

DEQ Comment Response Matrix
 Annual 2021 Groundwater Monitoring and LNAPL Removal Report
 Terminal 4 Slip 3

Reviewer Comment No.	Section Name/ Topic	Section/Table/ Figure No.	DEQ Comments (3/11/2022)	Port Response/Action (4/13/2022)
General 1	--	--	DEQ cautions the Port against moving too fast to suspend LNAPL monitoring/recovery and groundwater monitoring activities when the relevant upland ROD criteria appear to have been satisfied. Recent work has revealed measurable LNAPL and/or significant concentration increases in HC-5 and BEBRA wells BE-1 and BE-5, with wide variations between annual monitoring events, indicating the former pipeline release area continues to be a source of contamination in Slip 3. As the in-water work moves further into remedial design, DEQ suggests there is value in continuing this upland work, and even expanding the scope as necessary, in helping to remove LNAPL mass remaining in the subsurface and to achieve source control in Slip 3.	The Port plans to continue LNAPL monitoring/recovery and groundwater monitoring/sampling activities to further assess whether groundwater is a continued source of contamination in Slip 3. Based on DEQ 3/11/2022 comments and EPA 2/25/2022 comments and on the draft <i>Sufficiency Assessment Report</i> (Anchor QEA, Geosyntec, Apex, 2021), groundwater monitoring wells BE-1, BE-5, HC-2, HC-5, HC-6S, and HC-12D will be sampled on a quarterly basis in 2022 for an analytical suite including diesel- and oil-range Total Petroleum Hydrocarbons (TPH-Dx), polycyclic aromatic hydrocarbons (PAHs), C10 to C12 aliphatic hydrocarbons and metals (As, Cd, Cr, Cu, Pb, Mn, Hg, Zn and V). Section 6 has been revised to clarify the recommendations for additional monitoring.
General 2	--	--	The Port should consider the December 2021 detection of measurable LNAPL in HC-5 (0.04 feet), as well as detections in 2018 and 2019, as it develops a scope for a supplemental pre-design investigation as part of the in-water remedial design process. Porewater data from Slip 3 near monitoring well HC-5 would help clarify the source control status of the known groundwater plume and may help inform future cap placement and design decisions for the in-water work.	Comment noted. Porewater sampling in Slip 3 is planned for the fall of 2022, and that scope is under development as part of the Supplemental Pre-Remedial Design Investigation effort. Also, as indicated in the response to General Comment 1 above, the Port is planning to conduct quarterly groundwater monitoring in 2022 with an expanded analyte list and monitoring well network.
Specific 3	Chemical Analytical Results	Section 5.1	DEQ suggests the Port should not read too much into the magnitude of decreases in benzo(a)pyrene concentrations in BE-5 (96%) and TPH-D concentrations in HC-5 (96 and 94% in April and July 2021, respectively) relative to data from the December 2020 sampling event. Those apparent decreases reflect the magnitude of the antecedent concentration spikes in 2020 and DEQ does not believe that meaningful conclusions can be drawn from comparing these two data points.	Comment noted. The higher concentration of BAP in the sample collected from monitoring well BE-5 and TPH-Dx in the sample collected from monitoring well HC-5 during the December 2020 monitoring event appear to be anomalous with respect to the entire datasets for these wells and constituents.

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Specific 4	BEBRA Wells	Section 5.2.1	In discussing the statistical evaluation of TPH-D concentrations in BE-1, the Port states that the detection from the January 2019 resampling (430 µg/l) was used in place of the December 2018 detection (19,000 µg/l). Lacking a firm basis for this substitution, it appears the Port is “cherry picking” the data to provide a favorable result in the regression analysis presented in Appendix F (see Specific Comment 5). All relevant data should be utilized in the Mann-Kendall and regression analyses. In addition, DEQ notes that the samples from BE-1 and BE-5 were collected directly from the well during the 2021 sampling event, without purging the well prior to collection of the samples. Therefore, the sample results may not be entirely indicative of the groundwater within the surrounding formation. DEQ suggests that if there is a concern about slow recharge, the wells could be purged dry and then sampled on a subsequent day. Although this would necessitate an additional mobilization to sample such wells, it would help ensure the groundwater samples are representative of conditions in the formation.	The TPH-Dx result of the groundwater sample collected in December 2018 from monitoring well BE-1 appears to be anomalous and may be an artifact of trace LNAPL present in the well at the time of sampling because the result is inconsistent with historical and more recent samples. After discussing the December 2018 results with DEQ, the Port collected an additional two rounds of samples from monitoring well BE-1 in January and May 2019 and the results are consistent with historical data providing evidence that the December 2018 sample result is anomalous. We agree that results should not be arbitrarily ignored. However, given the likelihood of non-representative results for samples impacted by LNAPL, it is important to understand trends without the undue influence of these likely anomalous events. The December 2018 result is still included in our overall evaluation in that it indicates the potential for residual NAPL to be present immediately upgradient of the BEBRA fill. Due to slow recharge in monitoring well BE-5, the Port will consider purging the well on one day and returning for sample collection on a subsequent day to collect the groundwater samples as more representative of the formation during the quarterly (and annual) monitoring events.
Specific 5	BEBRA Wells	Section 5.2.1	The Port suggests that regression analysis for TPH-D concentrations in BE-1 reveals a flat to negative slope. However, as pointed out in Specific Comment 4, the data used for the regression do not include all sampling points. In addition, as shown in Appendix F, the R2 value for the regression is quite low, indicating a high variability of the data points around the regression line. As a result, the Port’s conclusion regarding the trend for TPH-D in BE-1 should acknowledge the sources of uncertainty within the evaluation. This comment also applies to similar language in Section 6.0.	See response to Specific Comment 4. Section 5.2.1 and Section 6 have been revised to acknowledge uncertainty in the regression evaluation due to the high variability in the TPH-Dx dataset for monitoring well BE-1.
Specific 6	Conclusions and Recommendations	Section 6.0	DEQ concurs that the requirements of the LNAPL monitoring and removal program have technically been met but agrees with the Port’s recommendation to continue annual LNAPL monitoring and recovery coincident with annual groundwater monitoring, except for monitoring well HC-5. Based on the detection of measurable LNAPL in HC-5 as recently as December 2021, DEQ requests that LNAPL monitoring and recovery continue in HC-5 on a quarterly basis in 2022. As with the monitoring program as implemented in 2021, if measurable LNAPL is not detected in HC-5, then a sample should be collected for laboratory analysis. DEQ also recommends that observations of the riverbank down-gradient of HC-5 be performed (i.e., to the extent practicable) at a frequency at least equivalent to the quarterly gauging of that well.	See response to General Comment 1. The Port will also continue conducting observations of hydrocarbon sheen in Slip 3 as part of the LNAPL monitoring/recovery and groundwater monitoring/sampling activities, including the riverbank downgradient from monitoring well HC-5.

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Specific 7	Conclusions and Recommendations	Section 6.0	DEQ agrees with the Port's recommendation to expand the groundwater monitoring program to include C10-C12 aliphatic hydrocarbons and metals. However, DEQ suggests that at least four quarters of data for the expanded analyte list be collected to ensure they adequately reflect seasonal variability. Such data would prove beneficial for evaluating the degree to which the groundwater pathway has been controlled under source control.	See response to General Comment 1.
Specific 8	For Completeness	Table 1	DEQ requests that locations where sheen was observed but no measurable NAPL confirmed or recovered (i.e., BE-4 on 1/20/21 and HC-12D on 12/22/21) be identified on the table with a note to provide an accurate record of product indicators at the Site. Also, the field form from 12/21/2021 indicates a total of 0.312 gallons of NAPL was removed from HC-5, which differs from the 0.30 gallons recorded in Table 1.	Table 1 has been updated to include additional detail on observations of sheen and rectify the difference in recovered LNAPL between the field notes and Table 1.