



STATE OF WASHINGTON  
**DEPARTMENT OF ECOLOGY**

Eastern Region Office

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September 27, 2023

Kyle Waldron  
Tesoro Logistics Operation LLC  
3450 S 344th Way, Ste 135  
Auburn, WA 98001

**Re: Ecology Comments on the draft Engineering Design Report and the draft Compliance Monitoring Plan:**

- **Site Name:** Chevron Pipeline Company, Pasco Bulk Terminal
- **Site Address:** 2900 Sacajawea Park Road, Pasco, WA 99301
- **Cleanup Site ID:** 4867
- **Facility/Site ID:** 55763995

Dear Kyle Waldron:

Thank you for submitting the draft Engineering Design Report (EDR), dated June 23, 2023, and the draft Compliance Monitoring Plan (CMP). The EDR and the CMP are key documents for the implementation of the Cleanup Action at the Chevron Pipeline Company, Pasco Bulk Terminal Site (Site) in accordance with the final Cleanup Action Plan (CAP) and Agreed Order No. 21664. Ecology has reviewed the EDR and the CMP and has the following comments:

## Engineering Design Report

### Section 3

**Comment 1, Page 3-1, Subsection 3-1, MTCA Cleanup Standards:** A discussion regarding soil cleanup levels (CULs) is missing.

**Comment:** Please include a discussion regarding soil cleanup levels.

**Comment 2, Page 3-2, Subsection 3.2.2 ,Points of Compliance, soil, second paragraph:**

*“Exposure to COCs in soil at this Site is based on leaching from soil to groundwater, and the proposed soil cleanup level is protective of groundwater. Concentrations of COCs in soil greater than the cleanup levels were only encountered at depths near the groundwater table (approximately 80 to 90 feet bgs). Because of the low sorption rate of the coarse-grained materials on Site, compliance with Site groundwater cleanup levels provide evidence of Site soils’ compliance with soil cleanup levels.”*

**Comment:** This paragraph is unclear. Is it saying that the proposed soil cleanup levels (CULs) from the CAP are protective of groundwater? Or is it saying that the cleanup level in whatever concentration is protective of groundwater? Please revise the paragraph to support subsection 4.3.1 in the Cleanup Action Plan discussing soil CULs

**Comment 3, Page 3-2, Subsection 3.2.2 ,Points of Compliance, soil, second paragraph:** Same paragraph as above.

**Comment:** There is not enough data to support this conclusion regarding the soil sorbtion rate, especially if the soil cleanup levels are Method A. Please remove the discussion about the soil sorbtion rate and refer back to the CAP subsection 4.3.1 regarding soil CULs.

**Comment 4, Page 3-2, Subsection 3.2.2 , Points of Compliance, soil, third paragraph:**

*“Therefore, an empirical demonstration will be made using Site groundwater data to show soil contaminant concentrations are protective of groundwater, following procedures described in WAC 173-340-747 (9). Compliance will be demonstrated by directly comparing groundwater concentrations at the Site to the proposed groundwater cleanup levels. If groundwater at the Site meets the cleanup levels, this pathway will be empirically demonstrated to have met soil cleanup levels and will be in compliance.”*

**Comment:** Please refer back to the CAP subsection 4.3.1 regarding the soil CULs and tie this paragraph in with the soil CUL discussion in the CAP.

**Comment 5, Page 3-2, Subsection 3.3.2 , Enhanced Bioremediation Using Oxygen-Reducing Compounds, first paragraph, last sentence:** *“The longevity of ORCs usually lasts between 4 to 12 months per application (FRTR, 2023).”*

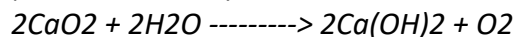
**Comment:** On page 4-1 the longevity of the chosen ORC product is stated as 3-6 months. Having a differing estimate of longevity here confuses the issue and does not provide data relevant to this cleanup. Please remove the estimate in this subsection.

**Comment 6, Page 3-3, Subsection 3.3.3, Monitored Natural Attenuation, first paragraph:** *“MNA is a passive remedial approach which allows naturally occurring processes within the soils and groundwater to reduce the concentrations of COCs (FRTR, 2023). MNA has been shown to successfully treat a number of contaminants including petroleum hydrocarbon constituents, chlorinated solvents, and metals. Contaminants that do not biodegrade can still be treated by MNA using other natural attenuation mechanisms, including abiotic degradation and groundwater dispersion (FRTR, 2023).”*

**Comment:** MNA cannot be the primary remedial action for the site, per WAC 173-340-370. Source control has not been conducted to the maximum extent practicable, and this EDR does not propose to treat all of the source areas. ORC treatment should be expanded to include, at the very least, all wells with groundwater contaminant exceedances, and preferably also wells where soil contamination is present near or within the saturated zone. Please revise this subsection that the selected remedy is enhanced MNA using ORC sleeves.

## Section 4

**Comment 7, Page 4-1, Subsection 4.3.1, product information, second paragraph:** *“In summary, the ORC product is deployed as sleeves, which are filled with a blend of materials that provide a continuous source of dissolved oxygen (DO) to the bacterial population within the groundwater (via calcium peroxide). Each sleeve is deployed inside a PVC canister. In the subsurface, the ORC materials will react with water to release oxygen slowly for a period of three to six months (Provectus, 2023).*



*The procedures for storing and handling the new sleeves are discussed in the O&M Plan. The procedures for managing the used sleeves as investigation-derived waste (IDW) are discussed in Section 4.6”*

**Comment:** Why is calcium peroxide and not magnesium peroxide being used? Magnesium peroxide release more oxygen per weight ORC material than calcium peroxide. Also, the waste product from magnesium peroxide, magnesium hydroxide (milk-of-magnesia) is less of an irritant than calcium hydroxide.

**Comment 8, Page 4-2, Subsection 4.3.2, Deployment, first paragraph:** *“ORC sleeves will be deployed in existing monitoring wells MW-02, MW-03, MW-11, and MW-17, which are also shown on Figure 2. The ORC sleeves will be deployed in such a way that the bottom of the canisters are at the same depth each year within the saturated water column.”*

**Comment:** What are the dimensions of the ORC sleeves (length)?

**Comment 9, Page 4-2, Subsection 4.3.2, Deployment, first paragraph:** *“ORC sleeves will be deployed in existing monitoring wells MW-02, MW-03, MW-11, and MW-17, which are also shown on Figure 2. The ORC sleeves will be deployed in such a way that the bottom of the canisters are at the same depth each year within the saturated water column.”*

**Comment:** How much ORC compound will each sleeve contain?

**Comment 10, Page 4-2, Subsection 4.3.2, Deployment, Table 6: “PVC Canister Deployment Summary”**

**Comment:** Please include No. of sleeves in each canister.

**Comment 11, Page 4-2, Subsection 4.3.2, Deployment, Table 6: “PVC Canister Deployment Summary”**

**Comment:** Please include total weight of ORC compound deployed in each well.

**Comment 12, Page 4-2, Subsection 4.3.3, Product Consumption and Oxygen Delivery Rates:**

*“Actual ORC product consumption and oxygen delivery rates will depend on groundwater seepage velocities that are variable through fine and coarse soils, the subsequent flow through the well filter pack and around the ORC sleeve, and diffusion from within the active compound to the groundwater in the well annulus. Approximate hydrocarbon mass removal can be calculated by multiplying the pounds of oxygen delivered by 0.3125 pounds, which is a general stoichiometric ratio for oxidation of hydrocarbons. Actual mass removal will depend on the specific composition of the hydrocarbons in the groundwater that will be preferentially degraded by microorganisms before TPH-d or TPH-o compounds. Estimates on the pounds of oxygen delivered per deployment period and pounds of hydrocarbons removed (per six months) at each monitoring well are listed on Table 5..”*

**Comment:** Please indicate where Table 5 is found in the report. Some tables are mixed into the text, and some are in the back. Please make references to the locations of the tables in the back.

**Comment 13, Page 4-2, Subsection 4.3.3, Product Consumption and Oxygen Delivery Rates:**

*“Actual ORC product consumption and oxygen delivery rates will depend on groundwater seepage velocities that are variable through fine and coarse soils, the subsequent flow through the well filter pack and around the ORC sleeve, and diffusion from within the active compound to the groundwater in the well annulus.”*

**Comment:** Please indicate the effective radius of remedial influence for the ORC PVC canisters.

**Comment 14, Page 4-2, Subsection 4.3.4, Schedule, second bullet:** *“Six months of continuous ORC sleeve deployment between the spring and fall during the warm season to take advantage of increased biological activity and contaminant breakdown with higher groundwater temperatures.”*

**Comment** Does this include potential multiple deployments so there is consistent treatment over the 6 months?

**Comment 15, Page 4-3, Subsection 4.3.4, Schedule, third bullet:** *“During Year 0, the 19 compliance monitoring wells will be sampled during the first and second semiannual events scheduled in spring and fall per the CMP.”*

**Comment:** Please add that year 0 is 2023.

**Comment 16, Page 4-3, Subsection 4.3.4, Schedule, fourth bullet:** *“Starting in Year 1, the 19 compliance monitoring wells will be sampled in the first semiannual event scheduled for spring per the CMP, and then ORC sleeves will be deployed pending Ecology’s approval of the EDR. In fall, the ORC sleeves will be removed, and groundwater samples will be collected from the 15 compliance monitoring wells not used for ORC deployment.”*

**Comment:** Please add that year 1 is 2024.

**Comment 17, Page 4-3, Subsection 4.4, Monitored Natural Attenuation and Compliance**

**Monitoring, first paragraph:** *“The primary mechanism of the cleanup action will be continued*

*natural attenuation processes that have provided significant remedial progress since discontinuation of active remediation in December 2002.”*

**Comment:** MNA cannot be the primary cleanup action at the site; see Comment No. 6. Please revise to reflect the CAP that the selected cleanup alternative is enhanced natural attenuation using an ORC compound.

**Comment 18, Page 4-4, Subsection 4.4, Monitored Natural Attenuation and Compliance**

**Monitoring, third paragraph:** *“The current available data is insufficient to calculate first order decay rates and an estimated time to reach cleanup levels. As more data is collected, analyses will be performed to track progress towards reaching the cleanup levels within the timeframe provided in the CAP. Groundwater compliance monitoring will be continued to track and ensure COC degradation occurs in a reasonable time”*

**Comment:** If MNA is going to be a large part of the cleanup for this site additional sampling should be conducted or data analysis performed before finalization of the EDR in order to assess first order decay rates and whether natural attenuation will indeed result in attaining site cleanup levels within the reasonable restoration timeframe set forth in the CAP. Please explain why the selected remedy will achieve the CAP reasonable restoration timeframe even though the first order decay rates are unknown.

**Comment 19, Page 4-4, Subsection 4.4, Monitored Natural Attenuation and Compliance**

**Monitoring, third paragraph:** *“Performance monitoring will then continue without ORC deployment for one additional year before transitioning to confirmation monitoring.”*

**Comment:** Ecology recommends that in addition to the semiannual sampling proposed here, that groundwater levels are recorded during the two other quarters of the year to verify groundwater flow and flow directions throughout the year.

**Comment 20, Page 4-5, Subsection 4.5, Health and Safety:**

**Comment:** Please include a section describing ORC spill control, compatible spill control materials, location of spill control materials and spill control safety precautions, etc. or include a reference to a document such as the HASP that should include this information as well.

**Comment 21, Page 4-6, Subsection 4.6.2, Temporary Staging Location and Drum Labeling, first**

**paragraph:** *“The spent ORC sleeves will be containerized in a Department of Transit (DOT)-approved 55-gallon drums, which will be temporarily stored at the Site in a designated location owned by Tesoro. An inventory of the drums (documenting the container contents and container number) will be kept on the Investigative Derived Waste Form in the O&M Plan (Appendix B).”*

**Comment 21A:** What kind of drum material will be used? Ensure that the drum material is compatible with the ORC waste and that the drums are free from grease and debris. Please provide this information in the EDR.

**Comment 21B:** Ecology is looking for a statement in the EDR that the drum material is compatible with the ORC.

**Comment 21C:** Please include the location of where the drums will be stored on-site, and preferably shown on a figure.

**Comment 21D:** Please include a statement in the EDR that spent ORC waste will be profiled and disposed at a controlled facility within 90 days from generation of the waste.

**Comment 22, Page 4-6, Subsection 4.6.3, IDW Sampling, last paragraph:** *“If the oxidizer is spent, the sample results will be negative.”*

**Comment:** How much active oxidizer can be in a sample that tests negative? Composite sampling seems like it could lead to potential safety issues if all the sleeves are designated "spent" when in reality the amount of oxidizer has been underestimated due to dilution within the sample.

**Comment 23, Page 4-6, Subsection 4.6.4, IDW Disposal:** *“Once it is established from the analytical testing that the oxidizer in the sleeves is fully spent after a certain deployment period, samples will not be taken in future years if the ORC sleeves are deployed for at least the same deployment period. AECOM on behalf of Tesoro may claim generator knowledge to dispose of the material as miscellaneous solid waste in accordance with the SAP Section 9.”*

**Comment 23A:** As contaminant concentrations decrease over time, the uptake of oxidizer over the same time period will likely change. As a result, the assumption that all oxidizer will be spent at the same rate during the cleanup action implementation seems to be incorrect.

**Comment 23B:** Ecology is looking for a statement that all applicable Federal, State, and local laws pertaining to hazardous waste storage, handling, and disposal will be followed.

**Comment 24, Page 4-6, Subsection 4.7, Permitting:** *“No permits will be needed to complete the proposed work. The four wells with ORC deployment will be registered as underground injection chambers with Ecology per WAC 173-218-060.”*

**Comment:** Please replace the above paragraph with the following: The wells with ORC deployment will be registered as underground injection chambers (UIC) with Ecology in accordance with WAC 173-218-060. The online UIC registration page is: <https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Underground-injection-control-program/Register-UIC-wells-online>. The person filling out the UIC application will need a Secure Access Washington account. All relevant documents are to be uploaded with the UIC application as well as the signed UIC Signature Page. Please notify the Ecology Site manager that wells have been registered. The Site manager will provide concurrence to the Ecology UIC manager that the proposed injections are part of an Ecology-approved cleanup action. Upon this information the UIC coordinator will review the registrations for final approval of the ORC deployment.

**Comment 25, Table 5:**

**Comment:** Ecology is looking for an explanation why the ORC material will yield a larger oxygen mass than the mass of ORC itself. It doesn't add up stoichiometrically with the chemical formula calcium peroxide+water forming oxygen+calcium hydroxide.

## **Engineering Design Report, Appendix B, Operations and Maintenance Plan,**

### **Section 3**

**Comment 26, Page 3-1, Subsection 3.1 Handling and Storage, first paragraph:** *Before the second semiannual event, new ORC sleeves will be ordered from Field Environmental Instruments (see Section 4.2 for supplier contact information). AECOM will either pick-up the sleeves at Field Environmental Instruments' facility in Portland, Oregon, or the sleeves will be shipped by Field Environmental Instruments to AECOM in Portland, Oregon. The ORC sleeves will be transferred to temporary storage at the AECOM warehouse in Portland, Oregon until the field staff mobilize for the semiannual event. "*

**Comment:** Will the sleeves be stored on-site and if so, where will they be stored?

**Comment 27, Page 3-2, Subsection 3.2 Spill Clean-up Procedure:**

**Comment:** Ecology presumes that cleanup procedures and descriptions of spill control materials and where these can be found will be discussed in the HASP. Please include a reference to the HASP for spill control procedures and where spill control materials can be found.

### **Section 4**

**Comment 28, Page 4-1, Section 4, Inspection and Maintenance Spill Clean-up Procedure, fourth bullet:** *"The ORC drum storage area is accessible, and the drums containing spent ORC sleeves are sealed and in good condition."*

**Comment:** Please include a map showing the storage locations of sleeves and wastes. If storage locations changes during the course of the project change the maps accordingly to update the EDR and the Health and Safety Plan.

**Comment 29, Page 4-3, Subsection 4.3.4, ORC Drum Storage, first paragraph:** *"The management of IDW is discussed in detail in Section 4.6 of the EDR. In summary, the spent ORC sleeves will be classified as IDW and will be containerized temporarily in plastic 55-gallon drum(s) pending confirmation of their oxidizer status from analytical testing. The oxidizer testing will likely only be required for the first 6-month"*

**Comment:** Specify what type of plastic will be used for the drums.

**Comment 30, Page 4-4, Subsection 4.3.4, ORC Drum Storage, second paragraph:** *"The oxidizer testing will likely only be required for the first 6-month deployment of the ORC to confirm the oxidizer status is negative after 6-months. As a spent oxidizer, the used ORC sleeves can be disposed of as miscellaneous solid waste"*

**Comment:** Does the waste need to be tested to confirm it being non-hazardous? Also, see Comment 23A.

**Comment 31, Page 4-4, Subsection 4.3.4, ORC Drum Storage, second paragraph:** *“The ORC drum(s) will be temporarily stored at the Site in a designated location owned by Tesoro. This designated area will be inspected during each semiannual event to confirm access and condition of the drum(s). The inspection is documented on the Inspection Form (Form 1, Attachment B). An inventory of the drums (documenting the container contents and container number) will be kept on the Investigative Derived Waste Form (Form 2, Attachment B). The drums will be labeled as shown below”*

**Comment:** Spent ORC sleeves will contain calcium hydroxide (slaked lime) that still has a high pH (about 12.3) that is an eye and skin irritant. Please include a discussion about safety precautions handling spent ORC sleeves even though they are non-oxidizing and considered non-hazardous.



## Compliance Monitoring Plan

### Section 1

**Comment 1, Page 1-2, Subsection 1.1.3, Enhanced Bioremediation with Deployment of Oxygen-Releasing Compounds, second paragraph:** *“The deployment of ORC in oxygen diffusing filter socks (ORC sleeves) in compliance monitoring wells within the source areas (MW-02, MW-03, MW-11, and MW-17) was included as part of the cleanup action to enhance natural degradation of the contaminants. The EDR describes the ORC deployment plan in detail.”*

**Comment:** ORC treatment should be expanded to include, at the very least, all wells with groundwater contaminant exceedances, and preferably also wells where deep soil contamination is present near or within the saturated zone.

**Comment 2, Page 1-3, Subsection 1.4.2, Performance Monitoring, third bullet:** *“Performance monitoring will then continue without ORC deployment for one additional year before transitioning to confirmation monitoring.”*

**Comment:** Ecology recommends that in addition to the semiannual sampling proposed here, that groundwater levels are recorded during the two other quarters of the year to verify groundwater flow and flow directions throughout the year.

**Comment 3, Page 1-4, Subsection 1.4.3, Confirmational Monitoring and Periodic Reviews, first paragraph:** *“Confirmational monitoring is long-term monitoring performed following the completion of the cleanup action to verify its long-term effectiveness [WAC 173-340-410(c)] (i.e., the site remedy is performing as expected over time).”*

**Comment:** Please add that confirmation monitoring will be two consecutive sampling events with all IHS Site compounds below the CULs.

### Section 2

**Comment 4, Page 2-1, Subsection 2.2, MTCA Cleanup Standards:** *“One of the requirements of the MTCA cleanup regulation [WAC 173-340] is to establish cleanup standards the Site.”*

**Comment:** Please add for between “standards” and “the”.

### Section 3

**Comment 5, Page 3-2, Subsection 3.2, Monitoring Well Network and Monitoring Schedule, third bullet:** *“During Year 0, the 19 compliance monitoring wells will be sampled during the first and second semiannual events scheduled in the spring and fall (Table 2).”*

**Comment:** Is year 0 the same as 2023 as in the EDR?

**Comment 6, Page 3-2, Subsection 3.2, Monitoring Well Network and Monitoring Schedule, fourth bullet:** *“Starting in Year 1, the 19 compliance monitoring wells will be sampled in the first*

*semiannual event scheduled for the spring, and then ORC sleeves will be deployed pending Ecology's approval of the EDR (Table 3).."*

**Comment:** Is year 1 the same as 2024 as in the EDR?

**Comment 7, Page 3-4, Subsection 3.3.3, Analytical Parameters, first paragraph:** *"Site COCs for the compliance monitoring program are TPH-g, TPH-d, TPH-o, BTEX, and naphthalene."*

**Comment:** Global replacement in both EDR and CMP: Please replace Constituents of Concern (COCs) with Indicator Hazardous Substances (IHSs).

## **Appendix A, Draft Sampling and Analysis Plan**

### **Section 3**

**Comment 8, Page 3-1, Section 3, Field Quality Assurance and Quality Control Samples:**

**Comment:** Please add field blank analysis samples, one per sampling event at a location where risk for cross-contamination is the highest.

### **Section 6**

**Comment 9, Page 6-1, Section 6, Analytical Procedures:** *"COCs for the compliance monitoring program are the following petroleum constituents: TPH-g, TPH-d, TPH-o, BTEX, and naphthalene."*

**Comment:** Please see Comment No. 7 above. Please replace COCs with IHSs throughout this document and the EDR.

### **Section 8**

**Comment 10, Page 8-1, Subsection 8.1.1, Field Blanks:** *"Field blanks can indicate bias in analytical results caused by artificially introduced contamination from sample containers, sampling equipment, filtration equipment, preservation reagents, transportation and storage practices, and other samples."*

**Comment:** Please include a discussion about collecting ambient field blanks, ex. from EPA Region III: Field Blank: *"A sample of analyte free water poured into the container in the field, preserved and shipped to the laboratory with field samples."*

*Purpose: Assess contamination from field conditions during sampling.*

*Frequency: 1 blank/day/matrix or 1 blank/20 samples/matrix, whichever is more frequent."*

Please also include criteria for when data is qualified or even rejected when ambient field blank data indicate a QA/QC problem.

**Comment 11, Page 8-1, Subsection 8.1.1.1, Trip Blanks:** *"Trip blanks will accompany all samples analyzed for volatile organic compounds as they are transported to and from the*

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*sampling site and then to the laboratory. They will consist of 40-ml glass vials filled with distilled/carbon-free water provided by the laboratory. One trip blank will be included with each cooler of sample containers destined for volatiles analysis.”*

**Comment:** Please include criteria for when data is qualified or even rejected when trip blank data indicate a QA/QC problem.

**Comment 12, Page 8-1, Subsection 8.1.1.2, Rinsate/Equipment Blanks:** *“Monitoring wells currently installed at the Site have dedicated sampling equipment; consequently, groundwater sampling equipment decontamination will not be necessary. If non-dedicated sampling equipment is used during sample collection, one rinsate blank will be prepared each day sampling is conducted with non-dedicated equipment. This sample will consist of deionized water provided by the laboratory poured over the non-dedicated sampling equipment after the equipment has been cleaned following the procedures specified in the applicable project plan. The rinsate water will be collected in the appropriate sample containers provided by the laboratory for the type of analysis to be conducted. The rinsate sample results will only be compared to analytical results collected at the sample location using the associated non-dedicated sampling equipment.”*


**Comment:** Please include criteria for when data is qualified or even rejected when rinsate/equipment blank data indicate a QA/QC problem.

If you have any further questions about these comments, please contact me at (509) 329-3543 or clof461@ecy.wa.gov.

Sincerely,



Christer Loftenius, L.G. L.H.G.  
Site Manager  
Toxics Cleanup Program, Eastern Region

cc: Nicholas Acklam, Ecology   
Katie Larimer, Ecology  
Nicky Moody, Aecom.  
Victoria Banks, Attorney General's Office  
Ecology Site File