Interstate 82 Exit 33A Yakima City Landfill: Discussion of Changes and Responses to Comments Regarding Unsaturated and Saturated Soil PCULs

To: Jennifer Lind
Site Manager
Toxics Cleanup Program
Central Regional Office

From: Arthur Buchan
Toxicologist
Toxics Cleanup Program
Central Regional Office

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Background and Scope

This memorandum represents a continued effort to come to agreement regarding Preliminary Cleanup Levels (PCULs) at the Interstate 82 Exit 33A Yakima City Landfill Cleanup Site (Landfill) (Facility Site ID – 1927, Cleanup Site ID – 3853). The information included in this memorandum is derived from previous correspondence:

1) Memorandum - Re: "Transportation Corridor Wood Debris and Landfill Gas Investigation Former Boise Cascade Mill Site and Closed City of Yakima Landfill Site" Landau Associates, Inc., dated September 12, 2018.

2) Ecology Letter with Attached Memorandum: "Interstate 82 Exit 33A Yakima City Landfill Preliminary Cleanup Levels," dated September 22, 2023.

3) Responses from LAI: "Response to Ecology September 2023 Memorandum and Letter Regarding Preliminary Cleanup Levels and Contaminant of Potential Concern, Interstate 82 Exit 33A Yakima City Landfill, Yakima, Washington" Landau Associates, Inc., dated October 20, 2023.

4) Email Correspondence – Landau Associates, Inc. to Ecology (P. Roelen to J. Lind): RE: "Brief update on Yakima landfill pCULs/COPCs" (Regarding the rationale for removing certain COPCs from soil and discussion of TMEQ calculations) dated July 14, 2024.

5) Meeting – Landau Associates, Inc. and Ecology to discuss Soil PCULs/COPCs was held on July 22, 2024.

6) Email Correspondence – Landau Associates, Inc. to Ecology (P. Roelen to J. Lind): RE: Brief update on Yakima landfill pCULs/COPCs (Regarding the depth of vadose vs. saturated zone and removing vinyl chloride as a COPC for surface water), dated July 22, 2024.

7) Ecology Letter dated August 21, 2024, with Attached Memorandum: "Interstate 82 Exit 33A Yakima City Landfill: Response and Resolution to Comments Regarding Groundwater and Surface Water PCULs," dated July 26, 2024.

Ecology believes this memorandum concludes the discussion regarding PCULs for unsaturated and saturated soil, and we can begin updating the Ecology memorandum: "Interstate 82 Exit 33A Yakima City Landfill Preliminary Cleanup Levels Memorandum," dated September 22, 2023.

The groundwater and surface water PCULs were discussed in a previous Ecology memorandum, "Interstate 82 Exit 33A Yakima City Landfill: Response and Resolution to Comments Regarding Groundwater and Surface Water PCULs," dated July 26, 2024. All media were not discussed concurrently because the calculated PCULs for soil are dependent on those agreed upon for both groundwater and surface water.

Discussion – Presented below are previously identified Chemicals of Potential Concern (COPCs) that will be removed from the Site's list of COPCs, along with the rationale behind the removal.

The tables referenced below can be found in the Ecology Memorandum: "Interstate 82 Exit 33A Yakima City Landfill Preliminary Cleanup Levels," dated September 22, 2023, and include:

a. Table 7 (Unsaturated Soil): Soil concentrations determined to be protective of human health and ecological receptors based on a site-specific pathway analysis (assumed unsaturated conditions for the leaching model), and

b. Table 8 (Saturated Soil): Soil concentrations determined to be protective of human health and ecological receptors based on a site-specific pathway analysis (assumed saturated conditions for the leaching model).

1. Bis(2-Ethylhexyl)Phthalate

a. Request from Consultant (October 20, 2023):

The consultant requested the removal of bis(2-ethylhexyl)phthalate from Table 7 (Unsaturated Soil) and the COPC list based on the absence of this contaminant in unsaturated soil.

The consultant provided additional information on July 14, 2024 and July 22, 2024 discussing depths of unsaturated vs. saturated soil at well/boring locations MW-106 and MW-109, and the specific concentration of bis(2-ethylhexyl)phthalate in unsaturated soil at well/boring location MW-109 to illustrate the lack of an exceedance of the PCUL.

Ecology Response:
The MW-109 unsaturated soil sample referenced by the consultant appears to be the only unsaturated soil sample collected and analyzed for bis(2-ethylhexyl)phthalate at the Landfill Site. One (1) sample isn't considered representative of conditions at the Site as a whole.

Resolution:
Bis(2-Ethylhexyl)Phthalate should remain on the COPC list for unsaturated soil.

2. N-nitrosodiphenylamine

a. Request from Consultant (October 20, 2023):
The consultant requested the removal of N-nitrosodiphenylamine from Table 7 (Unsaturated Soil) and the COPC list based on the absence of this contaminant in unsaturated soil.

The consultant provided additional information on July 14, 2024 and July 22, 2024 discussing depths of unsaturated vs. saturated soil at well/boring locations MW-106 and MW-109, and the specific concentration of N-nitrosodiphenylamine in unsaturated soil at well/boring location MW-109 to illustrate the lack of exceedance of the PCUL.

Ecology Response:
The MW-109 unsaturated soil sample referenced by the consultant appears to be the only unsaturated soil sample collected and analyzed for N-nitrosodiphenylamine at the Landfill Site. One (1) sample isn't considered representative of conditions at the Site as a whole.

Resolution:
N-nitrosodiphenylamine should remain on the COPC list for unsaturated soil.

b. Request from the Consultant (July 14, 2024):
The consultant requested the upward adjustment of both the unsaturated and saturated soil Practical Quantitation Limit (PQL) in Table 7 (Unsaturated Soil) and Table 8 (Saturated Soil) be upward adjusted to 0.1 mg/kg to reflect the higher of the consultant's and Ecology's proposed Method Reporting Limits (MRLs).

Ecology Response:
The upward adjustment is consistent with the approach used for other COPCs.

Resolution:
The PQLs for N-nitrosodiphenylamine in unsaturated and saturated soil can be upward adjusted to 0.1 mg/kg.

3. Benzo(b)fluoranthene

a. Table 7 (Unsaturated Soil)

Empirical Demonstration:
The "Interstate 82 Exit 33A Yakima City Landfill Preliminary Cleanup Levels Memorandum," dated September 22, 2023 lists benzo(b)fluoranthene as COPC with a PCUL based on the protection of surface water upward adjusted to PQL.

Benzo(b)fluoranthene can be removed as a COPC for surface water based on an empirical demonstration showing soil concentrations at the Site have not caused, and will not cause, groundwater and surface water PCULs to be exceeded (See Ecology's July 26, 2024 memo regarding groundwater and surface water PCULs for rationale and discussion).

Note: The toxicity of individual Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) are not typically calculated for soil or groundwater. Instead, cPAH mixtures are evaluated by converting to an equivalent concentration of benzo(b)pyrene.

Based on removal of benzo(b)fluoranthene as a COPC for surface water, it is unnecessary to consider this individual cPAH independent of the benzo(b)pyrene equivalent concentration for unsaturated soil.

Resolution:
Benzo(b)fluoranthene can be removed as a COPC for unsaturated soil.

a. Table 8 (Saturated Soil)

Empirical Demonstration:
The discussion above for unsaturated soil also applies to saturated soil.

Resolution:
Benzo(b)fluoranthene can be removed as a COPC for saturated soil.

4. Total cPAH

a. Table 7 (Unsaturated Soil)

Empirical Demonstration:
The "Interstate 82 Exit 33A Yakima City Landfill Preliminary Cleanup Levels Memorandum," dated September 22, 2023 lists Total cPAHs as a COPC with a PCUL based on the protection of surface water upward adjusted to the PQL.

Total cPAHs are not a COPC for groundwater or surface water, and the individual cPAH benzo(b)fluoranthene can be removed as a COPC as discussed in list number 3 above; therefore, it can be empirically demonstrated that unsaturated soil concentrations at the site have not caused, and will not cause, groundwater or surface water PCULs to be exceeded.

Based on the removal of the soil leaching to groundwater (surface water) pathway, the unsaturated soil PCUL can be upward adjusted to 0.19 mg/kg protective of direct contact by humans. The maximum concentration of Total cPAHs detected at the Site is less than this protective concentration.

Resolution:
Total cPAHs can be removed as a COPC for unsaturated soil.

b. Table 8 (Saturated Soil)

Empirical Demonstration:
The discussion above for unsaturated soil also applies to saturated soil.

Resolution:
Total cPAHs can be removed as a COPC for saturated soil.

c. Total Toxic Mobility Equivalent Concentrations (TMEQs)

The Total cPAH concentration was calculated using the Total Toxic Equivalent Concentration (TEQ) equation.

TMEQs will be added to an updated "Interstate 82 Exit 33A Yakima City Landfill Preliminary Cleanup Levels Memorandum."

Note: The TMEQ calculations will include all samples with any detection of a minimum required cPAH under WAC 173-340-708(e). This includes samples collected at boring locations GP-23 and GP-26. These boring locations are located up-gradient of the Landfill Site on the adjacent Boise Cascade Mill Cleanup Site (FSID: 450, CSID: 12095) Landau Associates Inc., September 12, 2018.

Significance:
TMEQs are used to evaluate the potential for cPAH mixtures in soil to impact groundwater (surface water). Considering it has been empirically demonstrated that Total cPAH concentrations present in soil have not impacted groundwater (surface water), the TMEQs do not affect the removal of Total cPAHs as a COPC.

5. Barium

a. Table 7 (Unsaturated Soil)

Empirical Demonstration:
The "Interstate 82 Exit 33A Yakima City Landfill Preliminary Cleanup Levels Memorandum," dated September 22, 2023 lists barium as a COPC with a PCUL based on the protection of surface water.

Barium can be removed as a COPC for surface water based on an upward adjustment of the surface water PCUL and an empirical demonstration showing soil concentrations at the Site have not caused, and will not cause, groundwater (surface water) PCULs to be exceeded (See Ecology's July 26, 2024 memo regarding groundwater and surface water PCULs for rationale and discussion).

Based on the removal of the soil leaching to groundwater (surface water) pathway, the unsaturated soil PCUL can be upward adjusted to 1,250 mg/kg protective of terrestrial ecological receptors. The maximum concentration of barium detected at the Site is less than this protective concentration.

Resolution:
Barium can be removed as a COPC for unsaturated soil.

b. Table 8 (Saturated Soil): Soil concentrations determined to be protective of human health and ecological receptors based on a site-specific pathway analysis (assumed saturated conditions for the leaching model).

Empirical Demonstration:
The discussion above for unsaturated soil also applies to saturated soil.

Resolution:
Barium can be removed as a COPC for saturated soil.

6. 4,4' – DDD (dichlorodiphenyldichloroethane) and 4,4' – DDT (dichlorodiphenyltrichloroethane)

a. Table 7 (Unsaturated Soil)

Empirical Demonstration:
The "Interstate 82 Exit 33A Yakima City Landfill Preliminary Cleanup Levels Memorandum," dated September 22, 2023 lists 4,4' – DDD and 4,4' – DDT as a COPCs with PCULs based on the protection of surface water upward adjusted to the PQL.

4,4' – DDD and 4,4' – DDT can be removed as COPCs for surface water based on an upward adjustment of the PQLs and an empirical demonstration showing soil concentrations at the Site have not caused, and will not cause, groundwater (surface water) PCULs to be exceeded (See Ecology's July 26, 2024 memo regarding groundwater and surface water PCULs for rationale and discussion).

Based on the removal of the soil leaching to groundwater (surface water) pathway, the unsaturated soil PCULs can be upward adjusted to 1.0 mg/kg (for each) protective of terrestrial ecological receptors. The maximum concentration of 4,4' – DDD and 4,4' – DDT detected at the Site are less than these protective concentrations.

Resolution:
4,4' – DDD and 4,4' – DDT can be removed as a COPC for unsaturated soil.

b. Table 8 (Saturated Soil)

Empirical Demonstration:
The discussion above for unsaturated soil also applies to saturated soil.

Resolution:
4,4' – DDD and 4,4' – DDT can be removed as a COPC for saturated soil.

REFERENCES

Ecology (September 22, 2023). Memorandum: "Interstate 82 Exit 33A Yakima City Landfill Preliminary Cleanup Levels."[1] Washington State Department of Ecology. No Publication No.

Landau Associates, Inc. (2023). Memorandum: "Response to Ecology September 2023 Memorandum and Letter Regarding Preliminary Cleanup Levels and Contaminant of Potential Concern, Interstate 82 Exit 33A Yakima City Landfill, Yakima, Washington." Landau Associates, Inc. No Publication No.

Ecology (July 26, 2024). Memorandum: "Interstate 82 Exit 33A Yakima City Landfill: Response and Resolution to Comments Regarding Groundwater and Surface Water PCULs"[2] Washington State Department of Ecology. No Publication No.

[1] https://apps.ecology.wa.gov/cleanupsearch/document/130578
[2] https://apps.ecology.wa.gov/cleanupsearch/document/145161