DEPARTMENT OF ECOLOGY

Toxics Cleanup Program

Memorandum

Date: September 5, 2025

To: Valerie Bound, Section Manager, Central Regional Office (CRO)

From: John Zinza, PE, Cleanup Project Manager, CRO

Subject: Ecology Comments on the Holden Mine Site Phase 2 Remedial Action Proposed Plan, dated July 2025

Below are comments from the review of the Holden Mine Site Phase 2 Remedial Action Proposed Plan received in our office from the US Forest Service on July 3, 2025. The comments are presented in a comment/discussion/resolution format.

Regarding our comments, Ecology is providing an opinion on the HMS-RAPP's compliance with state laws. Our opinions expressed in this letter are consistent with our authority under the Model Toxics Control Act (MTCA), Chapter 70A.305 RCW,[1] which includes WAC 173-340[2] and 173-204,[3] and the Water Pollution Control Act, Chapter 90.48 RCW,[4] which includes WAC 173-201A.[5]

Ecology Comments/Discussion/Resolution: Below are Ecology's comments, and as appropriate, associated discussion and expectations about the resolution:

Comment 1: Page 1. Under Section "1. INTRODUCTION," 2nd paragraph. The paragraph identifies fulfilling federal statutory and regulatory requirements, but lacks the necessary language to address state requirements.

Discussion: It's necessary to ensure all parties are aware that the state is asserting concurrent cleanup authority under MTCA.

Resolution: Make adjustments to include text about the state's role.

Comment 2: Page 1. In the box regarding public comments. There should be a reference to indicate that the process will meet State requirements, and thus, there will not be a separate State process.

Discussion: Since this is a joint CERCLA/MTCA settlement, it seems prudent to include a reference that the federal public comment process covers the state public comment process as well. Thus, there will not be a separate state public comment process.

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[1] https://app.leg.wa.gov/rcw/default.aspx?cite=70A.305
[2] https://app.leg.wa.gov/wac/default.aspx?cite=173-340
[3] https://app.leg.wa.gov/wac/default.aspx?cite=173-204
[4] http://app.leg.wa.gov/RCW/default.aspx?cite=90.48
[5] https://app.leg.wa.gov/wac/default.aspx?cite=173-201A

Resolution: Include text to indicate that the federal public comment period is being jointly used to satisfy State public participation requirements.

Comment 3: Page 2. Under the heading "The CERCLA Process," 3rd paragraph. If the Forest Service elects to modify the Preferred Alternative or select another cleanup alternative, there is no information on whether or not this process includes consultation with EPA, Ecology, and the Yakama Nation.

Discussion/Resolution: It would be beneficial to Ecology for the USFS to expand on this process. This likely should be done in a separate document.

Comment 4: Page 2. Under the heading "The CERCLA Process." 4th paragraph, 1st sentence. How will the public choose to comment on meeting State requirements if there is no reference to State requirements?

Discussion: Since the State has indicated that public participation requirements can be met with the CERCLA public commenting, there should be some reference to State requirements, especially since there is a plan in Section 8, Evaluation of Alternatives Under MTCA.

Resolution: Add text referencing State of Washington requirements.

Comment 5: Page 3. Under the heading "Summary of Preferred Alternative," the third sentence. This sentence omits the source control issue of the wind-blown tailings areas on the other side of Railroad Creek as sources to surface water and sediment.

Discussion: These areas of wind-blown tailings have been consistently omitted from documents. These areas are potential sources of Railroad Creek surface water and sediment and should not be ignored.

Resolution: Add this source control issue to the preferred remedy and ensure it includes some type of monitoring, erosion control, and/or treatment to address these areas as sources to Railroad Creek.

Comment 6: Page 3. Under the heading "Summary of Preferred Alternative," 1st bullet. Only surface water is mentioned, and sediment is omitted as a media of concern.

Discussion: Surface water and sediment are intertwined, and the preferred alternative must be conditioned to prevent groundwater contamination from reaching surface water and sediment. This is particularly important in gaining areas of the creek where groundwater flows upwards to the creek (i.e., into and through sediment). See page 14, which specifically states this as an issue.

Resolution: Revise this sentence and ensure sediment is included in all areas pertaining to protecting Railroad Creek.

Comment 7: Page 3. Under the heading "Summary of Preferred Alternative," 2nd bullet, last semi-colon sentence referring to "and shallow zone groundwater discharging to downstream sections of Railroad Creek…." Downstream appears to omit the wetland.

Discussion/Resolution: Downstream should be defined to include "…to the wetland and downstream sections of Railroad Creek…"

Comment 8: Page 3. Under the heading "Summary of Preferred Alternative," 4th bullet is specific to "shakedown period." The three years for a shakedown do not seem to meet the definition of a shakedown phase, which occurs following construction and before Operational & Functional status.

Discussion: Refer to EPA 540-R-98-016 OSWER Directive 9320.2-09A-P PB98-963223 January 2000 Close Out Procedures for National Priorities List Sites. Page 2-2. 2.3.1 Operational & Functional (O&F), which says:

> "2.3.1 Operational & Functional (O&F) O&F activities are conducted after physical construction of the remedy is complete to ensure that it is functioning properly and operating as designed. O&F determinations are made for containment remedies (all media), groundwater restoration, and surface water restoration, but not for monitored natural attenuation. **The phase following construction of the remedy and before O&F is often referred to as shakedown, where the constructor makes minor modifications as necessary** to ensure the remedy is operating as designed.
>
> Formal O&F determinations are primarily made for Fund-financed projects because O&F governs when the Regions turn these projects over to the States for operation and maintenance. The term O&F is also sometimes applied to the Potential Responsible Party (PRP) lead projects to signify the end of the shakedown period. For Federal Facilities (FF) lead projects, a different determination, Operating Properly and Successfully, is made."

Resolution: Consider using the term O&F and defining "shakedown' to be consistent with the EPA guidance.

Comment 9: Page 3, under the heading "Summary of Preferred Alternative," 4th and 7th bullets. It is unclear if the five years of monitoring of groundwater to verify if performance standards are separate from a long-term monitoring plan, or just part of the "shakedown period" component. The O&M tasks do not include long-term monitoring, nor is there a separate bullet for long-term monitoring.

Discussion: As a containment/pump & treat remedy that will be operational for an unspecified amount of time, long-term monitoring must be part of the preferred alternative. While explicit details for long-term monitoring are not necessary, it should be clearly stated that it is part of the preferred remedy.

Resolution: Provide context and the objectives of the five years of monitoring, and how it relates to the necessary long-term monitoring. Provide information on long-term monitoring, including groundwater, soil, sediment, porewater, and surface water.

Comment 10: Page 3. Under the heading "Summary of Preferred Alternative," 6th bullet and Page 25 Section 6 "Remedial Alternatives Monitored Natural Attenuation (MNA)." It is not consistently clear throughout the document which part of the site MNA applies and it is not stated if MNA has been modeled for the site.

Discussion: MNA is achieved through natural processes, not groundwater containment. Groundwater containment is used to prevent the spreading of contamination by diverting groundwater, which in this case is to the collection system for conveyance to the mine water treatment plant. Key EPA publications, such as the "EPA Ground Water Issue, Metal Attenuation Processes at Mining Sites"[6] identify the challenges for relying on MNA to address groundwater contamination from inorganics originating from AMD, including tailings piles. These challenges are related to physical and chemical conditions that may result in the remobilization of metals. This publication identifies that modeling is typically done for AML sites to evaluate MNA for site-specific conditions.

Resolution: Clarify the text and add a figure to show which part of the site MNA applies to, and specifically define MNA as a remedial technology specific to a mining site with acid mine drainage from waste rock and tailings piles. Provide information on any site-specific MNA modeling that has been completed, or is planned, and the results, including uncertainties of the data and conclusions.

Comment 11: Page 3. Under the heading "Summary of Preferred Alternative," the last paragraph. A statement that the preferred alternative will reduce the magnitude of risk and groundwater will be restored to beneficial uses does not include "meeting cleanup standards for all media" as a requirement.

Discussion: While reducing risk is an important goal, the preferred alternative must meet cleanup standards for all media within a reasonable restoration timeframe.

Resolution: Include this as a requirement for the preferred alternative.

Comment 12: Page 5. Under the heading "2. SITE BACKGROUND," 1st paragraph and Figure 2. Doesn't the Glacier Peak Wilderness Area go along the south side of Railroad Creek?

Discussion/Resolution: The figure does not seem to show that the Glacier Peak Wilderness Area is along the south side of Railroad Creek from TP3 to a location closer to the lake.

[6] https://archive.epa.gov/ada/web/pdf/60000isw.pdf

Comment 13: Page 5. Under the heading "2. SITE BACKGROUND," 2nd paragraph and Figure 2. The figure does not correlate with the text "the Site also includes about 10 miles of Railroad Creek…Lucerne Bar in Lake Chelan."

Discussion/Resolution: Amend the figure to identify the extents of the Site by adding an outline of the site.

Comment 14: Page 6. Under the heading "2. SITE BACKGROUND," third paragraph, second sentence starting "In situ pilot studies…" does not mention the results and how the study informed the preferred alternative.

Discussion: Are the results from the pilot study ready for the state to review? There is a mention of Honeymoon Heights in the beginning summary paragraph on Page 3, but no mention of what in-situ treatment has been deployed or the effectiveness of the treatment.

Resolution: Include this information and how the results informed, or will inform, the preferred alternative.

Comment 15: Page 7. See the paragraph directly following Table 1. Regarding the text "the nine criteria specified in Section 300.430(f)(5)(i) of the NCP," which includes a reference to a Floyd |Snider document. The 8th criteria (listed below) includes a requirement to assess the state's position and key concerns. The comments in this memorandum present State concerns.

> § 300.430 Remedial investigation/feasibility study and selection of remedy.
>
> (e) ***Feasibility study.***
>
> (9) ***Detailed analysis of alternatives.***
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> (iii) ***Nine criteria for evaluation.*** The analysis of alternatives under review shall reflect the scope and complexity of site problems and alternatives being evaluated and consider the relative significance of the factors within each criteria. The nine evaluation criteria are as follows:
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> (H) ***State acceptance.*** Assessment of state concerns may not be completed until comments on the RI/FS are received, but may be discussed, to the extent possible, in the proposed plan issued for public comment. The state concerns that shall be assessed include the following:
>
> (*1*) The state's position and key concerns related to the preferred alternative and other alternatives; and
>
> (*2*) State comments on ARARs or the proposed use of waivers.

Discussion/Resolution: Consider the comments in this memorandum a summary of state concerns.

Comment 16: Page 7. Under section "2. SITE BACKGROUND," see the paragraph directly following Table 1. Regarding the text "Although not part of the CERCLA process, the evaluation of alternatives under MTCA provides the State with a cleanup action plan under MTCA (WAC 173-340-380(4))[7] (see pages 27 through 39 of this Proposed Plan)," note that the State has extensive comments on the content of the pages indicated.

[7] https://app.leg.wa.gov/wac/default.aspx?cite=173-340-380

Discussion/Resolution: See the State's comments below.

Comment 17: Page 10. Under the heading "Post-ROD Response Actions," the last bullet. What type of wells were abandoned?

Discussion: Since there are multiple types of wells, environmental, drinking water, dry, etc., qualifying the well type may help the reader.

Resolution: Consider qualifying the type of well.

Comment 18: Page 11. Under the heading "Phase 1 Remedial Action," 2nd bullet on page 11. What was done with the ferricrete? Was it disposed of, and if so, where, or was it just broken up in place?

Discussion/Resolution: It might be helpful to the reader to add a few words regarding the outcome of the ferricrete.

Comment 19: Page 11. Under the heading "Additional Post-ROD Activities and Monitoring," 1st paragraph. Is there a reference document that can be cited for the wetland mitigation?

Discussion/Resolution: There seems to be inconsistencies in including references in the document. The text regarding mitigation seems like an appropriate place to add a reference.

Comment 20: Page 12. Under section "3.0 SITE CHARACTERISTICS," 3rd paragraph regarding the text "…(AOIs) where in situ treatment was completed or will be completed…." It would be helpful to distinguish the completed or will be completed (not completed) AOIs on Figure 3.

Discussion/Resolution: Update Figure 3 to distinguish the completed and not completed AOIs.

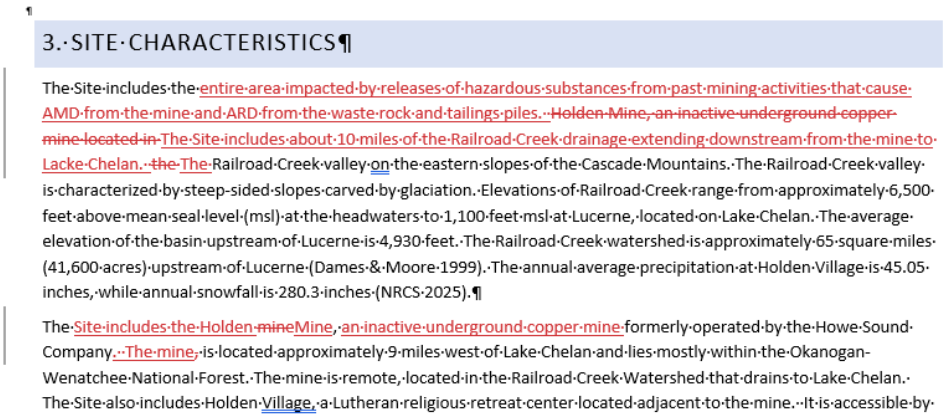
Comment 21: Page 12. Under section "3.0 SITE CHARACTERISTICS," first and second paragraphs, and the figure. The text and figure seems to support and convey that the Site is the mining features depicted in the figure on the page and not a Site extending to Lake Chelan.

Discussion: The text and figures from the ROD provide more clarity to the reader on the extent of the Site. See ROD, Part 2 text on Page 2-1 (provided below) and Figure 3.

> "The Site, shown on Figure 3, includes the entire area impacted by releases of hazardous substances from past mining activities that cause acidic drainage from the mine (AMD) and the waste rock and tailings piles (ARD). The Site also includes about 10 miles of the Railroad Creek drainage extending downstream from the mine to Lake Chelan, Holden Village, and outlying areas such as Honeymoon Heights (described in more detail in Section 5.2).[3]

Footnote 3: Although the mine is a bit less than 9 miles from Lake Chelan, the total length of the watershed impacted by releases from the mine is about 10 miles based on meanders in Railroad Creek."

Resolution: Edit text and add a figure similar to Figure 3 in the ROD to portray the Site extents. Suggested text revision as follows:



3. SITE CHARACTERISTICS

The Site includes the ~~entire area impacted by releases of hazardous substances from past mining activities that cause AMD from the mine and ARD from the waste rock and tailings piles. Holden Mine, an inactive underground copper mine located in~~ The Site includes about 10 miles of the Railroad Creek drainage extending downstream from the mine to Lacke Chelan. ~~the~~ The Railroad Creek valley on the eastern slopes of the Cascade Mountains. The Railroad Creek valley is characterized by steep-sided slopes carved by glaciation. Elevations of Railroad Creek range from approximately 6,500 feet above mean seal level (msl) at the headwaters to 1,100 feet msl at Lucerne, located on Lake Chelan. The average elevation of the basin upstream of Lucerne is 4,930 feet. The Railroad Creek watershed is approximately 65 square miles (41,600 acres) upstream of Lucerne (Dames & Moore 1999). The annual average precipitation at Holden Village is 45.05 inches, while annual snowfall is 280.3 inches (NRCS 2025).

The Site includes the Holden ~~mine~~Mine, an inactive underground copper mine formerly operated by the Howe Sound Company. The mine, is located approximately 9 miles west of Lake Chelan and lies mostly within the Okanogan-Wenatchee National Forest. The mine is remote, located in the Railroad Creek Watershed that drains to Lake Chelan. The Site also includes Holden Village, a Lutheran religious retreat center located adjacent to the mine. It is accessible by

Comment 22: Page 13. Under section "Groundwater," 1st paragraph regarding the text "…buried stream channels, including channels that have been subsequently covered by tailings piles… or in historic channel meanders …." It would be helpful to show these channels, especially the 1937 Railroad Creek channel.

Discussion/Resolution: Update Figure 3 to show known buried and historic stream/creek channels or alignments.

Comment 23: Page 13. Under section "Groundwater," it might be helpful to the reader to define the different zones (shallow, intermediate, etc.) by providing a description and depth.

Discussion/Resolution: Consider defining the zones.

Comment 24: Page 13. Under section "Shallow Zone Groundwater," 1st paragraph below Figure 4. Regarding the text "…and downgradient areas…," do these areas include the exceedances near and downstream of the treatment plant?

Discussion/Resolution: Clarify what these downstream areas are.

Comment 25: Page 13-14. Under section "Shallow Zone Groundwater," the last paragraph below Figure 4. Regarding the investigation proposed to evaluate the West Area Seeps, are there any details on what this investigation will involve?

Discussion/Resolution: Has the plan or the investigation been developed, and does it include a dye study? If so, please share.

Comment 26: Page 14. Under the heading "3. SITE CHARACTERISTICS. Groundwater" Figure 5. The text references the "gaining" sections of Railroad Creek, but the figure does not show gaining sections.

Discussion/Resolution: Add gaining sections to the figure.

Comment 27: Page 14. Under the heading "3. SITE CHARACTERISTICS. Sediment." The areas of ferricrete accumulation are not in any figures.

Discussion/Resolution: It would be helpful to have these areas added to Figure 5.

Comment 28: Page 15. Under the heading "3. SITE CHARACTERISTICS. Sediment." In the last paragraph, there is a footnote for "bioassay data" that should include the SMS citation, and the term "SQS" is incorrect.

Discussion/Resolution: Add WAC 173-204-563(3)[8] to the footnote and correct "SQS" to "SCO."

Comment 29: Page 15. Under the heading "Surface Water," 1st paragraph, second sentence. The "however" seems to diminish the fact that there are exceedances.

Discussion/Resolution: Here is a suggested start to a text revision. The paragraph should also say what is going to be done about the exceedances.

Surface·Water¶

Surface·water-based·criteria·exceedances·were·observed·for·copper·in·Railroad·Creek·during·the·most·recent·sampling·events·in·2024.·~~However~~Though,·surface·water·COC·concentrations·in·Railroad·Creek·have·decreased·over·time·and·are·less·than·concentrations·measured·prior·to·the·Phase·1·Remedial·Action·(Floyd·|·Snider·2024)·the·exceedances·still·need·to·be·monitored·and·addressed.·¶

Comment 30: Page 15. Under the heading "Surface Water," 2nd paragraph. What is the plan to address the exceedances?

Discussion: Ecology understands that the USFS made a decision to leave the tailings in place to avoid impacting the vegetation. However, that decision does not alleviate the responsibility to address the exceedances.

Resolution: Please identify a plan for addressing the exceedances.

Comment 31: Page 16. Under the heading "Soil," the last sentence. Regarding '…no cleanup actions…are anticipated as part of the Phase 2" RA.

Discussion/Resolution: Please confirm that the in-situ treatment cleanup action at Honeymoon Heights is part of Phase 1; is incomplete; and thus, is not part of Phase 2, but rather overlaps Phase 2.

[8] https://app.leg.wa.gov/wac/default.aspx?cite=173-204-563

Comment 32: Page 16. Under the heading "Air," will dust control measures be necessary for Phase 2 well installation activities, assuming well drilling and utility installation may occur in tailings?

Discussion/Resolution: Please confirm and address as necessary.

Comment 33: Page 17. Under the heading "Fate and Transport," 3rd paragraph. Regarding the preferential pathways. Is the 1937 Railroad Creek channel (and others?) considered a preferential pathway? Additional features should be shown in the figures to give context to help the reader.

Discussion/Resolution: If there are key preferential pathways, they should be shown on the figures, especially Figure 6. Since MIW migrates downgradient to a discharge near SG-10, then a SG-10 along with an indication of the MIW impact downgradient should be called out on Figure 6.

Comment 34: Page 17. Under the heading "Fate and Transport," 4th paragraph. Regarding surface water losing to groundwater, "effectively protecting this section of the stream" with the "exception" of the spring freshet. Can you provide an idea of the metal loading to Railroad Creek during these different times?

Discussion: Since the MIW is discharging to Railroad Creek part of the year, the creek is not protected and exceeds surface water CULs.

Resolution: Consider revising this paragraph to provide a more matter-of-fact observation about the impact on Railroad Creek during the course of the year, including an idea of the seasonal loadings of the Creek.

Comment 35: Page 19. See the paragraph under Figure 7 and MIW associated with the remnant tailings in the Wetlands. The text indicates that "the seep collection system at this location does not intercept all discharging groundwater" and "MIW present in the wetland surface water is attributed to … COCs at concentrations exceeding surface water criteria." What is the plan to address these exceedances? Will Phase 2 address these exceedances, or is there another plan to address these exceedances?

Discussion/Resolution: Please provide the information for not just the reader but also Ecology. Ecology may evaluate the response to develop a more detailed comment on the exceedances if warranted.

Comment 36: Page 20. Under the heading "4. SUMMARY OF SITE RISKS, Ecological Risks," does not include sediment and surface water exposure pathways.

Discussion/Resolution: Dermal contact and ingestion of sediment by invertebrates and risks to fish and aquatic life from contaminants in surface water should be included as bullets.

Comment 37: Page 20. Under the heading "4. SUMMARY OF SITE RISKS," human health sediment risks for the beach play exposure scenario are not mentioned.

Discussion: Considering the people who stay at Holden Village, beach play is a potential exposure scenario from sediment that should be discussed.

Resolution: Incorporate this exposure scenario and incidental ingestion/dermal contact as exposure pathways. SCUM Appendix K can be used to calculate site-specific values.

Comment 38: Page 20. Under the heading "4. SUMMARY OF SITE RISKS," there is no mention of surface water ecological risks.

Discussion: Considering the acid mine drainage, particularly from the seeps and potentially from the wetland, has low pH and contains metals, there is an ecological risk to aquatic life in Railroad Creek that should be discussed. This would be consistent with RAO 1 to reduce contaminant concentrations to be protective of aquatic life.

Resolution: Include a discussion specific to surface water quality and aquatic life risks.

Comment 39: Page 20. Under the heading "4. SUMMARY OF SITE RISKS, Ecological Sediment Risks," the "sediment quality standards" phrase is incorrectly referenced.

Discussion: The Sediment Management Standards benthic criteria are "sediment quality standards" in Part III of the rule, but the site falls under the authority of Part V of the rule. The regulatorily correct term is "sediment cleanup objectives."

Resolution: Make global changes when referencing the state Sediment Management Standards benthic criteria by using the term "sediment cleanup objectives," and do not use "sediment quality standards." Make a specific revision to the second sentence, "…have not exceeded the sediment cleanup objective biological criteria outline in the SMS."

Comment 40: Page 20. Under the heading "4. SUMMARY OF SITE RISKS, Ecological Sediment Risks." The term "historically" in reference to sediment CoCs can be interpreted as misleading.

Discussion/Resolution: Delete the term "historically." These are still CoCs for sediment since the alternative will need to be operational continuously and for an unspecified amount of time in order to protect sediment quality and meet and maintain cleanup standards.

Comment 41: Page 20. Under the heading "5. REMEDIAL ACTION OBJECTIVES AND CLEANUP LEVELS," RAO 1 bullet states "other surface waters," which is unclear.

Discussion/Resolution: Clarify what other surface waters this statement references.

Comment 42: Page 21. Under the heading "5. REMEDIAL ACTION OBJECTIVES AND CLEANUP LEVELS," paragraph after RAO 6. The statement that RAOs 1, 3, and 5 focus on containment of and preventing the discharge or MIW to surface water is unclear.

Discussion: Is this intended to address the discharge of MIW from TP 1-3 to surface water in the wetland as well? And, what about the discharge from the wetland to Railroad Creek?

Resolution: Clarify what surface water these RAOs pertain to and how the wetland discharge will be addressed. If it is through MNA, see our previous comments on MNA.

Comment 43: Page 21. Under the heading "5. REMEDIAL ACTION OBJECTIVES AND CLEANUP LEVELS," paragraph after RAO 6 states "…and by achieving surface water ARARs and bioassays," which is not accurate.

Discussion/Resolution. Bioassays are a tool used to comply with the SMS biological criteria, but they cannot be "achieved." Recommend revising the paragraph to "and by achieving surface water ARARs and SMS biological criteria."

Comment 44: Page 21. Under the heading "5. REMEDIAL ACTION OBJECTIVES AND CLEANUP LEVELS," Table 2. The table footnote "b" states that the "cleanup level is based on state or federal surface water quality criteria or background, if higher" does not appear to comply with WAC 173-201A.

Discussion: WAC 173-201A definition of background is "natural background," specifically "*surface water quality that was present before any human-caused pollution*." Any site-specific surface water background established for Holden, if samples were taken in Railroad Creek, would not be consistent with this definition due to the historical mining upstream of Railroad Creek and within the watershed.

Resolution: If any cleanup levels for surface water are based on "background," they should be adjusted to comply with the water quality standards in WAC 173-201A.

Comment 45: Page 23. Under the heading "5. REMEDIAL ACTION OBJECTIVES AND CLEANUP LEVELS," Table 3, Sediment Basis footnote "f" states "*constituent of concern list based on freshwater sediment TBCs*" is incorrect.

Discussion/Resolution: The SMS rule benthic criteria, which is an ARAR, should be the basis for sediment in this table.

Comment 46: Page 23. Under the heading "5. REMEDIAL ACTION OBJECTIVES AND CLEANUP LEVELS," Table 3, Sediment. Only aluminum is listed as a CoC with no explanation.

Discussion: Since the remedy will be containment and treatment, it will require continuous—or at least an unspecified long-term timeframe—operation to meet and maintain sediment quality and cleanup standards. Therefore, the historical CoCs should remain for sediment and be included in long-term monitoring.

Resolution: Revise the CoCs for sediment.

Comment 47: Page 24. Under the heading "6. REMEDIAL ALTERNATIVES," first paragraph. The design of the alternatives text is unclear and does not provide enough detail to fully understand the alternatives and substantive differences.

Discussion/Resolution: Recommend adding cross-section figures that provide details on engineering design with groundwater level for each alternative. This would be helpful for the public to understand the alternatives and substantive differences between them.

Comment 48: Page 24. Under the heading "6. REMEDIAL ALTERNATIVES, Monitored Natural Attenuation (MNA)." It is unclear if MNA applies to alternatives 3-6.

Discussion/Resolution: If this applies to alternatives 3-6, it should be stated as such, and the differences of how MNA will work detailed for each alternative. See previous comments on MNA.

Comment 49: Page 24. Under the heading "6. REMEDIAL ALTERNATIVES, Monitored Natural Attenuation (MNA)," the second paragraph includes dilution as a process for MNA, which is not consistent with MTCA. In addition, it is difficult to understand specifically where MNA applies at the site.

Discussion: It is unclear if dilution as a component of MNA means dilution with surface water as it enters Railroad Creek, which is not allowed under MTCA. The text uses the phrasing "downgradient groundwater" in terms of where MNA will apply. However, it is difficult to see where that area is geographically. Does "downgradient groundwater" start just downgradient of TP3, or just downgradient of the wetland, or further downgradient near SG10? Using Figure 6 to understand if "dilution" of surface water in Railroad Creek would occur just downgradient of TP3 (which is essentially the wetland), this appears to be the case, considering that area is either gaining or intermittently gaining.

Resolution: Clearly detail how and where MNA applies and how dilution with surface water into Railroad Creek is not part of any alternative. In addition, clarify if MNA is intended to address groundwater as it flows through the wetland and is diluted with surface water by discharging into Railroad Creek.

Comment 50: Page 25. Under the heading "6. REMEDIAL ALTERNATIVES, Monitored Natural Attenuation (MNA)." Please confirm if MNA has been modeled at the site?

Discussion: Key EPA publications, such as the "EPA Ground Water Issue, Metal Attenuation Processes at Mining Sites," identify the challenges for relying on MNA to address groundwater contamination from inorganics originating from AMD, including tailings piles. These challenges are related to physical and chemical conditions that may result in the remobilization of metals.

The document identifies that modeling is typically done for AML sites to evaluate MNA for site-specific conditions. Has modeling for MNA been completed for this Site? If so, please share. If not, then is it planned?

Resolution: Please provide information on modeling for site-specific MNA and the modeling findings.

Comment 51: Page 24. Under the heading "6. REMEDIAL ALTERNATIVES, Operations and Maintenance (O&M)." It is unclear if the O&M described applies to all alternatives.

Discussion/Resolution: Clarify to which alternatives this O&M applies.

Comment 52: Page 24. Under the heading "6. REMEDIAL ALTERNATIVES, Operations and Maintenance (O&M)." The design life for the Sludge Filter Cake Management Facility does not include a contingency.

Discussion: The design life is 23-37 years, which is not consistent with the necessary and unspecified timeframe of the pump and treat system to meet and maintain cleanup standards. Replacement must be included as a contingency and part of the remedial alternatives.

Resolution: Clarify the contingencies that will be implemented once the facility has reached design life capacity.

Comment 53: Page 25. Under the heading "6. REMEDIAL ALTERNATIVES, Water Treatment at the MWTP," the second sentence states that Alternative 3A has the highest potential for dilution with surface water, which, as written, is not consistent with MTCA.

Discussion/Resolution: Dilution with surface water in Railroad Creek is not an allowed remedial technology under MTCA. Alternative 3A should be revised to ensure it is not relying on dilution with surface water in Railroad Creek as a remedial technology. If Alternative 3A is intended to pump and treat groundwater that mixes with surface water (within the groundwater table), then this should be clarified.

Comment 54: Page 26. Under the heading "6. REMEDIAL ALTERNATIVES, Common Components for Alternatives 4 through 6, Conveyance to the MWTP," second sentence. This sentence explicitly applies to Alternatives 2 and 3A, but the section is under Alternatives 4 – 6, which is confusing.

Discussion/Resolution: Clarify this sentence.

Comment 55: Page 25. Under the heading "6. REMEDIAL ALTERNATIVES, Operations and Maintenance (O&M). What about O&M following the Phase 2 Remedial Action? Is there any consideration given to the order of the list?

Discussion: The sentence under the heading introduces a list of major components of the O&M Tasks for the Phase 1 Remedial Action. There is nothing said about Phase 2.

Additionally, from a remedial perspective, it seems like maintaining the groundwater and seep collection system and operating the MWTP are more important or primary than snow removal and taking care of the Lucerne Barge Ramp. The intent of this comment is not to downplay the importance of snow removal and taking care of the barge ramp; however, from a remedial perspective, this list seems like it should be rearranged.

Resolution: Consider rearranging the list based on activities directly related to remediation instead of indirectly related to remediation. Also, verify if there should be a reference to Phase 2.

Comment 56: Page 26. Under the heading "6. REMEDIAL ALTERNATIVES, Institutional Controls." Could a list of ICs be provided?

Discussion/Resolution: A list of ICs would benefit someone reading this document.

Comment 57: Page 26. Under the heading "6. REMEDIAL ALTERNATIVES, Water Treatment at the Mine Water Treatment Plan (MWTP)," 2nd paragraph. It would be helpful to add the date the SFCMF became active and associate a year with the 23- 37 years. It may also be helpful to identify what will happen to the sludge filter cake after 37 years. Also, what is the "considerable excess capacity" in terms of years?

Discussion/Resolution: Please provide some more context for this paragraph.

Comment 58: Page 27. Under the heading "6. REMEDIAL ALTERNATIVES, Groundwater Containment (Extraction Wells)," 3rd paragraph. The second sentence seems confusing about one existing crossing, then talks about different crossings.

Discussion: The sentence contains the text "From the distribution box, an HDPE line would exit and tie into an existing 6-inch diameter HDPE line that crosses Railroad Creek (Alternatives 2 and 3A have a different Railroad Creek crossing through existing conveyances from the cleanout reservoir)." This seems confusing since it is talking about "an existing…line," then talks about having different crossings.

Resolution: Please consider qualifying as necessary and refer to a figure to depict the crossings.

Comment 59: Page 27. Under the heading "6. REMEDIAL ALTERNATIVES, Conveyance to the MWTP," consider qualifying whether the pipe crossing Railroad Creek exists or not, and if it is under the creek or will be hanging.

Discussion/Resolution: Please consider that since the paragraph states that the cleanouts exist, it makes sense to qualify the crossing.

Comment 60: Page 28. Under the heading "6. REMEDIAL ALTERNATIVES, Summary of Alternatives, ALTERNATIVE 2." Alternative 2 does not include gpm capacity.

Discussion/Resolution: Add gpm capacity to be consistent with the other alternatives.

Comment 61: Page 28. Under the heading "6. REMEDIAL ALTERNATIVES, Water Treatment at the MWTP and Discharge-to-Railroad Creek." Should the NPDES permit be mentioned here? What is the schedule for the NPDES permit, and do the flow changes from phase 2 impact the permit?

Discussion/Resolution: Respond as appropriate. Consider mentioning the NPDES as part of the paragraph on page 28

Comment 62: Page 29. Under the heading "6. REMEDIAL ALTERNATIVES, Summary of Alternatives," consider qualifying that this is a summary of Phase 2 alternatives.

Discussion: Since these alternative numbers were previously used for this site, it may be beneficial to identify this heading as "Summary of Phase 2 Alternatives" to avoid any confusion (see URS Draft Final Feasibility Study HMS, Feb. 19, 2004, and 2007 USFS Supplemental Feasibility Study).

Resolution: Consider qualifying that these are Phase 2 alternatives where appropriate in the document.

Comment 63: Page 29. Regarding "Alternative 1," why not identify the current remedy being phase 1, like you did in the write-up for Alternative 2 below?

Discussion/Resolution: Consider revising the sentence under the bullets to drive out that the current remedy is Phase 1, and no action means not Phase 2.

Comment 64: Page 29. Regarding "Alternative 2," why not identify the estimated timeframe for the O&M?

Discussion/Resolution: Identify the estimated timeframe for O&M.

Comment 65: Page 29 - 32. Under the heading "Summary of Alternatives," starting on page 29 and continuing, please clarify the alternative names and descriptions regarding "hydraulic controls" vs "hydraulic containment."

Discussion/Resolution: For example, isn't Alternative 3A is really Hydraulic containment with hydraulic controls; and likewise with Alternatives 4, 5, and 6. Consider clarifying the difference between controls and containment and adjusting the alternative names.

Comment 66: Page 31. Under the heading "6. REMEDIAL ALTERNATIVES, Summary of Alternatives, ALTERNATIVES 4-6." It is unclear how these alternatives are substantively different from each other and Alternatives 2 and 3A (given the extraction gpm capacity), how gpm capacity was calculated based on the depth and length of the barrier wall, and the efficacy of each alternative.

Discussion: Based on the summaries, it is difficult to see the substantive differences between Alternatives 4-6, making it hard to understand why they were included.

For example, Alternatives 4 & 5, gpm capacity of the extraction system (250-380gpm, 250-400gpm, respectively) do not appear substantively different. In addition, Alternative 6 gpm capacity (150-230gpm) appears somewhat different from Alternatives 4 & 5, but it is difficult to determine if the difference is substantive.

Should we assume that the longer and deeper the barrier wall (Alternative 6), the less dilution with surface water from Railroad Creek is expected to occur (Alternatives 4 & 5)? Or is there an actual difference in the percent of contaminated groundwater extracted? It would seem that the extraction of contaminated groundwater would be more efficient if surface water were not diluting groundwater, and there would be less potential for a release of contaminated groundwater to surface water along the barrier wall and downstream of the extraction system. If this is the case, why were these alternatives considered equal when scoring the benefits if they extract differing amounts of contaminated groundwater? And what is the substantive difference between Alternatives 4 & 5, as well as the other alternatives?

Resolution: Alternatives should be further detailed and described in terms of why the engineering was chosen and how that specifically correlates to benefits. For example, if there is a difference in the percentage of contaminated groundwater extracted for treatment.

Comment 67: Page 33. Under the heading "7. COMPARATIVE ANALYSIS OF ALTERNATIVES, Overall Protection of Human Health and the Environment." The second paragraph does not mention preventing contaminated groundwater from flowing directly to surface water.

Discussion/Resolution: There is an explicit statement about preventing contaminated groundwater from entering sediment from beneath, but it should be stated that the alternative will also prevent the direct flow of groundwater to surface water (e.g., seeps).

Comment 68: Page 34. Under the heading "7. COMPARATIVE ANALYSIS OF ALTERNATIVES, Reduction of Toxicity, Mobility, and Volume through Treatment." The second paragraph mentions that sludge generated from all alternatives would result in a marginally increased volume of material requiring management without context.

Discussion/Resolution: If this refers to the volume of sludge generated during Phase I, this should be clarified.

Comment 69: Page 34. Under the heading "7. COMPARATIVE ANALYSIS OF ALTERNATIVES." The decision to only carry forward Alternatives 2 and 3A, with no explanation, through the full alternatives analysis introduces an inappropriate bias at the start.

Discussion: All alternatives should have gone through the full alternatives analysis to retain transparency and clearly detail how each alternative compares in order to select the preferred alternative.

Resolution: The alternatives analysis should be re-done, whether Alternative 3A will be the resulting selected alternative.

Comment 70: Page 36. Under the heading "7. COMPARATIVE ANALYSIS OF ALTERNATIVES," Table 5. It is unclear as to why the barrier wall for Alternative 2 would be decommissioned.

Discussion: Is the assumption that the barrier wall will be decommissioned in 100 years based on an analysis or modeling? If so, does it show that the wall will need to be decommissioned because it will no longer be necessary, or because the groundwater will no longer be contaminated? Or is it to be decommissioned and a new barrier wall constructed?

Resolution: Answers to these questions should be clearly detailed in the document for all alternatives with a barrier wall.

Comment 71: Page 37. Under the heading "8. Evaluation of Alternatives Under MTCA." MTCA does not distinguish between "threshold criteria" and "other requirements," and this section omits key MTCA requirements.

Discussion: There are no differences between the importance of MTCA requirements in WAC 173-340-360(3).[9]

Resolution: Rewrite section 8 to be consistent with MTCA requirements by including:

1. WAC 173-340-360(3)(a) has 10 general requirements, and (iv), (v), (vii), and (viii) are missing from this list.
2. WAC 173-340-360(3)(b) has action-specific requirements, which are missing from this list.
3. WAC 173-340-360(3)(c) has media-specific requirements, which are missing from this list.
4. WAC 173-340-360(3)(d) has tribal rights and interests requirements, which are missing from this list.

Comment 72: Page 37. Under the heading "8. Evaluation of Alternatives Under MTCA." A statement that "MTCA threshold requirements must be met for an alternative to be considered further" is incorrect and omits key MTCA requirements.

Discussion: MTCA is different from CERCLA as follows: WAC 173-340-351(6)(c)[10] and (d) are used to screen out alternatives or components that do not meet the cleanup requirements in WAC 173-340-360 (listed in the above comment).

[9] https://app.leg.wa.gov/wac/default.aspx?cite=173-340-360
[10] https://app.leg.wa.gov/WAC/default.aspx?cite=173-340-351

Then an evaluation of the remaining alternatives is completed using WAC 173-340-360 and 173-340-370,[11] which would not exclude alternatives 4-6 from the analysis as is done in this Proposed Plan. Part of the analysis of remaining alternatives includes the disproportionate cost analysis (PMEP) to identify the preferred alternative, while also using the requirements in WAC 173-340-360(3).

Resolution: Correct the statement and identify the key MTCA requirements as described in the Discussion and as listed in the above comment.

Comment 73: Page 40. Under the heading "8. Evaluation of Alternatives Under MTCA, Permanence." It is unclear if Alternatives 2-6 meet the definition of "permanent" under MTCA WAC 173-340-200.[12]

Discussion: Under MTCA, a permanent cleanup action means *"a cleanup action in which cleanup standards can be met without further action being required at the site being cleaned, other than the approved disposal of any residue from the treatment of hazardous substances."* If an alternative requires that groundwater diversion, collection, and treatment to remain in place and operational after cleanup standards for all media are met, then this is considered "further actions being required at the site being cleaned up" and does not meet the definition of permanent under MTCA.

Resolution. It should be clearly stated for each alternative what timeframe the engineered controls (i.e., hydraulic, wells, barrier wall, MWTP) are expected to be operational after meeting cleanup standards (which is different than the restoration time frame that is limited to meeting cleanup standards, not maintaining cleanup standards). If an alternative is expected to require further actions after cleanup standards are met for all media, then it should be scored lower than other alternatives that will not require further actions.

Comment 74: Page 40. Under the heading "8. Evaluation of Alternatives Under MTCA, Long-Term Effectiveness." Ecology's guidance version is incorrect.

Discussion/Resolution: Revise from 2017 to 2023.

Comment 75: Page 41. Under the heading "8. Evaluation of Alternatives Under MTCA, Long-Term Effectiveness." The "severe storms" climate impact identified is too vague, and the adaptive capacity of the alternatives is not complete.

Discussion: Severe storms are listed, but it should be specified that severe storms can result in unprecedented flooding from a variety of factors, such as increased heavy rain events, early snowmelt when soil is saturated and Railroad Creek levels are high, rain-dominated precipitation, and rain on snow events, all of which can occur as a confluence of events.

[11] https://app.leg.wa.gov/wac/default.aspx?cite=173-340-370
[12] https://app.leg.wa.gov/WAC/default.aspx?cite=173-340-200

The adaptive capacity of the alternatives should include resilience to overland flooding of Railroad and Copper Creeks, which can impact the integrity of the barrier wall, tailings piles, and the Sludge Filter Cake Management Facility.

Resolution: Revise this section to incorporate all types of flooding scenarios and how the alternatives are adaptive and resilient to these extreme events.

Comment 76: Page 42. Under the heading "8. Evaluation of Alternatives Under MTCA, Public Concerns." This is not the MTCA DCA criterion.

Discussion. WAC 173-340-360(3)(d) separates public concerns and tribal rights and interests from the DCA process in WAC 173-340-360(5)(d). It is a requirement that all alternatives must be separate from the DCA, and public concerns and tribal rights, and interests can be used as deciding factors to select an alternative after the DCA is completed.

Resolution: Rewrite this section consistent with MTCA.

Comment 77: Page 42. Under the heading "8. Evaluation of Alternatives Under MTCA, Table 9 DCA Summary." The decision to omit Net Present Value costs for Alternatives 4-6 is not consistent with MTCA and introduces error and an inappropriate bias.

Discussion: Ecology is unable to finish the DCA due to the lack of information provided for Net Present Value costs. The relative benefits scoring for Alternatives 4-6 is incorrect and unhelpful since capital costs are used for Alternatives 4-6, and Net Present Value cost is used for Alternatives 2 and 3A.

Resolution: Calculate Net Present Value costs for Alternatives 4-6 and recalculate the DCA for each alternative.

Comment 78: Page 42. Under the heading "8. Evaluation of Alternatives Under MTCA, Table 9 DCA Summary." Due to the lack of detailed information distinguishing the differences between Alternatives 4-6, confidently scoring benefits between Alternatives 4-6 cannot be done to compare to Alternatives 3A and 2.

Discussion: As written, the Proposed Plan appears to include Alternatives 4-6 as a paperwork exercise - akin to checking the box - rather than providing alternatives that have distinguishable and substantive differences. For example, why include a shallow depth/partial length barrier (Alternative 4) vs. a mid-depth/full length barrier (Alternative 6) if there are no substantive differences in protectiveness, permanence, and long-term effectiveness? As written, it would appear that a shallow partial length barrier ($61 million) is as protective, permanent, and effective as Alternative 3A ($24 million), which does not seem accurate.

Resolution: Rewrite and re-analyze all alternatives to be consistent with MTCA using recommendations in the above comments for Section 8 Evaluation of Alternatives Under MTCA.

Comment 79: Page 46. Under the heading "REFERENCES." Floyd|Snider submitted a revised (and final?) "Phase 2 Remedial Action Proposal" in April 2023. How come this is not included?

Discussion: Since this is a more recent version of the proposal and one that likely reflects responses to the government team comments, shouldn't this be included as a reference versus or in addition to the 2022 draft proposals?

Resolution: Please consider the April 2023 version of the "Phase 2 Remedial Action Proposal" as a reference and update the 2022 references with the 2023 document as needed.

Comment 80: Page 48. Under the heading "Glossary," consider adding "shakedown" and if used, "Operational and functional." See EPA OLEM 9200.3-105. EPA 540-R-98-016; OSWER Directive 9320.2-09A-P PB98-963223 January 2000 Close Out Procedures for National Priorities List Sites; and Ten Environmental Site Closeout Process Guide (September 1999) for definitions.

Discussion/Resolution: Thank you for considering the update.

Comment 81: Page 48. Under the heading "Glossary," regarding the definition of MTCA. Ecology is requesting that the definition of MTCA be revised.

Discussion/Resolution: Please revise the MTCA definition as shown below. Deleted text is indicated with a strike-through (~~sample~~), and new text is indicated with an underline (sample).

> **"Model Toxics Control Act (MTCA):** ~~a~~ is Washington State's environmental cleanup law. MTCA provides direction for the investigation, cleanup, and prevention of sites that are contaminated by hazardous substances. While there are similarities ~~law generally similar~~ to CERCLA~~.~~ (e.g., liability for contamination, cleanup standards, and potentially liable parties) The key difference is that MTCA is a state law applying to contaminated sites within Washington State, while CERCLA is a federal law applying nationwide. Under CERCLA, MTCA establishes substantive requirements for cleanup actions (as State ARARs) when those requirements are more stringent than CERCLA requirements.
>
> MTCA includes the SMS and its numerical and biological standards for the protection of marine benthic invertebrates."

Comment 82: Page 49. Under the heading "Glossary." The definitions of "Sediment Cleanup Objective," "Sediment Quality Standards, and" Sediment Management Standards" are incorrect.

Discussion: Sediment Cleanup Objective, as defined in this document, is specific to just human health. This should also include the benthic biological criteria as "no adverse effects to the benthic community." Sediment Quality Standard should be removed as it only applies to the Sediment Management Standards in Parts III and IV, and this site is under the authority of Part V. Sediment Management Standards is not an "MTCA rule." The SMS rule is adopted under the authority of the MTCA law and, in conjunction with the MTCA rule, provides for the investigation, cleanup, and prevention of sediment sites that are contaminated by hazardous substances and how to conduct source control to prevent sediment quality impacts.

Resolution: Make these revisions to be consistent with the Sediment Management Standards rule, MTCA rule, and MTCA law.

End of Comments

Though this is the end of the comments in this memo, we reserve the right to submit additional comments as necessary and within our authority. Please contact me at (509) 225-0304 or john.zinza@ecy.wa.gov if you require any clarification of these comments or have further questions.

Sincerely,

John Zinza
Cleanup Project Manager
Toxics Cleanup Program
Central Regional Office