

From: [John Peterson](#)
To: [DHONT, JEFF](#)
Cc: [Mike Gronseth](#); [John Peterson](#)
Subject: Iron King Mine - Humboldt Smelter Site Geotechnical Investigation and Analysis
Date: Friday, June 14, 2019 9:52:33 AM
Attachments: [ikmhs_adeq_comments_draft_geotech_investigation_tm_14_june_2019.pdf](#)

Jeff,

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

- *Iron King Mine-Humboldt Smelter Site Geotechnical Investigation and Analysis Technical Memorandum.*

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

Project Manager, Federal Projects Unit
Waste Programs Division
Ph: 602-771-2234



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Douglas A. Ducey
Governor

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY



Misael Cabrera
Director

June 14, 2019
FPU 19-248

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 Iron King Mine – Humboldt Smelter Site Geotechnical Investigation and Analysis Technical Memorandum* dated 14 May 2019.

Dear Mr. Dhont:

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

GENERAL COMMENTS

1. There are some minor issues apparent in the Acronyms and Abbreviations list. For example, the acronym WWRP is included in the list but not used in the text, and the acronyms K_s, ATC are defined in the text but not included in the list. Please review the text and include the acronyms as necessary.
2. Please separate the acronym K_s and its definition from the definition of K_h in the acronyms list.

SPECIFIC COMMENTS

1. **Page 3 of 316, List of Figures:** The list starts with Figure 7. Please include all missing figures referenced in the text.
2. **Page 6 of 316, Section 1.0, First Paragraph, First Sentence:** The sentence reads “This feasibility study (FS) was performed to help...” The document reviewed was a technical memorandum to support the on-going feasibility study, please revise.
3. **Page 7 of 316, Section 2.3, Second Paragraph, First Sentence:** The sentence indicates that “No adits are associated with the mine.” This statement is not correct as an adit is present in Galena Gulch in the area identified as FFP and/or Former

Fertilizer Plant/Mine Ops/Waste Rock Piles identified in Figure 4. Please correct the statement.

4. **Page 11 of 316, Section 3.2.3, First Paragraph, Fourth Sentence:** The sentence references Figure 5-9. The referenced figure was not included in the document and the format of the figure number is not consistent with others. Please provide the figure in the next version of the technical memorandum.
5. **Page 14 of 316, Section 4.0, First Paragraph, Third Sentence:** The sentence reads "Iron King Mine-Humboldt Smelter Site (Tetra Tech. 2018) . ." This is an incomplete sentence, please revise.
6. **Page 15 of 316, Section 5.1, Second and Third Paragraphs:** Both paragraphs refer to "slimes" less than one centimeter thick. All other measurements (depth for example) are presented in English units. It is confusing as to way references to slimes requires a change to metric units. Please present the measurements presented in this section in consistent units.
7. **Page 15 of 316, Section 5.1, Third Paragraph, Fifth Sentence:** The sentence states "Perched water zones were encountered in the boreholes,..." In order help fully assess the conditions within the Main Tailings Pile, it would be beneficial to indicate the depths where perched water was encountered. Please add to the text.
8. **Page 17 of 316, Section 5.9, First and Second Paragraphs, Last Sentence:** Both paragraphs indicate that the materials investigated are suitable for use as components of the potential remedies. One issue that has not been addressed is the volume of materials at these locations. It is acknowledged that the scope of this geotechnical investigation was limited in scope, however it would be helpful if text was added indicating that additional investigation to determine volumes of borrow materials will be conducted either during the on-going FS or subsequent remedial design phase to verify that sufficient material is available to complete the ultimately selected remedial alternative.
9. **Page 19 of 316, Section 6.3, Second Paragraph, First Sentence:** The sentence reads "A bulk sample from STS-01 at 5 to 10 feet and undisturbed samples from STS-01 at 10 feet, STS-01 at 15 feet, and STS-02 at 5 feet were tested to determine geotechnical properties of native bedrock beneath the tailings in the STS." The statement relative to native bedrock is confusing. Geotechnical data presented in later portions of the paragraph include Atterberg limits and USCS descriptions of geologic materials as clayey sand (SC) and poorly graded sand (SP-SC) which are typical for unconsolidated materials. Please clarify if the testing was actually performed on the silty sand and clay encountered beneath the tailings in the STS or if this is weathered bedrock materials.

10. **Page 28 of 316, Section 7.1.1.4, Second Paragraph, First Sentence:** The text indicates that a site-specific earthquake of magnitude M 6.1 was used in the analysis. This is different than the assumption used for the magnitude of the site-specific earthquake (M 5.7) used in the following paragraph. Please provide additional text explaining the rationale for selecting two different values for the magnitude of the site-specific earthquake.
11. **Page 30 of 316, Section 8.1, First Paragraph, First Sentence:** Please change ACC to AAC.
12. **Page 37 of 316, Section 8.5.2, Second Paragraph, Sixth Sentence:** Please change to read "The hydraulic barrier will reduce precipitation entering the *STS*, resulting in lower..."
13. **Page 41 of 316, Section 11.0, Second Paragraph, Third Sentence:** See comment 6 above regarding the change in units when discussing tailings slimes.

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

Sincerely,



John Peterson
Project Manager
Federal Projects Unit

cc: Mike Gronseth, Matrix Design Group