

Mr. Nicholas M. Acklam  
Unit Supervisor, Toxics Cleanup Program  
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Subject:

**Request to Decommission Select Monitoring Wells**

Cowlitz BP / Cowlitz Food and Fuel  
Former Texaco Service Station No. 211556  
101 Mulford Road  
Toledo, Washington

ENVIRONMENT

Date:

August 7, 2019

Dear Mr. Acklam:

On behalf of Chevron Environmental Management Company (Chevron), Arcadis U.S., Inc. (Arcadis) has prepared this Request to Decommission Select Monitoring Wells (letter) for the former Texaco Service Station No. 211556 located at 101 Mulford Road in Toledo, Washington (site; Figure 1). This letter is based on a meeting between Washington Department of Ecology (Ecology), Chevron, Arcadis, Leidos Engineering, LLC (Leidos), and the property owner, Mr. Charles Vineyard, held at the Ecology office in Lacey, Washington on April 3, 2019. Following the meeting, a summary of the path forward for the site was provided in an email dated April 15, 2019 and provided as Attachment A.

Contact:

Christopher Dotson

Phone:

503-785-9383

Email:

Christopher.Dotson@arcadis.com

This letter is also based on the previously submitted Natural Attenuation Assessment for Groundwater dated October 29, 2015, and the Revised Agency Review Draft Feasibility Study Report dated April 28, 2017 (Leidos 2015 and 2017, respectively). The most recent Semi-Annual, Second Quarter 2019 Groundwater Monitoring was submitted to Ecology on July 3, 2019 (Arcadis 2019). Historic groundwater gauging data and analytical results are presented in Table 1.

Our ref:

30012346

### Site Description and Background

The site is located on the east side of Interstate 5 at Vader-Ryderwood exit (Exit 59) in Lewis County, Washington (Figure 1). The site includes an active British Petroleum (BP) service station located on the northeast corner of Cowlitz Ridge Road and Mulford Road (active station), and a former service station located

south of the active station, across Mulford Road (former station). The active station is currently operated as a BP Mini-Market and Service Station. Immediately west of the active station is Mrs. Beasley's Restaurant. North and east of the active station is undeveloped land.

As noted in the Revised Agency Review Draft Feasibility Study Report, in 1955, the active station property was leased to Texaco, who constructed the building and installed the original underground storage tanks (USTs). A leak in a product delivery line was repaired by Texaco in April 1977. It is estimated that this leak resulted in a loss of approximately 2,296 gallons of gasoline. The ownership interests were transferred to Olson Brothers Garage, Inc. in 1980 and then to West Coast Oil Company in 1985. Ron and Sheri Smith (the Smiths) purchased the active station site from West Coast Oil in 1986. In March 1990, four USTs and their associated piping were removed and replaced with new fiberglass tanks and piping. Hydrocarbon odors and stained soil were reported during the assessment and a hole was observed in one of the USTs. During this process, petroleum contaminated soil in excess of Model Toxics Control Act (MTCA) Method A cleanup levels (CULs) was discovered and reported to Ecology. In 2004, the active station improvements were sold to the current operator, Tri-Tex Oil Company (Leidos 2017).

The former station property was originally leased to General Petroleum Corporation on May 5, 1955. In 1978, the property was leased by Olson Brothers Garage, Inc. and was occupied by a Mobile service station and a small restaurant until 1984. Following 1984, the station was no longer in operation and was subsequently destroyed. The former station property has been redeveloped as a sales lot for manufactured homes (Leidos 2017).

Based on common property ownership and indications that groundwater contaminant plumes from the sites may have been commingled, the two service stations were combined into one site by Ecology (Leidos 2017). Historical remediation efforts are summarized in detail in Agreed Order Nos. DE-00TCPSR-297, -298, and -299. and Agreed Order No. DE 08 TCPSR-5236 (2010) (Leidos 2017).

On April 28, 2017, Leidos submitted the Revised Agency Review Draft Feasibility Study Report (draft FS) for Ecology review. The draft FS included an evaluation of available historical groundwater sampling results collected from the 11 monitoring wells during quarterly sampling performed from September 2013 through August 2015 as well as additional assessment work performed during this time period. Based on the evaluation, Leidos concluded that conditions at the site are appropriate to consider use of natural attenuation as a cleanup alternative for petroleum contaminated groundwater at the Site. In a letter dated March 1, 2017, Ecology accepted the Natural Attenuation Assessment for Groundwater report as the Draft Final version (pending eventual public comment) (Leidos 2017).

On April 3, 2019, Ecology, Chevron, Arcadis, Leidos, and the property owner, Mr. Charles Vineyard met to discuss the site current status and the path forward for the site. As discussed during this meeting, routine semi-annual groundwater monitoring and sampling activities will continue as planned and Ecology will provide a formal review of the draft FS. Ongoing communication between Ecology will be maintained in the event of any change in property use or to evaluate any remedial activities at the site.

### Select Well Decommissioning Proposal and Rationale

Following the request from Mr. Vineyard and Ecology's approval to evaluate the data for this purpose, Arcadis has reviewed the historic groundwater data for the site and proposes decommissioning seven monitoring wells located on the former station property. These wells include monitoring wells MW-103,

MW-115, MW-116, MW-117, MW-118, MW-119, MW-120 and are shown on Figure 2. The Well Decommissioning Details are presented in the Table 1. These wells have had previously been removed from the routine groundwater sampling plan, but were historically analyzed for the following analytes:

- total petroleum hydrocarbons as gasoline-range organics (GRO), diesel-range organics (DRO), and heavy oil-range organics (HRO)
- benzene, toluene, ethylbenzene, and total xylenes (collectively called BTEX)
- methyl tertiary butyl ether (MTBE)

Historic groundwater gauging data and analytical results are summarized in Table 2. A summary of the rationale for decommissioning each monitoring well is provided below.

- MW-103 was removed from the sampling program in May 2016. Since sampling began at this location in February 1991, analytical results from this location have consistently been below laboratory method detection limits (MDLs) or below MTCA Method A CULs. Based on this historic data, the monitoring well is not anticipated to be used in the future for groundwater monitoring and is proposed for decommissioning.
- MW-115 was removed from the sampling program in May 2016. With two exceptions since sampling began at this location in August 1995 analytical results from this location have been below laboratory MDLs or below MTCA Method A CULs. In 1995, GRO was detected above its MTCA Method A CUL of 1000 µg/L (micrograms per liter) at 1,800 µg/L. In 2009, HRO was detected above its MTCA Method A CUL of 500 µg/L at 2,700 µg/L. Based on this historic data, the monitoring well is not anticipated to be used in the future for groundwater monitoring and is proposed for decommissioning.
- MW-116 was removed from the sampling program in May of 2016. With one exception since sampling began at this location in August 1995 analytical results from this location have been below laboratory MDLs or below MTCA Method A CULs. In 2009, DRO was detected above its MTCA Method A CUL of 500 µg/L at 590 µg/L. Based on this historic data, the monitoring well is not anticipated to be used in the future for groundwater monitoring and is proposed for decommissioning.
- MW-117 was removed from the sampling program in May of 2016. Since sampling began at this location in August of 1995, analytical results from this location have consistently been below laboratory MDL or below the MTCA Method A CULs. Based on this historic data, the monitoring well is not anticipated to be used in the future for groundwater monitoring and is proposed for decommissioning.
- MW-118 was removed from the sampling program in May of 2016. With one exception since sampling began at this location in August 1995 analytical results from this location have been below laboratory MDLs or below MTCA Method A CULs. In 2007, DRO was detected above its MTCA Method A CUL of 500 µg/L at 980 µg/L and HRO was detected above its MTCA Method A CUL of 500 µg/L at 710 µg/L. Based on this historic data, the monitoring well is not anticipated to be used in the future for groundwater monitoring and is proposed for decommissioning.

- MW-119 was removed from the sampling program in April of 2019. Since sampling began at this location in August of 1995, analytical results from this location have consistently been below laboratory MDL or below the MTCA Method A CULs. Based on this historic data, the monitoring well is not anticipated to be used in the future for groundwater monitoring and is proposed for decommissioning.
- MW-120 was removed from the sampling program in May of 2016. Since sampling began in February of 2015, analytical results from this location have consistently been below laboratory MDL or below the MTCA Method A CULs. Based on this historic data, the monitoring well is not anticipated to be used in the future for groundwater monitoring and is proposed for decommissioning.

Boring logs for the above-mentioned groundwater monitoring wells: MW-103, MW-115, MW-116, MW-117, MW-118, MW-119, MW-120 are presented as Attachment B.

## Monitoring Well Decommissioning Activities

### Pre-field Activities

Well destruction activities will be performed by a Washington licensed drilling company and will occur following receipt of the well destruction permits from the State of Washington. Arcadis personnel will provide direct oversight for well destruction activities. Arcadis will oversee well destruction according to the pressure grouting standards described in Bulletin 74-90 and ASTM Standards Designation D5299. Ecology will be notified prior commencing the field event.

### Health and Safety

A site-specific Health and Safety Plan (HASP) will be prepared for use by personnel at the site. At a minimum, the HASP will address physical and chemical hazards associated with the destruction of the proposed wells, provide a map to the nearest emergency medical facility, and include safety data sheets for any hazardous chemicals used or produced during the work. A copy of the HASP will be available to on-site personnel at all times. A tailgate safety meeting will be conducted daily, at a minimum, to review the potential hazards.

### Utility Locate

Arcadis will mark the proposed well destruction locations and contacted 811 a minimum of two working days prior to initiating intrusive activities. A private utility locate company will be retained to conduct an independent utility locate for subsurface features and utilities near the proposed destruction locations.

### Monitoring Well Destruction

The depth of each well will be measured to confirm the total depth prior to any destruction activities. Arcadis will pressure grout all wells with neat cement using a tremie pipe from the bottom up. Pressure will be applied to the grout for a sufficient time to force grout into the well filter pack. Well casings will be removed to a depth of five feet below ground surface and borehole grouted creating a mushroom cap to near ground surface. The ground surface will be restored to generally match surrounding conditions (i.e.

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asphalt or concrete). Ecology Well Completion Reports (DWR Form 188) will be submitted upon completion of well destruction activities.

### **Management of Investigation-Derived Waste**

Bentonite chips and a mixture of soil and water generated from well destruction activities will temporarily be stored on-site in properly labeled Department of Transportation-approved 55-gallon steel drums. The drums will be transported and disposed at an appropriate regulated facility by a waste management subcontractor. The waste manifests will be provided as a separate addendum upon receipt.

### **Conclusion**

Based on the current and historic groundwater analytical data provided in this letter, future use of seven monitoring wells is not anticipated. Based on a request from the property owner, this letter provides the rationale and proposed plan to decommission select monitoring wells at the site. Pending approval from Ecology to proceed, Arcadis will initiate monitoring well decommissioning activities in accordance with this letter.

Chevron and Arcadis look forward to continuing work with Ecology on this site. Please do not hesitate to contact us if you have any questions or concerns.

Sincerely,

Arcadis U.S., Inc.



Komal Dixit  
Project Task Manager



Christopher Dotson  
Portfolio Manager

Copies:

Tim Bishop, Chevron  
Eric Hetrick, Chevron  
Charles Vineyard

Mr. Nick Acklam  
Department of Ecology  
August 7, 2019

## References

Arcadis, U.S., Inc. 2019. Semi-Annual Status Report, Second Quarter 2019, Former Texaco Service Station No. 211556, 101 Mulford Road, Toledo, Washington. July 3.

Leidos Engineering, LLC, 2015. Natural Attenuation Assessment for Groundwater Cowlitz BP, Cowlitz Food and Fuel, Former Texaco Service Station No. 211556, 101 Mulford Road, Toledo, Washington. October 29.

Leidos Engineering, LLC, 2017. Revised Agency Review Draft Feasibility Study Report Cowlitz BP, Cowlitz Food and Fuel, Former Texaco Service Station No. 211556, 101 Mulford Road, Toledo, Washington. April 28.

## Figures

Figure 1 – Site Location Map

Figure 2 – Site Plan Showing Proposed Decommissioning Locations

## Tables

Table 1 – Well Decommissioning Details

Table 2 – Historic Groundwater Gauging Data and Analytical results

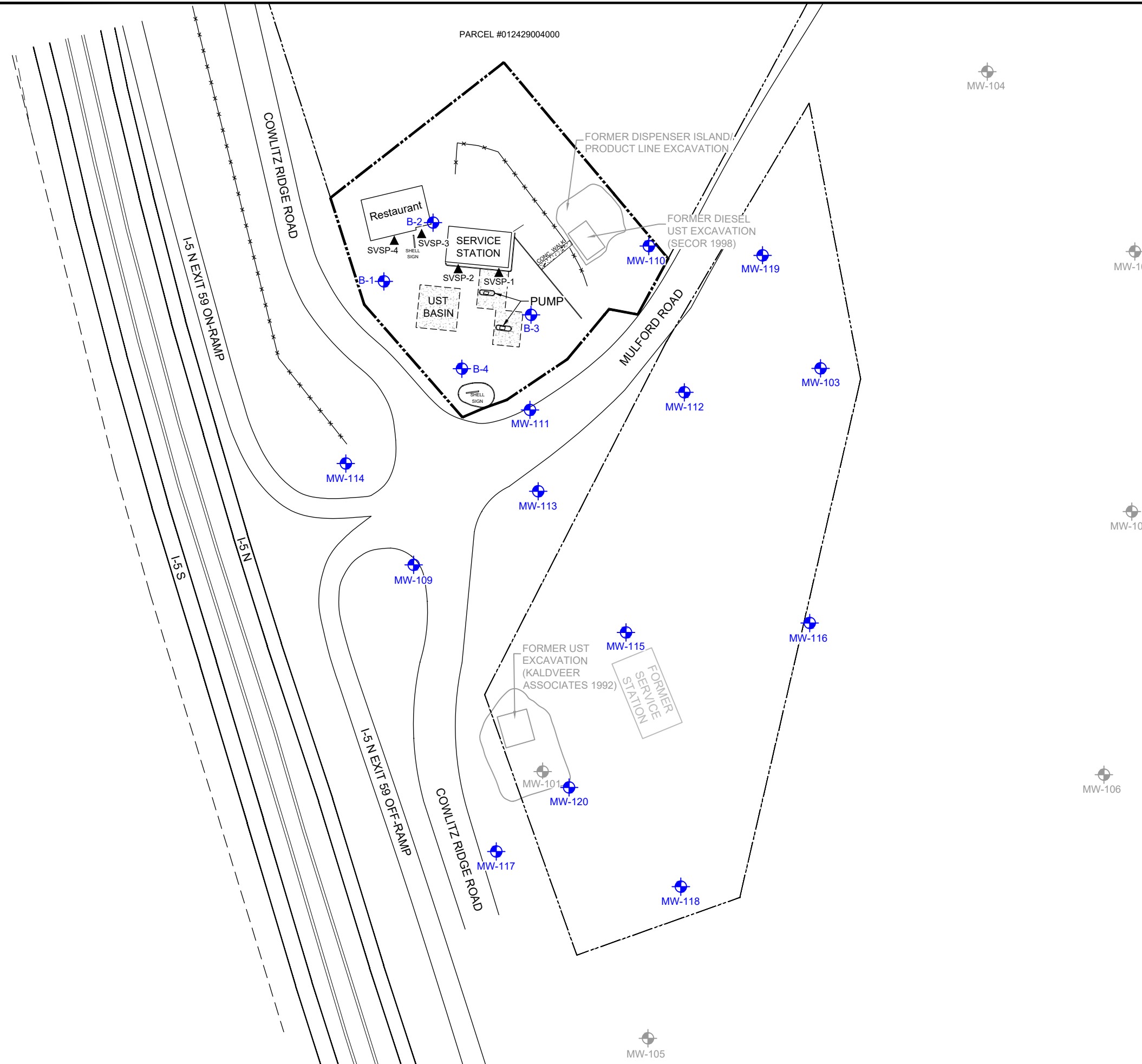
## Attachments

Attachment A – Ecology Correspondence

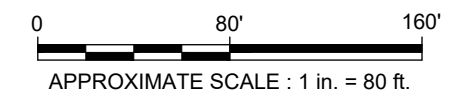
Attachment B – Boring Logs for Wells to be Decommissioned

# FIGURES





- LEGEND:**
- LEWIS COUNTY PARCEL No. 012429003001 BOUNDARY
  - LEWIS COUNTY PARCEL No. 012429002001 BOUNDARY
  - FENCE
  - MW-119 GROUNDWATER MONITORING WELL
  - MW-108 DECOMMISSIONED MONITORING WELL
  - SVSP-2 SOIL VAPOR SAMPLING PROBES
  - UST UNDERGROUND STORAGE TANK



COWLITZ BP / COWLITZ FOOD AND FUEL /  
 FORMER TEXACO SERVICE STATION No. 211556  
 101 MULFORD ROAD  
 TOLEDO, WASHINGTON

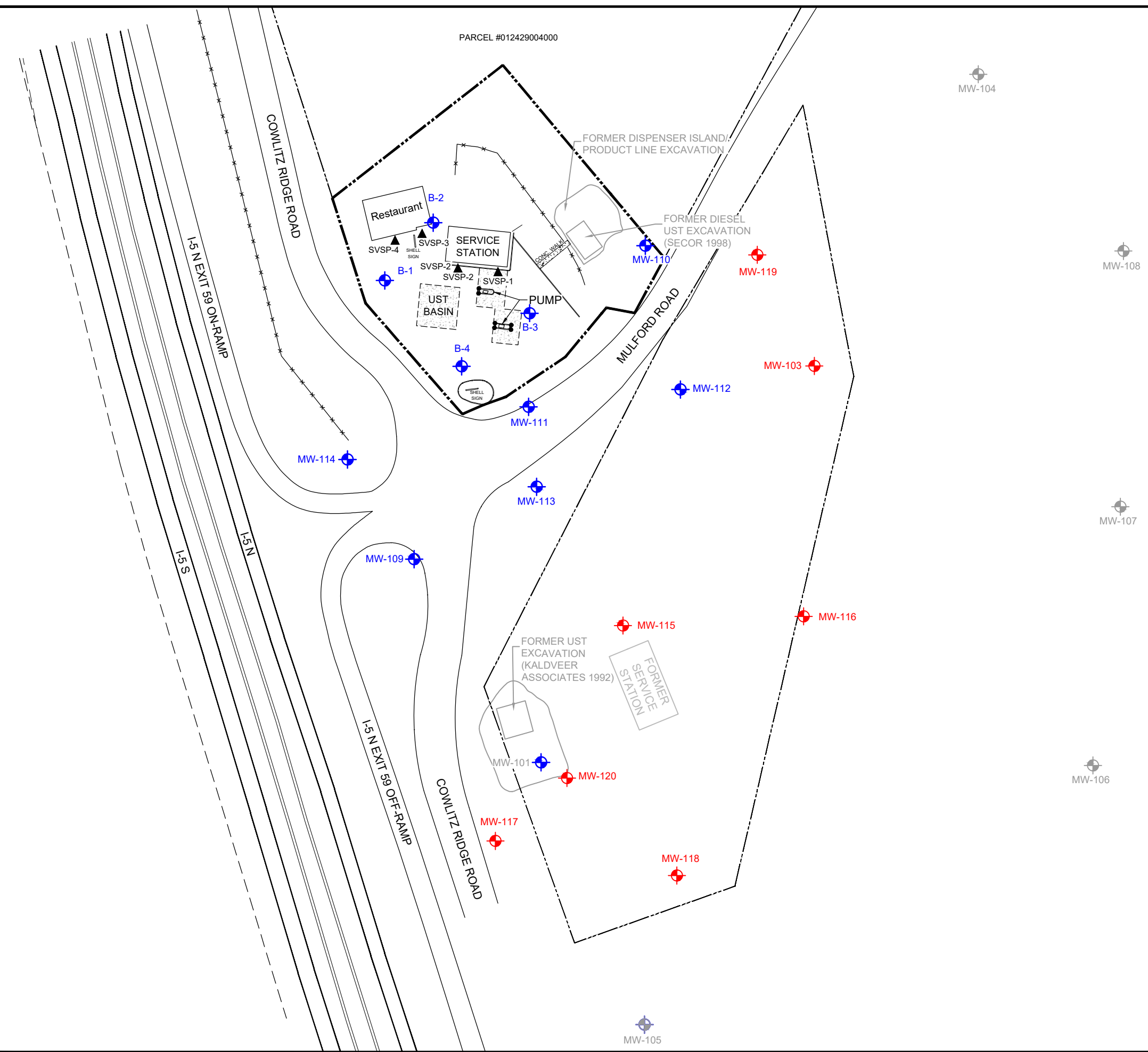
**SITE LOCATION MAP**

**ARCADIS** Design & Constancy  
for natural and  
built assets

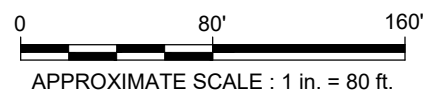
FIGURE  
**1**



CITY:EMERYVILLE, CA - DIV:GROUP:ENV:CAD - DR: A:REVES  
 C:\Users\barbaj@oneDrive - ARCADIS\BIM 360 Docs\CHEVRON CORPORATION\211556 - TOLEDO\2019\ASRTIMEH.155601-DWG\GWM-Fig4-Analytical Map.dwg LAYOUT: PROP DECOMMISSION - PLOTTED: 8/7/2019 1:12 PM BY: ROBITALLE, BEVERLY  
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- LEGEND:**
- LEWIS COUNTY PARCEL NO. 012429003001 BOUNDARY
  - LEWIS COUNTY PARCEL NO. 012429002001 BOUNDARY
  - FENCE
  - ◆ MW-119 GROUNDWATER MONITORING WELL
  - ◆ MW-108 ABANDONED MONITORING WELL
  - ◆ MW-116 PROPOSED GROUNDWATER MONITORING WELL TO BE DECOMMISSIONED
  - ▲ SVSP-2 SOIL VAPOR SAMPLING PROBES
  - UST UNDERGROUND STORAGE TANK



COWLITZ BP / COWLITZ FOOD AND FUEL /  
 FORMER TEXACO SERVICE STATION No. 211556  
 101 MULFORD ROAD  
 TOLEDO, WASHINGTON

**SITE PLAN SHOWING PROPOSED WELL  
 DECOMMISSIONING LOCATIONS**



FIGURE  
**2**

# TABLES



**Table 1**  
**Well Decommissioning Details**  
**Former Texaco Service Station No. 211556**  
**101 Mulford Road**  
**Toledo, Washington**

Well ID	Type	Depth (ft)	Well Diameter (in)	Borehole Diameter (in)	Abandonment Method
MW-103	Monitoring Well	20	2	8.5	Vaccum Pressure
MW-115	Monitoring Well	18	4	10.25	Vaccum Pressure
MW-116	Monitoring Well	18	2	8.25	Vaccum Pressure
MW-117	Monitoring Well	18	2	8.25	Vaccum Pressure
MW-118	Monitoring Well	18	2	8.25	Vaccum Pressure
MW-119	Monitoring Well	17.5	2	8.25	Vaccum Pressure

**Notes:**

ft = feet

in = inch



























**Table 2**  
**Historical Groundwater Gauging Data and Analytical Results**  
**COWLITZ BP / COWLITZ Food and Fuel / Former Texaco Service Station No. 211556**  
**101 Mulford Road, Toledo, Washington**  
*All analytical results are presented in micrograms per liter (µg/L)*

Well ID	Date	Purge Method	TOC <sup>2</sup>	DTW	DTP	LNAPL	GWE <sup>3</sup>	DRO <sup>4</sup>	HRO <sup>4</sup>	GRO	Benzene	Toluene	Ethylbenzene	Total Xylenes	MTBE	Dissolved Lead		
Model Toxics Control Act (MTCA) Method A Cleanup Levels (CULs) in µg/L										500	500	800/1,000	5	1,000	700	1,000	20	15
QA	2/16-18/09		--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--		
QA	5/4-6/09		--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--		
QA	8/19-21/09		--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--		
QA	11/18-20/09		--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--		
QA	2/8-10/10		--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--		
QA	5/12-13/10		--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--		
QA	8/11/10		--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--		
QA	11/3-4/10		--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--		
QA	2/3-4/11		--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--		
QA	5/23/11		--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--		
QA	8/23-24/11		--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--		
QA	11/7-9/11		--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--		
QA	2/6-8/12		--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--		
QA	5/2-4/12		--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--		
QA	8/1-3/12		--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--		
QA	11/26-28/12		--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--		
QA	2/4-6/13		--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--		
QA	5/6-8/13		--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--		
QA	9/9-13/13		--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--		
QA	11/18-22/13		--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--		
QA	2/4-11/14		--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--		
QA	6/12-14/14		--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--		
QA	8/18-21/14		--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--		
QA	11/19-20/14		--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--		
QA	2/17-20/14		--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--		
QA	5/11-15/15		--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--		
QA	8/10-11/15		--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--		
QA	11/16-18/15		--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--		
QA	5/13-14/16		--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--		
QA	11/14/16		--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--		
QA	5/14/17		--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--		
QA	11/11-12/17		--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--		
QA	5/11/18		--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--		
QA	11/11-12/18		--	--	--	--	--	--	--	<19	<0.2	<0.2	<0.4	<1	--	--		
QA	4/27/2019		--	--	--	--	--	--	--	<19	<0.2	<0.2	<0.4	<1	--	--		

**Notes:**  
ID = Identification  
TOC = Top of casing  
DTW = Depth to water in feet below TOC  
DTP = Depth to product in feet below TOC  
LNAPL = Light non-aqueous phase liquid thickness in feet  
GWE = Groundwater elevation in feet NAVD 88  
NAVD 88 = North American Vertical Datum of 1988  
TOC, DTW, DTP, GWE are measured in feet (ft).  
GRO = Gasoline Range Organics analyzed by Ecology Method NWTPH-Gx  
DRO = Diesel Range Organics analyzed by Ecology Method NWTPH-Dx  
HRO = Heavy Oil Range Organics analyzed by Ecology Method NWTPH-Dx  
MTBE = Methyl tertiary butyl ether  
800/1,000 = GRO MTCA Method A CUL with benzene present is 800 µg/L and without is 1,000 µg/L  
-- = Not analyzed/not applicable  
< = Analytical result is less than reporting limit shown  
LFP = Low flow (purge) sample  
DRO, HO analyzed by NWTPH-Dx Extended method; GRO, Benzene, toluene, ethylbenzene, and total xylenes (BTEX), MTBE by U.S. Environmental Protection Agency (USEPA) 8260B; D.Lead by USEPA 6020.  
QA = Quality Assurance

- Analytical results in bold font indicate concentrations exceed MTCA Method A cleanup levels.
- TOC elevations have been surveyed in feet relative to the 1988 North American Vertical Datum.
- When LNAPL is present, GWE has been corrected using the following formula:  $GWE = [(TOC - DTW) + (LNAPL \times 0.80)]$ .
- DRO and HRO results with multiple values are reported as follows: with silica gel cleanup/without silica gel cleanup. DRO and HRO analyses for monitoring completed between October 2004 and May 2013 was performed with silica gel cleanup. The use of silica gel cleanup for samples collected prior to October 2004 has not been confirmed.
- Laboratory report indicates this sample was laboratory filtered.
- Laboratory indicates they did not receive a QA sample. No results were provided.
- Laboratory analytical methods for historical data may not be consistent with list of current analytical methods. When necessary, consult original laboratory reports to verify methods used.
- Insufficient groundwater to collect sample.



# ATTACHMENT A



Mr. Nicholas M. Acklam  
Unit Supervisor, Toxics Cleanup Program  
Department of Ecology, Southwest Regional Office  
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Olympia, WA 98504

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Subject:

**Project Timeline Summary and Path Forward**

Former Texaco No. 211556  
Cowlitz Food and Fuel  
101 Mulford Rd., Toledo, WA  
Agreed Order No. DE5236  
Facility ID No. 1166

ENVIRONMENT

Date:  
April 15, 2019

Contact:  
Jason Little

Phone:  
206-726-4741

Email:  
Jason.Little@arcadis.com

Our ref:  
ASRTM0EH.1556

Dear Mr. Acklam:

On behalf of Chevron Environmental Management Company (CEMC), Arcadis U.S., Inc. (Arcadis) has prepared this Project Timeline Summary and Path Forward (summary) for the former Texaco Service Station No. 211556 located at 101 Mulford Road in Toledo, Washington (site). This summary is based on previously submitted documents for the site and is in accordance with the project status as discussed during a meeting on April 3, 2019, at the Washington Department of Ecology (Ecology) office in Lacey, Washington, attended by Ecology, CEMC, Arcadis, Leidos, Inc., and the property owner Mr. Charles Vineyard.

**Project History and Regulatory Framework**

The following summary of site activities is based on the April 28, 2017, Revised Agency Review Draft Feasibility Study Report (2017 Draft FS) and other previously submitted reports.

- 1955 – Active service station property leased to the Texas Oil Company. Inactive service station property leased to General Petroleum Corporation.
- 1977, April – A leak in a product delivery line on the active service station was repaired by Texaco. Historical reports estimated a release of approximately 2,296 gallons of gasoline product.

- 1984 – Service station operations ceased on the inactive service station property and the above-ground infrastructure was subsequently demolished. Underground storage tanks (USTs) were in place.
- 1990, March – Four USTs and associated piping were removed and replaced with new fiberglass tanks and piping on the active station property. During this process, petroleum impacted soil was observed and reported to Ecology. Historic reports indicate that approximately 1,000 cubic yards of petroleum impacted soil was excavated from the UST basin and treated on-site by aeration.
- 1991, February – Groundwater monitoring wells B-1 through B-4 were installed on the active station property.
- 1991, April – Ecology issued Enforcement Order No. DE 91-S123 to the then-property owner, Mr. Frank Vineyard. The Enforcement Order required that a Remedial Investigation/Feasibility Study (RI/FS) be completed for both the active and inactive station properties, and that the USTs at the inactive station property be removed.
- 1992, January – Two 6,000-gallon gasoline USTs and one 300-gallon used-oil UST were removed from the inactive station property.
- 1993 – Original RI/FS report was completed.
- 1994, May – The original draft Cleanup Action Plan (1994 CAP) was released for public comment. The selected cleanup alternative consisted of excavating remaining impacted soil for treatment on-site using bioremediation, followed by groundwater remediation by a pump and treat system that would reinject treated groundwater through two infiltration trenches. This cleanup action was not implemented.
- 1994, October – Texaco Downstream Properties Inc. (TDPI) and Bob and Sheri Smith (former operators) were named as PLPs.
- 1995, August – SECOR performed a supplemental investigation on behalf of TDPI, including installation of ten monitoring wells (MW-110 through MW-119). SECOR concluded that the groundwater plume was not as extensive as previously reported and that groundwater impacts were primarily confined to the areas around the former UST basins at the active and inactive station locations. Additional investigation activities, including vapor extraction pilot testing and intrinsic bioremediation sampling, were also performed.
- 1999, August – An updated CAP was submitted for the site, which identified enhanced in-situ biodegradation as the selected cleanup remedy for petroleum impacted soil and groundwater at the site.
- 2001, May – Ecology issued Agreed Order Nos. DE00-TCPSR-297, -298, and -299 to implement the 1999 CAP.
- 2001, June and July – A Cleanup Work Plan was submitted which included placing oxygen release compound (ORC) into 50 soil borings, installing a product recovery canister in monitoring well MW-111, and continued groundwater monitoring. ORC placement was performed in July 2001. Only 37 ORC borings were completed due to difficult drilling conditions.
- 2004 – Active station improvements were sold to the current operator, Tri-Tex Oil Company of Castle Rock, Washington.
- 2004, May – SAIC prepared a report summarizing a review of groundwater data performed to evaluate the effectiveness of the 2001 ORC application.

- 2004, November and December – SAIC performed an additional investigation at the site to further delineate the extent of petroleum contaminated soil.
- 2004, December – SAIC submitted a letter report presenting the preliminary results of November/December 2004 soil sampling activities and outlining possible remedial alternatives to achieve the cleanup goals for the site. The report concluded that excavation, followed by natural attenuation, would have the highest likelihood of success and would provide the shortest restoration timeframe.
- 2006 – SAIC prepared a revised draft CAP (2006 DCAP), which identified the following cleanup actions that were selected by Ecology and CEMC:
  - Active station - Institutional controls and surface paving for containment of contaminated soil, MNA for soil and groundwater, and long-term monitoring
  - Inactive station – Excavation, MNA for groundwater, and long-term monitoring
- 2006, November – Ecology provided comments on the 2006 DCAP. Among the comments, Ecology indicated that an alternative evaluation for the active station property would not be complete without considering two additional options: 1) complete excavation of the contaminated soil, and 2) hot-spot excavation and removal. The 2006 DCAP was not finalized because on December 29, 2006, Ecology provided notice that preparation of the final CAP should be delayed until a new Agreed Order could be prepared for the site.
- 2010, March – The current Agreed Order for the site (DE 08 TCPSR-5236) became effective. This Agreed Order requires that:
  - A new FS be prepared for the site;
  - Groundwater monitoring be continued;
  - A new DCAP be prepared for the site; and
  - An Interim Action be planned and implemented to remove residual contaminated soil associated with a former diesel UST on the active station property and the former gasoline USTs on the inactive station property.
- 2010, August – Ecology approved the Interim Remedial Action (IRA) Work Plan for the site.
- 2010, October – SAIC completed the IRA excavation field activities on the active and inactive station properties. While confirmation soil sampling results indicated that each of the IRA excavations were successful in removing petroleum impacted soils in the vadose zone, some impacted soils potentially remained in the saturated zone at the base of each excavation. Approximately 2,000 pounds of ORC was placed in the bottoms of the excavations to enhance natural attenuation of inaccessible impacted soil that was left in place.
- 2011, February – SAIC submitted a draft FS to Ecology. The draft FS identified monitored natural attenuation as the proposed cleanup action for the site. Ecology provided comments on the draft FS by letter, dated April 15, 2011, which requested additional details regarding the alternatives proposed and a re-evaluation of the scoring used to rank the alternatives. Ecology also disagreed with the conclusions presented in the draft FS regarding the elimination of a soil and/or groundwater to vapor exposure pathway.
- 2011, April – SAIC submitted the Final Interim Remedial Action Report.
- 2011, September – Ecology approved a work plan prepared by SAIC to complete vapor intrusion assessment sampling and install a new monitoring well (MW-120) on the inactive station property. Field work was performed in October and December 2011 and results were summarized in a report that was approved by Ecology on September 4, 2012.

- 2012, October – SAIC submitted a revised FS for the site, which incorporated the results of the 2011 investigation activities. The 2012 Draft FS identified Alternative 2 (partial excavation, MNA, and institutional controls) or Alternative 4 (MNA, institutional controls, and future property-wide excavation in conjunction with service station upgrades or property redevelopment) as the preferred cleanup action for the site.
- 2013, February – Ecology provided comments on the 2012 Draft FS and identified Alternative 3 (partial excavation, air sparge/SVE, MNA, and institutional controls) as the preferred cleanup action.
- 2013, May – Representatives of Ecology, CEMC, and SAIC met to discuss a path forward strategy for the site. Ecology agreed to delay completion of the FS to allow further assessment of the site, specifically collection of additional soil sampling data and performance of an assessment to evaluate natural attenuation processes in groundwater.
- 2013, July – SAIC submitted a work plan to complete soil sampling and natural attenuation assessment activities at the site. A final version of this work plan was conditionally approved by Ecology on October 2, 2013.
- 2014, March – Leidos submitted a report summarizing the results of soil sampling activities completed in November 2013.
- 2015, October – Leidos submitted a report to Ecology presenting the results of their evaluation of natural attenuation of petroleum impacts to groundwater at the site. Based on this evaluation, Leidos concluded that conditions at the site are appropriate to consider use of natural attenuation as a cleanup alternative for petroleum contaminated groundwater.
- 2017, March – Ecology accepted the Natural Attenuation Assessment for Groundwater report as the Draft Final version (pending eventual public comment). The letter also stated that by accepting the report, Ecology was concluding completion of the additional assessment work proposed by CEMC in June 2013. Therefore, preparation and submittal of a revised draft FS was the next step required under the terms of the Agreed Order for the site.
- 2017, April – Leidos submitted revised Agency Review Draft Feasibility Study Report to Ecology.
- 2017, November – Ecology Site Manager Steve Teel contacted Russ Shropshire of Leidos by phone to discuss questions related to assurances for future implementation of Alternative 4 presented in the 2017 Draft FS. To date, no written comments have been received from Ecology on the 2017 Draft FS.
- 2018, September – Steve Teel leaves position as Ecology Site Manager.

Semi-annual groundwater monitoring continues to be performed at the site, now on a semi-annual basis (typically in May and November). All 17 monitoring wells at the site are gauged and samples are collected from nine monitoring wells using low-flow purge and sampling methods.

### **Project Path Forward**

The following is a summary of the path forward for the site as discussed during the April 2019 meeting at Ecology's office.

- Ecology will provide a formal review of the April 28, 2017, Revised Agency Review Draft Feasibility Study Report.
- CEMC and Arcadis will continue to maintain communication with the property owner, Mr. Vineyard, in the event of a change in property use or other opportunity to evaluate conducting remedial excavations at the site.

Mr. Nick Acklam  
Department of Ecology  
April 15, 2019

- Arcadis will continue to perform routine semi-annual groundwater monitoring at the site.
- As requested by Mr. Vineyard, Arcadis will review historical site data and submit to Ecology a proposal for select well abandonments at the inactive service station.

CEMC and Arcadis look forward to continuing work with Ecology on this site. Please do not hesitate to contact us if you have any questions or concerns.

Sincerely,

Arcadis U.S., Inc.



Jason Little  
Project Manager



Christopher Dotson  
Portfolio Manager


Copies:  
Eric Hetrick, CEMC  
Charles Vineyard

# ATTACHMENT B



DRILL METHOD	<b>B-61 HOLLOW-STEM</b>	SURFACE ELEVATION	<b>100.0 feet</b>	LOGGED BY	<b>RAW</b>
DEPTH TO GROUNDWATER	<b>8.0 feet</b>	BORING DIAMETER	<b>8.5-inch</b>	DATE DRILLED	<b>1/31/92</b>

DESCRIPTION AND CLASSIFICATION		DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT)	PID READING (PPM)	EPA TEST METHODS	WELL CONSTRUCTION
DESCRIPTION AND REMARKS	SOIL TYPE						
Brown Silty Sand, moist.							
Brown Gravelly Sand, moist to wet.		5					
Blue grey Clay w/ Sand (occasional gravel), moist.		15					
Bottom of borehole at 20 feet below grade.. WELL CONSTRUCTION NOTES: 2-inch PVC casing with 0.020-inch slots installed in borehole. Borehole backfilled with #8 silica sand and caved formation material to 3 feet below grade followed by 2 foot thick bentonite chip seal. Monitor well topped with locking monument encased in concrete.		20					

 <p><b>Kaldveer Associates</b> Geoscience Consultants Incorporated</p>	<b>EXPLORATORY BORING LOG</b>		
	<b>RI/FS INTERSTATE 5 at VADER/RyderWOOD EXIT LEWIS COUNTY, WASHINGTON</b>		
	PROJECT NO.	DATE	BORING NO
	<b>WE-1035-011-131</b>	<b>June 18, 1992</b>	<b>MW-103</b>



SECOR

BORING LOG

BORING MW-115

PAGE 1 OF 1

PROJECT COWLITZ BP SITE LOCATION 101 MULFORD ROAD TOLEDO, WASHINGTON  
 SURFACE ELEVATION -- CASING TOP ELEVATION 100.43  
 START 8/21/95 1013 FINISH 8/21/95 1059  
 SAMPLER DJD MONITORING DEVICE MICROTIP PID  
 SUBCONTRACTOR AND EQUIPMENT CASCADE DRILLING INC; CME 75, 10.25" O.D. HSA  
 COMMENTS SAMPLED AT INDICATED INTERVALS WITH A 3" I.D. X 18" LONG SPLIT SPOON LINED WITH BRASS SLEEVES, DRIVEN BY A 140 LB. HAMMER WITH A 30" STROKE ABY 976

PENETRATION RESULTS	Sample Depth Interval, feet	PID Reading (ppm)	Depth Below Surface, feet	Lithologic Description	Well Construction Details
			0		
50/50			5	No recovery-Resample	
100				No recovery-Resample	
100		6.2		Cobbles with Gravel, dark brown, (10YR 3/3)*, mostly rounded cobbles to 6" with little fine to coarse rounded gravel, few sand, trace silt, moist. (7.5,15,10.5,0)**	
			10	Dark gray (10YR 4/1)	
			15		
			20	Boring terminated at 18 feet. Sampler advanced to 7.5 feet. Boring converted to a groundwater monitoring well on 8/21/95.	
			25	* Munsell (1990) Soil Color Charts ** Percentage of grain size types shown in this order: (50,25,20,5,0) Cobbles, Gravel, Sand, Silt, and Clay; based on field observations	

SECOR

BORING LOG

BORING MW-116  
PAGE 1 OF 1

PROJECT COWLITZ BP SITE LOCATION 101 MULFORD ROAD TOLEDO, WASHINGTON  
 SURFACE ELEVATION -- CASING TOP ELEVATION 100.11  
 START 8/21/95 1543 FINISH 8/21/95 1608  
 SAMPLER DJD MONITORING DEVICE MICROTIP PID  
 SUBCONTRACTOR AND EQUIPMENT CASCADE DRILLING INC; CME 75, 8.25" O.D. HSA  
 COMMENTS SAMPLED AT INDICATED INTERVALS WITH A 3" I.D. X 18" LONG SPLIT SPOON LINED WITH BRASS SLEEVES, DRIVEN BY A 140 LB. HAMMER WITH A 30" STROKE ABY 879

PENETRATION RESULTS	Sample Depth Interval, feet	PID Reading (ppm)	Depth Below Surface, feet	Lithologic Description	Well Construction Details
			0		
50/50		12.8	6.7	Cobbles with Gravel, brown, (10YR 4/3)*, mostly rounded cobbles to 6" with little fine to coarse rounded gravel, few fine sands, trace silt, moist, (90,25,10,5,0)**	
			10		
			15		
			18	Silt, very light grayish blue fines, mostly very fine silt, few clay, (0,0,0,90,10)	
			20	Boring terminated at 18 feet. Sampler advanced to 6.7 feet. Boring converted to a groundwater monitoring well on 8/21/95. * Munsell (1990) Soil Color Charts ** Percentage of grain size types shown in this order: (50,25,20,5,0) Cobbles, Gravel, Sand, Silt, and Clay; based on field observations	
			25		

SECOR

BORING LOG

BORING MW-117  
PAGE 1 OF 1

PROJECT COWLITZ BP SITE LOCATION 101 MULFORD ROAD TOLEDO, WASHINGTON  
 SURFACE ELEVATION -- CASING TOP ELEVATION 99.03  
 START 8/21/95 0837 FINISH 8/21/95 0918  
 SAMPLER DJD MONITORING DEVICE MICROTIP PID  
 SUBCONTRACTOR AND EQUIPMENT CASCADE DRILLING INC: CME 75, 8.25" O.D. HSA  
 COMMENTS SAMPLED AT INDICATED INTERVALS WITH A 3" I.D. X 18" LONG SPLIT SPOON LINED WITH BRASS SLEEVES, DRIVEN BY A 140 LB. HAMMER WITH A 30" STROKE ABY 975

PENETRATION RESULTS	Sample Depth Interval, feet	PID Reading (ppm)	Depth Below Surface, feet	Lithologic Description	Well Construction Details
			0		
100	5.1	5.1	5	Cobbles with Gravel, brown, (10YR 4/3)+, mostly cobbles to 4" with some fine rounded gravel, few fine sands, trace silt, moist. (50,35,10,5,0)+	
			10		
			15		
			20	Silt with Clay, very dark brown, (10YR 2/2), trace sand, mostly fine silt, little clays, wet to saturated, (0,0,5,75,20)	
			25	Boring terminated at 18 feet. Sampler advanced to 7.5 feet. Boring converted to a groundwater monitoring well on 8/21/95. • Munsell (1990) Soil Color Charts ** Percentages of grain size types shown in this order: (50,25,20,5,0) Cobbles, Gravel, Sand, Silt, and Clay; based on field observations	

SECOR

BORING LOG

BORING MW-118  
PAGE 1 OF 1

PROJECT COWLITZ BP SITE LOCATION 101 MULFORD ROAD TOLEDO, WASHINGTON  
 SURFACE ELEVATION -- CASING TOP ELEVATION 99.34  
 START 8/21/95 1209 FINISH 8/21/95 1237  
 SAMPLER DJD MONITORING DEVICE MICROTIP PID  
 SUBCONTRACTOR AND EQUIPMENT CASCADE DRILLING INC: CME 75, 8.25" O.D. HSA  
 COMMENTS SAMPLED AT INDICATED INTERVALS WITH A 3" I.D. X 18" LONG SPLIT SPOON LINED WITH BRASS SLEEVES, DRIVEN BY A 140 LB. HAMMER WITH A 30" STROKE ABY 977

PENETRATION RESULTS	Sample Depth Interval, feet	PID Reading (ppm)	Depth Below Surface, feet	Lithologic Description	Well Construction Details
			0		
100 100			5	No recovery-resample No recovery-resample	
40/50		4.4	4.4	Cobbles with Gravel and Sand, brown, (10YR 4/3)*, to dark yellowish brown, (10YR 4/6), mostly cobbles up to 5" with some fine to coarse rounded gravel, little fine sand, trace silt, slightly moist to wet, (50,30,15,5,0)**	
			10		
			15	Silty Clay, gray, (10YR 5/1) to dark gray, (10YR 4/1) some silt, mostly clay, wet, (0,0,0,30,70), organic particles, wood chips, some mottling evident	
			20	Boring terminated at 18 feet. Sampler advanced to 8.0 feet. Boring converted to a groundwater monitoring well on 8/21/95. * Munsell (1990) Soil Color Charts ** Percentage of grain size types shown in this order: (50,25,20,5,0) Cobbles, Gravel, Sand, Silt, and Clay; based on field observations	
			25		

SECOR

BORING LOG

BORING MW-119

PAGE 1 OF 1

PROJECT COWLITZ BP SITE LOCATION 101 MULFORD ROAD TOLEDO, WASHINGTON  
 SURFACE ELEVATION -- CASING TOP ELEVATION 100.84  
 START 8/22/95 1525 FINISH 8/22/95 1608  
 SAMPLER DJD MONITORING DEVICE MICROTIP PID  
 SUBCONTRACTOR AND EQUIPMENT CASCADE DRILLING INC; CME 75, 8.25" O.D. HSA  
 COMMENTS SAMPLED AT INDICATED INTERVALS WITH A 3" I.D. X 18" LONG SPLIT SPOON LINED WITH BRASS SLEEVES, DRIVEN BY A 140 LB. HAMMER WITH A 30" STROKE ABY 983

PENETRATION RESULTS	Sample Depth Interval, feet	PID Reading (ppm)	Depth Below Surface, feet	Lithologic Description	Well Construction Details
50	2.4	2.4	0 to 2.4	Cobbles with Gravel, dark yellowish brown, (10YR 4/4)*, mostly rounded cobbles up to 5" with little fine to coarse rounded gravel, few fine sand, trace silt, moist, (60,25,10,5.0)**	
			17.5	Silty Clay, dark gray, (10YR 4/1), some silt, mostly clay, moist to wet, (0,0,0,45,55)	
			17.5 to 20	Boring terminated at 17.5 feet. Sampler advanced to 6.5 feet. Boring converted to a groundwater monitoring well on 8/22/95. * Munsell (1990) Soil Color Charts ** Percentage of grain size types shown in this order: (50,25,20,5,0) Cobbles, Gravel, Sand, Silt, and Clay; based on field observations	