



STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY

PO Box 47775 • Olympia, Washington 98504-7775 • (360) 407-6300

July 11, 2013

Ms. Marlea Harmon  
Chevron Environmental Management Company  
6101 Bollinger Canyon Road  
Sam Ramon, CA 94583

**Re: Further Action at the following Site:**

- **Site Name:** Former Unocal Bulk Plant 0855
- **Site Address:** 333 6<sup>th</sup> Street, Woodland, WA
- **Facility/Site No.:** 1111
- **Cleanup Site ID No.:** 3790
- **VCP Project No.:** SW1290

Dear Ms. Harmon:

The Washington State Department of Ecology (Ecology) received your request for an opinion on your independent cleanup of the Unocal Bulk Plant 0855 Facility (Site). This letter provides our opinion. We are providing this opinion under the authority of the Model Toxics Control Act (MTCA), Chapter 70.105D RCW.

**Issue Presented and Opinion**

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Is further remedial action necessary to clean up contamination at the Site?

**YES. Ecology has determined that further remedial action is necessary to clean up contamination at the Site.**

This opinion is based on an analysis of whether the remedial action meets the substantive requirements of MTCA, Chapter 70.105D RCW, and its implementing regulations, Chapter 173-340 WAC (collectively "substantive requirements of MTCA"). The analysis is provided below.

**Description of the Site**

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This opinion applies only to the Site described below. The Site is defined by the nature and extent of contamination associated with the following release:

- Petroleum hydrocarbons and related constituents into the Soil and Groundwater.



**Enclosure A** includes a detailed description and diagram of the Site, as currently known to Ecology.

Please note the parcels of real property can be affected by multiple sites. At this time, we have no information that the parcel(s) associated with this Site are affected by other sites.

### **Basis for the Opinion**

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This opinion is based on the information contained in the following documents:

1. SAIC Energy, Post Excavation Groundwater Monitoring Report, Former Union Oil Bulk Plant No. 306490. March 23, 2013.
2. SAIC Energy, Environment & Infrastructure, LLC., Site Summary Report, Former Union Oil Bulk Plant No. 306490. February 2013.
3. SAIC Energy, Environment & Infrastructure, LLC., Site Investigation Report, Former Union Oil Bulk Plant No. 306490. May 14, 2012.
4. Ecology, NFA Rescission: Further Action Determination for the following Hazardous Waste Site: Unocal 0855, February 6, 2006.
5. Ecology, Further Action determination letter, November 3, 2005.
6. ENSR International, Groundwater Remedial Action Summary Report, June 30, 2005.
7. Ecology, No Further Action letter, and Restrictive Covenant, November 21, 2002.
8. Maul Foster and Alongi, Results of Soil Excavation Activities, Bulk Terminal #0855, Woodland, Washington. January 29, 2002.

Those documents are kept in the Central Files of the Southwest Regional Office of Ecology (SWRO) for review by appointment only. You can make an appointment by calling the SWRO resource contact at (360) 407-6365.

This opinion is void if any of the information contained in those documents is materially false or misleading.

### **Analysis of the Cleanup**

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Ecology has concluded that **further remedial action** is necessary to clean up contamination at the Site. That conclusion is based on the following analysis:

1. **Characterization of the Site.**

Ecology has determined your characterization of the Site is insufficient to establish cleanup standards and select a cleanup action. The Site is described above and in **Enclosure A**.

Former Unocal Bulk Plant 0855 (also known as Chevron site #306490) is located at 333 6<sup>th</sup> Street, Woodland, Washington (some reports or letters for this Site mistakenly noted the site location as 333 6<sup>th</sup> Avenue, Woodland, Washington). Unocal began operating this facility as a bulk fuel and distribution facility in 1926. In 1992, the bulk plant was closed and all facilities were removed, including its warehouse, pumping house, garage, two railroad spurs, five aboveground storage tanks (ASTs), three 2-inch-diameter aboveground product delivery lines, and associated dispenser pumps. The ASTs used for fuel storage ranged in size from 5,000 to 20,000 gallons.

Historical records indicate that a leak occurred in 1985 with 10–15 gallons of product released. In 1986, approximately 20 gallons of gasoline was released. However, the majority of the contamination at the Site was believed to be related to normal bulk plant operations.

A series of investigation and cleanup efforts have been conducted to characterize the soil and groundwater contamination at the Site since 1992. The latest Site investigation was performed in 2012.

- **Phase II Site investigation:** As part of a Phase II Site investigation, seven soil borings (B1 through B6, and a hand auger boring HB-1) and eight monitoring wells (MW-1 through MW-8) were installed between 1992 and 1994 (see Figure 2 of Enclosure A). One soil sample was collected from each boring, at 7.5 feet below ground surface (bgs) for B1 through B6 and at 4 feet bgs for the hand auger boring HB-1. One soil sample was also collected from MW-3 through MW-6, and MW-8, at depths of 5 to 8 feet bgs. Two soil samples were collected from MW-7 at depths of 2.5 and 7.5 feet bgs, respectively. Among these soil samples, the ones from both depths of MW-7, and the soil sample from B2 detected various contaminants exceeding the MTCA Method A cleanup levels. These contaminants included gasoline-range total petroleum hydrocarbons (TPH-Gx), at concentrations of 126 to 17,000 milligram per kilogram (mg/kg); diesel-range total petroleum hydrocarbons (TPH-Dx) at concentrations of 16,000 to 24,000 mg/kg; and benzene (53.6 mg/kg), toluene (240 mg/kg), ethylbenzene (78.7 mg/kg), and total xylenes (42.2 – 459 mg/kg).
- **Semi-annual groundwater monitoring 1994–1999:** Semi-annual groundwater monitoring was conducted at wells MW-1 through MW-8. The monitoring revealed persistent exceedances of BTEX (benzene, toluene, ethylbenzene, and total xylenes), TPH-Gx, and TPH-Dx above the MTCA Method A cleanup levels in

MW-1, MW-5, and MW-7. Occasional exceedances were also found in MW-2, MW-3, and MW-6. The monitoring results indicated that the groundwater contamination was limited beneath the former ASTs and transfer line area. MW-7 showed the highest groundwater concentrations of TPH-Gx at 280,000 microgram per liter (ug/L), TPH-Dx at 63,000 ug/L, and benzene at 19,000 ug/L, toluene at 47,000 ug/L, ethyl-benzene at 3,400 ug/L, and total xylenes at 21,800 ug/L.

- **Quarterly groundwater monitoring in 2002-2005:** In September 2001, monitoring wells MW-2 and MW-7 were decommissioned during an interim cleanup action (see Section 4 of this letter for details). After the soil excavation, quarterly groundwater monitoring began in 2002 and continued until 2005 in wells MW-1, MW-3 through MW-6, and MW-8. A new well MW-9, which was installed at the furthest down gradient point of the property, was also included in the monitoring network. Monitoring data during this period indicated that the September 2001 interim action appeared to result in a general improvement of contamination levels in MW-5. MW-5 only detected one TPH-Gx exceedance at the concentration of 2,500 ug/L in 2004. MW-1, on the other hand, continued to detect TPH-Gx at concentrations of 926 to 6,860 ug/L, TPH-Dx at concentrations of 505 to 895 ug/L, and benzene at 5.05 to 16.1 ug/L. Additionally, since MW-7 was decommissioned and no new well was installed for replacement, there is no monitoring data available to reflect the groundwater quality in the area formerly represented by MW-7.
- **Decommissioning of Well MW-1:** In September 2005, monitoring well MW-1 was decommissioned in anticipation of a planned "hot-spot" soil excavation. However, this excavation work was never performed.
- **Site Investigation in 2005:** Between September and November 2005, Site assessment activities were performed to further characterize soil and groundwater in the vicinity of former monitoring well MW-1. Seventeen push probe borings (GP-1 through GP5, and GP8 through GP-19) were advanced to 15 feet bgs. One or two soil samples from the depths of 7 to 13.5 feet bgs and one groundwater sample were collected from each boring. Among the borings, only GP-11 detected soil contamination of benzene and TPH-Gx at 13 feet bgs whereas seven groundwater samples (GP1, GP3, GP8, GP9, GP11, GP17, and GP19) demonstrated that TPH-Gx exceeded the MTCA Method A cleanup level. Even though turbidity associated with the direct push groundwater samples made these samples less representative of the actual groundwater quality, the exceedances somewhat reflected the groundwater contamination qualitatively because all these exceedances were located around former well MW-1, while all borings away from MW-1 detected no exceedances in groundwater (see Figure 2 in Enclosure A).
- **Additional Site investigation 2012:** In February 2012, an additional Site investigation was completed to evaluate the current Site conditions. Seventeen soil borings (SB1 through SB-17) were installed using hand auger and direct push

methods (see Fig 2 in Enclosure A). Three or four soil samples were collected from 4–19 feet bgs in each boring with 3–6 foot sampling intervals. The soil samples were analyzed for TPH-Gx, TPH-Dx, and BTEX. Selected samples were also analyzed for ethylene dibromide (EDB), ethylene dichloride (EDC), n-hexane, carcinogenic polynuclear aromatic hydrocarbons (cPAHs), volatile petroleum hydrocarbons (VPH), and extractable petroleum hydrocarbons (EPH). Among the 17 soil borings, only the sample from SB-9 at 13 feet bgs detected TPH-Gx, ethylbenzene, and total xylenes above the MTCA Method A cleanup levels. Boring logs indicated that the groundwater table was at 9–10 feet bgs in the area surrounding former monitoring well MW-1. Therefore, the SB-9 soil sample was from below the groundwater table suggesting groundwater at this location may be impacted.

- **Installation and monitoring of well MW-1A:** MW-1A was installed in August 2012, approximately 5 feet east of the decommissioned MW-1. MW-1A was screened from 5 to 15 feet bgs. Two quarters of groundwater monitoring was conducted for this well in August 2012 and February 2013, before and after the 2012 soil excavation in this area (see Section 4 of this letter for details) and groundwater was non-detect for contaminants in both seasons.

Based on the Site characterization and the confirmation soil sampling after various cleanup actions (see Section 4 of this letter for details) conducted to date, Ecology has determined that the vertical boundary of the contamination plume and the level of contamination are not adequately defined at the Site. Ecology has determined that the Site characterization is insufficient and has following comments:

1. **Soil and groundwater contamination at the area around former well MW-7:** High concentrations of groundwater contamination were detected in this area during 1992 to 1999. The deepest soil sample at 7.5 feet bgs from MW-7 detected soil contamination exceeded the MTCA cleanup level in 1994. In 2001, soil excavation was conducted at this location to 13 feet bgs without prior information of the vertical extent of soil contamination (see Section 4 of this letter for details).

Upon completion of the soil excavation, no confirmation soil samples were collected from the bottom of the excavation pit. No groundwater monitoring was conducted for this location after the 2001 soil excavation either.

Since previous groundwater monitoring has indicated that the groundwater gradient in this area was quite small, and the plume did not migrate much over the monitoring period. It is unclear whether the soil and groundwater beneath the Excavation #1 area is now in compliance with MTCA because the excavation only removed contaminated soil above 13 feet bgs and a limited amount of impacted groundwater.

Additional characterization of the vertical extent of soil contamination and groundwater monitoring are warranted in this area. At least one groundwater monitoring well needs to be installed in this area, and to be monitored, along with other monitoring wells at the Site, until all groundwater monitoring data indicating that groundwater is in compliance with MTCA (see Comment #3 below). Groundwater cleanup actions may be necessary if contamination exists.

2. **Groundwater contamination at the area near former well MW-1 and soil boring SB-9:** During the 2012 investigation, soil was found still contaminated in SB-9. However, the SB-9 soil sample was collected at 13 feet bgs, which was below the groundwater table (approximately 9.8 feet bgs at the time). The September 2005 soil sample that detected petroleum contamination in GP-11 was at the same location, and was also collected at 13 feet bgs and below the groundwater table. The final monitoring data in July 2005 from well MW-1 before its decommission detected TPH-Gx at 2,400 ug/L, exceeding the MTCA Method A cleanup level. Both the soil samples and the groundwater monitoring data indicate that groundwater was impacted in this area and has not been remediated. Although soil excavation was conducted in 2012 at this location (see Section 4 of this letter for details), and two quarters of groundwater monitoring in MW-1A since 2012 have been conducted indicating that TPH-Gx, TPH-Dx, and BTEX below the MTCA Method A cleanup levels, groundwater must be further monitored to confirm its compliance with MTCA (see comment #3).
3. Ecology requires that at least four rounds of quarterly groundwater sampling be conducted showing concentrations of contaminants below MTCA Method A cleanup levels to meet the substantive requirements of MTCA. The reason for this is to determine any seasonal variations in the contaminant concentrations. Four consecutive quarters of monitoring data have not been acquired after the 2005 groundwater pump and treat effort, and 2012 soil excavation. Groundwater monitoring in wells MW-1A, other existing wells (MW-3, MW-6, MW-5, MW-8, and MW-9), and a replacement well of MW-7 to be installed will have to be monitored until the requirement is met.
4. All previously detected contaminants must be analyzed for in the samples during groundwater monitoring.
5. In accordance with WAC 173-340-840(5) and Ecology Toxics Cleanup Program Policy 840 (Data Submittal Requirements), data generated for Independent Remedial Actions shall be submitted simultaneously in both a written and electronic format. Ecology understands that the data for the previous Site investigations and cleanup have been submitted. However, data generated in additional Site investigation and groundwater monitoring will have to be submitted as well. For additional information regarding electronic format requirements, see the website <http://www.ecy.wa.gov/eim>. Be advised that according to the policy, any reports containing sampling data that are submitted for Ecology review are considered incomplete until the electronic data has been entered. Please ensure that

data generated during on-site activities is submitted pursuant to this policy. **Data must be submitted to Ecology in this format for Ecology to issue a No Further Action determination.** Please be sure to submit all data in this format. Data collected prior to August 2005 (effective date of this policy) is not required to be submitted; however, you are encouraged to do so if it is available. Be advised that Ecology requires up to two weeks to process the data once it is received.

**2. Establishment of cleanup standards.**

Ecology has determined the cleanup levels and points of compliance you established for the Site do not meet the substantive requirements of MTCA.

The MTCA Method A cleanup levels for unrestricted land uses for soil and groundwater are being used for the Site.

Standard points of compliance are currently being used for the Site. The point of compliance for protection of groundwater shall be established in the soils throughout the Site. For soil cleanup levels based on human exposure via direct contact or other exposure pathways where contact with the soil is required to complete the pathway, the point of compliance shall be established in the soils throughout the Site from the ground surface to 15 feet bgs. In addition, the point of compliance for the groundwater shall be established throughout the Site from the uppermost level of the saturated zone extending vertically to the lowest most depth that could potentially be affected by the Site.

Additional data collection is warranted prior to establishing points of compliance.

**3. Selection of cleanup action.**

Ecology has determined the interim cleanup actions you selected for the Site have not met the substantive requirements of MTCA.

Cleanup actions conducted to date included source removal (removal of the ASTs and product transporting lines, and pump house); contaminated soil excavation and groundwater pump and treat on Site (see Section 4 of this letter for details). However, further cleanup or confirmation of groundwater cleanup status is warranted.

**4. Cleanup.**

Ecology has determined the interim cleanup you performed has not met the cleanup standards at the Site. The cleanup activities conducted so far at the Site included:

### Soil Excavations:

- Excavation #1: In September 2001, the impacted soil at the former dispenser pumps/truck unloader area was excavated (see Figure 2 of Enclosure A). The total excavated area was approximately 2,900 square feet and down to 13 feet bgs, which was approximately 1 foot below groundwater table. After completion of the excavation, four soil samples were collected from the sidewalls of the excavation pit at a depth of approximately 7 feet bgs. Results showed that the petroleum hydrocarbons in the soil samples were below method reporting limits (MRLs). No bottom sample from the excavation pit was collected.

During the soil excavation, approximately 8,250 gallons of impacted groundwater was pumped from the excavation pit and transported to Emerald Petroleum Services facility in Seattle for treatment and disposal.

- Excavation #2: In September 2001, the impacted soil at former MW-2 area was excavated. The final excavation had an area of approximately 500 square feet, and the maximum depth was 10.5 feet bgs. One sidewall confirmation soil sample was collected from 7 feet bgs, and one bottom confirmation soil sample was collected from 10 feet bgs. Both soil samples were below MRLs for petroleum hydrocarbon contaminants.

No groundwater was encountered during the excavation.

- Excavation #3: In September 2001, the impacted soil at the former garage area was excavated down to 9 feet bgs within a 400-square foot area. Groundwater was not encountered during the excavation. A composite soil sample from the four sidewalls and a bottom confirmation soil sample were collected and both were below MRLs for petroleum hydrocarbon contaminants.

A total of 1,990 cubic yards of soil was excavated from all three excavation pits (Excavation #1, #2, and #3). After soil testing, 1,030 cubic yards of soil was transported to Regional Disposal Company landfill in Roosevelt, WA for disposal. The remaining 960 cubic yards of "clean" soil was used to backfill the excavation pit.

- Excavation in 2012: In September 2012, a roughly 15 by 20 foot area was excavated to 17 feet bgs. About 30 cubic yards of petroleum-impacted soil from below 11 feet bgs was transported to the Waste Management Hillsboro Landfill for disposal. Two sidewall and one bottom confirmation soil samples were collected from the excavation pit. All the soil samples were non-detect for contaminants.



### Groundwater Cleanup Actions:

- During May 2 to June 16, 2005, a pump and treat operation was conducted at the Site. Approximately 224,000 gallons of groundwater was extracted from monitoring well MW-1 and treated on Site. A series of two skids, with two-bag filters mounted on each skid, were placed in-line with the discharge port of the holding tank and a carbon cell containing 1,000 pounds of activated carbon. During the treatment operation, groundwater was pumped from MW-1 into the holding tank, and then pumped from the tank through a diaphragm pump into the two bag filters, then flow through the carbon cell. The groundwater was allowed to rest a minimum of 24 hours in the carbon cell before being released into the drain field by gravity feed. Two treated groundwater samples were collected the same day on May 18, 2005 during the treatment operation from the discharge point of the carbon filter prior to discharge. The samples were analyzed for TPH-Gx, TPH-Dx, heavy oil range TPH, and BTEX. Results indicated that the contaminants were below their respective MRLs, which were set below the MTCA Method A cleanup levels.
- Groundwater monitoring has been conducted semi-annually at the Site during 1994–1999 and quarterly during 2002 to 2005. The latest monitoring was conducted quarterly since 2012 only in the newly installed well MW-1A.

Groundwater monitoring conducted to date has not demonstrated that the groundwater has achieved compliance with MTCA for at least four consecutive quarters.

Additional data collection is warranted prior to conducting a final cleanup action.

### Limitations of the Opinion

#### 1. **Opinion does not settle liability with the state.**

Liable persons are strictly liable, jointly and severally, for all remedial action costs and for all natural resource damages resulting from the release or releases of hazardous substances at the Site. This opinion **does not**:

- Resolve or alter a person's liability to the state.
- Protect liable persons from contribution claims by third parties.

To settle liability with the state and obtain protection from contribution claims, a person must enter into a consent decree with Ecology under RCW 70.105D.040(4).

**2. Opinion does not constitute a determination of substantial equivalence.**

To recover remedial action costs from other liable persons under MTCA, one must demonstrate that the action is the substantial equivalent of an Ecology-conducted or Ecology-supervised action. This opinion does not determine whether the action you performed is substantially equivalent. Courts make that determination. *See* RCW 70.105D.080 and WAC 173-340-545.

**3. State is immune from liability.**

The state, Ecology, and its officers and employees are immune from all liability, and no cause of action of any nature may arise from any act or omission in providing this opinion. *See* RCW 70.105D.030(1)(i).

**Contact Information**

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Thank you for choosing to clean up the Site under the Voluntary Cleanup Program (VCP). After you have addressed our concerns, you may request another review of your cleanup. Please do not hesitate to request additional services as your cleanup progresses. We look forward to working with you.

For more information about the VCP and the cleanup process, please visit our web site: [www.ecy.wa.gov/programs/tcp/vcp/vcpmain.htm](http://www.ecy.wa.gov/programs/tcp/vcp/vcpmain.htm). If you have any questions about this opinion, please contact me by phone at (360) 407-6265 or by e-mail at [hqiu461@ecy.wa.gov](mailto:hqiu461@ecy.wa.gov).

Sincerely,



Hans Qiu, L.HG.  
Site Manager  
SWRO Toxics Cleanup Program

HQ/SIR/ksc:Site FA Unocal 0885 SW1290

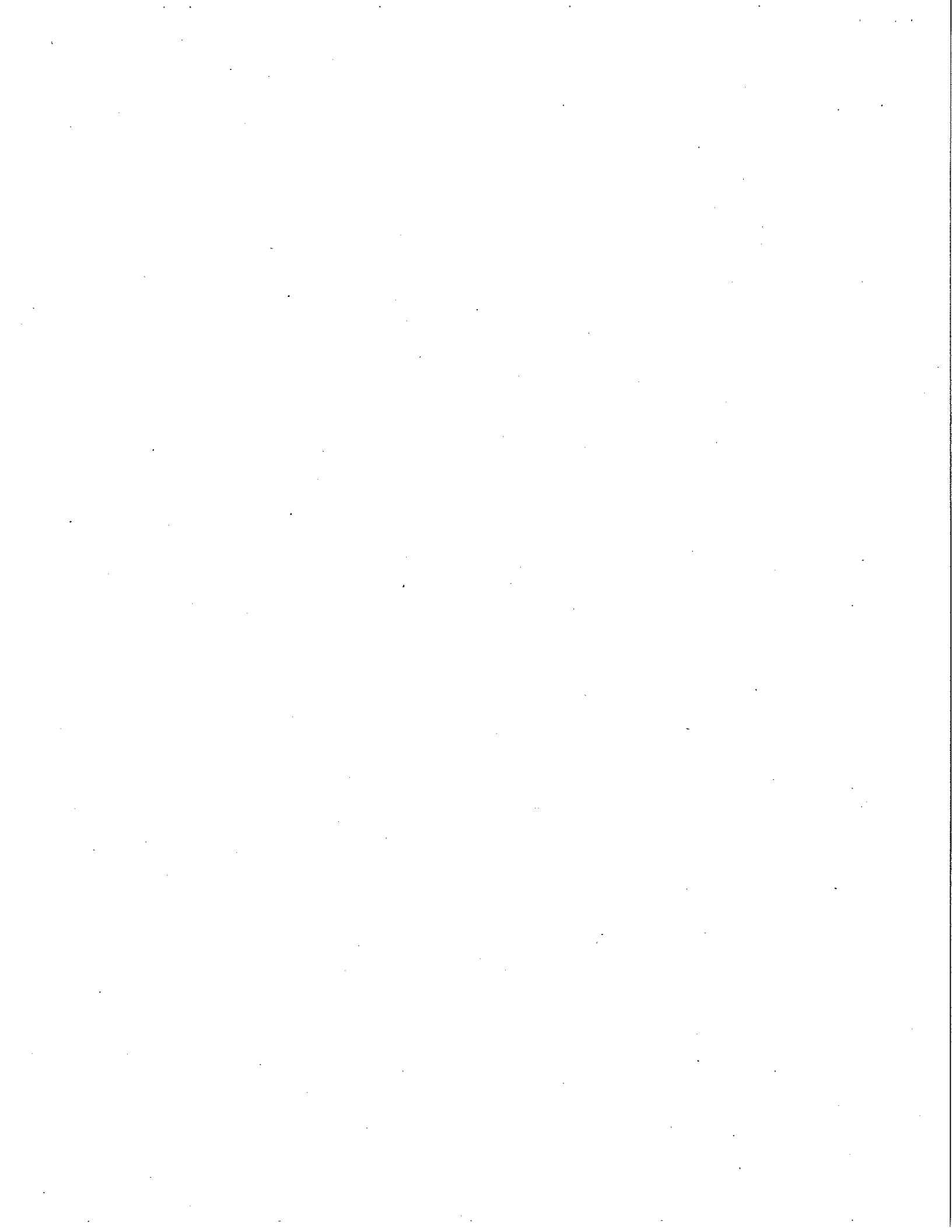
Enclosures: A – Description and Diagrams of the Site

By certified mail: (7011 2970 0000 0555 4019)

cc: Julie Wartes, Science Application International Corporation (SAIC)  
Don Wyll, Science Application International Corporation (SAIC)  
Dolores Mitchell – Ecology  
Scott Rose – Ecology

## **Enclosure A**

### **Description and Diagrams of the Site**



## Site Description

The Unocal Bulk Plant 0855 facility Site, also known as Chevron site # 306490, is located at 333 6<sup>th</sup> Street, Woodland, Cowlitz County, Washington. In some of the previous documents, the Site was mistakenly noted as located at 333 6<sup>th</sup> Avenue, Woodland, Cowlitz County. The property is currently vacant and owned by Chevron, Inc. Nearby land uses include commercial, agricultural, and rural residential. The property is surrounded by the former Fleetwood Homes site to the north, south, and east, and by the Burlington Northern Sante Fe (BNSF) rail line to the west. Large tracts of land beyond the rail line to the west appear to be agricultural land.

The Site was formerly operated as a bulk fuel plant from approximately 1926 to 1992. Former structures included a warehouse, pump house, garage, two railroad spurs, five above-ground storage tanks (ASTs) ranging in size from 5,000 to 20,000 gallons, three 2-inch-diameter above-ground product delivery lines, and associated dispenser pumps (Figure 2). In 1992, the bulk plant closed and all facilities were removed.

The Columbia River is located approximately 2.3 miles to the west and the Lewis River and Horseshoe Lake are located approximately 0.8 and 0.2 miles to the east of the Site. The Site is relatively flat. The groundwater table is encountered at depths ranging from 7 to 12.5 feet below ground surface (bgs). The groundwater flow direction is to the southwest but the gradient is small, approximately 0.0006 – 0.0009 based on an October 2001 contour map.

The Site is underlain by unconsolidated alluvium, including silt, sandy silt, and sands. These soil represent floodplain deposits of the Columbia River Alluvium. Soil from borings primarily consists of medium density, poorly graded sands and gravelly sand that extend to 20 feet bgs. Frequent lenses of very fine sand and clay were also observed between 3 to 8 feet bgs, at various locations across the Site.

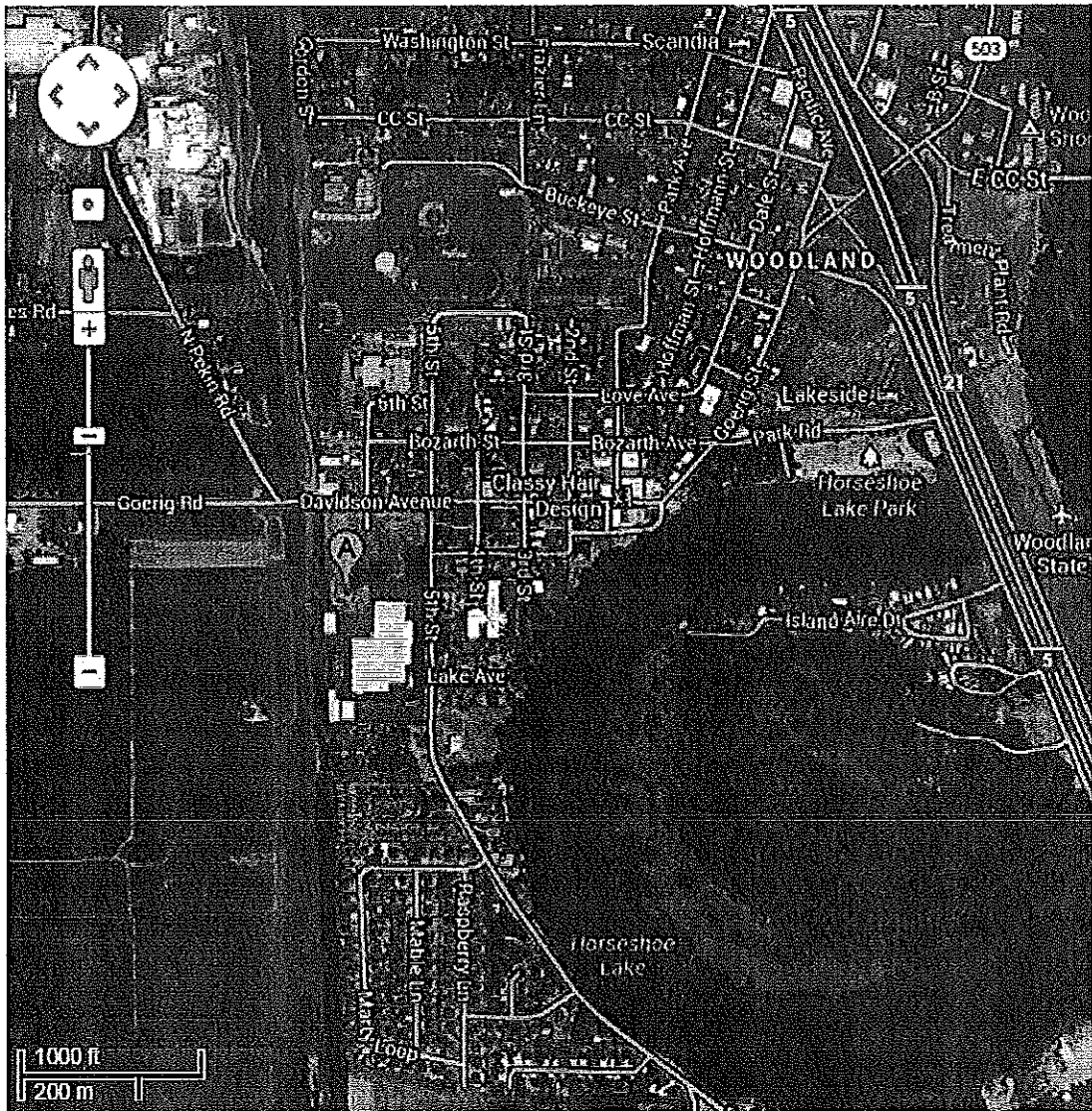


Fig 1. Location of the Unocal Bulk Plant 0855 Site, in Woodland, WA (Snapped from Google Map)