas where local volcanic lava flows have deposited igneous rocks over the surface. It is generally near areas of Olympic soils. Included in mapping were a few areas where the slope is more than 30 percent and a few areas that are less than 3 feet deep to weathered gravel, cobblestones, and clay. Surface runoff is slow to rapid, and the erosion hazard is slight to severe if the surface is left bare.

This soil is suited to timber (Capability unit VIIs-1; woodland suitability group 3dH3; wildlife site 12)

Hillsboro Series

The Hillsboro series consists of deep, well-drained soils on terraces. These are medium-textured soils that developed in deposits of old Columbia River alluvium. Most areas are nearly level to gently sloping, but strongly sloping to very steep areas are along drainageways and streams. Most areas are in the southwestern, central, and south-central parts of the county. The native, vegetation is dominantly Douglas-fir and a scattering of grand fir, bigleaf maple, and western dogwood. The understory consists principally of salal, ferns, Oregongrape, and vine maple. The annual precipitation is 40 to 50 inches.

Hillsboro soils are among the most productive terrace soils in the county; about 90 percent of the acreage is cultivated. These soils are used extensively for high-income crops, such as pole beans, strawberries, sweet corn, cucumbers, and other truck crops, and for hay and pasture. They are also used for urban development.

Hillsboro silt loam, 3 to 8 percent slopes (HoB).-This is the dominant soil in the southwestern part of the county. The relief is gently undulating. In most places the slopes are short.

In a typical profile the surface layer is dark-brown silt loam about 7 inches thick. The next layer is about 48 inches thick. In sequence from the top, the upper 17 inches is friable, dark-brown silt loam; the next 16 inches is friable, dark grayish-brown heavy silt loam; and the lower 15 inches is friable, dark grayish-brown silt loam. The next layer, to a depth of 86 inches, is dark grayish brown silt loam.

Included in mapping were areas between Whipple and Salmon Creek where the texture of the surface layer is nearly clay loam.

This soil is well drained, moderately permeable, and easily tilled. The available water capacity is very high. Fertility is moderately high. Surface runoff is slow, and the erosion hazard is slight.

Representative profile of Hillsboro silt loam, in a cultivated area 600 feet east of U.S. 99 and 350 feet

north of 104th Street, 3 miles north of Vancouver, SE1/4NE1/4SW1/4 sec. 35, T. 3 N., R. 1 E.

Ap-0 to 4 inches, dark-brown (10YR 3/3) silt loam, pale brown (10YR 5/3) when dry; weak, very fine, granular structure; soft, very friable, nonsticky and slightly plastic; no roots; strongly acid (pH 5.5); abrupt, smooth boundary. (3 to 6 inches thick)

A1-4 to 7 inches, dark-brown (10YR 3/3) silt loam, pale brown (10YR 5/3) when dry; massive; hard, firm, slightly sticky and slightly plastic; few fine roots; many very fine and medium, and few coarse, tubular and interstitial pores; strongly acid (pH 5.5); clear, smooth boundary. (2 to 4 inches thick)

B1-7 to 17 inches, dark-brown (10YR 3/3) silt loam, pale brown (10YR 5/3) when dry; weak, medium and coarse, subangular blocky structure; slightly hard, friable, sticky and plastic; few fine roots; many, very fine, tubular and interstitial pores; thin, patchy clay films on ped surfaces; medium acid (pH 5.6); gradual, smooth boundary. (7 to 12 inches thick)

B21t-17 to 24 inches, dark-brown (10YR 3/3) heavy silt loam, brown (10YR 5/3) when dry; moderate, coarse, subangular blocky structure; hard, friable, sticky and plastic; very few, fine, fibrous roots; many, fine, tubular and interstitial pores; moderately thick, patchy clay films on ped surfaces and in pores; strongly acid (pH 5.5); gradual, smooth boundary. (7 to 11 inches thick)

B22t-24 to 32 inches, dark grayish-brown (10YR 4/2) heavy silt loam, light brownish gray (10YR 6/2) when dry; moderate, medium and coarse, subangular blocky structure; very hard, friable, sticky and plastic; very few fine roots; many, very fine, tubular and interstitial pores; moderately thick, continuous clay films; strongly acid (pH 5.4); gradual, smooth boundary. (7 to 11 inches thick)

B23t-32 to 40 inches, dark grayish-brown (10YR 4/2) heavy silt loam, light brownish gray (10YR 6/2) when dry; weak, medium, prismatic structure breaking to moderate, medium, subangular blocky; very hard, friable, slightly sticky and plastic; no roots; common, very fine, tubular pores; moderately thick, patchy clay films on ped surfaces and moderately thick, continuous clay films in pores; very strongly acid (pH 5.0); gradual, smooth boundary. (6 to 12 inches thick)

B3t-40 to 55 inches, dark grayish-brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) when dry; weak, coarse, subangular blocky structure; very hard, friable, slightly sticky and slightly plastic; no roots; common, very fine, interstitial pores; moderately thick, patchy clay films; strongly acid (pH 5.1); gradual, smooth boundary. (12 to 20 inches thick)

C1-55 to 72 inches, dark grayish-brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) when dry; few, fine, faint, dark-brown (7.5YR 4/2) mottles; massive; hard, friable, nonsticky and nonplastic; many, very fine, tubular pores; thin clay films in pores; strongly acid (pH 5.3); gradual, smooth boundary. (12 to 20 inches thick)

C2-72 to 86 inches, dark grayish-brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) when dry; few, fine, faint, dark-brown (7.5YR 4/2) mottles; massive; hard, friable, nonsticky and nonplastic; common, very fine, tubular pores; strongly acid (pH 5.5).

The A1 horizon ranges from very dark brown to dark brown in color. The B horizon ranges from 10YR to 7.5YR in hue and from 2 to 4 in chroma. In places the profile is loam to a depth of about 36 inches, sandy loam to a depth of 48 inches, and sand between 48 and 62 inches.

Most of the acreage of this soil is cultivated or in urban fringe development. Nearly all the crops suited to this area are grown. Pears, canberries, strawberries (fig. 7), pole beans, potatoes, and walnuts are important truck crops. Alfalfa and red clover are important



Figure 7.-Strawberries on a Hillsboro silt loam. This area is near Salmon Creek.

legumes for hay, and white clover is important for pasture. Orchardgrass and ryegrass are the chief grasses for hay and pasture. (Capability unit IIe-1; woodland suitability group 2oL3 ; wildlife site 3)

Hillsboro loam, 0 to 3 percent slopes (HIA).-This soil is similar to Hillsboro silt loam, 3 to 3 percent slopes, except that the surface layer is 1 to 3 inches thicker, and the texture is loam to a depth of about 36 inches, sandy loam between a depth of 36 and 48 inches, and sand between a depth of 48 and 62 inches. Surface runoff is very slow, and the hazard of erosion is none to slight.

Where cultivated for a number of years, this soil tends to develop a tillage pan. Deep plowing or use of a subsoiler will alleviate this condition. The available water capacity is high.

Most of this soil is used for crops and pasture. Pole beans, strawberries, potatoes, and cucumbers are grown. Alfalfa or a mixture of red clover and ryegrass for hay is commonly grown in rotation with the cash crops. There is a small acreage of cane and tree fruits. (Capability unit I-2; woodland suitability group 3oH3; wildlife site 3)

Hillsboro loam, 3 to 8 percent slopes (HIB).-This is the dominant terrace soil in the central part of the county. It is similar to Hillsboro silt loam, 3 to 8 percent slopes, except that the profile is loam to a, depth of about 36 inches, sandy loam between a depth of 36 and 48 inches, and sand between a depth of 48 and 62 inches.

Where cultivated for a number of years, this soil tends to develop a tillage pan. Deep plowing or use of a subsoiler will alleviate this condition. The available water capacity is high.

Most of this soil is used for crops and pasture. Pole beans, strawberries, potatoes, and cucumbers are grown. Alfalfa or a mixture of red clover and ryegrass for hay is commonly grown in rotation with the truck crops. There is a small acreage of cane and tree fruits. (Capability unit IIe-1; woodland suitability group 3oH3 ; wildlife site 3)

Hillsboro loam, 8 to 15 percent slopes (HIC).-This soil is similar to Hillsboro silt loam, 3 to 8 percent slopes, except that the surface layer is 1 to 3 inches thinner, and the texture is loam to a depth of about 36 inches, sandy loam between a depth of 36 and 48 inches, and sand between a depth of 48 and 62 inches. Surface runoff is medium, and the erosion hazard is moderate. The slopes are complex and rather short.

Pole beans, strawberries, potatoes, and cucumbers are grown. Alfalfa or a mixture of red clover and ryegrass for hay is commonly grown in rotation with the cash crops. There is a small acreage of cane and tree fruits.

Cross-slope seeding and winter cover crops help control erosion. The available water capacity is high. (Capability unit IIIe-5; woodland suitability group 3oH3; wildlife site 3)

Hillsboro loam, 15 to 20 percent slopes (HID).-This soil is along the edge of drainageways and streams. It is similar to Hillsboro silt loam, 3 to 8 percent slopes, except that the slopes are longer, and the texture is loam to a depth of about 36 inches, sandy loam between a depth of 36 and 48 inches, and sand between a depth of 48 and 62 inches. Surface runoff is medium, and the erosion hazard is moderate.

Grasses and legumes are more common on this soil than other crops.

Use of machinery is difficult because of the slopes. Conservation practices, such as cross-slope seeding, and the use of long-lived grasses and legumes in the rotation are needed to control loss of soil. The available water capacity is high. (Capability unit IIIe-5; woodland suitability group 3oH3; wildlife site 3)

Hillsboro loam, 20 to 30 percent slopes (HIE).-This soil is similar to Hillsboro silt loam, 3 to 8 percent slopes, except that the surface layer is 1 to 3 inches thinner, and the texture is loam to a depth of about 36 inches, sandy loam between a depth of 36 and 48 inches, and sand between a depth of 48 and 62 inches. It occurs along the edges of drainageways and streams. Surface runoff is medium to rapid, and the erosion hazard is moderate to severe if the surface is left bare through the winter.

Pasture is the main use where this soil is cleared. Uncleared areas are used primarily for timber production. The available water capacity is high. (Capability unit IVE-2; woodland suitability group 3oH3; wildlife site 3)

Hillsboro loam, 30 to 50 percent slopes (HIF).-This soil occurs along Salmon Creek and its tributaries. It is similar to Hillsboro silt loam, 3 to 8 percent slopes, except that the surface layer is 2 to 4 inches thinner, and the texture is loam to a depth of about 36 inches, sandy loam between a depth of 36 and 48 inches, and sand between a depth of 48 and 62 inches. Surface runoff is rapid to very rapid, and the erosion hazard is severe to very severe if the surface is left bare in winter.

This soil is suited to timber.

The available water capacity is high. (Capability unit VIe-3 ; woodland suitability group 3rH4; wildlife site 3)

Hillsboro silt loam, 0 to 3 percent slopes (HoA).-This soil is similar to Hillsboro silt loam, 3 to 8 percent slopes. Surface runoff is very slow, and there is no erosion hazard.

Most of the acreage of this soil is cultivated or in urban fringe development. Nearly all the crops suited to this area are grown. Pears, caneberries, strawberries, pole beans, potatoes, and walnuts are important truck crops. Alfalfa and red clover are important legumes for hay, and white clover is important for pasture. Orchardgrass and ryegrass are the chief grasses for hay and pasture. (Capability unit I-2; woodland suitability group 2oL3; wildlife site 3)

Hillsboro silt loam, 8 to 15 percent slopes (HoC).-This soil is similar to Hillsboro silt loam, 3 to 8 percent slopes, except that the surface layer is 1 to 3 inches thinner. Surface runoff is medium, and the erosion hazard is moderate. Most of the slopes are short.

Nearly all the crops suited to this area are grown. Pears, caneberries, strawberries, pole beans, potatoes, and walnuts are important cash crops. Alfalfa and red clover are the important legumes for hay, and white clover for pasture. Orchardgrass and ryegrass are the chief grasses for hay and pasture.

This soil is easily cultivated. Cross-slope tillage and grasses and legumes in the rotation are needed to control erosion. (Capability unit IIIe-5; woodland suitability group 2oL3 ; wildlife site 3)

Hillsboro silt loam, 15 to 20 percent slopes (HoD).-This soil is along streams and major drainageways. It is

similar to Hillsboro silt loam, 3 to 8 percent slopes, except that the surface layer is 2 to 3 inches thinner. Surface runoff is medium, and the erosion hazard is moderate.

Most of the crops grown on Hillsboro silt loam, 3 to 8 percent slopes, are grown on this soil. More long-lived grasses and legumes are grown because the steeper slopes create an erosion hazard and difficulty in operation of machinery. (Capability unit IIIe-5 ; woodland suitability group 2oL3 ; wildlife site 3)

Hillsboro silt loam, 20 to 30 percent slopes (HoE).-This soil is along Salmon Creek, Whipple Creek, and other major drainageways in the western part of Clark County. It is similar to Hillsboro silt loam, 3 to 8 percent slopes, except that the surface layer is 2 to 4 inches thinner. Surface runoff is medium to rapid, and the erosion hazard is moderate to severe if the surface is left bare.

Most of the crops grown on Hillsboro silt loam, 3 to 8 percent slopes, are grown on this soil. More of the acreage is used for long-lived grasses and legumes because of the moderately steep slopes. (Capability unit IVE-2; woodland suitability group 2oL3; wildlife site 3)

Hillsboro silt loam, 30 to 65 percent slopes (HoG).This soil is similar to Hillsboro silt loam, 3 to 8 percent slopes, except that the surface layer is 7 to 10 inches thick. Surface runoff is rapid to very rapid, and the erosion hazard is severe to very severe if the surface is left bare.

This soil is suited to Douglas-fir. (Capability unit VIe-3 ; woodland suitability group 2rL5 ; wildlife site 3)

Hillsboro bouldery silt loam, 3 to 8 percent slopes (HsB).-Most of the acreage of this soil is on terraces along the Columbia River. The soil is similar to Hillsboro silt loam, 3 to 8 percent slopes, except that it is bouldery on the surface. Included in mapping were a few areas steeper than 8 percent. The available water capacity is high.

The soil in most places is too bouldery to be cultivated. The boulders range in weight from a few hundred pounds to several tons. They can be removed only at considerable cost. Much of the acreage is view property and is gradually developing into residential use. (Capability unit Vs-1; wildlife site 12; not assigned to a woodland suitability group)

Hockinson Series

The Hockinson series consists of deep, moderately well drained and somewhat poorly drained, nearly level to gently sloping soils on terraces. These are loamy soils that formed in old alluvium of mixed origin. Nearly all the acreage is near Hockinson and Battle Ground, but some of the acreage is near Manor. The native vegetation on Hockinson soils is Oregon ash, Oregon white oak, western redcedar, red alder, hardhack, sedges, and water-tolerant grasses. The average annual precipitation is between 50 and 60 inches.

About 95 percent of the acreage has been cleared, and the soils are used chiefly for hay and pasture. In areas that are artificially drained, irrigated pasture, and some row crops, such as cucumbers, pole beans, and potatoes, are grown. Crops that require spring planting cannot be grown unless the soils are drained. Without artificial

Attachment G.5:
Local Geology and Hydrology – Excerpts from *Additional Investigation Summary Report and Pilot Study Work Plan NuStar Vancouver Annex Terminal Vancouver, Washington*
(August 2017)

Full report available at:

[file:///C:/Users/cwong/Downloads/20170823 Apex Additional Investigation Summary Report and Pilot Study Work Plan.pdf](file:///C:/Users/cwong/Downloads/20170823%20Apex%20Additional%20Investigation%20Summary%20Report%20and%20Pilot%20Study%20Work%20Plan.pdf)



*Additional Investigation Summary
Report and Pilot Study Work Plan
NuStar Vancouver Annex Terminal
Vancouver, Washington*

Prepared for:
NuStar Terminals Operations Partnership, L.P.

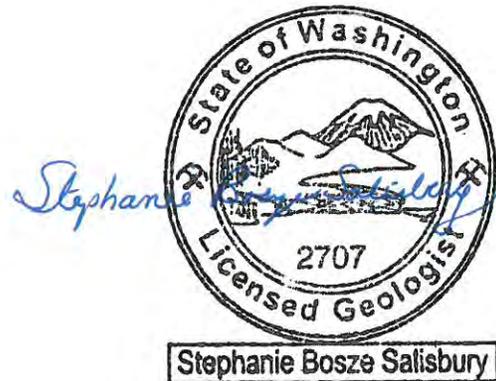
August 2, 2017
1569-09



***Additional Investigation Summary Report
and Pilot Study Work Plan
NuStar Vancouver Annex Terminal
Vancouver, Washington***

Prepared for:
NuStar Terminals Operations Partnership, L.P.

August 2, 2017
1569-09



Stephanie Bosze Salisbury, L.G.
Associate Geologist

Table of Contents

1.0 INTRODUCTION	1
2.0 BACKGROUND	1
2.1 Site Location, Description, and History	1
2.2 Geology and Hydrogeology	2
3.0 SUMMARY OF SITE INVESTIGATIONS.....	4
3.1 Summary of Historical Investigations – 2001 thorough 2012.....	4
3.2 Summary of Additional Investigation – 2014 to 2016	4
4.0 PILOT TEST WORK PLAN.....	9
5.0 SCHEDULE AND REPORTING.....	13
6.0 REFERENCES	14

Tables

1	Groundwater Elevation Data
2	Summary of Analytical Results from Monitoring Wells
3	Summary of Soil Analytical Results: TPH and VOCs
4	Grab Groundwater Sample Analytical Results: TPH, BTEX, and MTBE

Figures

1	Site Location Map
2	Site Plan
3	Groundwater Elevations – September 2015
4	TPH Concentrations in Groundwater – October 2015
5	BTEX and MTBE Concentrations in Groundwater – October 2015
6	Pilot Study Area
7	Pilot Study Injection Layout

Appendices

A	Soil Boring Lithologic Logs and Monitoring Well Construction Logs
B	Apex Standard Operating Procedures (SOPs)

1.0 Introduction

This *Additional Investigation Summary Report and Pilot Study Work Plan* summarizes data collected during investigations conducted at the NuStar Terminals Operations Partnership, L.P. (NuStar) Annex Terminal located at 5420 NW Fruit Valley Road, Vancouver, Washington (the Facility) from 2014 through 2016 and presents a work plan to conduct a remedial technology pilot study. A location map for the Facility is provided on Figure 1; a site plan is provided on Figure 2.

On July 12, 2012, NuStar submitted a draft Feasibility Study to the Washington State Department of Ecology (Ecology) in accordance with Agreed Order (AO) No. 09-TC-S DE5250 between the Washington State Department of Ecology (Ecology) and NuStar. The technical basis of the FS was the Remedial Investigation (RI) and Risk Assessment (RA) documented in the *Remedial Investigation and Risk Assessment Report* (RI/RA Report) submitted to Ecology in December 2010 (Ash Creek, 2010). The FS proposed monitored natural attenuation to address residual hydrocarbon impacts in the eastern portion of the tank farm. On October 16, 2013 Ecology provided NuStar with comments on the Draft FS. In the months following receipt, NuStar held several meetings with Ecology to discuss Ecology's comments on the FS, as well as additional comments that were presented to NuStar in a February 4, 2014 meeting. The meetings culminated in a Final Project Coordinator's Decision (the "Decision") issued by Ecology on August 26, 2014, which established a series of steps for collecting additional data to support resubmittal of a revised FS, including one year of sitewide quarterly groundwater monitoring. One of the additional data requests included groundwater investigation near historical borings SB-8 and SB-9 located in the western portion of the terminal. NuStar agreed to the additional investigation, and the results indicated the presence of petroleum hydrocarbons in groundwater at concentrations above Washington Model Toxic Control Act (MTCA) Method A levels. As a result, additional well installation, site investigation and groundwater monitoring has been conducted to evaluate the extent of the petroleum hydrocarbons in the western terminal. This report summarizes the results of the additional groundwater investigations and presents a work plan for a proposed pilot study to evaluate the efficacy of injecting chemical oxidants to address petroleum hydrocarbons detected in groundwater in the western terminal area.

2.0 Background

2.1 Site Location, Description, and History

Location. The Facility address is 5420 NW Fruit Valley Road, Vancouver, Washington 98660 (Latitude: N45° 39.70', Longitude: W122° 41.66'), as shown on Figure 1. The Facility is located on Clark County Tax Lot (TL) No. 147360.

Physical Features. Figure 2 is a Site Plan. The Facility is approximately 31 acres and is roughly rectangular, with dimensions of approximately 800 by 1,800 feet. The Facility is located in a mixed

industrial-agricultural area and currently includes a tank farm containing jet fuel and methanol (seven aboveground storage tanks [ASTs] ranging in size from 30,000 gallons to 3,000,000 gallons); a covered truck refueling rack with two ASTs (approximately a 400-gallon AST and a 7,500-gallon AST containing anti-static additive [ASA] and fuel system icing inhibitor [FSII] additive); and several buildings used for equipment storage and offices. A former underground storage tank (UST) associated with a vapor recovery system was also located on the Facility and was removed in 2001. The vapor recovery system and an associated oil/water separator (OWS) remain on-site. The surface of the Facility is comprised of graveled areas and grass fields, with asphalt-paved roads providing access to the fueling areas, ASTs, and office buildings.

Property History. Support Terminals Operating Partnership, L.P. (STOP) purchased the Facility from Cenex Harvest States Cooperative (Cenex) in 2003. In March 2008, STOP changed its name to NuStar.

The property was developed in 1957 as a truck loading terminal. Records are unclear as to whether the Facility was developed by Cenex. Historically, chemicals and other products stored at the Facility included liquid fertilizers and refined petroleum products such as gasoline, diesel and kerosene, de-natured alcohol, and petroleum product additives. A slop tank is present in the eastern portion of the Facility (Figure 2) and this is typically where waste (such as from tank-bottom cleanouts or the OWS) would be stored prior to off-site disposal or recycling. There is no indication that materials from tank-bottom cleanouts were buried at the Facility.

Prior to or during Cenex's ownership, American Cyanamid conducted agricultural research—including the testing of herbicides and pesticides—in the southeastern portion of the Facility (Figure 2).

2.2 Geology and Hydrogeology

This section presents the understanding of the geology and hydrogeology as discussed in the RI/RA Report (Ash Creek, 2010).

2.2.1 Geology

Regional Geology. The regional geology is summarized below and is based on reports prepared by Pacific Groundwater Group (PGG; 2001) and AMEC (2002a). The vicinity of the Facility is dominated by three primary units: Recent Alluvial deposits; the Pleistocene Alluvial deposits; and the Troutdale Formation.

The Recent Alluvial deposits are the upper unit with deposits approximately 55 feet thick and consist of fine-grained silt and sand within the areas investigated near Vancouver Lake. The Pleistocene Alluvial deposits are approximately 95 to 115 feet thick and consist of coarse-grained sand and gravel. The Pleistocene Alluvial deposits originate from alluvial deposits from the Columbia River and deposits from the catastrophic Missoula Floods. The Troutdale Formation underlies the Pleistocene Alluvial deposits and can

be greater than 1,000 feet thick. It is made up of cemented sandy gravels and semi-consolidated sands, silts, and clays.

Site Geology. During previous Facility investigations performed by others, soil borings have been installed to depths of up to 50 feet below ground surface (bgs) at the Facility. During a 2007 Facility investigation conducted by Ash Creek Associates (Ash Creek, 2007), one boring was completed to a depth of 72 feet bgs. Recent investigations in the western portion of the terminal included installing borings up to depths of 50 feet bgs.

The Recent Alluvial deposits underlying the western portion of the Facility consist of silt and silty clay with some fine sand to depths of approximately 20 to 25 feet bgs. Below 20 to 25 feet bgs, the Recent Alluvial deposits consist of layers of fine- to medium-grained sand to a depth of at least 50 feet bgs. On the eastern portion of the Facility, fine sand or sandy silt with variable layers of sand or silty sand is encountered to a depth of approximately 10 feet bgs. Below 10 feet bgs, the Recent Alluvial deposits in the eastern portion of the Facility consist of layers of fine- to medium-grained sand to a depth of approximately 50 to 60 feet bgs. The Pleistocene Alluvial deposits are encountered below the Recent Alluvial deposits and consist of sand and/or gravel layers of varying thicknesses.

2.2.2 Hydrogeology

Regional Hydrogeology. The regional aquifers, Recent Alluvial Aquifer (RAA); Pleistocene Alluvial Aquifer (PAA); and the aquifers of the Troutdale Formation, follow the regional geology discussed above. The regional hydrogeology summarized below is based on reports prepared in support of Clark Public Utilities (CPU) South Lake Wellfield (PGG, 2001; PGG, 2009), and by Ash Creek (2008a and 2008b).

The RAA is unconfined and receives recharge directly from the land surface and/or surface water features. The PAA directly underlies the RAA and is a productive aquifer with high well yields (several thousand gallons per minute [gpm] without significant drawdown). The groundwater flow system is highly influenced by local surface water bodies. The Columbia River, Vancouver Lake, Vancouver Lake Flushing Channel, and Lake River form natural hydrologic boundaries to the groundwater flow system. Tidal influences and seasonal variations in surface water runoff cause dynamic variation in the stage of the Columbia River, and resulting adjustments in the stages of the other three connected surface water bodies. The groundwater flow system is also influenced by tidal and seasonal variations in the surface water bodies. Regionally, it is anticipated that groundwater within the RAA and PAA near the Facility would have a net gradient towards Vancouver Lake and the Columbia River.

Site Hydrogeology. The depth to first encountered groundwater at the Facility ranges from approximately 15 to 32 feet bgs. This zone corresponds to the silt and fine- to medium-grained sand of the RAA. Deeper groundwater of the PAA is encountered at depths of approximately 50 to 70 feet bgs beneath the Facility (Ash Creek, 2008a).

Shallow groundwater flow at the Facility is, under static conditions, relatively flat with a slight gradient (0.0002 foot per foot [ft/ft]) to the southeast (AMEC, 2002a; SECOR, 2003; and Ash Creek, 2009). Groundwater contour maps prepared for previous investigations are contained in Appendix B of the RI/RA Report (Ash Creek, 2010) and the elevation map from September 2015 is shown on Figure 3 for reference.

3.0 Summary of Site Investigations

The below sections summarize historical and recent investigations conducted at the Facility.

3.1 Summary of Historical Investigations – 2001 thorough 2012

Several investigations have been conducted at the Facility since 2001. The initial investigation assessed the area of a possible fuel release during a UST decommissioning and resulted in further work to define the extent of impacted soil and groundwater (AMEC 2002a, 2002b). In 2003, SECOR conducted a comprehensive Phase II Environmental Site Assessment (ESA) of the Facility as a part of due diligence activities for Cenex during the property transaction to NuStar (SECOR, 2003). From 2007 to 2008, Ash Creek completed several investigations to further characterize the site (Ash Creek, 2007, 2008a, and 2008b). Four monitoring wells were installed in 2004 and were monitored periodically or quarterly during the 2004 to 2012 investigation period. The scope and results of each of these investigations are detailed in the RI/RA Report (Ash Creek, 2010). Table 1 summarizes the depth to groundwater and groundwater elevation data collected during these investigations; Table 2 summarizes the historical groundwater monitoring data; and Table 3 summarizes the historical soil data.

3.2 Summary of Additional Investigation – 2014 to 2016

As previously discussed in Section 1.0, Ecology provided NuStar with comments on the Draft FS on October 16, 2013. In the months following receipt, NuStar held several meetings with Ecology to discuss Ecology's comments on the FS, as well as additional comments that were presented to NuStar in a February 4, 2014 meeting. The additional comments included a request for additional groundwater investigation near historical borings SB-8 and SB-9. NuStar agreed to the additional investigation, and the preliminary investigation indicated that petroleum hydrocarbons were present in groundwater near historical borings SB-8 and SB-9 at concentrations above MTCA Method A levels. As a result, additional well installation, site investigation and groundwater monitoring was conducted to evaluate the magnitude and extent of petroleum hydrocarbons in groundwater in the western portion of the terminal. A summary of each investigation is described in the paragraphs below. Boring and monitoring well installations were conducted using a push probe rig operated by Cascade Drilling of Clackamas, Oregon, under the supervision of an Apex field geologist. Groundwater monitoring events were conducted by Apex field technicians.

During each investigation, soils were logged and field screened using a photoionization detector (PID) and sheen tested. The field logging and screening information for each investigation is summarized on the boring logs/monitoring well construction logs provided in Appendix A. Methods and procedures used during the investigations were conducted in accordance with the Standard Operating Procedures (SOPs) contained in Appendix B. Except for soil samples collected in September 2014 during the initial groundwater investigation near historical borings SB-8 and SB-9, soil samples were not collected for laboratory analysis.

Unless otherwise specified, groundwater samples were collected into laboratory approved containers and submitted to Pace Laboratory of Davis, California for the following analyses:

- TPH-Diesel and Heavy Oil by Method NWTPH-Dx;
 - Select samples were also analyzed for NWTPH-Dx with silica gel cleanup for comparison purposes, at the request of Ecology.
- TPH-Gasoline Range by Method NWTPH-Gx; and
- Benzene, toluene, ethylbenzene and xylenes (BTEX) and methyl tert butyl ether (MTBE) by EPA Method 8260.

3.2.1 Groundwater Investigation – September 20, 2014.

A groundwater investigation was conducted on September 29, 2014 in accordance with a scope of work submitted to Ecology in an email on September 17, 2014 and approved by Ecology in an email on September 24, 2014. Borings SB-8R and SB-9R were installed in the vicinity of historical borings SB-8 and SB-9, respectively. Both borings were advanced to a depth of 25 feet bgs. A temporary 3/4-inch diameter PVC well was installed in each boring; the screened interval in boring SB-8R was from 15 to 20 feet bgs and in SB-9R was from 17 to 22 feet bgs. A groundwater sample was collected from the temporary wells in SB-8R and SB-9R using a peristaltic pump from depths of approximately 19 feet bgs and 17 feet bgs, respectively. At the request of Ecology, soil samples were also collected in the vadose zone above the water table, at depths previously sampled from borings SB-8 and SB-9. Soil samples were collected in both borings at a depth of 12 feet bgs and an additional soil sample was collected in boring SB-9R at a depth of 13.5 feet bgs. The soil and groundwater samples were submitted for laboratory analysis of total petroleum hydrocarbons (gasoline, diesel and heavy oil range) by Method NWTPH-Gx and TWTPH-Dx. The soil results are included on Table 3 and the grab groundwater results are shown on Table 4.

Analytical summary tables from this event were provided to Ecology by email on October 30, 2014. The results of the investigation indicated that groundwater from the borings had TPH gasoline and diesel range concentrations in exceedance of MTCA Method A Cleanup Levels. Based on the results and the provisions of the Decision, Ecology required permanent monitoring wells to be installed at the locations of borings SB-8R and SB-9R, followed by four consecutive quarters of groundwater monitoring.

3.2.2 Monitoring Well Installation – December 2, 2014.

On December 2, 2014, monitoring wells MW-5 and MW-6 were installed at the locations of SB-8R and SB-9R, respectively in accordance with the work scope outlined in a November 25, 2014 email to Ecology and approved by Ecology on December 2, 2014. Both monitoring wells were installed using 2 inch-PVC with a screened interval between 10 and 25 feet bgs, to account for seasonal fluctuations in the water table. It should be noted, that given the proximity to the September 30, 2014 boring locations SB-8R and SB-9R, monitoring wells MW-5 and MW-6 were not logged for lithology or screened using a PID or sheet test during installation. Well construction logs which include lithologic and screening information from the original borings, are provided in Appendix A. Additional information on the installation of wells MW-5 and MW-6 is included in the *Groundwater Monitoring Results – December 2014* letter report submitted to Ecology on February 6, 2015 (Apex, 2015a).

3.2.3 Groundwater Monitoring – December 2014 to September 2015.

One of the provisions of the Decision included conducting one additional year of groundwater monitoring of site wells to evaluate groundwater conditions. As such, groundwater samples were collected from wells MW-1 through MW-6 on a quarterly basis between December 2014 and September 2015. The analytical results from each monitoring event were submitted to Ecology in quarterly letter reports and are summarized on Table 2. Results from the quarterly monitoring indicated the following conclusions:

- BTEX concentrations were below method reporting limits in wells MW-1 through MW-4, located in the western portion of the site.
- The historical MTBE plume located near well MW-2 has attenuated to below cleanup levels, as projected in the 2012 FS; MTBE is non-detect in the remaining wells.
- TPH-g and TPH-d concentrations in groundwater samples from wells MW-5 and MW-6, located in the eastern portion of the site, were above MTCA Method A Cleanup Levels.
- Xylenes concentrations in groundwater samples from well MW-5 were above MTCA Method A Cleanup Levels.
- Benzene, ethylbenzene and xylenes in well MW-6 were above MTCA Method A Cleanup Levels.

Based on these results, Ecology requested a plan for additional groundwater investigation to define the extent of petroleum hydrocarbons and related constituents in the areas of wells MW-5 and MW-6 in an email to NuStar dated March 15, 2015. NuStar provided Ecology the additional investigation work plan in the *March 2015 Groundwater Results Report and Groundwater Investigation Work Plan* (Apex, 2015b). Ecology approved the work plan with comments on June 11, 2015. In its comments, Ecology requested:

- Three depth discrete groundwater samples collected from the borings installed downgradient of wells MW-5 and MW-6; and

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- Grab groundwater samples collected at the depths exhibiting the highest TPHd and TPHo PID readings from at least two borings be analyzed both with and without silica gel cleanup on the sample extract.

3.2.4 Additional Groundwater Investigation – October 2015.

From October 22 through 30, 2015, an additional groundwater investigation was conducted in the western tank farm in accordance with the *March 2015 Groundwater Results Report and Groundwater Investigation Work Plan* (“the Work Plan”; Apex, 2015b), and included depth discrete groundwater samples and TPHd/TPHo analysis with and without silica gel, as requested by Ecology. This included the installation of 12 borings (B-1 through B-12) and the collection of two to three depth discrete groundwater samples from each boring using temporary wellpoints. Boring locations are shown on Figure 4.

Boring Locations and Installation. The borings were installed using direct push technology following the Apex SOPs included in Appendix B. Soil was continuously screened for the presence of petroleum hydrocarbons using a photoionization detector (PID) and logged for lithologic conditions. Soil samples were not collected for laboratory analysis. Boring logs prepared for each location are contained in Appendix A. Initially, eight borings were installed, B-1 through B-8: one boring to the north, south, east and west of each well, MW-5 and MW-6. During installation of the initial eight boreholes, PID measurements indicated the presence of petroleum hydrocarbons in saturated soil; therefore, four “step-out” borings, B-9 through B-12, were advanced to further delineate the extent of hydrocarbons in groundwater.

Groundwater Sampling Approach and Methodology. Grab groundwater samples were collected from two to three discrete depths from each boring to assess and define the vertical extent of petroleum hydrocarbons in groundwater. Prior to initiating the investigation, depth-to-groundwater levels were measured in wells MW-5 and MW-6 to determine the water table elevation in the investigation areas at the time of drilling. The shallowest groundwater sample was collected from first encountered groundwater in each boring. A second grab groundwater sample was collected at the depth at which PID measurements fell below 5 parts per million (ppm). When collected, a third groundwater grab sample was collected from approximately 10 feet below the second sample location. PID measurements on saturated soil at the water table did not indicate the presence of petroleum hydrocarbons at borings B-7, B-8, and B-12; therefore, grab groundwater samples were collected at the water table and ten feet below the water table to confirm the absence of hydrocarbons in accordance with the Work Plan.

To collect the grab groundwater samples, the boring was advanced to a depth two feet below the identified sampling depth and a temporary well point with a four foot screen was placed in the hole such that the middle interval of the screen was at the targeted sampling depth. Low flow sampling techniques were then employed to purge the well point and collect the grab groundwater sample, with the sample intake placed at the mid-point of the temporary well point screen. The groundwater samples were submitted for laboratory

analysis of BTEX and MTBE by EPA Method 8260B and TPHg by Method NWTPH-Gx and TPHd by Method NWTPH-Dx (with silica gel cleanup).

PID Measurement Results. As shown on the boring logs contained in Appendix A, PID measurements on soil were below 5 ppm on unsaturated soil above the historical water table at all locations except boring B-6 and at this location, significant readings (e.g., greater than 100 ppm) were not encountered until a depth of 8 feet bgs. Boring B-6 is located adjacent to borings SB-8 and SB-8R. These results are consistent with the 2002 investigation in these areas and support that the residual hydrocarbons identified in groundwater in the eastern terminal area are from historical releases (e.g., at least 15 years old).

Groundwater Sampling Results. Analytical results for the depth discrete grab groundwater samples are summarized on Table 4; results for TPH and BTEX are shown on Figures 4 and 5, respectively. As can be seen on the figures, the results indicate two relatively limited areas of hydrocarbons in groundwater around wells MW-5 and MW-6. With the exception of ethylbenzene in two locations, B-5 and well MW-5, and xylenes in one location, well MW-5, BTEX were not detected in groundwater near well MW-5 and TPH concentrations were predominantly in the gasoline and diesel carbon ranges. Although benzene, ethylbenzene, and xylenes are detected in groundwater near well MW-6, BTEX is more limited in extent than TPH.

Two of the groundwater borings in the well MW-5 area indicated detectable TPH concentrations at depths between 40 and 50 feet bgs; TPH was detected in groundwater down to 40 feet bgs in the well MW-6 area.

3.2.5 Additional Groundwater Investigation and Compliance Well Installation – July 2016

The results from the October 2015 investigation were submitted to Ecology in an email dated November 25, 2015 and subsequently discussed with Ecology at a meeting on December 15, 2015. At the December 15, 2015 meeting, Ecology requested additional delineation to the west of wells MW-5 and MW-6. Due to physical restrictions immediately west of the wells, delineation to the west was conducted outside and to the west of the tank farm berm. Ecology also requested that two compliance wells be installed at the terminal to monitor the potential for impacted groundwater to migrate off-site to the north in response to future anticipated pumping from Clark Public Utilities (CPU) wells installed north of the facility in the PAA. Based on discussion in and subsequent to the December 2015 meeting, a work plan was submitted to Ecology in an email dated March 23, 2016. A revised work plan was submitted on May 12, 2016, which included the addition of one “deeper” well located near one of the northern compliance wells to evaluate for a potentially induced vertical gradient once CPU initiates pumping at their supply wells located north of the site. The work scope was approved by Ecology on June 1, 2016 and was implemented from July 6 through 8, 2016. The scope of the July 2016 investigation included the following:

- Installation of boring B-13 outside of the tank farm berm to the west of MW-5 as shown on Figure 4. Using the same methodology that was approved for and used during the October 2015

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- investigation, temporary well points were installed in the boring at targeted sampling intervals and groundwater was sampled from 15 to 20 feet bgs and from 25 to 30 feet bgs.
- Installation of boring B-14 outside of the tank farm berm to the west of MW-6 (Figure 4). Temporary wells points were installed in the boring using the approved methodology and groundwater was sampled from 15 to 20 feet bgs and from 25 to 30 feet bgs.
 - Installation of four compliance wells and one deep well at the locations shown on Figure 4, including:
 - Well MW-8, directly north of well MW-5. This monitoring point will be used to monitor for off-site migration to the north in the direction of the CPU well field (test wells TW-4 through TW-8). MW-8 was installed with a screened interval from 10 to 25 feet bgs.
 - Well MW-8D, a deeper well installed adjacent to well MW-8, and coupled with well MW-8, will be compliance wells used to monitor groundwater gradients and quality after municipal pumping is initiated by CPU. Monitoring well MW-8D was installed with a screened interval from 35 to 45 feet bgs.
 - Compliance wells MW-7, MW-9 and MW-10 were installed to the west of the tank farm, northeast of MW-5, and south of the tank farm, respectively. Each well was installed to a depth of 25 feet bgs with a screened interval from 10 to 25 feet bgs.

The borings were advanced and the monitoring wells were installed, developed, and sampled in accordance with the May 12, 2016 work plan and following Apex SOPs for these activities; these SOPs are contained in Appendix B for reference. Groundwater samples were submitted to Pace Analytical laboratory under chain-of-custody procedures and samples were analyzed for TPHd and TPHo by Method NWTPH-Dx and TPHg by Method NWTPH-Gx, as well as BTEX and MTBE by EPA Method 8260. Analytical results for the groundwater samples collected from the monitoring wells and from borings B-13 and B-14 are summarized on Tables 2 and 4, respectively.

TPH and BTEX concentrations in the samples from wells B-13, B-14, MW-7 through MW-10 and MW-8D were below method reporting limits. The results were presented to Ecology in a meeting on September 22, 2016. During the meeting, Ecology supported the conclusion that the delineation activities were complete and that the compliance well network was acceptable for monitoring purposes.

4.0 Pilot Test Work Plan

In the September 2016 meeting, Ecology stated that the Feasibility Study would need to evaluate active remediation to address the petroleum hydrocarbons in groundwater near wells MW-5 and MW-6 based on the additional groundwater investigations conducted from 2014 to 2016. As such, NuStar indicated that initial evaluations of potential remedial alternatives identified injections of oxygen releasing compound

**Attachment H.8:
Stormwater Drainage Map**

