MOTT MACDONALD

Data Gaps Investigation Work Plan

Cascade Natural Gas Site
Sunnyside, Washington

August 2024

Contents

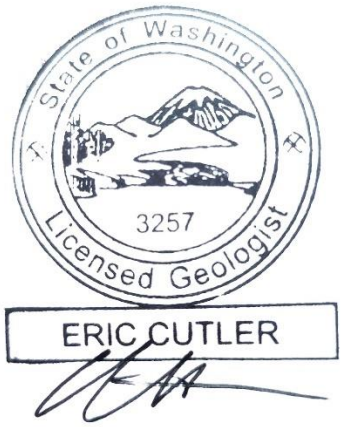
Tables

Figures

Appendices

SIGNATURE

This report, and Mott MacDonald's work contributing to this report, were reviewed by the undersigned and approved for release.



Eric Cutler, P.G., L.Hg.
Project Manager/Hydrogeologist
Washington State Geologist No. 3257

1 Introduction

This Work Plan describes a proposed data gaps investigation to be conducted at the Cascade Natural Gas (CNG) site in Sunnyside, Washington. Work will be performed by Mott MacDonald in coordination with Yakima County and Washington State Department of Ecology (Ecology) under site Consent Decree 98-2-01173-3 (Attorney General of Washington [Washington], 1998). Additional project information regarding document distribution, organization, background, and problem definition is provided in the attached Quality Assurance Project Plan (QAPP) (**Appendix A**). Following completion of fieldwork and receipt of data, a Data Summary Report will be prepared to document findings.

1.1 Site Overview

Yakima County submitted a Revised Remedial Options (RRO) report to Ecology in April 2015 (Pacific Groundwater Group [PGG], 2015). The RRO report outlined remedial options at the CNG site to meet the remediation timeline in the site Consent Decree. However, several data gaps needed to be filled prior to final design and implementation of the remedy. In 2017, PGG (now Mott MacDonald) performed an initial data gaps investigation and concluded that an upgradient source exists (PGG, 2017). In order to select and implement the appropriate remedy, characterization of the upgradient source needs to be completed. This 2024 Data Gaps Investigation Work Plan and attached QAPP (**Appendix A**) describe the objectives, sampling approach, sampling locations, and analyses to be conducted to fill the remaining data gaps.

1.2 General Site Information

General site information for the CNG property is provided in **Table 1**. Detailed information regarding site history, including previous owners, site use, and past environmental investigations and removal actions is provided in the site Consent Decree (Attorney General of Washington [Washington], 1998).

Table 1. General Site Information

Site Name:	Cascade Natural Gas
Site Address:	512 East Decatur Avenue, Sunnyside, WA
Parcel Number:	221025-24406
Facility/Site Identification (ID):	492
Cleanup Site ID:	4925
Consent Decree Number:	98-2-01173-3 (effective May 12, 1998)

1.3 Investigation Objectives

The 2024 Data Gaps Investigation is intended to fill the following data gaps:

- Refine extent of petroleum contamination in groundwater north and west (cross-gradient) of the known CNG UST source area,

- Refine extent of the contaminant plume upgradient of the CNG property to the northeast of the CNG property and upgradient of the Commercial Tire building to constrain the upgradient extent of contamination.

This information will be used to:

- support selection of the supplemental remedial action,
- support remedial design, and
- inform decisions on the possible upgradient source area.

1.4 Constituents of Concern

The site constituents of concern (COCs) are listed in the site Consent Decree (Washington, 1998) and include:

- Total Petroleum Hydrocarbons (TPH) – Diesel Range
- TPH – Gasoline Range
- Benzene
- Toluene
- Ethylbenzene
- Xylenes
- 1,2-dichloroethane (1,2-DCA)

2 Field Activities

Field activities performed as part of this investigation include utility locating, direct push technology (DPT) drilling, groundwater sampling, field screening for indications of petroleum contamination, and temporary and permanent groundwater monitoring well installation. Proposed sampling locations are shown on **Figure 1**. Exact sampling locations may differ based on utility locate findings, as described in **Section 2.2**. General activities and procedures for drilling, temporary and permanent well installation, groundwater sampling, laboratory analysis, investigation-derived waste (IDW) management, and access requirements are provided in **Sections 2.3, 2.4, 2.5, 2.6,** and **2.7**, respectively. Detailed field activity descriptions and quality assurance and quality control (QA/QC) procedures are provided in the QAPP (**Appendix A**).

2.1 Sampling Objectives

Sampling objectives include:

- Temporary well installation, and groundwater sampling to the west and north of the known UST source area is intended to improve understanding of the lateral extent of contamination in cross-gradient directions.
- Temporary and permanent well installation, and groundwater sampling northeast of the source area along the property boundary and within the adjacent utility easement is intended to improve understanding of the upgradient plume extent and width.
- Temporary well installation, and groundwater sampling east-northeast of the Commercial Tire (Former Tom Denchel Ford) property and within existing right of way is intended to determine the presence or absence of contamination further upgradient.

2.2 Utility Locate

An 811 utility locate request will be submitted a minimum of 72 hours prior to drilling for all proposed sampling locations. A third-party private utility locate may also be conducted to mark out non-public utilities and provide an additional check on public utilities.

2.3 Drilling

Drilling and temporary/permanent well installation will be performed with a direct push drill rig. Proposed temporary and permanent well locations are shown on **Figure 1**. Prior to drilling, a hand auger will be advanced to a minimum of 3 feet below grade to confirm absence of utilities. If refusal is encountered during hand auguring, a new boring/well location will be selected.

Direct push sampling will be conducted consistent with the QAPP and standard EPA methods (Environmental Protection Agency [EPA], 2005). Boring logs will be prepared recording the observed geology and indications of contamination at each boring. Any mechanical or operational issues during drilling will be recorded on the boring logs and within field notes. Decontamination of drilling equipment will be performed prior to the start of work, between borings, and at the end of work.

2.4 Well Installation

2.4.1 Temporary Well Installation

A total of 13 temporary wells/borings are proposed as part of this investigation (**Figure 1**). Temporary well screens will be set immediately below the water table (anticipated to occur at approximately 9 feet bgs) to collect reconnaissance groundwater samples. Proposed temporary well construction materials and information is provided in the attached QAPP (**Appendix A**). Temporary wells will be backfilled with bentonite and surface capped with an asphalt patch after collection of the groundwater sample, consistent with WAC 173-160. Cascade Natural Gas will be notified and consulted prior to well installation.

2.4.2 Permanent Well Installation

One permanent well is proposed as part of this investigation. The proposed permanent well is located within the storage yard in the northeast portion of the property (**Figure 1**). The well will be installed as close to the property line as possible to characterize groundwater contamination migrating on site from the upgradient source. Cascade Natural Gas will be notified and consulted prior to well installation. The location of the well may be adjusted based on qualitative field observations in upgradient temporary wells. Like the temporary wells, the well screen will be set immediately below the water table. Proposed permanent monitoring well construction materials and information is provided in the attached QAPP (**Appendix A**).

2.5 Groundwater Sampling

Groundwater samples will be collected from all proposed temporary and permanent monitoring wells, including existing monitoring wells. For temporary wells, disposable tubing will be set to 1 foot from the bottom of the screen and purged with a peristaltic pump until turbidity stabilizes. For permanent and existing groundwater wells, pumping will occur until water quality parameters stabilize. Stabilization criteria is detailed in **Appendix A**. Groundwater samples will then be collected directly into laboratory-provided containers and placed in coolers with ice. Chain of custody will be maintained until samples are delivered to the analytical laboratory.

2.6 Laboratory Analysis

Groundwater samples will be delivered to Analytical Resources, Inc. (ARI) in Tukwila, Washington for analysis. Samples will be analyzed for the COCs listed in **Section 1.4**. ARI is a Washington accredited laboratory for the selected methods. Additional details regarding analytical methods and laboratory QA/QC methods are provided in the QAPP (**Appendix A**). Chromatograms will be included in the laboratory data package for all groundwater TPH analyses, consistent with Consent Decree requirements for quarterly groundwater monitoring and to assist in comparing potential sources.

2.7 Investigation-Derived Waste

Investigation derived waste (IDW) is anticipated to include soil cuttings, decontamination water, and purge water. IDW will be containerized and stored in labeled drums on the CNG property. IDW will be characterized, transported, and disposed of by Yakima County in accordance with state and local regulations.

2.8 Site Access

The majority of field activities will be conducted on the CNG property and will not require access beyond coordination with CNG. Locations in the upgradient alley, Decatur Avenue, 5th Street, and 6th Street, are in publicly owned rights of way and will not require third-party formal access. However, Yakima County intends to contact the owner of the northeast and east-adjacent properties and notify them of the upcoming investigation before field work begins.

3 Reporting

A Data Summary Report will be prepared to document the data gaps investigation that includes the following elements:

- Description of field activities and deviations from the Work Plan,
- Summary of analytical data and data validation,
- Laboratory analytical reports,
- Confirmation of proper investigation Derived Waste (IDW) disposal,
- Map of sampling locations,
- Table of borings and screen intervals for all temporary and permanent wells, and
- Well completion and boring log for the permanent well and boring logs for the temporary wells.

4 Schedule

Fieldwork is planned to occur in Fall/Winter 2024 within 60 days of the signed award with the drilling subcontractor or Ecology-approval of workplan, whichever occurs at a later date. A Data Summary Report will be submitted to Ecology within 90 of receipt of validated data.

5 References

Attorney General of Washington (Washington), 1998. Consent Decree. Ecology v. Cascade Natural Gas, et al., Yakima County Superior Court Cause No. 98-2-01173-3. May 12, 1998.

Environmental Protection Agency (EPA), 2005. Groundwater Sampling and Monitoring with Direct Push Technologies. OSWER No. 9200.1-51. EPA 540/R-04/005. August 2005.

Pacific Groundwater Group [PGG], 2015. Cascade Natural Gas Site Revised Remedial Options, Sunnyside, Washington. April 24, 2015.

PGG, 2017. Data Gaps Investigation Data Summary Report, Cascade Natural Gas Site, Sunnyside, Washington. April 2017.

MOTT MACDONALD

Data Gap Investigation Quality Assurance Project Plan

Cascade Natural Gas Site
Sunnyside, Washington

August 2024

This page left intentionally blank for pagination.

Mott MacDonald
1601 5th Avenue
Suite 800
Seattle
WA 98101
United States of America

T +1 (206) 838 2886
mottmac.com

Data Gap Investigation Quality Assurance Project Plan

Cascade Natural Gas Site
Sunnyside, Washington

August 2024

Contents

Tables

1 Project Management

The following project management elements address the procedural aspects of the project, summarize the project team, and summarize the project.

1.1 Distribution List

The below table lists the document distribution list for the Quality Assurance Project Plan (QAPP) once it has been reviewed and approved by the Washington Department of Ecology (Ecology).

Name	Agency/Company	Position	Email	Phone Number
Mary Monahan	Ecology	Project Coordinator/Site Manager	mmon461@ECY.WA.GOV	509-454-7840
Don Anderson	Yakima County Prosecuting Attorney's Office	Corporate Counsel	Don.anderson@co.yakima.wa.us	509-574-1206
Eric Cutler	Yakima County Consultant (Mott MacDonald)	Project Manager	Eric.cutler@mottmac.com	650-823-4947
Kalle Godel	Montana-Dakota Utilities Co.	Cascade Natural Gas (CNG) Technical Representative	Kalle.godel@mdu.com	701-222-7657
Mike Clapp	CNG	CNG Representative	Mike.clapp@cngc.com	509-457-8176

1.2 Project Organization

The project team is formed by members of Ecology, Yakima County, Cascade Natural Gas (CNG), Mott MacDonald, and subcontracting analytical laboratories and drillers, as needed. The project organization is summarized below.

Ecology is the lead regulatory agency for this project. Mary Monahan is the Project Coordinator for Ecology.

The soil source area is located on property owned by CNG. Don Anderson will act as the representative for Yakima County. CNG will provide access to the site.

The prime consultant for this study is Mott MacDonald who will be responsible for field activities, data collection, data management, and reporting to Ecology and the City of Sunnyside. The key Mott MacDonald staff who will be involved in the project are:

- Eric Cutler, PG: Project Manager
- Ashley Parkhurst: Field and Analysis Support
- Wayne Rennick: GIS Specialist

Yakima County or Mott MacDonald may contract the utility locate and drilling portion of the investigation.

1.3 Background and Problem Definition

Petroleum hydrocarbons are present above cleanup levels in soil and groundwater related to a historic leaking underground storage tank (UST). Ecology, Yakima County, and CNG entered a Consent Decree 98-2-01173-3 (effective May 12, 1998) (Attorney General of Washington [Washington], 1998). This QAPP relates to sampling that will be conducted to investigate the nature and extent of groundwater contamination in support of completing a Data Gaps Investigation.

1.4 Task Description and Summary

This QAPP is part of the Data Gaps Work Plan. The Work Plan includes groundwater sampling. These tasks will be summarized in the following section and further detail is provided in **Section 2**.

1.4.1 Contaminants of Concern

Based on site history and previous sampling, the contaminants of concern (COCs) are petroleum-related compounds including:

- TPH-G (gasoline range)
- TPH-D (diesel range)
- Benzene
- Toluene
- Ethylbenzene
- Xylenes
- 1,2 dichloroethane (1,2-DCA or 1,2-EDC)

1.4.2 Groundwater Investigation

A groundwater investigation will be performed under this Data Gap Work Plan to accomplish two goals:

- Refine extent of lateral petroleum contamination north and west (cross-gradient) of the known CNG UST source area,
- Refine extent of the contaminant plume upgradient of the CNG property as it crosses onto the CNG property and upgradient of the Commercial Tire building to constrain the upgradient extent of contamination.

To accomplish these goals, a network of grab groundwater samples will be collected and analyzed at the proposed locations shown **Figure 1**. This document describes methods and procedures used in sample collection and data analysis. **Section 3.1** details drilling and sampling methods.

1.5 Assessment Criteria

Data from the CNG site will be assessed using the cleanup levels established in Consent Decree (Washington, 1998). **Table 1** includes soil, groundwater, and surface water cleanup levels from Table 2 of the Consent Decree.

1.6 Data Quality Objectives

Quality assurance objectives for measurement data are usually expressed in terms of accuracy and precision. The data will be evaluated using the parameters discussed below.

Definitions of these characteristics are as follows:

Accuracy. A sample spike is prepared by adding a known amount of a pure compound to the environmental sample (before extraction for extractables), and the compound is the same or similar (as in isotopically labeled compounds) as that being assayed for in the environmental sample. These spikes simulate the background and interferences found in the actual samples and calculated percent recovery of the spike is taken as a measure of the accuracy of the total analytical method. When there is no change in volume due to the spike, percent recovery is calculated as follows:

$$PR = \frac{(O - X) \times 100}{T}$$

Where:

PR = percent recovery

O = measured value of analyte concentration after addition of spike

X = measured value of analyte concentration in the sample before the spike is added

T = value of the spike

Tolerance limits for acceptable percent recovery established by the lab in accordance with Contract Laboratory Program National Functional Guidelines (CLP guidelines) will be followed for this project. Sample spike recoveries that fall outside the tolerance limits must be assessed and the problem identified and corrected. The result for that analyte in the unspiked sample is suspect and may not be reported for regulatory compliance purposes.

Surrogate spikes are also a measure of accuracy. When surrogate recoveries are outside the control limits established in the SW-846 methods, the corrective action procedures specified in the methods must be followed by the laboratory.

Precision. Aliquots are made in the laboratory of the same sample and each aliquot is treated exactly the same throughout the analytical method. The percent difference between the values of the duplicates, as calculated below, is taken as a measure of the precision of the analytical method.

$$RPD = \frac{2(D_1 - D_2) \times 100}{(D_1 + D_2)}$$

Where:

RPD = relative percent difference

D_1 = first sample value

D_2 = second (duplicated) sample value

The tolerance limit for percent differences between laboratory duplicates will be $\pm$ 20 percent. If the precision values are outside this limit, the laboratory should recheck the calculations and/or identify the problem. Reanalysis may be required. The result for that analyte in the unspiked sample is suspect and will be flagged when reported; it may not be viable for regulatory compliance purposes.

The tolerance limit for relative percent differences between the field duplicates will be ± 35 percent consistent with prior data investigations at the site. If the precision values are outside this limit, a replicate sample may be run to verify Laboratory precision. If precision limit exceedances are linked to field sampling, samplers should recheck field sampling procedures and identify the problem. Resampling and analysis may be required.

Representativeness. Representativeness is a qualitative term to evaluate how closely the measured results typify the environmental conditions. The sampling plan design, sampling techniques, and sample handling protocols are developed to ensure representative samples.

Comparability. Comparability is a qualitative term that expresses the confidence with which one data set can be compared with another. The use of standard techniques for sample collection and certified analytical laboratories for analyses should make the data comparable throughout the RI work as well as with pre-existing analytical data.

Completeness. Completeness is the percentage of valid measurements collected out of the planned number of measurements. Results will be considered valid if all the precision and accuracy targets are met. Internal laboratory quality control (QC) checks, preventive maintenance, and corrective action, as described in other sections of this document, will be implemented to help meet the Quality Assurance (QA) objectives established for these analyses.

1.6.1 Measurement Performance Criteria

The laboratory quality control samples are described in **Section 2.5**. The target tolerance limits established by the lab in accordance with United States Environmental Protection Agency (EPA) CLP Guidelines will be followed for this project. The limits are summarized below.

Laboratory Quality Control

Laboratory quality control samples for water will be method blanks, laboratory control samples (LCS), matrix spikes, and MS/MSDs.

The goal is to have no detectable contaminants in the method blank. If contamination is detected in the method blank sample, the nature of the interference and the effect on the analysis of each sample in the batch will be evaluated. The source of contamination will be investigated and measures taken to minimize or eliminate the problem. Affected samples are reprocessed or data is appropriately qualified following CLP Guidelines.

LCS results are calculated in percent recovery. Results are compared to established acceptance criteria. A LCS that is within the criteria effectively establishes that the analytical system is in control and validates system performance for the samples in the associated batch. If a LCS result is found to be outside the criteria, this indicates that the analytical system is “out of control.” Any affected samples associated with an out of control LCS are reprocessed and re-analyzed (if possible), or the results reported with appropriate data qualifying codes.

The results from matrix spike analyses are expressed as percent recovery (%R) and RPD. Results are compared to the established acceptance criteria. If the results are outside the criteria, the cause is investigated and corrective actions are taken if necessary, or the matrix spike data is reported with appropriate qualifiers.

The results from matrix duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as RPD. Results are compared to established acceptance criteria. If results are outside the criteria, the cause is investigated and corrective actions are taken if necessary, or the matrix duplicate data is reported with appropriate qualifiers. The acceptance criteria for matrix duplicate analysis vary between analytical methods and will follow the ARI standard laboratory procedures.

1.7 Training and Certification

Direct push drilling will be performed by a Washington State licensed well driller. Laboratory services will be performed by labs accredited by Ecology.

1.8 Documents and Records

Mott MacDonald will be responsible for distributing an electronic version of the Work Plan/QAPP and Data Summary Report to the individuals referenced on the distribution list (**Section 1.1**). These individuals will be responsible for distributing the report throughout their organizations as necessary.

The Consent Decree requires that Yakima County, CNG, and Ecology retain records, reports, documents, and data for 10 years after the completion of the Consent Decree (through 2038). This requirement applies to reports, documents and data generated during the Data Gaps Investigation.

2 Data Generation and Acquisition

This Data Gap investigation at CNG involves collection of soil and water samples for laboratory analysis.

2.1 Sampling Process Design

The groundwater sampling investigation objective is to assess the presence or absence of light non-aqueous liquid (LNAPL), better identify western and northern plume edges, investigate the upgradient source(s), and characterize the quality of groundwater at the site and within the upgradient plume.

2.2 Sampling Methods

Sampling methods vary according to the analyte and well type. Sampling methods that will be used in this study are summarized below. This section also provides drilling methods for the direct push sampling locations.

2.2.1 Drilling

Proposed drilling locations (**Figure 1**) will be white lined by Mott MacDonald ahead of drilling activities. An 811 utility locate request will be submitted a minimum of 72 hours prior to drilling for all proposed sampling locations. Given the quantity and high density of utilities at and adjacent to the project site, a third-party private utility locate may also be conducted to mark out non-public utilities and provide an additional check on public utilities.

Mott MacDonald will subcontract with a Washington-licensed driller for completion of direct-push (geoprobe) borings. Prior to drilling, a hand auger or concrete corer will be advanced by the driller to a minimum of 3 feet below grade to confirm absence of utilities. If refusal is encountered during hand auguring, a new boring/well location will be selected. Borings will be accomplished using a pushprobe to advance a 2- or 3-inch diameter standard direct push sampling core barrel between 3- and 5-feet in length. The core barrel will be lined with an acetate or equivalent sleeve. Water samples will be collected as discussed below.

The probe tooling will be decontaminated before each use. Drill cuttings and decontamination water will be drummed for appropriate disposal.

2.2.2 Direct-Push Groundwater Sampling

Field water quality instruments will be calibrated at the beginning (prior to sampling) of each day. Calibration data will be recorded in the field notes. Groundwater samples collected from direct push borings will be sampled with a temporary screen (well) and peristaltic pump. The temporary well screen will be a 5-foot length of 15 slot PVC screen set in the borehole across the water table (sampling interval is the saturated interval of the borehole). Sampling will be conducted as follows:

- Lower the new, clean polyethylene tubing into the temporary well until the tubing intake is approximately 1-foot above the bottom of the temporary screened interval. Secure the tubing to the top of the well and leave approximately 5 feet of tubing outside the well. Attach a 1-foot length of silicon tubing that is appropriate for a peristaltic pump to the polyethylene tubing.
- Attach the silicon tubing to the peristaltic pump. Purge (remove with pump) water from the well into a calibrated 5-gallon bucket or similar and monitor flow rate.
- Purge water at the maximum sustainable flow rate to clear sediment from the temporary well screen. Purge until turbidity stabilizes.

- Reduce pump flow rate to the rate appropriate for sampling. The goal of this sampling approach is to create minimal screen velocities during purging that will entrain fines, potentially biasing sample results. If turbidity decreases after the flow rate is reduced, then allow turbidity to stabilize. If air is entrained in the sample tubing, reduce the flow rate until bubbles are no longer pre-sent in the sampling tubing. If lack of bubbles cannot be achieved (well yield is less than mini-mum pump rate), note the presence of bubbles in discharge line in field notes.
- Collect samples of water for laboratory analysis in a manner that minimizes volatilization of potential contaminants from the water into the air. Hands and clothing will be clean when handling sampling equipment and during sampling.
- Clean, disposable, latex, nitrile, or equivalent material gloves will be worn when filling bottles for analyses. Gloves will be changed when dirty and between samples. All water samples will be collected from the pump discharge lines directly into the appropriate sample containers.

Collect samples in the following manner:

- Completely fill the appropriate number of bottles to meet laboratory volume requirements and cap securely. Groundwater samples for VOCs will be collected with no headspace in sample containers.

Record sample identification data on each sample container, in the field notes, and on the chain-of-custody. Sample identification will be the same as the well name/number.

2.3 Monitoring Well Sampling

New permanent monitoring wells will be developed prior to sampling. Existing and new permanent monitoring well purging and sampling will be conducted following the protocols for quarterly sampling, where field parameters will be monitored until sequential measurements are stable. “Stable” is defined as:

- Specific conductance, turbidity, oxidation-reduction potential, pH, and temperature that do not indicate a trend (continuously increasing or decreasing between readings).
- Specific conductance, turbidity, oxidation-reduction potential, and temperature that do not vary by more than 10 percent between readings; temperature will not vary by more than 1 degree C[1].
- pH measurements that do not vary by more than 0.1 pH units between readings.

2.4 Sample Handling and Custody

Following collection, groundwater samples will be handled in the manner described below. A summary of analytical holding times is presented in **Table 1**.

- Place sample bottles in clean, insulated containers (ice chests) containing frozen gel, ice, or another compound to maintain temperature near, but not at, or below, freezing. Use sufficient cooling materials to maintain temperature near freezing during the entire time of transport to the lab.
- Maintain custody of samples from time of sampling to receipt at the laboratory. "Custody" means that samples remain in direct possession of a person who is recorded on the Chain-of-Custody form or locked in secure vehicles or offices.
- Complete the appropriate Chain-of-Custody forms and any other pertinent sampling/shipping documentation to accompany the samples.

[1] In some conditions, environmental conditions may influence temperature measurements and greater availability may be observed. If these conditions are present and influence temperature readings, the readings will be qualified and conditions recorded in field notes.

- Samples will be transferred to the analytical laboratory, accompanied by Chain-of-Custody forms and any other pertinent shipping/sampling documentation. One set of Chain-of-Custody forms will be used per laboratory shipment. Sample container custody seals will be used for all shipped containers not delivered directly to the lab by Mott MacDonald personnel. Seals will consist of breakable tape (such as paper masking tape) signed in ink by the person relinquishing the sample. The tape will be placed in such manner that the tape must be broken in order to open the sample container.

2.5 Analytical Methods and Laboratories

The analytical methods and hold times for groundwater samples are summarized in **Table 1**. Groundwater samples measured by method NWTPH-Dx will include silica gel preparation if non-petroleum organic material such as wood or peat is observed in borings from that geologic interval (Ecology, 2016; Ecology, 2023). Organic material may bias petroleum results high if present in samples.

All groundwater samples will be submitted to Analytical Resources, Inc. (ARI) in Tukwila, Washington for analysis. A field duplicate sample will be collected and analyzed for every 20 normal samples collected.

2.6 Laboratory Quality Control

ARI will perform analyses of water quality for the project. ARI is accredited in accordance with WAC 173-50, Accreditation of Environmental Laboratories.

EPA Contract Laboratory Program (CLP) QA/QC procedures or similar efforts will be used for the analyses. ARI will follow the ARI Quality Assurance Manual.

Preparation batches have a maximum of 20 field samples of the same matrix. QA/QC samples processed with each batch are:

- One method blank. The method blank is used to assess the preparation batch for possible contamination during the preparation and processing steps. It is processed along with and under the same conditions as the associated samples.
- One laboratory control sample (LCS). The LCS is used to evaluate the performance of the total analytical system, including all preparation and analysis steps.
- One matrix spike (MS), if suitable. Matrix specific QA/QC samples indicate the effect of the sample matrix on the precision and accuracy of the results generated using the selected method. The information from these controls is sample/matrix specific and is not normally used to determine the validity of the entire batch.
- One matrix spike and matrix spike duplicate (MS/MSD). MS/MSDs are replicate aliquots of the same sample taken through the entire analytical procedure. The results from this analysis indicate the precision of the results for the specific sample using the selected method. One duplicate sample is analyzed with each preparation batch. If sufficient sample is provided, this will be an MS/MSD. If not, a laboratory control sample duplicate will be analyzed.

Target acceptance criteria are discussed in **Section 1.6**.

2.7 Data Management, Verification, Validation, and Assessment

The data generated from field and laboratory measurements will be managed, evaluated, and reported. The data are evaluated to verify that data quality objective (DQO) criteria for Accuracy, Precision, Representativeness, Completeness, and Comparability are obtained. The data will be independently validated for all analytical data generated for this project. The data validation will be performed in accordance with EPA National Functional Guidelines for organic and inorganic analyses, and laboratory-

defined QC limits, regarding the following, as appropriate to the particular analysis: sample documentation/custody, holding times, reporting limits, blank spike, matrix spike and surrogate percent recoveries, laboratory duplicates, comparability, and completeness. Pre-existing data will be evaluated for comparability to new data. Following verification and validation of the data, the data will be assessed for usability. If the DQOs have been met, the quality of the data should be useable. If the DQOs have not been met, the data will be assessed determine if they are still useable to help fill data gaps listed in the Work Plan. Ultimately, the assessment of the meaningfulness of the data to fill data gaps, improve the site conceptual model, and inform future work will be carried out as part of the Data Gaps Work Plan and Reporting.

3 References

Attorney General of Washington (Washington), 1998. Consent Decree. Ecology v. Cascade Natural Gas, et al., Yakima County Superior Court Cause No. 98-2-01173-3. May 26, 1998.

Ecology, 2016. Guidance for Remediation of Petroleum Contaminated Sites. Ecology Toxics Cleanup Program Publication No. 10-09-057. Published November 2010, revised June 2016.

Ecology, 2023. Guidance for Silica Gel Cleanup in Washington State. Ecology Toxics Cleanup Program Publication No. 22-09-059. Published September 2022, revised November 2023.

Table 1. Analytical Parameters

Cascade Natural Gas Site, Sunnyside, Washington

Constituent	Analytical Method	Groundwater			Soil			Surface Water			Hold Time (days)	
		Units	*CUL*	*RL*	*Units*	*CUL*	*RL*	*Units*	*CUL*	*RL*	*Water*	*Soil*
TPH-G (gasoline range)	NWTPH-G	ug/L	1,000	100	mg/kg	100	5	ug/L	NA	100	7	14
TPH-D (diesel range)	NWTPH-Dx	ug/L	1,000	100	mg/kg	200	5	ug/L	NA	100	7	14
Benzene	EPA 8260	ug/L	5	0.2	mg/kg	0.5	0.001	ug/L	43	0.2	7	14
Toluene	EPA 8260	ug/L	1,600	0.2	mg/kg	160	0.004	ug/L	48,500	0.2	7	14
Ethylbenzene	EPA 8260	ug/L	800	0.2	mg/kg	80	0.001	ug/L	6,910	0.2	7	14
Xylenes	EPA 8260	ug/L	16,000	0.2	mg/kg	1,600	0.002	ug/L	NA	0.2	7	14
1,2 Dichloroethane (1,2, DCA)	EPA 8260	ug/L	5	0.2	mg/kg	0.005	0.001	ug/L	59	0.2	7	14

Notes:

CUL: Cleanup Level, values from Consent Decree Table 2.

RL: Reporting Limit

Reporting limits may increase in samples due to matrix interferences from elevated concentrations of other constituents.

NA: Not Applicable

Surface water criteria are applicable to samples historically collected from the irrigation drains

Soil samples analyzed by NWTPH-Dx will have silica gel cleanup. Groundwater samples analyzed by NWTPH-Dx will have silica gel cleanup if non-petroleum organic material observed in soil core (wood, etc).


Commercial Tire
(Former Tom
Denchel Ford)
Storage
Yard
CNG
Building
Former Shell
Service Station
United
Telephone
Company
S 5th St
S 6th St
Decatur Ave
MH-1
MW-10
MW-2
B21
B22
B20
B16
B8
B11
B9
B10
B12
MW-13
B4
B26
B5
B27
B17
B30
B25
B24
B23
B29
MW-9
B28
B19
B13
B7
B18
B6
B3
B2
MW-12
B1
MW-1
MW-4
MH-2
B14
B15
MW-3
MW-5
Storm Drain-3
MW-11
MH-3
MH-4
MW-6
CD-West
CD-East
MW-8
MW-7
K:\PONYYAKIMA\CNG\GIS\AGP\CascadeNG\CascadeNG.aprx 6/12/2024
Proposed Boring
Proposed Monitoring Well
Monitoring Well
Boring
Manhole/Catch Basin
Former USTs
CNG Parcel
UST Excavation Extent
SVID Irrigation Drain
Assumed Sanitary Sewer Line
Assumed Storm Drain
Onsite Drain
0
Feet
60
All Locations Approximate
Figure 1
Site Map
Cascade Natural Gas
Sunnyside, WA