

April 26, 2017

Kerry Graber
Washington State Department of Ecology
300 Desmond Drive SE,
Lacey, Wa 98503

Dear Kerry,

The Port of Tacoma has a long relationship with Occidental Chemical Corporation (OCC), developed through ownership of neighboring properties as well as a performing party partnership to clean up the Mouth of the Hylebos Waterway. Because OCC's groundwater plumes impact multiple neighboring Port properties, OCC's cleanup action plan is of great interest to the Port. Over the years OCC has kept the Port abreast of progress toward their cleanup action plan for the Site, allowing the Port to see earlier versions of this Feasibility Study (FS) and to provide informal feedback. The Port appreciates OCC's diligence and efforts working towards cleaning up this very complex and challenging Site.

As the Port's representative, I have reviewed the available documentation, including this FS, the Vapor Intrusion reports, the Porewater Report, as well as the Remedial Investigation and Conceptual Site Model Reports. This letter provides my comments on the FS, focused on the proposed preferred remedy. In Section 8, components of the proposed preferred remedy are presented in bullet format. Below I provide high-level specific comments in response to the Section 8 bullets, followed by general comments regarding the Port's preference for a preferred remedy.

- **Institutional Controls (ICs) - fence, use restrictions, soil management and Site-specific health and safety plans**

The Port intends to provide OCC's consultants reasonable access to Port property for implementation of remedial activities, monitoring, and placement of institutional controls, subject to current lease restrictions. Nonetheless, any site use restrictions, soil management or health and safety requirements proposed by OCC for Port property require close coordination with the Port. For example implementing any deed restriction on Port of Tacoma property for management of OCC's soil and groundwater contamination will require a formal legal agreement between the Port and OCC, similar to agreements that currently exist.

- **Groundwater Quality Monitoring**
- **Soil Vapor Monitoring**

Groundwater quality and soil vapor monitoring are proposed but the sampling and analysis plans have not yet been prepared. The Port requests to see these documents once drafted. It is important that both datasets are sufficient to 1) confirm that human health and the environment are adequately protected, 2) determine if concentrations are increasing, decreasing, or remaining constant over time on OCC and adjacent Port properties, and 3) support the future management and optimization of any implemented remedy.

- **PDCE Barrier for 605 & 709 Alexander Avenue Properties, Navy Todd Dump, N Landfill, and 709 Embankment Fill Area**

The physical direct contact exposure barrier will be an important component of the implemented remedy. At other cleanup sites in the Tacoma tide flats, hydro-stratigraphic units are distinguished as the Fill aquifer (typically hydraulic fill), first aquitard (silt and clays from the pre-filled tideflats), intermediate aquifer (sands), second aquitard, and deeper aquifer. Given OCC's reliance on 3-D interpolations, which is understandable based on the extreme depth of the plume, it is difficult to evaluate potential exposures near the surface. The Port requests that figures be developed for the constituents of interest in the Fill aquifer and possibly the Intermediate Aquifer. The direct contact screening criteria should be used as a concentration isopleth. This will clarify where institutional controls may be required on Port property. Other relevant exposure screening criteria should be posted as concentration isopleths including vapor intrusion and surface water screening criteria.

During design, the permeability of the PDCE barrier should be evaluated. If the barrier were impermeable it would improve the efficiency of the hydraulic containment, however it would also lengthen the remediation timeframe. This tradeoff should be carefully considered. It may prove beneficial to infiltrate storm water into select zones of OCC's property to enhance flushing toward the groundwater extraction system. Any impacts to Port property and Port tenant operations need to be carefully considered during design with direct input from the Port to be consistent with current lease restrictions.

- **Sheet pile vertical barrier wall between the Site and the Hylebos**

The sheet pile wall will be an integral component of the implemented remedy. The wall will prevent potential erosion of impacted soil into the Hylebos. When coupled with the groundwater extraction system, the sheet pile wall will reduce and possibly eliminate the groundwater seepage and contaminant flux from the shallow hydrostratigraphic units to the Hylebos. The Port has the following concerns regarding aspects of the wall.

1. Given the potential long-term remediation time frame of the implemented remedy, the wall should be designed to last a similar time-frame. This may require cathodic protection or anticipated replacement(s). For financial assurance purposes, the resulting assumptions need to be included in a cost-estimate for the duration of the remediation time frame (RTF) with the appropriate discount rates applied.
2. As it is, none of the remedies present any RTFs for their implementation even though RTF estimation methods exist. Absence of a quantified RTF estimate limits your ability to optimize the remedy.
3. Design elements of the sheet pile wall will need to incorporate future land uses both upland and in the waterway. The Port has previously shared the potential for future deepening of the waterway with both OCC and Ecology. The wall depth and tiebacks will need to allow for this deepening. The upland should accommodate marine industrial use which will include heavy truck traffic, cranes, and wharf infrastructure. The Port of Tacoma is willing to provide input during design to accommodate future land uses.

4. With regards to the groundwater modeling, Section 3.1 of Appendix E indicates that the sheet pile wall was modeled as a no flow boundary. This is not an appropriate way to simulate a sheetpile wall. The sheetpile wall manufacturer (Arcelor) has a design manual that presents methods and references for assessing leakage through sheetpile wall interlocks based on different joint filler materials. Sheet pile walls should be simulated with MODFLOW's Horizontal Flow Barrier package where the wall is assigned a thickness and hydraulic conductivity. The use of a no-flow boundary will over predict the effectiveness of hydraulic containment.
 5. The Port has a 30 year long term lease with Trident Seafoods for use of the Pier and uplands. Any potential impacts to Port property and our tenant operations during remedial construction and/or operations and maintenance need to be carefully considered during design with direct input from the Port to be consistent with current lease restrictions.
- **VOC source area mass reduction by strategic groundwater pumping from nine extraction wells**

The VOC source area mass reduction alternative is a good addition to this version of the FS and it goes a long way to optimizing the remedy. However, in a world of limited resources and excessive CO₂ emissions, I believe that further optimization is possible. Monitored natural attenuation should be considered as a component to the selected remedy particularly in low concentrations areas at depth. Groundwater extraction should be focused on higher concentration areas to shorten the remediation timeframe but weighted to areas with the potential for discharge to surface water and areas with the potential to cause vapor intrusion issues. The groundwater/contaminant transport modeling incorporates advection and retardation but doesn't simulate biodegradation. Given the age of the contaminant release I assume that the plume is stable or declining, but I have not seen that technical analysis. Whether for this FS or during design, that work should be presented, the model should be updated and used as a tool to optimize the implemented remedy.

- **Hydraulic containment by groundwater pumping from eleven extraction wells (the nine for VOC source area mass reduction by strategic groundwater pumping plus two additional wells)**

The FS evaluates 4 different hydraulic containment alternatives including the option presented with the preferred remedy, and describes model-based performance objects in Appendix E. To be blunt, the focus of this FS on hydraulic containment seems excessive and the performance objects appear arbitrary. What is the basis for a 1 foot drawdown target, when drawdown is not a direct measurement of plume capture? The TCVOC mass discharge of less than 0.2 percent is overly conservative given that the model doesn't incorporate biodegradation. With the recent porewater sample results only showing one sample location with CVOC impacts, it is overly aggressive to reverse all groundwater flow beneath the waterway.

The remedy should be optimized to focus on source reduction to reduce potential risk and to shorten the remediation time frame. While hydraulic containment needs to be a component of the remedy, it should to be evaluated using appropriate methodologies and metrics. The EPA's 2008 Systematic Approach for Evaluation of Capture Zones at Pump and Treat Systems is a good resource for estimating capture zones once the remedy is in place. I recommend that the model be updated with biodegradation, identify areas of the plume with the potential to discharge to surface water, refine the number and locations of the source area mass reduction

wells, then build and operate the system. If additional wells are needed to achieve hydraulic containment they can be installed as needed, subject to Port lease restrictions.

- **Ex situ treatment of extracted groundwater through a newly constructed conveyance and treatment system**

The remedy should be designed and constructed so that the property can be used productively during remedial operations, considering lease obligations and tenant needs. For example the new treatment system building should be located a corner of the property with a minimal footprint. All piping should be below grade but rated for appropriate truck traffic. As with installation of the sheet pile wall, the Port is willing to provide input during remedial design to accommodate potential future land uses.

General Comments: Below are the Port's general comments that provide a few other points of clarification regarding Porewater, Vapor Intrusion, and MTCA points of compliance.

Porewater (2.4.6): The Port disagrees with OCC's conclusion that the porewater migration pathway is not significant at this time. The results of the 2016 porewater sampling results were welcome news. They indicate that OCC's plume doesn't extensively impact the Hylebos water way. However, given contaminant fate and transport coupled with tidal dynamics, one would expect the greatest impacts on porewater concentrations to occur at low tide in groundwater fluxing to surface water from the Fill Aquifer. There will be a narrow band along the shoreline, expressed as seeps at low tide that will exhibit elevated CVOC concentrations. This is evidenced in the 2006 seep sample results (Figure 4.44 Concentrations in Seeps, SCR 2014). Any future porewater monitoring should be focused close to the shoreline and should be designed appropriately to account for placement of the sheetpile wall.

Indoor Air (2.4.7) - Vapor Intrusion: The Port agrees that with the exception of OCC's office the vapor intrusion pathway is currently not complete. However the potential for future vapor intrusion into existing buildings on Port property cannot be ruled out. Because tenant operational changes overtime can alter preferential airflow in Port buildings, long term monitoring of this pathway is warranted. Regarding Building 595, the Port will consider active sub-slab vapor mitigation but we request, at a minimum, frequent monitoring to ensure that air quality in the building is not impacted by the elevated sub-slab air quality conditions. Other Port buildings located above the Fill Aquifer where groundwater concentrations are above Vapor Intrusion screening criteria should also be monitored regularly although on a less frequent basis.

MTCA points of compliance (2.4.6, 2.7, 4.2.1): In the FS there is only limited mention of the applicable point of compliance. It is unclear whether these instances are references to MTCA's concept of points of compliance or more a risk based exposure point approach under CERCLA. Will the cleanup be managed to a standard or conditional point of compliance, and have remediation levels been discussed with regard to transitions between remedial technologies? I would like to see more clarity regarding this issue for the cleanup action plan. At a complex site like this one, where multiple remedial technologies may be applied, it is important to develop a decision framework for managing and optimizing remedial operations.

Overall the Port supports the components of the proposed preferred remedy, although I believe that additional optimization can and should be pursued, either through this FS or during design.

It is my opinion that the other alternatives presented in the FS do not present the most optimum remedial option. The Port is in favor of aggressively targeting contaminant mass that presents the greatest potential risk to human health and the environment on OCC's property and Port of Tacoma property, particularly shallow contaminant mass with the potential to migrate to the Hylebos Waterway. Based on the information provided in the FS the optimum remedy is unclear. What is the potential for shallow contamination to migrate offsite? What impacts would addressing this shallow excavation have on the remediation timeframe? What additional benefits are gained over the proposed preferred remedy? A portion of the M3 Alternative 100 mg/kg to -4 ft NGVD contaminated soil treatment zone is located on Port property. Any excavation of shallow soil on Port property will require careful consideration due to existing buildings and tenant operations. Less intrusive remedial technologies such as groundwater recirculation, enhanced insitu bioremediation, or other insitu treatments are more suitable for Port property.

As the Port's representative I appreciate the opportunity to provide comment on OCC's FS. I look forward to publication of the cleanup action plan and implementation of the remedial action.

Sincerely,

A handwritten signature in black ink that reads "Robert Healy". The signature is written in a cursive, flowing style.

Robert Healy
Senior Manager, Environmental Quality
Port of Tacoma

RH

CC: Jason Jordan, Scott Francis, Clint Babcock, Kim Seely