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October 21, 2022

Branislav Jurista
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Re: Further Action at the following contaminated Site:

- **Site Name:** Woodworth & Co Inc. Lakeview Plant
- **Site Address:** 2800 104th St Ct S, Tacoma, Pierce County, WA 98499
- **Facility/Site ID:** 1372
- **Cleanup Site ID:** 165
- **VCP Project ID:** SW1012

Dear Branislav Jurista:

The Washington State Department of Ecology (Ecology) received your request for an opinion on your independent cleanup of the Woodworth & Co Inc. Lakeview Plant facility (Site). This letter provides our opinion. We are providing this opinion under the authority of the Model Toxics Control Act (MTCA),[1] chapter 70A.305 Revised Code of Washington (RCW).[2]

Issue Presented and Opinion

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 70A.305 RCW, and its implementing regulations, Washington Administrative Code (WAC) chapter 173-340[3] (collectively "substantive requirements of MTCA"). The analysis is provided below.

[1] https://apps.ecology.wa.gov/publications/SummaryPages/9406.html
[2] https://app.leg.wa.gov/RCW/default.aspx?cite=70A.305
[3] https://apps.leg.wa.gov/WAC/default.aspx?cite=173-340

- *Prior to concurring with a no further action determination, Ecology needs additional data supporting that recently discovered releases are appropriately delineated and remediated at the Site and confidence that future releases will be prevented.*

- *This Site sits atop a sole-source aquifer used as a public drinking water source. Trichloroethene (TCE) continues to be detected in the reported shallow and deep aquifers and in the industrial well, screened within the regional aquifer. Ecology needs additional reporting and evaluation within these aquifers to ensure that contamination will not enter the Lakewood Water District drinking water system.*

- *Limited and irregular groundwater monitoring events at the Site are not sufficient for Ecology to adequately evaluate groundwater contaminant trends or restoration timeframes.*

- *The lateral and vertical extents of contamination in some areas of the Site are not defined.*

Description of the Site

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

- Volatile organic compounds (VOCs) including TCE, petroleum hydrocarbons and related constituents, metals, and carcinogenic polycyclic aromatic hydrocarbons (cPAHs) into the Soil and Groundwater.

The parcel of real property associated with this Site is also located within the projected boundaries of the Asarco Tacoma Smelter facility (#89267963). At this time, we have no information that the parcel is affected. As such, this opinion does not apply to any contamination associated with the Asarco Tacoma Smelter facility.

Site location information can be found on Ecology's What's In My Neighborhood[4] website.

A parcel 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

This opinion is based on the information contained in the document list in the Enclosure.

You can request these documents by filing a records request.[5] For help making a request, contact the Public Records Officer at publicrecordsofficer@ecy.wa.gov or call 360-407-6040.

[4] https://apps.ecology.wa.gov/neighborhood/?lat=47.06753&lon=-122.41185
[5] https://ecology.wa.gov/About-us/Accountability-transparency/Public-records-requests

Before making a request, check whether the documents are available on Ecology's Cleanup Site Search web page.[6]

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

Analysis of the Cleanup

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.

The Woodworth & Co Inc. Lakeview Plant is a toxics cleanup Site located at 2800 104th Street Ct S, Tacoma, Washington (the Property, including Pierce County tax parcels 0319061135, 0319062075, 0319062076, 0319062081, and 0319061142). The Property is surrounded to the north by commercial and residential properties, to the east by multi-tenant apartment complexes, to the south by State Route 512 and industrial properties, and to the west by the Interstate-5 right-of-way. The Site includes a portion of the Property.

The Property is currently used for recycling imported asphalt and concrete debris and for producing hot- and cold-mix asphalt. Former uses of the Lakeview Facility included sand and gravel mining, asphalt production, stockpiling, and permitted thermal desorption treatment of petroleum-contaminated soil.

For this opinion, Ecology is responding to Farallon's August 31, 2021, *Response to August 30, 2019, Letter Regarding Further Action – Woodworth & Company, Inc. – Lakeview Plant*, (the Response). The following comments and suggestions are intended to help you collect and evaluate sufficient characterization data, establish cleanup standards, and select a cleanup action in accordance with MTCA.

Site Characterization Comments:

Soil – General Comments:

Individual cleanup levels cannot be applied to individual areas of a site unless the releases are separate for soil only and not comingled with groundwater.

- Farallon references a 2011 opinion letter that approved a "Site-specific MTCA Method B [Cleanup Level (CUL)] for the Former Recycled Stockpile Area of 3,739 [milligrams per kilogram (mg/kg)]." This cleanup level is not applicable if MTCA Method A is being proposed for the Site.

[6] https://apps.ecology.wa.gov/gsp/Sitepage.aspx?csid=165

- In addition, since there was new contamination discovered in this area, calculations need to be redone if Method B is proposed for use because the old, calculated number did not take this into account.

- The other issue with this calculated cleanup level is that it was based on direct contact only and assumed that the soil to groundwater pathway is incomplete. In addition, results now exist that show the groundwater is contaminated and as a result, this calculated cleanup level is not protective. Further, although mixing Methods is possible, in general, if a Method B cleanup level is calculated for soil, a Method B cleanup level should be calculated for groundwater as well.

Soil – Specific Comments:

Former Recycled Stockpile Area

In the western area near MW-24, cPAH should be analyzed in the boring/test pit soil samples that were positive for diesel range petroleum hydrocarbons (DRO) and/or heavy oil range petroleum hydrocarbons (ORO). Additional soil samples should be collected and analyzed for PAH by EPA Method 8270SIM. Further given the groundwater results in this area, additional investigation of TPH source material should be conducted to facilitate excavation and removal.

Hot Mix Storage Area

As a contaminant of concern (COC), analysis for cPAH terminal depth soil samples should be consistent in all soil borings even though DRO/ORO are non-detect. For example, cPAH was not analyzed in the terminal samples from B-31 and B-33 although it was analyzed in the remaining terminal boring samples where DRO/ORO were not detected. Given cPAH transport in soil is variable and can be independent of visible TPH, cPAH mobility should be analytically evaluated at each site as mobility is dependent upon variations in available soil column sorbent surface area/micropore volume and sorbate (fulvic/humic acids and humins) and hydrophobicity/molecular volume.

Equipment Storage Carport Area

The areal and vertical extent of the B-12 soil contamination needs to be further defined so that this information can be used in the feasibility study. Extensive excavation occurred in this area in 2011 to a depth of between 8-13 feet below ground surface (bgs). Boring B-12 was subsequently drilled in 2017 with ORO detected at 12,000 mg/kg at a depth of 9 feet bgs. Soil samples should be analyzed for DRO/ORO and PAH by EPA 8270SIM.

Former Asphalt Testing/Laboratory/Roofer Shredder Area

- B-16 Area: Delineate ORO impact in B-16 in the easterly and southerly directions to assess the extent of impact at depth. The extent should be defined in more detail between 3 and 10 feet bgs to better delineate the vertical thickness of contaminated soil.

- Boring Spread and B-19 Area: Additional localized delineation of ORO and cPAH is needed at and near former boring B-19 given the ORO detection of 6,200 mg/kg. In addition, while cPAH was analyzed in the terminal boring samples from B-30, B-32, and B-34, the sample results were non-detect and were most likely the result of a lack of associated DRO/ORO impacts in local samples versus the ORO result in former boring B-19. As a result, Ecology still considers cPAH as a potential risk in the area of that former boring location and requests that further/future assessment and/or remedial activity in the B-19 area incorporate cPAH as an analyte via EPA 8270SIM in all soil confirmation samples.

Groundwater – General Comments:

- Several issues regarding groundwater and groundwater monitoring need resolution. These issues are as follows:

- The May 25, 2017, Ecology letter requested that water samples be collected from both the Laurel Lane and Majestic Oaks domestic supply wells for analysis of VOCs. Please advise on the status of this request.

- In June 2021, Ecology published information on updated toxicity data and physical/chemical properties for petroleum mixtures.[7] The updated information provided in this 2021 guidance has been incorporated into a revised version (MTCA TPH Ver. 11.1) of the Excel Workbook tool for calculating cleanup levels for petroleum contaminated sites.[8]

  The worksheets provided in Attachment C of the Response are incorrect because they were prepared using an outdated version of the workbook tool. For example, Ecology's calculation using the version 11.1 workbook tool resulted in a MTCA Method B protective TPH groundwater concentration value of 319.68 micrograms per liter (µg/L) for well MW-13. This value is substantially lower than the result shown in Attachment C for this well (614.50 µg/L). Ecology's calculated values for the other shallow wells, MW-9R and SVE-5, are 234.83 µg/L and 229.66 µg/L, respectively. Please recalculate the respective cleanup levels.

[7] Ecology 2021, Toxicity Data and Physical/Chemical Properties for Petroleum Mixtures. Supporting material for Cleanup Levels and Risk Calculation (CLARC), June, available at: https://www.ezview.wa.gov/Portals/_1987/Documents/Documents/ToxicityChemPropPetroleumMixtures.pdf

[8] The revised version of the spreadsheet tool is available at: https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Clean-up-petroleum-contamination

- Groundwater characterization for both shallow and deep water-bearing zones needs to be performed on a Site-wide basis in addition to the areas of concern. This is especially important for the deep water-bearing zone given no well completions exist in the southwestern, central western, and northern areas of the Site.

- Please revise Response Figures 3, 4, 5, 9, 12, 13, 16, and 20 to indicate where groundwater concentrations exceed the MTCA Method A cleanup level.

- Ecology needs additional information to evaluate a proposed point of compliance. The current report does not adequately describe how achieving the Site cleanup level within a reasonable restoration timeframe is not practicable. The previous Ecology opinion letter[9] provided information required for Ecology to evaluate a proposed conditional point of compliance.

Groundwater – Specific Comments:

Northern Parcel Arsenic/Lead Plume Area

Monitoring wells in this area were last sampled in January 2020 (2 years ago) and should be resampled for total and dissolved fractions of arsenic and lead to assess current concentrations and contaminant extent in both the shallow and deep water-bearing zones. Shallow zone wells to be retested should include MW-9, MW-9R, MW-9A, MW-9D, MW-12, MW-31, MW-32, MW-33, MW-34, and MW-35. Deep zone wells to be retested should include MW-9D, MW-12B. The wells should be retested in, for example, January and August 2023, to assess groundwater responses to seasonal fluctuations. Groundwater flow direction and gradient should be calculated after each sampling event.

Regional Aquifer/On-site Industrial Water Supply Well TCE Impact

Given the singular groundwater sampling events for the industrial and surrounding deep zone wells presented in the Response, Ecology does not concur with the conclusions presented on page 13 of the Response. Ecology suggests sampling the industrial well in addition to wells MW-2, AS-1 through AS-4, AS-6 through AS-9 and MW-14C to assess chlorinated VOC concentrations throughout the year and to better evaluate any trends that may exist between the wells. The wells should be retested in, for example, January and August 2023, to assess groundwater responses to seasonal conditions as well as establishing both groundwater flow direction and gradient that are coincident with the sampling events.

[9] Ecology, August 30,2019; VCP Opinion on Feasibility Study – FA at Site; Woodworth & Co Lakeview Plant.

Former Recycled Stockpile Area

- Western MW-24 Area: cPAH should be analyzed in the groundwater samples which bore detectable concentrations of DRO and/or ORO. Groundwater data should be updated in the MW-24T area (last sampled November 2017) and B-36 (last sampled December 2019) locations. Well MW-24 should be located and uncovered, or a new installation should be completed in that area and sampled to assess contaminant behavior and trends.

  Of note, either insufficient groundwater sampling frequency and/or inadequate subaerial well network coverage in an area obfuscates evaluation of a temporally significant seasonal concentration range and/or facilitate trend analysis.

  To that end, redundant wells within an area network should be sampled over four consecutive calendar quarters to assess seasonal variations in water table and contaminant concentrations. Further and in general, please define the full nature and extent of the blue TPH groundwater boundary in Figure 3 of the Response to the north, south, and east through additional investigation and sampling.

- Eastern MW-9R/16 Area: Groundwater samples were collected in January, September, and December 2020 from monitoring wells MW-9R and 16R and submitted for laboratory analysis of DRO/ORO, extractable petroleum hydrocarbons, volatile petroleum hydrocarbons, benzene, toluene, ethylbenzene, and xylene (BTEX), naphthalenes, and cPAHs, to calculate the site-specific MTCA Method B cleanup level in MW-16 area. The results from these analyses were entered into the Ecology Workbook Tools for Calculating Soil and Ground Water Cleanup Levels under the MTCA, User's Guide for MTCATPH 11.1 & MTCASGL 11.0,[10] to calculate site-specific MTCA Method B cleanup levels for TPH.

  The calculated TPH concentration for the sample from monitoring well MW-9R was 301.78 µg/l, less than the calculated MTCA Method B cleanup level for TPH for the MW-9R area of 493.93 µg/l. Upon Ecology's evaluation of the workbook, the data was found to be incorrectly entered, specifically about 1,2-dibromoethane (EDB) and 1,2-dichloroethane (EDC). Of note, EDB was analyzed at a PQL of 0.20 µg/L versus the Method A cleanup level of 0.01 µg/L. Further, on the MW-9R sheet, EDB was incorrectly entered as ½ the PQL as 0.0475 and should be corrected while the correct entry for all the non-detected cPAH analytes in the workbook is 0.00475 µg/L. Please reassess if these may have been omitted based on no detections at the Site.

[10] Ecology Publication No. 01-09-073, revised December 2007. https://apps.ecology.wa.gov/publications/SummaryPages/0109073.html

Please also complete the adjustments and ensure the data is accurately corrected to prevent double counting of overlapping carbon ranges and ensure the data is accurately corrected,[11] Ecology recommends having the laboratory report to the MDL rather than the PQL or MRL as this will reduce the conservative accounting of non-detections. In addition, the calculated TPH concentration for the MW-16R sample was 369.49 µg/l, less than the calculated MTCA Method B TPH cleanup level for the MW-16R area of 585.04 µg/L. Based on the calculated TPH results and the MTCA Method B cleanup levels, Farallon concluded that cleanup of TPH-impacted groundwater in the shallow and deep water-bearing zones around monitoring wells MW-9R and MW-16R is not warranted.

Upon Ecology review, similar data entry edits should be completed, equivalent carbon fractions should be adjusted to prevent double-counting, and non-detect xylenes with the lowest PQL should be evaluated as ½ of the PQL

Given that this conclusion is based on one data point per water-bearing zone, Ecology does not concur with this conclusion and suggests that additional groundwater delineation in the vicinity of the wells be performed to better substantiate such a conclusion.

Equipment Storage Carport Area

Shallow groundwater should be evaluated near the former B-12 to assess the potential for groundwater impact and the need for remediation.

Former Asphalt Testing/Laboratory/Roofer Shredder Area

Groundwater in the immediate B-16 area should be further evaluated for DRO/ORO. In addition, monitoring (MW)/soil vapor extraction (SVE)/air sparge (AS) wells that were last sampled in January 2020 (2 years ago) should be resampled for CVOC to assess current concentrations and migratory extent in both the shallow and deep water-bearing zones. Deep zone wells to be retested should include MW-2, MW-14, MW-15, MW-16R, MW-18, MW-19, MW-20, MW-21, MW-22, MW-23, MW-25, SVE-1, SVE-2, SVE-8, AS-1, AS-2, AS-3, AS-4, AS-6, AS-7, and AS-8. Shallow zone wells to be retested should include MW-3, MW-4, MW-9, MW-9R, MW-26, MW-36, SVE-3, SVE-12, and AS-5/SVE-6. The wells should be retested in at least, for example, August 2022 and January 2023 to assess groundwater responses to seasonal conditions and groundwater flow direction and gradient should be established coincident with the sampling events.

Deep Groundwater Delineation

Ecology suggests that more wells be installed in the deep groundwater zone to complete evaluation of nature and extent across the Site.

[11] Ecology; 2016 Guidance for Remediation of Petroleum-Contaminated Sites, Table 8.7.

Groundwater Monitoring

Groundwater sampling has been completed infrequently and is insufficient for Ecology to evaluate trends at particular monitoring wells or areas.[12] To collect sufficient information for Ecology to evaluate trends, we recommend sampling Site monitoring wells at regular intervals.

- Use the groundwater monitoring results to evaluate and report on the lateral and vertical extents of contamination and concentration trends.

- Continue to measure geochemical parameters including temperature, pH, oxygen reduction potential (ORP), and conductivity.

- Provide contaminant concentration isopleth maps in plan view and geologic cross section delineating the Site. Plan view and geologic cross section concentration isopleth maps will be necessary to determine appropriate conditional points of compliance for any environmental covenant and will be included as attachments to any environmental covenant determined appropriate for the Site.

Monitored Natural Attenuation

Once additional groundwater data have been obtained and after the Conceptual Site Model (CSM) has been updated, please reassess natural attenuation at the Site.[13] Farallon used Ecology's 2005 Natural Attenuation Analysis Tool Package for Petroleum-Contaminated Ground Water, Package A, to predict restoration time frames. However, as stated in the companion User's Manual, this guidance and tool is not intended for contaminants other than petroleum-related compounds. In Ecology's previous opinion letter, Ecology recommended the use of the technical protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Ground Water (EPA, 1998).[14] Therefore, Ecology does not agree with the use of the Ecology (2005) guidance to predict restoration time frames for chlorinated organics and cannot assess whether Monitored Natural Attenuation (MNA) is appropriate until an adequate assessment has been made as per EPA (1998).

- As an example, SVE-12 does not show a statistically significant trend and the most recent TCE result (September 2020, 12 µg/L) is nearly an order of magnitude higher than the previous sample result (January 2020, 1.7 µg/L). Therefore, this proposed MNA monitoring point does not seem to indicate that MNA is occurring. Also, the Initial Screening Process Flow Chart in EPA (1998),[15] shows that selected additional remedial options should be evaluated if it does not appear that natural attenuation alone will meet the regulatory criteria.

[12] Response to Comments for the Woodworth & Co. Lakeview Plant, May 2017, pages 8-9
[13] Response to Comments for the Woodworth & Co. Lakeview Plant, May 2017, page 7
[14] Revised August 2008. https://cfpub.epa.gov/si/si_public_record_Report.cfm?Lab=NRMRL&dirEntryID=99187
[15] USEPA 1998; Attenuation of Chlorinated Solvents in Ground Water; EPA/600/R-98/128.

- Table 11 in the Response indicates that Cleanup Alternative 1 (institutional and engineering controls) will have an "indefinite" and "long-term" restoration time frame, although Cleanup Alternative 1 does not meet the minimum requirements for cleanup actions in WAC 173-340-360(2). This alternative does not protect human health and the environment or provide for a reasonable restoration time frame. Also, as stated in WAC 173-340-360(2)(e)(iii), cleanup actions shall not rely primarily on institutional controls and monitoring where it is technically possible to implement a more permanent cleanup action for all or a portion of the site.

Vapor Intrusion/TCE

Ecology understands that for current receptors, the vapor intrusion risk is understood and accepted. However, Ecology cannot evaluate the Site based on the reclamation plan alone as such a plan can easily change based on a new submittal to the Department of Natural Resources.

As a result, the Site must formalize an industrial use status in perpetuity via an environmental covenant or require an additional vapor intrusion assessment once reclamation is complete and before any land use designation changes via an environmental covenant.

Groundwater Geochemistry

Ecology previously provided that stockpiling of recycled concrete aggregate stored at the Site likely has increased the pH of shallow groundwater. During the December 2017 groundwater monitoring event, pH was detected as high as 13.01 (MW-9B) in the deep aquifer and as high as 12.52 in the shallow aquifer (MW-31). High levels of lead and arsenic have been detected in shallow groundwater in this area (MW-12 and MW-31), potentially a result of elevated pH in this area of the Site leaching those metals from soil into groundwater. In response to Ecology concerns, subsequent activities were conducted to evaluate elevated pH proximate to well MW-9B.

- Arsenic/Lead: As a result of past monitoring efforts, arsenic-impacted groundwater appears to be limited in extent to the area immediately surrounding monitoring wells MW-12 and MW-31, and likely is associated with elevated pH in groundwater at those locations, causing mobilization of metals. Additionally, concentrations of dissolved arsenic detected in groundwater samples collected from monitoring wells MW-12 and MW-35 either were less than or slightly exceeded background concentrations. Ecology concurred with using dissolved arsenic and lead concentrations as representative of Site groundwater.[16]

  Ecology maintains this position due to filtered samples providing a more representative measure of groundwater quality due to the natural background concentrations that typically exist within the water-bearing zone underlying the Site.[17]

[16] Ecology; Response to Comments for the Woodworth & Co. Lakeview Plant, May 25, 2017.
[17] WAC 173-340-720(9)(b).

Monitoring Wells

Thank you for decommissioning deep well MW-16 and installing replacement well MW-16R. Groundwater collected from MW-16R also exceeded the MTCA Method A cleanup level for DRO and ORO combined. Of note, Ecology does not concur with the conclusion that the combination of DRO/ORO concentrations were below the Method B-calculated cleanup level as that cleanup level needs to be updated according to the current guidance. Please evaluate the lateral and vertical extent of TPH contamination in the deep aquifer near MW-16.

Due to concern with potential damage to well MW-9, this shallow well was also decommissioned and replaced with MW-9R. This well is adjacent to MW-16R and exceeds the MTCA Method A cleanup level for combined DRO and ORO.

The Response also reports that well SVE-5 was decommissioned due to concerns regarding aquifer intercommunication and because SVE has been discontinued. This well is screened across both the shallow and deep water-bearing zones. There are other SVE wells that are or may be screened across the two aquifer zones (for example SVE-3, -5, -6, -7, -8, -9, and -10). To meet WAC 173-160-420(2), Ecology recommends decommissioning any other SVE wells that are interconnecting aquifers.

Conceptual Site Model and Nature and Extent of Contamination

Thank you for updating the CSM. The nature and extent of contamination are summarized below by area of concern:

- Former Recycled Stockpile Area: The contaminants and medium of concern are DRO and ORO in the shallow water-bearing zone groundwater. Please conduct additional investigation to delineate the source of petroleum contamination area and to assess removal of any remaining contaminated soil that may serve as a source of petroleum detections at MW-24T and B-36.

- Equipment Parking Area: Based on the analytical results for soil samples, the calculated concentration of TPH in groundwater from monitoring well MW-13 exceeds the Method A cleanup level. Additional delineation should be conducted to evaluate/define the contaminant source for this well.

- Hot Mix Storage Area: ORO-impacted soil occurs in an area approximately 30 by 45 feet to a maximum depth of approximately 10 feet bgs. PAH should be evaluated in soil and groundwater in this area to determine if soil contaminants are causing an impact.

- Equipment Storage Carport Area: The contaminants and media of concern are ORO and cPAHs in soil, and DRO and ORO in shallow groundwater. ORO and cPAH-impacted soil occur in an area approximately 30 by 45 feet to a depth of approximately 15 feet bgs. Given that residual ORO in soil is continuing to impact groundwater and that DRO should be a concern in soil given its presence in groundwater, additional investigation should be conducted in this area to assess those associations.

- Former Asphalt-Testing Laboratory Area: The contaminants and media of concern are ORO and cPAHs in shallow soil, and DRO, ORO, and TCE in shallow (SVE-5, MW-36) and deep water-bearing zone groundwater. ORO- and cPAH-impacted soil occur in the Former Asphalt-Testing Laboratory Area in an area approximately 25 by 50 feet to a maximum depth of approximately 10 feet bgs. The area around B-16 should be investigated further to facilitate excavation and removal of ORO-impacted soil. In addition, groundwater in the B-16 area should also be assessed for TPH impact.

- Groundwater: The current investigative extent of ORO and DRO in shallow groundwater is limited to the Former Recycled Stockpile Area, the Equipment Storage Carport Area, and the SVE-5 Area, depicted on Figures 3, 8, and 10, respectively, of the Response. However, based on consideration of groundwater TPH values relative to the Method A cleanup levels and shallow groundwater flowing to the interior of the Site towards monitoring well MW-9R, the extent of TPH-impacted groundwater becomes a site-wide versus area-of-concern issue and should be investigated accordingly.

  The extent of ORO in deep groundwater is limited to the area around monitoring well MW-16R with an east-northeasterly groundwater flow direction. The downgradient extent of ORO in deep groundwater is defined by the analytical results for groundwater samples collected from monitoring well MW-9D. Ecology suggests that further assessment be conducted that assesses the source of ORO impacts to deep groundwater in the MW-16R area.

  This assessment should evaluate vertical migration from the contaminated shallow water-bearing zone and consider the vapor wells SVE-3 and SVE-6 as potential conduits through the aquitard as illustrated on Figure 16 (transect F-F') from the Response. This should be compared with the different transect gap in the same area depicted on Figure 7 of the August 2009 Remedial Investigation/Feasibility Study (RI/FS) Report as well as the boring logs for AS-2/SVE-3 and AS-5/SVE-6 in the June 2011 Cleanup Action Status Report. Those boring logs indicated well-graded gravels with sand (indicative of the shallow sand and gravel water-bearing zone) versus the silt and silty gravel that is characteristic of the aquitard.

  Farallon concluded that cleanup of TPH-impacted groundwater in the shallow and deep water-bearing zones around monitoring wells MW-9R and MW-16R is not warranted. Given that this conclusion is based on one data point per water-bearing zone, Ecology does not concur and suggests that additional groundwater delineation and monitoring for the contaminants of concern near the wells would better substantiate such a conclusion.

Based on the prior 2020 groundwater analytical data, TCE was found to exist within both the shallow and deep water-bearing zones in the vicinity of the Former Asphalt Testing Laboratory Area at levels above the MTCA Method A cleanup levels. Ecology recommends additional sampling be conducted to further assess the current TCE contaminant extent and concentrations in both water-bearing zones.

Silica Gel

Ecology understands that the previous split-sample analysis was conducted to evaluate heavier fraction petroleum contamination with and without the silica gel cleanup procedure Further, Ecology understands that the selection of remedial alternatives was not based on the 2017 samples analyzed with silica gel cleanup.

In addition, Ecology acknowledges that soil and groundwater samples collected at the Site in 2019, 2020, and 2021 and submitted for analysis for DRO and ORO were not analyzed using a silica gel cleanup preparation.

Feasibility Study/Cleanup Alternative Evaluation/Disproportionate Cost Analysis

Ecology reviewed the updated evaluation of cleanup alternatives and the Disproportionate Cost Analysis (DCA) based on Ecology's 2019 recommendations. Ecology's 2019 recommendations included evaluating at least three cleanup alternatives including at least one permanent cleanup alternative. The remedial alternatives evaluated included:

- Alternative 1: Institutional and Engineered Controls.
- Alternative 2: In-Situ Chemical Oxidation (ISCO) and Soil Solidification (SS).
- Alternative 3: Source Removal, Enhanced Aerobic Degradation, and MNA.
- Alternative 4: In-situ Vapor Extraction and Air Sparging.
- Alternative 5: Excavation and Off-Site Disposal (EOSD).

Ecology did not review the sixth alternative, In-Situ Treatment via Soil Solidification, as alternative was combined within Alternative 2.

Alternatives 1, 2, and 3 were selected and MTCA Composite Benefit Scores were calculated for the three remedial alternatives and were costed to weigh against the benefit score as a benefit-to-cost ratio for each alternative. The estimated costs for Alternatives 1, 2, and 3, rounded to the nearest $10 thousand, were $129,000, $9.02 million, and $30.59 million.

Based on the results from the cleanup alternative evaluation and disproportionate cost analysis, the recommended alternative is Cleanup Alternative 1—Institutional and Engineered Controls for residual contamination at the Lakeview Facility to achieve a No Further Action determination from Ecology under the Voluntary Cleanup Program (VCP).

- Ecology suggests that the Alternatives be repackaged such that worthwhile alternatives would not be disproportionately skewed and would be worth considering. For example, TPH Alternative 3a, in Table 12a of the Response, Source Removal, has an estimated cost between $3.3-4M, and has the potential to greatly improve TPH groundwater concentrations. However, it becomes disproportionate when it is combined with the other Alternative 3 Subareas for a total cost of $30.59M.

- Ecology suggests that the FS include a cleanup alternative that includes excavation of TPH source areas that have been both identified and delineated. The FS and DCA should then be revised after the additional data and delineation are complete.

Conditional Points of Compliance Update

- Soil: Although trichloroethene, arsenic, nor lead have been detected at concentrations exceeding the MTCA Method A cleanup levels in soil, the associated sources in soil are still contributing to their presence in groundwater. Therefore, cleanup levels for those constituents of concern in soil have not been attained at the standard point of compliance. Conversely, DRO, ORO, and cPAHs have been detected at concentrations exceeding MTCA Method A cleanup levels or calculated Site-specific MTCA Method B cleanup levels. Potential exposure will be addressed by engineering controls consisting of an asphalt or concrete cap and/or a minimum of 15 feet of clean fill cover. Ecology concurs with the suggested soil points of compliance.

- Groundwater: Ecology concurs with the conditional points of compliance for shallow water-bearing zone groundwater as designated in the Response with the exception of the following:

    - Ecology does not concur with the selection of soil vapor extraction wells SVE-3 and SVE-6 for the TCE-affected Former Asphalt-Testing Laboratory Area. These wells should be decommissioned because they may facilitate communication between the shallow and deep water-bearing zones.

    - Ecology does not concur with monitoring well MW-9R as a conditional point of compliance (POC) as cleanup levels must be met at the point of compliance and they are not currently met at this well.

    - Regarding the Arsenic and Lead Plume in Groundwater Area, Ecology does not agree with monitoring wells MW-32, MW-33, and MW-34 as these are upgradient wells and conditional POC must be downgradient of contamination.

        - Ecology concurs with the conditional points of compliance for deep water-bearing zone groundwater as presented in the Response with the exception of the Former Asphalt Testing Area. Monitoring wells MW-15, MW-18, or MW-25 as these wells are either upgradient or crossgradient to the TCE plume in the deep water-bearing zone.

Environmental Covenant

Ecology understands the proposed remedial alternative consists of an institutional control as an environmental covenant and engineering controls.

Ecology suggests re-evaluating the preferred remedial alternative and the need for institutional controls after you complete the additional investigation and analyses suggested in this opinion.

If institutional or engineered controls remain an appropriate part of the preferred remedial alternative determined through the FS and DCA, please update the draft environmental covenant to manage implementation of needed institutional or engineered controls with consideration to the [listed] requirements.

Long Term Monitoring Plan (LTMP)

The August 3, 2018, draft environmental covenant included long-term groundwater monitoring. However, the LTMP did not include a contingency plan describing actions that will be conducted if results exceed applicable cleanup levels at the conditional points of compliance, cap maintenance or repair of remedy is required, or contaminated soil is encountered during property redevelopment activities. Ecology suggests revising the LTMP with inclusion of the aforementioned additions after the additional evaluations and analyses suggested in this opinion are completed.

2. Establishment of Cleanup Standards.

Under MTCA, cleanup standards consist of three primary components; points of compliance,[18] cleanup levels,[19] and applicable local, state, and federal laws.[20]

a. <u>Points of Compliance</u>: Ecology would likely concur with the appropriate use of the following points of compliance, that you need to propose for the Site:

Media	Points of Compliance
Soil-Direct Contact	Based on human exposure via direct contact, the standard point of compliance is throughout the Site from ground surface to fifteen feet below the ground surface.[21]
Soil-Protection of Groundwater	Based on the protection of groundwater, the standard point of compliance is throughout the Site.[22]
Soil-Protection of Plants, Animals, and Soil Biota	Based on ecological protection, the standard point of compliance is throughout the Site from ground surface to fifteen feet below the ground surface.[23]

[18] WAC 173-340-200 "Point of Compliance"
[19] WAC 173-340-200 "Cleanup level"
[20] WAC 173-340-200 "Applicable state and federal laws," WAC 173-340-700(3)(c)
[21] WAC 173-340-740 (6)(d)
[22] WAC 173-340-747
[23] WAC 173-340-7490(4)(b)

Media	Points of Compliance
Groundwater	Based on the protection of groundwater quality, the standard point of compliance is throughout the site from the uppermost level of the saturated zone extending vertically to the lowest most depth which could potentially be affected by the site.[24]
Air Quality	Based on the protection of air quality, the point of compliance is indoor and ambient air throughout the Site.[25]

b. **<u>Cleanup Levels:</u>** For each media and point of compliance above that you determine applicable to the Site, please provide appropriate cleanup levels for each hazardous substance detected in the remedial investigation. Apply the proposed cleanup levels at the appropriate points of compliance.

The MTCA Method A or Method B cleanup levels established for the constituents of concern at each area of concern are as follows:

- <u>Soil:</u>
    - DRO and ORO: 2,000 mg/kg, with the following exceptions:
        - Equipment Parking Area – calculated MTCA Method B cleanup level for total TPH (sum of DRO and ORO): 3,699 mg/kg.
        - Former Stockpile Area – calculated MTCA Method B cleanup level for total TPH (sum of DRO and ORO): 3,739 mg/kg.
        - cPAHs (benzo[a]pyrene): 0.1 mg/kg.
- <u>Groundwater:</u>
    - DRO and ORO: 500 µg/l, except for the area of monitoring wells MW-9R and MW-16R and the Equipment Parking Area (monitoring well MW-13), where calculated TPH concentrations do not exceed the calculated MTCA Method B cleanup levels.
    - TCE: 5 µg/l.
    - Dissolved arsenic: 5 µg/l (or the Puget Sound Area background level of 8 µg/l.)
    - Dissolved lead: 15 µg/l.

[24] WAC 173-340-720(8)(b)
[25] WAC 173-340-750(6)

c. <u>Applicable Laws and Regulations:</u> In addition to establishing minimum requirements for cleanup standards, applicable local, state, and federal laws may also impose certain technical and procedural requirements for performing cleanup actions. These requirements are described in WAC 173-340-710.

All cleanup actions conducted under MTCA shall comply with applicable local, state, and federal laws.[26]

The person conducting a cleanup action shall identify all applicable local, state, and federal laws. The department shall make the final interpretation on whether these requirements have been correctly identified and are legally applicable or relevant and appropriate.[27]

There are three general groups of applicable local, state, and federal laws for you to identify:

i. Chemical-Specific: Examples of chemical-specific laws include promulgated concentrations from another rule that result in adjusting proposed cleanup levels. Method A is inclusive of these laws. For Methods B or C, additional evaluation of chemical-specific applicable state and federal laws is required.

ii. Action-Specific: Examples of action-specific laws include requirements for obtaining local permits to excavate and/or dispose of contaminated soil, stormwater construction permits, or the requirement to notify in case human remains are discovered during excavation. All MTCA cleanups require evaluation of action-specific applicable state and federal laws.

iii. Location-Specific: Examples of location-specific laws include specific requirements for working near wetlands or archeologically important areas. All MTCA cleanups require evaluation of location-specific applicable state and federal laws.

After you have selected appropriate applicable local, state, and federal laws, justify in reporting the applicable local, state, and federal laws selections you made and how those laws and regulations impact proposed cleanup levels, points of compliance, or the cleanup, if at all. Provide all permits obtained for the cleanup action.[28]

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

3. Selection of Cleanup Action.

Ecology has determined that additional remedial investigation is necessary at the Site before selecting a cleanup action.

[26] WAC 173-340-710(1)
[27] WAC 173-340-710(2)
[28] WAC 173-340-710(9)(a)

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 70A.305.040(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 70A.305.080 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 70A.305.170(6).

Contact Information

Thank you for choosing to clean up the Site under the 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 Voluntary Cleanup Program webpage.[29] If you have any questions about this opinion, please contact me at 360-489-5347 or joe.hunt@ecy.wa.gov.

Sincerely,

Joseph B. Hunt, LHG
Toxics Cleanup Program
Southwest Region Office

JH/tm

Enclosure: Document List

cc by email: Randall Black, Lakewood Water District, rblack@lakewoodwater.org
Jeff Woodworth, Woodworth Capital Inc., jeff@woodworthcapital.com
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Andy Rippert, Ecology, andy.rippert@ecy.wa.gov
Ecology Site File

[29] https://www.ecy.wa.gov/vcp

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Enclosure

Document List

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Document List

1. Farallon Consulting LLC, (Farallon), *Response to August 30, 2019, Letter Regarding Further Action – Woodworth & Company, Inc. – Lakeview Plant*, August 31, 2021.

2. Farallon Consulting LLC, (Farallon), *Addendum to Focused Feasibility Study and Disproportionate Cost Analysis Report*, August 3, 2018.

3. Ecology, *Approval of September 25, 2017, Sampling and Analysis Work Plan and November 3, 2017, Revised Addendum to Sampling and Analysis Work Plan*, November 16, 2017.

4. Farallon, *Revised Addendum to Sampling and Analysis Work Plan*, November 3, 2017.

5. Farallon, *Addendum to Sampling and Analysis Work Plan*, October 30, 2017.

6. Ecology, *Review of September 25, 2017, Sampling and Analysis Work Plan*, October 12, 2017.

7. Farallon, *Sampling and Analysis Work Plan*, September 25, 2017.

8. Woodworth Capital, Inc., *Woodworth Lakeview Facility*, July 5, 2016.

9. Farallon, *Response to Letter Regarding Ecology Comments and Corrections on Farallon Meeting Summary,* June 28, 2016.

10. Ecology, *Opinion on Proposed Cleanup for the Site*, October 6, 2015.

11. Ecology, *Letter to Ransavage and Lewis regarding July 25, 2015, Compliance Inspection*, August 25, 2015.

12. Farallon, *Focused Feasibility Study and Disproportionate Cost Analysis Report*, April 14, 2015.

13. Farallon, *Cleanup Action Status Report, September 2009 through February 2011*, June 2, 2011.

14. Farallon, *Soil Excavation Cleanup Action Report Completion Report,* March 28, 2011.

15. USGS, *Hydrogeologic Framework, Groundwater Movement, and Water Budget in the Chambers–Clover Creek Watershed and Vicinity, Pierce County*, *Scientific Investigations Report 2010–5055* (USGS 2010).

16. Farallon, *Remedial Investigation/Feasibility Study Report*, August 19, 2009.