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August 25, 2021

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**Re: Comments on the Data Gap Investigation Progress Summary and Soil Vapor Intrusion Status and Recommendations Memorandum.**

- **Site Name:** Taylor Way and Alexander Avenue Fill Area (TWAAFA)
- **Site Address:** 1500 Block Taylor Way E, Tacoma, Pierce County, WA 98409
- **Agreed Order:** DE 14260
- **Enforcement Order:** DE 19410
- **Facility/Site No.** 1403183
- **Cleanup Site ID No.** 4692

Dear Tasya Gray and Scott Hooton:

Thank you for submitting the Data Gap Investigation Progress Summary and Soil Vapor Intrusion Status and Recommendations memorandum (memo)[1] in response to the Department of Ecology's (Ecology) May 5, 2021, letter.[2] Below are our comments:

1. 1205 Alexander Avenue/1300 Taylor Way (Hylebos Marsh Property: Thank you for providing additional information regarding the debris that were observed to be eroding from the bank.

[1] DOF, *TWAAFA Data Gap Investigation Progress Summary and Soil Vapor Intrusion Status and Recommendations*. July 2, 2021.

[2] Ecology, *Comments on the Aboveground Site Conditions Memorandum and Existing Groundwater Monitoring Network Evaluation and Recommendations Memorandum*, letter, addressed to Tasya Gray (DOF) and Scott Hooton (Port of Tacoma), May 5, 2021.

2. Burlington Environmental Property:

    a. Thank you for agreeing to evaluate locations near the current tank farm for replacement well CTMW-11R. We look forward to reviewing your location recommendation prior to installation.

    b. Lab Pack Building:

        i. Thank you for providing the Vapor Mitigation System Operation and Maintenance (O&M) Manual (AFW, 2018)[3] in Attachment A of the memo. Ecology does not agree that additional assessment of the building is not warranted. EPA (2008) states that post-installation, initial acceptance testing should include verification of the mechanical performance of the system combined with appropriate air concentration measurements.[4] EPA (2008) also state that monitoring approaches, at least in the early stages, should include direct measurement of VOCs in indoor air and possibly pressure differentials in the sub-slab soil gas. Post-installation air concentration and pressure differentials have not been measured. Please prepare for Ecology review and approval a Sampling and Analysis Plan (SAP). The SAP shall include pressure differential measurements and indoor, sub-slab, and ambient air sampling. Ecology recommends that the initial sampling be performed twice annually on a seasonal basis (spring/summer and then late fall/winter).

        ii. The memo states that semi-annual inspections include vacuum measurements from the sub-slab monitoring reports and measurements from the individual lines for methane, VOCs, and vacuum and that annual monitoring includes all semi-annual tasks plus a calibration check for the methane sensors. It does not appear that reports of these inspections have been submitted to Ecology. Please provide us with copies of the reports completed to date within 30 days of this letter. Please submit future inspection reports within 30 days of inspection.

    c. Stabilization Building: In our May 5, 2021, comment letter, we expressed concern that operation of the 20,000 cubic foot per minute (CFM) blower for dust collection during treatment of waste could cause air pressure to be lower than in

[3] Amec Foster Wheeler Environment & Infrastructure, Inc. (AFW), *Vapor Mitigation System Operations and Maintenance Manual, Stericycle Tacoma, 1701 Alexander Drive*, May 2018.
[4] U.S. Environmental Protection Agency (EPA), *Engineering Issue: Indoor Air Vapor Intrusion Mitigation Approaches*, Office of Research and Development, National Risk Management Research Laboratory, EPA/600/R-08-115, October 2008.

the subsurface, thereby increasing the potential for vapor intrusion and/or methane entry into the building. Therefore, Ecology recommended that differential and barometric pressures beneath the slab and inside the buildings be measured, during both active and non-active blower operation, to determine if the pressure beneath the slab can be greater than indoor air. A pressure gradient from sub-slab to indoor air could result in sub-slab soil vapor migrating into the indoor air space through advection.

However, the memo argued that further assessment of the Stabilization Building is not necessary based on the construction of the building (gravel pad beneath building providing for a preferential pathway for release of sub-slab pressure), building design and use (open to ambient air via passive louvers on the east and west sides of the building; lack of cooling or heating system), and the theoretical dilution calculations of indoor air concentrations during blower operations. Ecology agrees that it is possible that the memo may be correct in this conclusion; however, actual measurements are still needed for the following reasons:

i. As stated in Ecology's Implementation Memorandum (IM) No. 21 (Ecology 2018a), Ecology no longer recommends using models (or theoretical calculations) as the sole (or primary) method to support a "screen-out" decision.[5] Instead, Ecology recommends a weight of evidence evaluation that includes collecting site-specific data to assess the potential for VI.

ii. The VI assessment of the Lab Pack Building resulted in sufficient concern to install a VI mitigation system. The Lab Pack Building is located only approximately 80 feet north of the Stabilization Building. Therefore, the conditions that caused the VI concern for the Lab Pack Building could also be present beneath the Stabilization Building.

iii. The memo mentioned the soil vapor sample results from AFW (2016) that were collected approximately 100 feet north of the Stabilization Building.[6] However, the memo was incorrect in only referring to benzene as the only compound that exceeded screening levels. As shown in Table 1 in AFW

[5] Ecology, *Frequently Asked Questions (FAQs) Regarding Vapor Intrusion (VI) and Ecology's 2009 Draft VI Guidance, Implementation Memorandum No. 21*, Publication No. 18-09-046, November 15, 2018. See answer to question no. 25.
[6] AFW, *Revised Soil Vapor Sampling Memorandum,* Stericycle Tacoma Facility, Tacoma, Washington, July 26, 2016.

(2016), 1,2-dibromoethane (EDB), 1,2-dichloroethane (EDC), 1,4-dioxane, trichloroethene, and vinyl chloride also exceeded MTCA Method B and/or Method C VI screening levels.

Please prepare for Ecology review and approval, a soil vapor sampling and analysis plan for the Stabilization Building. Please note that guidance from the New Jersey Department of Environmental Protection (NJDEP, 2018) recommends that a minimum of four sub-slab samples should be used for a building footprint size of the Stabilization Building (5,001 to 10,000 square feet).[7]

d. Parcel A: Please also measure concentrations of oxygen and carbon dioxide in soil vapor as recommended by Ecology (2018b).[8]

e. Transportation Building: Please prepare and submit for our review, a detailed floor plan for the entire building (shop bays and office space) that also shows the locations of your proposed sub-slab samples. Sub-slab sample locations shall include the entire building footprint (shop and office area). NJDEP (2018) recommends that a minimum of five sub-slab samples should be used for a building footprint the size of the Transportation Building. NJDEP (2018) also notes that the determination of the necessary number of sub-slab samples for VI assessment will vary from building to building due to various features and uses of the building. The floor plan should identify any potential preferential pathways for vapor intrusion, such as floor drains, cracks, and utility penetrations. The presence of exhaust fans should also be noted. These preferential pathways should be considered in the selecting of sub-slab sampling locations. Building construction and foundation type should also be noted, because these can affect the flow path of contaminants from soil vapor into indoor air. Sub-slab sample concentrations can have significant spatial variations beneath a building, depending upon their proximity to contaminant sources. However, recent research by Lutes et al. (2021) suggests that sub-slab samples show significantly less temporal variations compared to indoor air samples.[9]

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[7] New Jersey Department of Environmental Protection (NJDEP), Site Remediation and Waste Management Program, *Vapor Intrusion Technical Guidance*, Version 4.1, January 2018.

[8] Ecology, *Petroleum Vapor Intrusion (PVI): Updated Screening Levels, Cleanup Levels, and Assessing PVI Threats to Future Buildings, Implementation Memorandum No. 18*, Publication No. 17-09-043, January 10, 2018.

[9] Chris Lutes, Victoria Boyd, Laurent Levy, Keri Hallberg, Gwen Buckley, Donna Caldwell, and Loren Lund (Jacobs); Robert Truesdale (RTI); Travis Lewis (NAVFAC EXWC); Teresie Walker (NAVFAC Atlantic); Eric Ross (NAVFAC Mid-Atlantic); John Zimmerman, Alan Williams, and Brian Schumacher (US EPA ORD), *Eighteen Months of High Resolution Indoor and Subslab Temporal Observations from an Industrial Building*, presented at AEHS West Coast Conference, San Diego CA, March 22, 2021,

Therefore, it will not be necessary to collect sub-slab samples during different seasons (winter and summer). One sub-slab sampling event should be sufficient to determine if a Tier II assessment is needed. Please also measure concentrations of oxygen and carbon dioxide in soil vapor as recommended by Ecology (2018b).

3. Former Potter Property: Thank you for providing the Draft Vapor Sampling and Analysis Plan (SAP) for the Potter Property (MFA, 2021)[10] in Attachment D of the memo. Please revise the SAP to incorporate the following comments and then resubmit for our review:

   a. Section 2.1, Site Reconnaissance: This section states that several tasks were completed, but little or no details are provided as to what was observed. For example, the second bullet point states that preferential pathways were evaluated, but no details are given regarding what was observed during the inspection. Similarly, for bullet points three and four, no details are provided on the type of heating, ventilation, and air-conditioning (HVAC) system and potential indoor sources of VOCs. Please provide details for each of the bullet points on what was observed during the inspection.

   b. Please provide detailed, scaled, floor plans for each of the buildings that show room use, locations of interior walls and room boundaries, and potential preferential pathways such as floor or trench drains, cracks, utility penetrations, and sumps. The presence of exhaust/vent fans should also be noted. Preferential pathways should be considered in the selecting of sub-slab sampling locations. Please indicate on the floor plans the proposed locations of sub-slab samples.

   c. The number of proposed sub-slab samples (one per building) is insufficient. Guidance from NJDEP (2018) recommends that a minimum of three sub-slab samples per building should be used for a building footprint size from 5,001 to 10,000 square feet. Since the Shop Building, Quonset Hut 1, and Quonset Hut 2 have approximate footprints of 4900, 4000, and 4000, respectively, then a minimum of three samples will be needed from each building. NJDEP (2018) also notes that ideally, sample points should be near the center of the slab and equidistant from each other relative to the outer wall. However, a secondary location can be along the perimeter of the building, no closer than 5 feet to the outer wall and biased toward the groundwater plume or source material.

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available at: https://iavi.rti.org/assets/docs/04_High%20Res_Indoor_Subslab_2021_AEHS.pdf.
[10] Maul Foster & Alongi, *Ecology Review Draft Vapor Sampling and Analysis Plan, 1801 E. Alexander Avenue, Taylor Way and Alexander Avenue Fill Area*, June 30, 2021.

d. Please also measure concentrations of methane, oxygen, and carbon dioxide in soil vapor as recommended by Ecology (2018b).

e. Please add the collection of duplicate samples for quality assurance. Duplicate vapor samples for TO-15 and APH analyses shall be collected by using a T-splitter at the point of sample collection to divide the sample stream into two separate canisters. Duplicate samples shall be collected on a daily frequency.

f. The July 2015, California Active Soil Gas Investigations guidance document (available at https://dtsc.ca.gov/vapor-intrusion/) notes that naphthalene analysis by US EPA Method TO-15 can be affected by contaminant carryover and variability in recovery unless special protocols are followed. Therefore, please revise the plan to state that the recommendations and protocols in Appendix E (Naphthalene Soil Gas Collection) of the California guidance shall be followed.

g. Equilibration Time: The standard operating procedure (SOP) in Appendix A of the SAP states that an equilibration time of 30 minutes will be used for temporary sampling points. However EPA has recommended a 2-hour equilibration time for sub-slab probes.[11] Please observe a 2-hour equilibration time, prior to sampling, following sub-slab sample point installation.

h. Ecology recommends installing permanent sub-slab sample probes in case additional sampling is necessary or if long-term monitoring is necessary.

4. Former CleanCare Property: Ecology concurs with your response.

5. 1514 Taylor Way Property: Ecology concurs with your response.

6. Data Submittal: Please ensure that all environmental data is provided in accordance with WAC 173-340-840(5) and *Ecology Toxics Cleanup Program Policy 840 (Data Submittal Requirements)*.[12]

[11] U.S. Environmental Protection Agency Office of Research and Development, National Risk Management Research Laboratory, Cincinnati, OH, *Assessment of Vapor Intrusion in Homes Near the Raymark Superfund Site Using Basement and Sub-Slab Air Samples*, EPA/600/R-05/147, March 2006.
[12] https://apps.ecology.wa.gov/publications/documents/1609050.pdf

**Please revise the memo to incorporate the above comments and submit for Ecology review within 30 days of the date of this letter.** If you have any questions, please contact me at (360) 407-6247 or steve.teel@ecy.wa.gov.

Sincerely,

Steve Teel, LHG
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Toxics Cleanup Program
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