EPA comments to the BERA Refined ESV Technical Memorandum
Columbia Falls Aluminum Company NPL Site
Columbia Falls, Montana
Issued September 25, 2018

Responses Prepared for Columbia Falls Aluminum Company, LLC by Roux / EHS Support, LLC
Prepared December 6, 2018

Specific Comments – USEPA Comments in Black. Roux / EHS Support LLC responses in blue. EPA responses in green.

Text Comments:

1. Page 3, 4th paragraph, last sentence: The text states "Soil conditions at CFAC are not strongly oxidizing and a waste stream that would deposit Cr(VI) directly into soils has not been identified at the CFAC facility (Roux Associates, 2017)." The Roux Associates 2017 reference (Phase I Site Characterization Data Summary Report) does not mention Cr(VI) or information about the oxidizing strength of the soils at CFAC. Suggest removing the reference and providing additional discussion to justify this statement.

   The sentence will be deleted. As discussed in the 5th paragraph of page 3 of the technical memorandum, a select number of soil borings will be analyzed for Cr(VI) and total chromium in the Phase II Site Characterization to reduce uncertainty in the risk assessment of chromium in site soils. These data will be used to evaluate the presence of Cr(VI) and the relative concentrations of Cr(VI) and Cr(III) in soils at CFAC.

   EPA Response: No additional comments.

2. Bottom page 4, top of page 5: The text states "In the TEC2,3,7,8-TCDD calculation, dioxin/furan concentrations below detection limits will be estimated as 0.5 times the quantitation limit for constituents that were detected in at least one other sample in the soil dataset; constituents that were below detection limits in all soil samples will be assigned a concentration of 0 in the TEC2,3,7,8-TCDD calculation (USEPA, 2008b)."

   a. The EPA 2008b reference (Framework for Application of the Toxicity Equivalence Methodology for Polychlorinated Dioxins, Furans, Biphenyls in Ecological Risk Assessment) does not specifically outline this strategy (or any strategy) for dealing with non-detects. It leaves it up to the risk assessors and risk managers.

   b. The EPA 2008b document states: "The best method for handling non-detects in a particular risk assessment should be determined through consultation between risk assessors and risk managers early in the risk assessment process (planning/problem formulation phase)."

   c. It is preferred that all dioxin/furan non-detects be evaluated at ½ the sample-specific detection limit that accounts for matrix interference and sample size.

It is agreed that consensus must be reached regarding the handling of non-detects for dioxin/furan congeners prior to performing the data analysis, as whatever decision is reached can significantly influence the final TEC calculations. It is also agreed that USEPA (2008b) does not stipulate how to handle non-detect results; rather, the document presents numerous options, including assigning a value equal to zero, using one-half or the whole detection limit, or other possible approaches. Assuming a concentration of 0 for non-detect results can create a downward (non-conservative) bias on statistics by ignoring the potential of non-detected congeners to be present at very low concentrations (i.e., below the detection limit). However, substituting a value for the non-detect result can also lead to biases, and can lead to misleading conclusions in data interpretation (Ramos et al., 2015). The approach proposed in the BERA Work Plan was intended to strike a balance that would be highly unlikely to underestimate dioxins at the site to any substantial degree, while introducing some realism by acknowledging (mathematically) that congeners not detected in any sample are unlikely to be present at any appreciable concentration. Therefore, the recommendation is to retain this approach, which is consistent with EPA (2008b). The potential of underestimating the 2,3,7,8-TCDD TEC value using this approach will be discussed in the uncertainty analysis.

References:

Ramos, S.L., J. Nuwer, and G.L. Glass. 2015. *Inferring Dioxin Sources in Sediments from a Coastal Harbor Using Multivariate Analysis*. In 40 Years of Chemometrics – From Bruce Kowalski to the Future. Chapter 4, pp 65-94, American Chemical Society.

EPA Response: To account for the range of TEQ values associated with a variety of non-detect substitutions for dioxin and furan congeners (e.g., 0, 0.5 the quantitation limit, and 0.5 the sample-specific detection limit), EPA recommends calculating TEQ values utilizing all three non-detect substitution strategies. This approach is also mentioned in EPA 2008b. Alternatively, the most conservative approach could be presented in the main body of the text, with evaluation of remaining approaches as part of an uncertainty assessment if deemed necessary (i.e., risks are predicted to be above based on the most conservative approach).

Table Comments:

Table 1 – Refined ESVs for Soil

1. Values for trivalent (mammals and birds) and hexavalent (mammals) chromium have been omitted for ORNL. Values are available for these analytes and receptors (as indicated). These values should be added, or justification provided for why they have been omitted.

   These values were inadvertently omitted and will be added to Table 1.

   EPA Response: No additional comments.

2. The soil invertebrate screening value for hexavalent chromium is based on ORNL and not LANL. Rationale for this deviation from the hierarchy is not provided in the text.

The refined ESV for this hexavalent chromium will be changed to the LANL value, which is slightly lower than the ORNL value. This is consistent with the approach of selecting the minimum value for each of the trophic level receptors as described near the bottom of page 2 of the memorandum.

EPA Response: No additional comments.

Table 2 – Refined ESVs for Sediment

USEPA Region 5 RCRA ESLs:

3. Dinbenzo(a,h)anthracene – The Region 5 ESL is 0.033 mg/kg, but the Region 5 ESL reported in Table 2 is "---". The chemical name used for this compound by EPA is *Dinbenz(a,h)anthracene*.

   The Region 5 ESL for dibenzo(a,h)anthracene will be added to the table.

   EPA Response: No additional comments.

Table 3 – Refined ESVs for Surface Water

DEQ-7 Aquatic Life Standards:

4. Lead: The DEQ-7 standard concentration reported in Table 3 is incomplete. The concentration should be reported as 0.545 µg/L, not 0.54 µg/L

   The change to the lead surface water ESV will be made as suggested.

   EPA Response: No additional comments.

USEPA Region 3 Freshwater Screening Benchmarks:

5. Cadmium – Region 3 screening value is 0.25 (@hardness = 100 mg/L), but Table 3 reports the Region 3 screening value as "---". Advise including a value for this source and updating it to be based on 25 mg/L.

   The Region 3 value for cadmium will be added after adjusting it for a water hardness of 25 mg/L, as suggested.

   EPA Response: No additional comments.

6. Copper, Lead, Nickel, Zinc: The Region 3 screening values reported in Table 3 are based on a hardness of 100 mg/L, not 25 mg/L. Advise updating Region 3 values to be based on a hardness of 25 mg/L.

   The Region 3 values for copper, lead, nickel, and zinc will be added after adjusting them for a water hardness of 25 mg/L, as suggested.

   EPA Response: No additional comments.

7. Cyanide: Region 3 screening value (5 µg/L) is reported as Free Cyanide, not Total Cyanide.

The Region 3 screening value will be switched from Total Cyanide to Free Cyanide.

EPA Response: No additional comments.

8. Fluoride: Region 3 screening value is 2119.4 (@hardness = 100 mg/L), but table 3 reports the Region 3 value as "---". Advise including a value for this source and updating it to be based on 25 mg/L.

   The Region 3 value for fluoride will be added after adjusting it for a water hardness of 25 mg/L, as suggested.

   EPA Response: No additional comments.

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