

Memorandum

To: Ray Hoy, Oregon Department of Environmental Quality

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From: Adia Jumper, PE, Floyd|Snider

Date: June 28, 2024

**Re: RESPONSE TO DEQ AND USEPA REVIEW OF THE MONITORING AND PERFORMANCE EVALUATION REPORT
Vigor Shipyards—Swan Island**

Dear Mr. Hoy:

On April 3, 2024, Vigor Industrial LLC (Vigor) received Oregon Department of Environmental Quality (DEQ) and U.S. Environmental Protection Agency (USEPA) comments on the February 2022 Monitoring and Performance Evaluation Report prepared for Vigor by Floyd|Snider. Vigor and Floyd|Snider discussed comments with DEQ in an April 22, 2024, meeting and have addressed DEQ and USEPA comments provided in the April 3, 2024, letter in the 2022 Monitoring and Performance Evaluation Report (2022 MPER). Per communications with DEQ, additional changes have been made to the 2022 MPER to reflect updates and corrective actions that Vigor is implementing under the facility's National Pollutant Discharge Elimination System (NPDES) 1200-Z Permit.

Note: DEQ and USEPA comments are reproduced below in numbered, **bold** type with Vigor and Floyd|Snider responses following in *indented and italicized* type.

DEQ General Comments

1. **Limited performance monitoring has been collected following them implementation of SCMs in several basins. Typically, performance monitoring (3-4 rounds) needs to be conducted following new SCMs implemented. SCMs have been implemented in N-series, M, C, R, D and P and in most cases only one round of post SCM has been collected. As discussed in our February 14, 2024 phone call, several rounds of NPDES monitoring have occurred in some of these basins and may be sufficient to confirm the effectiveness of the**

SCMs in several of these basins. DEQ requests that Vigor provide a brief memo presenting an evaluation of all the available post-SCM stormwater data (including any performance monitoring data collected under the Performance Monitoring Work Plan and under the NPDES permit). The evaluation should clearly present the post-SCM data plotted on the DEQ stormwater curves and recommendation on if additional data is needed to support the effectiveness of the SCMs.

Response: The 2022 MPER revision includes an additional figure (Figure 1.3) outlining SCM implementation, key determinations made in the previous reports, and monitoring details to clarify the timeline of actions taken for each basin group. In addition, existing tables have been updated to more clearly distinguish between data points that represent SCM monitoring and Contingency SCM monitoring. The 2022 MPER revision presents and analyzes the data set presented in the February 2022 submission (fourth quarter 2019 through fourth quarter 2021) and does not include any additional data collected since December 2021.

To meet the request for a post-SCM stormwater data memorandum, Vigor plans to submit the Post-Contingency SCM Stormwater Analytical Data Memorandum presenting an evaluation of all available post-SCM stormwater data by June 2025. The data will be evaluated in whole after completion of the requested dioxin/furan monitoring at Pier C and the N-Series, and Source Control Monitoring of Group Q in accordance with the Post-Phase 1 and Phase 2 EC System Sampling Work Plan. The June 2025 deadline will allow for sufficient data collection at Pier C, N-series, and Group Q, as well laboratory analysis, data validation, and data evaluation.

- 2. The 2022 MPER did not include performance monitoring of the EC system. Performance monitoring of the EC system will need to begin once the additional basins added to the EC System are complete. Any additional performance monitoring should be put into a work plan.**

Response: On April 10, 2024, Vigor submitted the Post-Phase 1 and Phase 2 EC System Sampling Work Plan to DEQ. Sampling of the EC system is being completed in accordance with the work plan and will include at least four sampling events. The monitoring events and analytical results will be summarized in the Post-Contingency SCM Stormwater Analytical Data Memorandum requested in DEQ Comment 1.

DEQ Specific Comments

- 3. Section 4.6 Group C Basin. DEQ anticipates continued monitoring of Basin Pier C is necessary, in addition to improved best management practices as copper concentrations continue to remain high and are highly variable. The NPDES data indicate copper concentrations continue to be at or above the knee of the rank order curves in 2022 and 2023 at Pier C.**

Response: Vigor is continually sampling Pier C under the facility's NPDES 1200-Z permit. Under the 1200-Z permit, Vigor is required to implement Tier 1 Corrective Actions to address benchmark exceedances. In addition, Vigor is working to improve sample methodology to reduce sampling artifacts that are likely causing elevated copper concentrations in effluent samples. This action will ensure collected samples are representative of facility discharge conditions. Data collected after completion of implementation of Contingency SCM Tier 1 Corrective Actions and improvements to sampling methodology will be summarized in the Post-Contingency SCM Stormwater Analytical Data Memorandum requested in DEQ Comment 1.

4. **Section 4.7 Group R Basins. As EPA noted, a weight of evidence evaluation is missing for Basin T and should be added to the MPER.**

Response: The 2022 MPER has been updated to clarify that the weight of evidence evaluation for Group R and Group T are summarized within the Group R weight of evidence evaluation presented in Section 4.7.

5. **4.12.1 Basins R, Pier C, and N-Series. DEQ requests additional performance monitoring for Dioxin/furans in Basins R and Pier C. The reported results in these basins appeared to be potentially elevated relative to other sites in Portland Harbor. One of the four samples from Pier C appears elevated for 1,2,3,7,8-PeCDD and OCDD, and two of the four sample collected from the N-series appear elevated for 1,2,3,7,8-PeCDD and OCDD.**

Response: As discussed with DEQ during the meeting on April 22, 2024, Vigor will collect two additional samples for dioxins/furans at both Pier C and N-series basins. Sample methodology similar to the methodology described in the Dioxins/Furans Sampling Work Plan, submitted on November 18, 2020, will be followed. However, evaluation of previous results has confirmed that elevated total suspended solids (TSS) has a direct correlation to elevated dioxin/furan results at the facility and that elevated TSS is often caused by sampling artifacts in these basins. Vigor will compare influent and effluent TSS results to determine whether samples are representative of facility discharge conditions, or whether effluent sample concentrations may be artificially elevated due to sample methodology limitations. Samples with higher effluent TSS than influent TSS will be considered impacted by sample methodology and will not be analyzed for dioxins/furans.

6. Figures-Rank Order Curves. Please provide revised rank order curves that clearly show data collected post-SCMs in each basin.

Response: The rank order curves provided in the 2022 MPER revision present data in the redefined groups listed below:

- *Pre-SCM Implementation: Data collected prior to and evaluated prior to implementation of SCMs described in the July 2018 Stormwater Source Control Measure Final Design Report (Revised Final Design Report).*
- *SCM Monitoring: Data collected after implementation of initial SCMs. This includes data collected under the SCM monitoring program for evaluation in the March 2020 Revised Monitoring and Performance Evaluation Report (RMPER) and 1200-Z data collected after SCM implementation and prior to Contingency SCM implementation.*
- *Contingency SCM Monitoring: Data collected after implementation of Contingency SCMs. This includes all data collected under the March 2020 SCM Monitoring Plan for evaluation in the 2022 MPER and data collected under the 1200-Z NPDES permit after Contingency SCM implementation and prior to January 2022.*

Please note that date ranges for each data grouping may vary by basin group due to date of SCM and Contingency SCM implementation within each group. Figure 1.3 provides a timeline of SCM and Contingency SCM implementation and the associated sampling programs.

7. Figures-Rank Order Curves. Please provide rank order curves for TSS for each basin.

Response: The 2022 MPER revision includes rank order curves for TSS for each basin group. A general line of evidence for TSS throughout the facility is provided in Section 4.1.5. Discussion of rank order curves for basins with TSS exceedances (Group N-Series, Group Pier C, and Group LD1-B) are provided in Section 4.2, Section 4.6, and Section 4.8, respectively.

USEPA Primary Comments

- 1. The data points that were used in the spatially weighted average concentrations (SWACs) (Figures 4-8 and 4-10) should be identified, possibly on the maps of Figures 4-7 (copper) and 4.9 (zinc) and considered when assessing the utility of comparing SWACs across different time periods. Based on the quiescent nature of the river near many of the outfalls (particularly within Swan Island Lagoon and the dry dock areas), the sediment samples that are nearest to the outfalls are most relevant for characterizing effects of stormwater from Vigor Shipyards. Additionally, because of the significant variation in number of samples, sample locations, and sample density in the periods evaluated, comparisons of SWACs in these different periods may be misleading. For example, Figure 4-8 seems to show a distinct pattern of decreasing copper concentrations over time in the dry dock area sediments. However, Figure 4-7 shows that before 1998 there were many samples in the vicinity of the dry docks, fewer samples were collected between 2002 and 2007, and very few samples**

were collected near the dry docks between 2014 and 2019 (including no samples in the area with the highest copper concentrations in sediment before 1998). It is possible that the apparent trend in Figure 4-8 is only a result of fewer samples being collected in areas with the highest copper concentrations. Because of this, EPA is not confident that the SWAC analysis is meaningful in the weight of evidence evaluation.

Response: The figures showing interpolated copper and zinc concentrations over time (formerly Figures 4.7 through 4.10) have been replaced with figures showing discrete sediment surface copper, lead, and zinc results over time (now Figures 4.9 through 4.11) without interpolation. The associated discussion about these results in Section 4.0 of the document has been reduced to (1) consider the available data in the vicinity of each outfall in accordance with this comment and 2009 DEQ Guidance for Evaluating the Stormwater Pathway at Upland Sites, and (2) acknowledge that the existing sediment data, which were collected for purposes other than characterizing stormwater discharges from facility outfalls, are not optimally located in all cases to effectively assess sediment quality “beneath the outfall” relative to the surrounding area (refer to new Section 4.1.6). Further evaluation of sediment quality beneath the outfall will be considered in the forthcoming Recontamination Evaluation Report.

- 2. A weight of evidence evaluation is missing for Basin T and should be added to the MPER. Section 3.1.7 describes the sampling results for Basin T and states that it was separated from Group R. However, unlike the rest of the basins, Section 4 does not include an evaluation of the data that were collected in Basin T.**

Response: This comment has been addressed as described in the response to DEQ Comment 4.

- 3. There is insufficient evidence to conclude that SCMs are controlling copper in stormwater in the group Pier C basin. Copper concentrations are above the surface water cleanup level (CUL) in all samples, one of the samples collected from Pier C (2019-2021) contained a copper concentration that was in the steep portion of the rank order curve and among the highest concentrations detected site-wide, and two other samples appear to be near the knee of the rank-order curve (Figure 4.3). Additionally, copper removal performance in the scupper inserts is highly variable, with removal efficiencies ranging from negative 17% to positive 77% across the five samples collected (Table 3.3). The two most recent sampling events had improved performance, but there is insufficient data to suggest that a trend is emerging, and the results are not related to storm-to-storm variability. EPA is supportive of continuing to monitor this basin as part of the 1200-Z program and implementing corrective actions as needed if copper concentrations continue to exceed CULs and permit benchmarks.**

Response: Variability is to be expected in SCM removal efficiencies. However, the two sampling events with negative copper removal efficiencies (Storm Event 8B and Storm Event 9B) had greater TSS concentrations in the effluent sample than the influent sample. To collect samples at Pier C, the scupper inserts need to be lifted out of the scupper, which disturbs the sampling media and can cause particulate to be present in the effluent sample that would not ordinarily discharge. TSS results that are greater in the effluent than the influent indicates that sampling artifacts are the likely cause of apparent poor performance of the SCMs during these events. Vigor will continue to monitor Pier C and implement corrective actions as needed under the 1200-Z program.

- 4. There is insufficient evidence to conclude that the SCMs are effective at controlling copper in stormwater discharge from the Group Pier D basins. Many of stormwater samples exceed the surface water CUL for copper and are at or above the knee of the rank order curve provided in Figure 4.5. The text indicates that additional filtration fabric and media were installed at the catch basin inserts to improve performance but does not provide timing of when those supplemental SCMs were installed relative to sample collection. The two most recent sampling events had improved effluent concentrations, but Table 3.3 suggests that this was largely the result of lower influent copper concentration and not improved removal efficiency. The catch basin inserts appear to be working reasonably well based on removal percentages, but because influent concentrations are often high, copper remains elevated in discharges. EPA suggests considering additional and/or improved BMPs that would prevent copper from mobilizing in stormwater in an effort to reduce influent concentrations to the Pier D catch basins. EPA is supportive of continuing to monitor this basin as part of the 1200-Z program and implementing corrective actions as needed if copper concentrations continue to exceed CULs and permit benchmarks.**

Response: Group Pier D stormwater data are highly impacted by best management practices (BMPs) and operations that occur within the area causing variability in results. Vigor has and will continue to work closely with the City of Portland Bureau of Environmental Services under the facility's NPDES 1200-Z permit to implement Tier 1 Corrective Actions, such as increased BMPs, that improve stormwater quality at Pier D. Tier 1 Corrective Actions implemented since February 2020 and analytical results will be summarized in the Post- Contingency SCM Stormwater Analytical Data Memorandum requested in DEQ Comment 1.

USEPA To Be Considered

- 1. Section 2.0 Summary of Sampling Events and Figures 2.2 through 2.12: Given the number of sampling locations and scope of the sampling program, it appears that Vigor has made a commendable effort to meet the storm event criteria and sampling protocols described in Appendix D of the Portland Harbor Joint Source Control Strategy (JSCS) (DEQ and EPA 2005). Because there were some storm events where these criteria were not achieved (e.g., there were not antecedent dry periods of 24 hours or samples were not collected within the first 3 hours of runoff), the MPER should provide a discussion of whether there are any samples**

that are not considered representative of stormwater runoff or that should be weighted less heavily in the weight of evidence evaluation.

Response: The stormwater data provided in the hyetographs are pulled from the Swan Island Rain Gage database, which is not always fully reflected in site conditions at the facility. Field notes were reviewed to confirm that first flush and antecedent dry period requirements were met.

- 2. Section 3.1, page 3-2: Revise the discussion in Section 3.1 to note that the method detection limit for arsenic is also above the screening criteria (i.e., the CUL). In addition, this section or related sections should explain the effect on the data evaluation goals when a chemical's reporting limits exceed screening criteria.**

Response: The requested edits have been made to Section 3.1 of the 2022 MPER to clarify that although arsenic detection limits are less than the Screening Criterion, analytical results indicate that all arsenic results were detected at concentrations greater than the method detection limit. The detection limit is considered appropriately sensitive for the data collected and did not introduce uncertainty to the results.

- 3. Section 3.1 and data tables 3.1 to 3.4: Additional text should explain the selective application of the "e" qualifier versus using the "J" qualifier, which is the national function guidelines qualifier when the result for this analyte is between the method detection limit and the quantitation limit and should be considered as estimated concentration as defined and used in the Appendix C data validation reports. As noted in the laboratory reports, the E qualifier has a different role.**

Response: This project uses the "e" qualifier as described in Section 3.1 and data Tables 3.1 and 3.4 for consistency with historical data and data reporting. Similar to the "J" qualifier, the "e" is used for analytes that were detected between the method detection limit and the method reporting limit, are considered to be an estimate, and are reported at the estimated concentration. The capital qualifier "E" is used for analytes that exceed the range of the detector.

- 4. Section 4.3, page 4-3: Supplemental discussion should be provided regarding the control of PCBs in stormwater. The text in Section 4.1.3 indicates that previous stormwater monitoring from 2018 to 2019 suggested that PCBs were controlled. Because many SCMs have been changed since that monitoring period, it would be beneficial to confirm that the updated SCMs and ongoing BMPs are expected to perform equivalent or better than previous SCMs at preventing PCBs from discharging in stormwater. This is particularly important since PCBs are a primary driver of active remediation in the Swan Island Basin project area.**

Response: Figure 1.3 has been added to the report to summarize and clarify SCM types, implementation timelines, and monitoring timelines. The new SCMs are typically “upsized” systems of similar media that has proven to be effective at the facility. These upsized SCMs improve contact time and accommodate direct flow through media.

- 5. Section 4.1.5, page 4-3: The TSS discussion in Section 4.1.5 could be improved by adding the rank order curve for TSS to the MPER. A single figure showing the 58 sample results on the TSS rank order curve (color-coded by basin) would help inform the discussion of relative TSS concentrations in stormwater discharge compared to other Portland Harbor heavy industrial sites.**

Response: This comment was addressed in DEQ Comment 7.

- 6. Section 4.4.5, page 4-9: The statement that all copper and zinc concentrations fall on the lower portion of the rank order curves for Basin M does not appear to be correct and should be revised in the text. On Figure 4.2 it appears that at least one zinc sample and several copper samples that were collected during 2019 to 2021 monitoring in Group M stormwater fall near the “knee” of the rank order curves.**

Response: The 2022 MPER rank order curves have been updated as described in the response to DEQ Comment 6 to more clearly delineate which samples were collected post-Contingency SCM implementation. The Group M rank order curve discussion in Section 4.0 has been updated to state that Group M copper and zinc concentrations fall within the flatter portion of the curve and within the lower knee of the curve.

- 7. Section 4.7.5 Weight of Evidence Determination, page 4-15: Although plausible, there is insufficient evidence to conclude the elevation PAH concentration detected during Storm Event 9D from Group R was an anomaly and that the source of the high PAH concentration is no longer present. Some consideration should be given to the elevated PAH concentration detected in Storm Event 9D when evaluating which additional stormwater contingency SCM will be selected for Group R.**

Response: The Group R analytical results for the Storm Event 9D were not reproduceable in any of the three later sampling results. Data and field notes were evaluated for possible sources (e.g., seal coat, oil/fuel spill); however, no direct correlation or source was identified. The performance monitoring conducted in Basin R reflects effective TSS reduction and, therefore, would also reduce any sorbed PAH concentrations.

- 8. Section 4.12 Dioxin/Furan Sampling Weight of Evidence Evaluation, pages 4-21 to 4-23: The dioxins and furans sampling data indicate that the highest concentrations detected in stormwater (based on the dioxins/furans TEC concentration) were at Basins N and L, which are both being rerouted to the electrocoagulation (EC) treatment system. The remaining**

samples appear to be relatively consistent (ranging from 2.23 J to 11.9 J pg/L). The exception is the sample collected at Pier C on 3/18/21 that had a dioxin/furan TEQ concentration of 62.6 J pg/L. The reporting and evaluation of dioxin/furan data should describe whether the relatively high concentration at Pier C on 3/18/21 of 62.6 J pg/L warrants additional investigation or consideration of enhanced BMPs.

Response: Section 4.12.1 has been updated to discuss the dioxin/furan toxic equivalent (TEQ) result of 62.6 J pg/L at Pier C. As described in the response to DEQ Comment 5, this result appears to be related to the uncharacteristically elevated TSS concentration in this sample, which was likely elevated due to sample collection methodology. Overall, the data show that when SCMs are properly implemented and effluent samples are collected following treatment via undisturbed filtration media, TSS and associated adsorbed contaminants are effectively removed from stormwater. This has been verified by repeated representative sampling of facility stormwater. Efforts to ensure all samples collected accurately represent discharge stormwater quality are ongoing.

9. **Appendix B: The rationale for the approach for XRF sampling should be clarified in Appendix B. It is difficult to assess whether the selected sampling locations are representative and appropriate for characterizing metals content in building materials and how building materials may impact stormwater discharges. Specific comments are as follows:**
- a. **The text discussing Building 72 sampling states, “The building’s roof and gutters were tested at two locations along the southern edge of the roof. An additional two test locations were taken of the roof near the eastern edge where no gutter existed.” Revise the text to provide the rationale for the roof sampling locations.**
 - b. **The text indicates that only select downspouts on Buildings 4 and 10 were sampled. Clarify whether the material of the sampled downspouts is representative of all downspouts, roofs, and metal siding that could potentially come into contact with stormwater. It would be helpful to include photographs of the various siding and spout materials to support this discussion.**

Response: Discussion of the XRF survey is included in Section 4.7 because it is relevant to Vigor’s ongoing efforts to control potential sources of metals in Group R. However, Appendix B text was not revised because the sampling effort at Building 72 was outside of the initial scope of the March 2020 SCM Monitoring Plan. Building 72 sampling was completed to support an internal request for funding. A summary of the Building 72 roof coating and analysis of data collected since SCM implementation will be provided in the Post-Contingency SCM Stormwater Analytical Data Memorandum.

USEPA Matters of Style

- 1. If SWACs are retained in the report (see Primary Comment #1), error bars should be added to Figure 4.8 to show the uncertainty associated with each of the calculated SWACs.**

Response: The SWAC figures have been removed from the 2022 MPER as described in response to EPA Primary Comment 1.

- 2. Verify that the interpolated polygons are correct in Figure 4.7. Specifically, there appear to be samples with concentrations between the CUL and 3x the CUL (i.e., yellow dots) but no interpolated area surrounding those exceedances (see dry dock area between 2002 and 2007 and lagoon area between 2014 and 2019).**

Response: The interpolated copper and zinc sediment surface concentration figures have been removed from the 2022 MPER revision as described in response to EPA Primary Comment 1.