

From: [John Peterson](#)
To: [Dhont, Jeffrey](#)
Cc: [Mike Gronseth](#); [John Peterson](#)
Subject: RE: Iron King Mine-Humboldt Smelter Superfund Site Draft Final Feasibility Study
Date: Thursday, April 16, 2020 1:25:28 PM
Attachments: [IKHS_FS_ADEQ_Comments_20200416_signed.pdf](#)

Jeff,

ADEQ and our contractor Matrix Environmental Services reviewed the following document prepared by Tetra Tech for US EPA:

- *Draft Final Feasibility Study, Iron King Mine / Humboldt Smelter Superfund Site, February 2020.*

ADEQ comments are included in the attached PDF. If you have any questions or need additional information, please contact me.

ADEQ may add or amend ADEQ comments if evidence to the contrary of our understanding is discovered; if received information is determined to be inaccurate; if any condition was unknown to ADEQ at the time this document was signed or electronically delivered; if other parties bring valid and proven concerns to our attention; or site conditions are deemed not protective of human health and the environment within the scope of this Department.

John Peterson

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Douglas A. Ducey
Governor

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY



Misael Cabrera
Director

April 16, 2020
FPU 20-235

Mr. Jeffrey A. Dhont
U.S. Environmental Protection Agency, Region IX
75 Hawthorne Street Mail Stop SFD-6-2
San Francisco, CA 94105

Re: *Draft Final Feasibility Study, Iron King Mine / Humboldt Smelter Superfund Site,
February 2020.*

Dear Mr. Dhont:

The Arizona Department of Environmental Quality (ADEQ) reviewed the above-referenced document and has the following comments:

General Comments:

1. Overall the document is well written and presents remedial alternatives that are consistent with and have been successfully implemented at other similar abandoned mine sites.
2. Acronyms and Abbreviations. There are several acronyms or abbreviations included in the list that are not defined in the text (i.e. §, BA, MSD) please review and revise accordingly.
3. Acronyms and Abbreviations. The acronym for the Unified Soil Classification System is define as UCSC. Please revise to USCS.

Specific Comments:

1. **Section E.2, Page ES-1, First Paragraph, Third Sentence.** The sentence reads "...-five west of Highway 69 (WHO) and nine..." Please revise the acronym to WOH for consistency with acronyms list and usage elsewhere in the document.
2. **Section E.8, Exhibit E.8-1: Estimated Costs.** The cost listed for Alternative 2 (\$83.5 million) is not consistent with the cost for Alternative 2 presented in Exhibit 6.4-1 (\$82.4 million). Please review and revise accordingly.

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3. **Section 1.3.1, Page 8, Second Paragraph, Last Sentence.** Please correct the acronym for the Unified Soil Classification System from UCSC to USCS.
4. **Section 1.3.1, Page 10, Partial Sentence at top of page.** Please correct the acronym for the American Society of Civil Engineers from USACE to ASCE.
5. **Section 1.3.5, Page 14, Second Paragraph, First Sentence.** The sentence reads “Five potential on-site mine waste repository locations were evaluated for capacity (Figure 1-8). The reference figure presents only three locations. Please revise to show all repository locations that were considered.
6. **Section 1.3.5, Page 14, Third Paragraph, Third Sentence.** The sentence reads “Table 1-11 lists capacities of the repositories on the east and west sides of Highway 69.” The table is inconsistent with the number of repository locations presented in the text (5) and Figure 1-8 (3). Please review all references and revise for consistency.
7. **Section 1.3.6, Page 15, Last Bullet.** The response to the bulleted question reads “Generation of ARD is occurring within tailings in the MTP (west of Highway 69) and Smelter Blow Fan (east of Highway 69) regions (Figure 1-10). The reference to the “Smelter Blow Fan” is confusing, please revise to indicate if this references the fan from the 1964 MTP blow out that migrated to the east of Highway 69 or the fan from the smelter tailings swale blow out. In addition, the Figure referenced presents sulfate concentrations versus pH without differentiation as to wells on the west or east side of Highway 69. Please revise the text/figure to illustrate which wells are indicative of ARD generation on the respective sides of Highway 69.
8. **Section 1.4, Page 17, First Paragraph, Second Sentence.** The sentence reads “Figure 1-12 is a conceptual depiction of the primary contaminant transport mechanisms..” Figure 1-12 presents XRF locations along Galena Gulch. Please review the figure reference and revise.
9. **Section 1.5, Page 17, First Paragraph, Second Sentence.** The sentence reads “Sample locations for XRF measurements were selected for lower Galena Gulch on public land south of Highway 69 (Figure 1-11).” Figure 1-11 presents the conceptual site model. Please review the figure reference and revise.
10. **Section 1.6.1, Page 18, First Paragraph, First Bullet.** The list of COCs for the residential receptor includes cobalt. The list of COCs on the forward referenced Table 2-1 lists copper as a COC and not cobalt. Please review and revise the text to correct this discrepancy.
11. **Section 1.6.1, Page 18, First Paragraph, Third Bullet.** The list of COCs

for the Recreationalist receptor includes dioxin. The list of COCs on the forward referenced Table 2-1 lists hexavalent chromium as a COC and not dioxin. Please review and revise the text to correct this discrepancy.

12. **Section 1.6.2, Page 18, Second Paragraph, First Sentence.** The text reads “Table 2-1 lists the LOAEL-based PERG for each receptor...” Please revise the text to indicate Table 2-2 which contains the indicated PERGs.
13. **Table 2-2.** Please add the units for the numerical values presented on the table.
14. **Section 3.1, Page 32, First Paragraph, Second Sentence.** The text reads “General response actions and technology evaluations regarding off-site surface water and stream sediments in the Agua Fria River have not been addressed because remediating on-site contaminated mine waste materials and surface water associated with the Site will subsequently reduce or eliminate many off-site impacts.” This text is confusing due to in the alternatives developed later in this FS monitored natural recovery (MNR) is presented as the response action for addressing impacted Agua Fria River sediments. Please add a discussion to text and associated table to include MNR as a response action to contaminated river sediments.
15. **Section 3.4.** The section presents various Engineering Controls that could be included in subsequent remedial alternatives. The text in some cases indicates if a technology is retained and in other cases the text does not mention if a technology has been retained for future inclusion in alternatives. Please indicate for all technologies presented if they are retained or not retained for future alternatives.
16. **Section 3.4.4, Page 41, Partial Paragraph at top of page, Last Sentence.** The text reads “The off-site disposal alternative will be retained for comparison to on-site disposal alternatives.” Section 3 presents technologies not alternatives. Please revise the text to indicate that off-site disposal is retained for inclusion in remedial alternatives.
17. **Section 3.5.** The section presents various Treatment and Reprocessing options that could be included in subsequent remedial alternatives. The text in some cases indicates if a technology is retained and in other cases the text does not mention if a technology has been retained for future inclusion in alternatives. Please indicate for all technologies presented if they are retained or not retained for future alternatives.
18. **Section 3.7.1, Page 45, First Paragraph, Fourth Sentence.** The text reads “The goal of channelization would be to convey the water from periodic stormwater events in these drainages safely downstream and in such a manner as to minimize erosion and entrainment of contaminated soils and mine wastes outside the channel.” This section does not include

a discussion as to how channelized water would be released to the lower drainages if the dam remains in place. Please add text discussing how the water will be conveyed over the dam to minimize erosion and damage to remedial components downstream of the dam.

19. **Section 4.4, Page 53, Second Paragraph, Second Sentence.** The text indicates that the Chaparral Gulch Dam would be removed and hauled to the MTP for disposal. Blocky concrete debris typically takes up significant disposal volume and can be a source of settlement of engineered covers if voids are not filled properly during placement. Please add text relative to the assumed method used to remove this massive concrete structure and whether additional processing is assumed to reduce the size of the debris prior to hauling and placement in the repository.
20. **Section 4.5, Page 55, Third Paragraph, Last Sentence.** The text reads “This double handling of the waste would increase costs and is the main cost difference between this alternative and Alternatives 3 and 4, which call for repositories on each side of the highway.” Please clarify the references to the alternatives, Section 4.5 presents Alternative 3 therefore the text referencing costs differences “between this alternative and Alternatives 3 and 4” is incorrect.
21. **Section 4.6, Page 57, First Paragraph.** Please add text indicating that the removal of the Chaparral Gulch Dam is included as indicated in Figure 4-3.
22. **Section 4.6, Page 57, Second Paragraph.** For clarity please add text discussing the excavation and handling of waste WOH.
23. **Section 4.7, Page 58, Second Paragraph, Fourth Sentence.** The text indicates that the channel would be lined with a low-permeability liner. Figure 4-4 includes a detail which indicates that the underlying waste would be covered by granular fill or liner. In general, granular fill would not constitute a low-permeability liner and therefore would not prevent infiltration. Please clarify the text and/or figure relative to the proposed liner system.
24. **Figure 4-4.** The figure indicates that the Chaparral Gulch Dam is retained. The text indicates that due to the anticipated grade of the channel most of the dam would have to be removed. Please edit the figure to indicate that “Partial Dam Removal” for consistency.
25. **Section 4.7, Page 58, Second Paragraph.** The text presents the general channel design however there is no text indicating how the water will be released at the dam. Given there are ARD treatment facilities in the lower gulch below the dam, please add text discussing energy dissipation structures that may be included to protect the ARD treatment facilities

during normal flow as well as during the 100-year design event.

26. **Section 4.7, Page 58, Third Paragraph.** The text indicates that the channel dimensions are approximately 160 feet wide by 7 feet deep. The depth of the channel represents safety concerns. Please add text regarding controls that may be included to prevent entry into the channel.
27. **Section 4.8.** A reference to Figure 4-5 needs to be included in this section.
28. **Section 4.9.1, Page 62, First Paragraph, Sixth Sentence.** The text reads “Disposal of removed slag would occur at the MTP under Alternative 2, at the DPO/SSP or STS under Alternatives 3 and 4, or off site under Alternative 5.” Please review and rectify the text as the slag would be disposed at the DPO/SSP under Alternatives 3, 4, and 5 or off-site under Alternative 6.
29. **Section 5.2.** The subsections are inconsistent relative to identifying which alternatives are being retained for detailed analysis. Please add a sentence at the end of each subsection indicating if the alternative is retained (or not) for the detailed analysis.
30. **Section 5.2.2, Page 74, First Paragraph, Second Sentence.** Please revise the text to read “...and Chaparral Gulch (*approximately* 880,000 CY) would be transported...”
31. **Section 5.2.2, Page 74, First Paragraph, Third Sentence.** Please indicate the volume of all waste peripheral to IKM that would be disposed of at the MTP.
32. **Section 5.2.3, Page 76, Partial Paragraph at top of page, Second Sentence.** The text reads “Total volume of waste from WOH going to the MTP would be approximately 440,000 CY.” The cost estimate indicates that a volume of 446,710 from the EOH going to the MTP repository. Please confirm that the reference to WOH is correct.
33. **Section 6.1, Page 83, Last Bullet.** It would be beneficial for public reviewers to include text discussing that the modifying criteria are not evaluated until completion of the public comment period.
34. **Section 6.1, Page 84, Last Paragraph, Second Sentence.** The term “reclaim-in-place” is used for the first time. Although a common term within the industry, the term may confuse a general reviewer. Please revise the text to provide a clarification as to meaning of the term relative to capping or repository alternatives.
35. **Section 6.2, Page 89, First Bullet (Magnitude of Residual Risk), Third Paragraph, Last Sentence.** Please revise the text to read “This high sedimentation rate would naturally bury, mix-in-place, and disperse COCs in sediment in the Agua Fria River *through monitored natural*

recovery.”

36. **Section 6.2, Page 93, First Bullet (Community Protection), First Paragraph, Last Sentence.** Please add text indicating that dust monitoring would be included to quantify releases of fugitive dust during RA implementation.
37. **Section 6.2, Page 93, First Bullet (Community Protection), Second Paragraph.** Please add text indicating that dust control and monitoring are included with partial waste removal.
38. **Section 6.2, Page 93, First Bullet (Community Protection), Fourth Paragraph, Last Sentence.** Please revise the text to read “The extent of the groundwater control area would be ...”
39. **Section 6.2, Page 93, Second Bullet (Worker Protection).** Please include text indicating that the use of standard health and safety procedures as well as the use of PPE reduce the risk to site workers.

If you have any questions, please contact me at 602-771-2234 or peterjohn@azdeq.gov.

Sincerely,



John R. Peterson
Project Manager
Federal Projects Unit

cc: Mike Gronseth, Matrix Environmental Services