STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
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February 17, 2021

Moshghan Mansoori
GHD, Inc.
20818 44th Avenue West, Suite 190
Lynwood, WA 98036

Re: Opinion on Remedial Investigation and Feasibility Study at the following Site:

Site Name:	Yellowstone Pipeline Co Fairchild Delivery Facility
Site Address:	2122 Graham Road, Spokane
Cleanup Site ID:	2084
Facility/Site ID:	15488433
VCP Project ID:	EA0265

Dear Moshghan Mansoori:

On November 18, 2020, the Washington State Department of Ecology (Ecology) received your request for an opinion on your Revised Remedial Investigation and Feasibility Study for the independent cleanup of the Yellowstone Pipeline Co Fairchild Delivery 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

Upon completion of the proposed cleanup, will further remedial action likely be necessary to clean up contamination at the Site?

YES. Ecology has determined that, upon completion of your proposed cleanup, further remedial action will likely be necessary to clean up contamination and meet all cleanup standards 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 as follows.

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:

- Petroleum hydrocarbons and volatile organic compounds (VOCs) into the soil and groundwater

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

Please note 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 following documents:

1. GHD, Revised Remedial Investigation and Feasibility Study, Phillips 66 Facility No. 6624, November 17, 2020.

2. GHD, Site Investigation Summary Report, Phillips 66 Facility No. 6624, February 27, 2020.

3. GHD, Site Assessment Work Plan, Phillips 66 Facility No. 6624, June 19, 2019.

4. GHD, Remedial Investigation Report, Phillips 66 Facility No. 6624, December 12, 2018.

Some of these documents are accessible in electronic form from the Site webpage[1].The complete records are stored in the Central Files of the Eastern Regional Office of Ecology (ERO) for review by appointment only. Visit our Public Records Request page[2], to submit a public records request or get more information about the process. If you require assistance with this process, you may contact the Public Records Officer at recordsofficer@ecy.wa.gov or 360-407-6040.

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

[1] https://apps.ecology.wa.gov/gsp/CleanupSiteDocuments.aspx?csid=2084
[2] https://ecology.wa.gov/About-us/Accountability-transparency/Public-records-requests

Analysis of the Remedial Investigation

Ecology concurs with your characterization and conceptual site model developed for the Site. We also agree with the cleanup standards you have selected for the Site, with the exception of the cleanup standard for total petroleum hydrocarbons (TPH) detailed below. Further action is required to meet all of the substantive requirements of MTCA.

1. **Characterization of the Site.**

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

   Since 1999, multiple subsurface investigations have yielded approximately seventy soil samples from borings and test pits at depths ranging from 0 to 15 feet below ground surface (bgs), and include eight groundwater monitoring wells installed in both the shallow and deeper water-bearing zones. Both soil and groundwater samples have been analyzed for gasoline-, diesel-, and oil-range petroleum hydrocarbons, as well as volatile organic compounds (VOCs) and additives typically associated with petroleum products. The results of these investigations suggest that the petroleum release is limited in extent to the vicinity of monitoring well MW-1 and the pipeline manifold area, and has not migrated into the deeper water-bearing zone.

   Establishment of cleanup standards.

   Ecology has determined that some, but not all, of the cleanup levels and points of compliance you established for the Site meet the substantive requirements of MTCA. The exceptions are listed below:

   Soil

   For soil, the cleanup levels in the Revised Remedial Investigation were established for total petroleum hydrocarbons (TPH) using MTCA Method B and are based on protection of groundwater. The land use is classified as unrestricted. The cleanup level of 2,987 milligrams per kilogram (mg/kg) that you calculated is not appropriate since it is greater than the mean value of the TPH concentrations of borings HA-1, HA-2, and HA-3 determined to be protective of groundwater. Based on the boring data, the appropriate soil TPH cleanup level would be 298 mg/kg.

   In addition, the target groundwater TPH concentration used in the soil cleanup level calculation is not applicable for Method B, as it is the default Method A gasoline cleanup level. The soil cleanup level you calculated is based on the protection of potable groundwater, when it has been established that groundwater within the site boundary is prohibited from use as drinking water

based on the proximity to the Graham Road/Waste Management Subtitle D landfill. An amended soil TPH cleanup level should be calculated using a target non-potable groundwater TPH concentration. This target groundwater concentrations should be calculated using extractable petroleum hydrocarbon (EPH) and volatile petroleum hydrocarbon (VPH) fractionation data collected during the initial 2018 Remedial Investigation. Please refer to the section on groundwater cleanup standards below for more information on calculating an appropriate target groundwater cleanup level to apply to your soil cleanup level calculations.

For soil, the point of compliance is throughout the lateral and vertical extent of the Site. This is the standard point of compliance.

Groundwater

For groundwater, the cleanup levels in the Revised Remedial Investigation were established using MTCA Method A and are based on the protection of drinking water beneficial use. According to the Concise Explanatory Statement and Responsiveness Summary for the Amendment of Chapter 173-340 WAC, MTCA Cleanup Regulation (Ecology Publication No. 07-09-108)[3], it is not permitted to mix cleanup level methods, such as using a Method A groundwater cleanup level in conjunction with a Method B soil cleanup level. As referenced in the prior section on soil cleanup standards, it may also not be appropriate to apply a cleanup level based on the protection of potable groundwater due to the restrictions placed on groundwater use at the site. An amended groundwater TPH cleanup level should be calculated for non-potable use based on the EPH/VPH fractions using the MTCA TPH workbook and data collected during the initial 2018 Remedial Investigation. The amended TPH groundwater cleanup level can then be used as the target groundwater concentration for calculating an appropriate soil TPH cleanup level for protection of non-potable groundwater.

For groundwater, the 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. This is the standard point of compliance.

Analysis of the Feasibility Study

Ecology concurs with your evaluation of the remedial alternatives, but disagrees that the scope of your selected remedial alternative is sufficient to meet all cleanup standards at the Site. We have provided further recommendations for revising your selected remedy to meet all of the substantive requirements of MTCA.

[3] Concise Explanatory Statement and Responsiveness Summary for the Amendment of Chapter 173-340 WAC, Model Toxics Control Act Cleanup Regulation

1. **Evaluation of Remedial Action Alternatives.**

   The remedial alternatives included for evaluation in your feasibility study include:

   i. Dual-phase extraction (DPE), a combination of groundwater withdrawal and treatment with soil vapor extraction (SVE)
   ii. Soil vapor extraction (SVE) and air sparging (AS)
   iii. Physical containment with institutional controls

   Ecology agrees with the conclusions of your disproportionate cost analysis and agrees that some method of engineered and institutional controls may be necessary to meet cleanup standards at the Site. However, the most protective remedial alternative involves the permanent removal or destruction of contaminated media, as well as the source of the release. The existing pipeline manifold, associated infrastructure, and subsurface lithology limit the effectiveness of the in-situ remedial actions described in the first two alternatives. Ecology disagrees that limiting the selected remedial alternative to containment with institutional controls addresses the source of the release, nor does it provide the most permanent solution.

2. **Selection of Remedial Action Alternative.**

   While Ecology agrees that containment of contaminated material in combination with institutional controls may be required to meet all cleanup standards at the Site, Ecology disagrees that the removal and disposal of contaminated material is not also a feasible and more permanent remedial alternative at the Site. According to Chapter 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. While the existing pipeline manifold and associated infrastructure will limit the ability to remove all contaminated soil, removal to the maximum extent practicable may be effective in reducing the concentration of petroleum hydrocarbons in groundwater and negating the need for institutional controls to prevent exposure to contaminated groundwater. All excavated materials designated for disposal could be taken to the proximal Graham Road Waste Management Subtitle D landfill, significantly reducing transportation costs.

   Your selected remedial alternative relies on utilizing the existing subsurface lithology, consisting of low-permeability silts and basalt bedrock, to prevent the migration of contaminated soil and groundwater. If further removal of contaminated materials is not implemented, additional engineered controls should be considered, including but not limited to an impermeable surface barrier to prevent direct contact with contaminated materials. Installation of such controls would also require removal of surficial soils, which would facilitate offsite disposal of soils as described above.

Your selected remedial alternatives also include institutional controls to limit groundwater use at the Site. In accordance with Chapter 173-340-440(10) WAC, local governments with land use planning authority should be notified of the proposed institutional controls and given opportunity to provide consultation on the development of land use or activity restrictions. Ecology may also require the opportunity for public notice and participation in accordance to Chapter 173-340-600 WAC.

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 proposed will be substantially equivalent. Courts make that determination. *See* RCW 70.105D.080 and WAC 173-340-545.

3. **Opinion is limited to proposed cleanup.**

   This letter does not provide an opinion on whether further remedial action will actually be necessary at the Site upon completion of your proposed cleanup. To obtain such an opinion, you must submit a report to Ecology upon completion of your cleanup and request an opinion under the Voluntary Cleanup Program (VCP).

4. **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.180.

Contact Information

Thank you for choosing to clean up the Site under the VCP. As you conduct your cleanup, please do not hesitate to request additional services. We look forward to working with you.

For more information about the VCP and the cleanup process, please visit our webpage[4]. If you have any questions about this opinion, please contact me by phone at (509) 342-5564 or e-mail at ted.uecker@ecy.wa.gov.

Sincerely,

Ted M. Uecker
ERO Toxics Cleanup Program

tmu;hg

Enclosures (1): A – Site Description and Diagram

cc: Rich Solomon, Phillips 66
Brian Peters, GHD
Kathleen Falconer, Ecology KLF

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

Enclosure A

Description and Diagram of the Site

Site Description

The Site is a former tank farm with two above-ground storage tanks (ASTs) that were decommissioned in 2002. The petroleum release to soil and groundwater was discovered on October 23, 1996 during hydrostatic testing of the pipeline manifold.

The site surface consists of gravel and bare ground with sparse vegetative cover. Subsurface soils consist of gravel, silt and variable sand, underlain by weathered basalt. Historic soil concentrations exceeding MTCA cleanup levels are present from approximately 2 to 10 feet below ground surface (bgs). Groundwater at the site occurs in the shallow aquifer (0.5 to 15.1 feet bgs), a deeper water bearing zone (beginning at 7.28 to 15.02 feet bgs), and encountered again in fractured bedrock at 93 feet bgs. Contaminants have not been detected in samples collected in the deep monitoring well (MW-1D) since its installation in 2001, which suggests that the shallow and deep aquifers are not hydraulically connected. In addition, contaminants have not been detected in groundwater from downgradient well MW-3, suggesting that there is not significant plume migration along the groundwater flow direction.

Private wells are located within 0.25-0.5 miles of the site and are screened within the deep aquifer (100-205 feet bgs) or deeper yet (480 feet bgs). However, due to the proximity to the Graham Road Landfill, groundwater in the vicinity cannot be used as a drinking water source.

Site History

In 1999, one unregulated underground storage tank (UST) was removed, and petroleum impacted soils related to the above-ground manifold was sampled but not analyzed. In 2000, three groundwater monitoring wells (MW-1 through MW-3) were installed and six soil samples were analyzed. One soil sample exceeded the MTCA Method A cleanup level, and one monitoring well (MW-1) exceeded the MTCA Method A cleanup levels, for gasoline-range petroleum hydrocarbons (GRPH), diesel-range petroleum hydrocarbons (DRPH), and volatile organic compounds (VOCs) including benzene, toluene, ethylbenzene, and xylenes (BTEX). Later in 2000, eight test pits, six soil borings, and two additional monitoring wells (MW-5 and MW-7) were completed. One test pit sample exceeded the cleanup level for DRPH, the other samples were below cleanup levels. In 2001, eight additional test pits were excavated and sampled, no samples exceeded cleanup levels. In 2006, twelve additional test holes were excavated and sampled from 1 to 4 feet bgs, with one sample exceeded the cleanup levels for GRPH and benzene. In 2013, three additional monitoring wells (MW-8, MW-9, and MW-10) were installed and four soil samples were collected, no soil concentrations exceeded the cleanup levels.

Groundwater monitoring has been conducted at the Site on a quarterly to semi-annual frequency since 2001, with a gap from 2014-2017. In October 2016, Ecology authorized an Underground Injection Control (UIC) well for hydrogen peroxide injections to rehabilitate well MW-1 by cleaning the filter pack and adjacent soils. Groundwater monitoring resumed in April

2017.

In September 2017, groundwater samples were collected from 3 monitoring wells. MW-3 had insufficient quantities of water for sampling. TPH-G concentrations were above cleanup levels in MW-1. A follow-up sample collected in March 2018 showed GRPH concentrations remained above cleanup levels in MW-1, increasing from the previous sampling event. This increase appears to be consistent with historical trends.

In March and June 2018, groundwater samples collected from MW-1 contained gasoline-range petroleum concentrations of 2,700 and 1,900 ug/L, respectively. In 2019, current soil conditions were evaluated by collecting samples from borings near TH-7, TH-9, and TH-19 near the above-ground manifold. Concentrations of GRPH had decreased over the 14 years since the last soil samples were collected, however they still exceeded the MTCA Method A cleanup level.

In November 2020, an updated RI/FS was submitted which revised the conceptual site model, cleanup levels, and areas of focus for proposed remedial actions. Groundwater monitoring in September 2020 demonstrated that MW-1 continues to have exceedances of GRPH and DRPH (2,200 ug/L and 640 ug/L, respectively), while no other wells sampled contained any constituents of concern.

The RI/FS concluded that the following exposure pathways are present at the Site:

- Non-potable contaminated groundwater could migrate offsite to potable groundwater
- Direct contact through soil
- Direct contact through groundwater
- Non-potable groundwater beneficial uses (irrigation, dust suppression) could show impact

In addition, the RI/FS determined that vapor intrusion and surface water were not exposure pathways. A terrestrial ecological evaluation (TEE) was also submitted, which concluded that further evaluation was not warranted as no significant ecological receptors were impacted by the release. The cleanup levels proposed in the RI include Method A for groundwater, as determined by NWTPH-Gx and NWTPH-Dx analyses, and Method B for soil, as determined by the TPH concentration protective of potable groundwater. The soil cleanup level was calculated using boring samples HA-1, HA-3, and HA-3, analyzed for extractable petroleum hydrocarbon (EPH) and volatile petroleum hydrocarbon (VPH) fractions, and the MTCA TPH workbook for determining Method B TPH cleanup levels for soil and groundwater. The areas of concern include soil around the above-ground manifold (GRPH, benzene, total xylenes), shallow groundwater near MW-1

Three remedial alternatives were evaluated as part of the Feasibility Study, including:

- Dual-phase extraction (DPE), a combination of groundwater withdrawal and treatment with soil vapor extraction
- Soil vapor extraction (SVE) and air sparging (AS)
- Physical containment with institutional controls

DPE is considered feasible to remove adsorbed hydrocarbons from soil below the water table, and to treat the free NAPL and dissolved phase hydrocarbons in groundwater. Requirements for DPE include permits for discharging treated groundwater, as well as a permit for air emissions from the local clean air authority. The effectiveness of the DPE system will be dependent on the porosity of the subsurface lithology and contaminant mass removal rates, which will be determined by a 5-day pilot test. It is considered the option most protective of human health and the environment, and most permanent in the treatment of impacted media.

AS and SVE are not considered feasible since the contaminated soil and groundwater intervals are relatively shallow, thin, and underlain by partially competent basalt, which would not allow for the AS wells to sufficiently deliver air below the contaminant mass.

Containment with institutional controls is the lowest cost alternative, but does not reduce or remove the contaminant mass in either media, and relies on the effective management of the institutional controls. In addition, the proposal for containment in the FS relies only on the underlying and adjacent silts and basalt for preventing migration of contaminated media, and does not propose additional engineered controls or an above-media barrier.

Site Diagram