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VIA EMAIL AND OVERNIGHT DELIVERY

August 7, 2013

Mr. Rusty Lundberg
Director of the Utah Division of Radiation Control
State of Utah Department of Environmental Quality
195 North 1950 West
P.O. Box 144850
Salt Lake City, UT 84116-4850

Re: White Mesa Uranium Mill – RML UT1900479
April 27, 2011 Request to Amend Radioactive Materials License to Allow Processing of Alternate Feed Materials from Dawn Mining Company's Midnite Mine Water Treatment Plant ("WTP")
Response to July 31, 2013 URS Email comments

Dear Mr. Lundberg:

This letter responds to an email from Jon Luellen of URS, Inc. regarding ("EFRI's") April 27, 2011 Request to Amend (the "April 2011 Amendment Request") the White Mesa Mill's (the "Mill's") Radioactive Materials License UT1900479 (the "RML" or the "License") to allow processing of alternate feed material from Dawn Mining Company (the "Uranium Material") and June 14, 2013 Response to Comments letter. Mr. Luellen's email addressed EFRI's responses to Comment 7a, in the June 14, 2013 letter. For ease of review, each of URS's comments is provided verbatim below in italics, followed by EFRI's response.

Question

1. The statements on the airborne beryllium concentration are not clear. The statement is apparently calculating a beryllium concentration in air by scaling with Th-230 concentrations. Please verify that this is the case.

EFRI Response

The approach taken was to estimate the mass concentration of particulates in air to which the public could be exposed but still remain within the effluent limits set by 10 CFR 20, Appendix B, Table 2. The Th-230 effluent limit is the critical parameter as it has the lowest value for the radiological constituents of tailings. Therefore, it was used to estimate the maximum allowable particulate tailings mass concentration in air at the site boundary.

Once the maximum allowable mass concentration of particulates from tailings at the site boundary was calculated, the known beryllium concentration of the feed material was used to calculate the mass concentration of beryllium in effluent air to which the public would be exposed if the Th-230 concentration was at the effluent limit. The calculation is provided below.

Step 1:

- Assuming a Th-230 activity concentration in the tailings of 980 pCi/g
- The Th-230 effluent limit in air is 2 x10-14 uCi/ml; 10 CFR Part 20, Appendix B, Table 2, Column 1)
- Estimated beryllium concentration in the ore/ feed materials and/or tailings of 0.1 ppm (mg/kg)
- Beryllium RfC of 0.02 ug/m^3
- Conversion factors
  - 1 x 10^6 ml/m^3
  - 1 x 10^{-6} uCi/pCi
  - 1 x10^6 ug/g
  - 1 x 10^{-9} kg/ug

Step 2: Calculate the mass concentration of Th-230 in air to reach the 10 CFR 20 Appendix B effluent limit identified in Step 1:

- 2.00 x 10^{-14} uCi/ml x 1 x 10^6 ml/m^3 x 1 x10^6 ug/g / (980 pCi/g x1 x 10^{-6} uCi/pCi) = 20 ug/m^3

Step 3: Use the Be concentration in ores, feed materials and/or tailings from Step 1 of 0.1 ppm (0.1 mg/kg = 1 x 10^2 ug/kg)

Step 4: Calculate the beryllium mass concentration in the airborne particulates given the beryllium concentration of the ores, feed materials and tailings in Step 3 and the air concentration of particulates from Step 2.

- 1 x 10^2 ug Be/kg feed x 20 ug feed/m^3 x 10^{-9} kg feed/ug feed = 2 x 10^{-6} ug/m^3 beryllium

Step 6: Calculate the ratio of the beryllium RfC (0.02 ug/m^3) to the beryllium mass concentration in the particulates from Step 5.

- 0.02 ug/m3 / 2 x 10-6 ug/m3 beryllium = 10,000.

2. Please confirm that the 10CFR20 effluent limit of 2 x 10-14 micro-Ci/ml is for airborne concentration (not water).

EFRI Response

The value of 2 x 10-14 microCuries/ml is an airborne (not water) concentration, as specified in http://www.nrc.gov/reading-rm/doc-collections/cfr/part020/appb/Thorium-230.html.

3. It is not clear what the concentration of 40 micro-g/m3 refers to - is it airborne dust, Th-230, or beryllium?

EFRI Response

The value should be 20 ug/m^3 not 40 ug/m^3. This is the mass concentration of airborne particulates (i.e., tailings) with an activity concentration of 980 pCi/g Th-230 that would result in a potential Th-230 concentration in air at the 10 CFR 20 Appendix B effluent limit of 2.00 x 10^{-14} uCi/ml.

4. Please explain the basis of the "maximum offsite airborne particulate concentration of 20 micro-g/m3". How does this relate to the previously stated value of 40 micro-g/m3?

EFRI Response

The value of 40 uCi/m^3 is erroneous. It should be 20 uCi/m^3. See response to Item 1, Step 2 above for its derivation.

5. The beryllium particulate concentration is stated to be 2 x 10-6 micro-g/m3. Please explain the basis for this number and how it was calculated.

EFRI Response

Please see response to Question 1, above

6. In comparing the beryllium concentration of 2 x 10-6 micro-g/m3, it is said to be a factor of 2,500 below the RfC of 0.02 micro-g/m3, when the actual ratio appears to be a factor of 10,000. Please explain the basis for the factor of 2,500.

EFRI Response

The commenter's observation is correct. The beryllium concentration in airborne particulates of 2 x 10-6 ug/m^3 is approximately 10,000 times below the RfC of 0.02 ug/m^3. The recalculation is presented in response to Question 1.

If you have any questions, please contact me at (303) 389-4132.

Yours very truly,

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Attachments