ENERGY FUELS

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May 16, 2022

Via Electronic Mail and Express Delivery

Mr. Rik Ombach, Manager
Minor Source Compliance Section
Division of Air Quality
Utah Department of Environmental Quality
Salt Lake City, UT 84114-4284

Re: Compliance Advisory – Plan for Refilling of Cell 4B, White Mesa Mill, San Juan County

Dear Mr. Ombach:

In response to a recent request from the Utah Department of Environmental Quality ("**UDEQ**"), Division of Air Quality ("**DAQ**"), and with reference to the DAQ's October 27, 2021 *Compliance Advisory* (the "**Advisory**"), Energy Fuels Resources (USA) Inc.'s ("**Energy Fuels**"") November 16, 2021 *Response to Compliance Advisory* (the "**Response**") and the U.S. Environmental Protection Agency's ("**EPA's**") March 3, 2022 *Clarification of March 11, 2019 "Regulatory Interpretation of the Term 'Solid Material' in 'National Emission Standards for Radon Emissions from Operating Mill Tailings,' 40 CFR Part 61, Subpart W (40 CFR 61.252(b))"* (the "**Clarification Letter**"), Energy Fuels is providing a plan for the refilling of Cell 4B at the White Mesa Mill (the "**Mill**") so that, as described in the EPA Clarification Letter, "Solid byproduct material" (which EPA now interprets to include evaporative crystals) "on the more extensive bottom of the impoundment is...kept covered such that it is not visible above the liquid level."

1. Current Status

As of April 8, 2022, when refilling of Cell 4B commenced, Cell 4B had solution covering 25% or less of the bottom.

Evaporation through the hot summer months will impact the timeline for covering the bottom of Cell 4B. The Mill has historically evaporated 48 inches over the warm months of the year. During this time, a portion of the incoming water will be lost to evaporation, and the filling of Cell 4B will be slowed.

The following is a breakdown of the amount of water required to cover the floor of Cell 4B as of April 8, 2022.

<u>**Cover Cell 4B Floor**</u>	
Geometric Volume	85,000,000 gal
Evaporation Volume	<u>45,000,000 gal</u>
Total Volume	130,000,000 gal

The Mill commenced refilling Cell 4B on April 8, 2022, by drawing water from its existing on-site deep water wells #4 and #5 (the "**Water Wells**") (as described in Section 3.2 below), pending a determination by DAQ as to the most appropriate method of refilling the cell.

2. Methods Available

Under normal circumstances, the Mill would rely primarily on water from Recapture Reservoir to refill Cell 4B. However, that option is not available to the Mill at this time due to the severe drought conditions in the region.

This leaves three available methods to refill Cell 4B:

- Pumping Water from the Water Wells into Cell 4B;
- Pumping Water from the Water Wells into Cell 4B while at the same time transferring some Cell 4B solutions to Cell 1 for the first few months of the campaign to preserve resource values in the Cell 4B solutions for future recycling and to ensure adequate solution levels are maintained in Cell 1; and
- Transferring tailings solutions from conventional impoundment Cell 4A to Cell 4B, combined with continued pumping of water from the Water Wells into Cell 4B.

These methods will be discussed below, along with Energy Fuels' recommended approach.

3. Evaluation of Available Methods

3.1. Pumping Water from the Water Wells into Cell 4B

Under this method, Energy Fuels would pump water from the Water Wells into Cell 4B until such time as the bottom of Cell 4B is covered with solutions, and as necessary would maintain solution cover over at least the full bottom of the cell thereafter.

Energy Fuels estimates that the available water volume from the Water Wells combined will be approximately 300 gallons per minute (gpm).

As discussed in Section 1 above, as of April 8, 2022, a total volume of 130,000,000 gallons of water was required to raise the solution level in the cell enough to cover the bottom of the cell with solutions.

At a fill rate of 300 gpm, a total of approximately 432,000 gallons would be expected to be added to the cell per day. The total time required to fill the cell would be approximately 301 days from April 8, 2022. Based on these estimations, the floor of Cell 4B would be expected to be covered by about the end of February 2023.

It should be noted that there is a potential that some water from the Water Wells may need to be added to Cell 1 during that same time period in order to ensure that, as a non-conventional tailings impoundment, it satisfies the same work practice standards as applicable to Cell 4B (i.e., the requirement to maintain liquid cover over the bottom of the cell at all times). This could extend the time required to refill Cell 4B by up to a month or two, depending on continued drought conditions and evaporation in Cell 1 and other inflows into Cell 1 from Mill operations.

3.2. Pumping Water from the Water Wells into Cell 4B while at the Same Time Transferring some Cell 4B Solutions to Cell 1 for the First Few Months of the Campaign

Under this method, Energy Fuels would pump water from the Water Wells into Cell 4B at the expected rate of 300 gpm until such time as the bottom of Cell 4B is covered with solutions, and as necessary to maintain solutions cover on the full bottom of the cell thereafter. For the first few months of this

campaign (expected to be approximately three to four months[1]) Energy Fuels would simultaneously pump solutions from Cell 4B into Cell 1 at the expected rate of approximately 100 gpm at the same time it is pumping water into Cell 4B from the Water Wells at the rate of 300 gpm. This means that the net inflow into Cell 4B would be approximately 200 gpm for the first three or four months of the campaign and approximately 300 gpm for the remainder of the campaign.

At a fill rate of 200 gpm, a total of approximately 288,000 gallons would be expected to be added to the cell per day for the first three to four months, and at a fill rate of 300 gpm thereafter a total of approximately 432,000 gallons would be expected to be added to the cell per day for the remainder of the campaign. The total time required to fill the cell would be approximately 341 days from April 8, 2022 (assuming a net inflow of 200 gpm for the first four months of the campaign). Based on these estimations, the floor of Cell 4B would be expected to be covered by about the end of March 2023.

The Mill has implemented this method since April 8, 2022, although initial flow metering has proven to be inaccurate and unreliable for this purpose, with the result that the net inflows to Cell 4B have averaged less than 200 gpm to date. Improved metering has recently been installed so that the net inflow to Cell 4B can be maintained at approximately 200 gpm with more reliability. Nevertheless, even given this slow start, from April 8, 2022, to May 13, 2022, the solution level in Cell 4B has increased by 1.15 feet. This increase in elevation has resulted in liquid now covering approximately 40% of the bottom of Cell 4B, compared to about 25% on April 8, 2022, representing coverage of approximately 20% of the exposed crystals on the bottom of Cell 4B during that time period.

There are two reasons for transferring some solutions from Cell 4B to Cell 1 during the first few months of the campaign. First, the existing solutions in Cell 4B have high concentrations of vanadium and uranium, which would be lost to future recycling if the solutions in the cell are diluted by the addition of water to the cell. The Mill can draw down a portion of these solutions as they are being diluted and transfer them to Cell 1 until such time as the concentrations of vanadium and uranium in Cell 4B are diluted by the addition of water to concentrations that are no longer suitable for future recycling. This is expected to be within three or four months after April 8, 2022, the start of the campaign. By doing so, the Mill would be able to preserve some of the recyclable resources in Cell 4B by transferring the resources to Cell 1 for future recycling. This would be consistent with the Mill's sustainability goal of recycling valuable resources to the extent reasonably practicable at all times. To date, the Mill has recovered approximately 1,800,000 pounds of vanadium and 500,000 pounds of uranium from recycling its tailings solutions that would otherwise have been lost to direct disposal. We are not aware of any other facility in the world that can make that type of claim.

Second, the transfer of solutions from Cell 4B to Cell 1, while Cell 4B is simultaneously being refilled with water from the Water Wells, would serve to maintain the solution levels in Cell 1 above the bottom of the liner in the face of normal evaporative losses in that cell. Like Cell 4B, Cell 1 is a non-conventional impoundment and is subject to the same National Emission Standards for Hazardous Air Pollutants ("**NESHAP**") work practice standards as Cell 4B. Normal solutions management for Cell 1 would likely require the addition of solutions during the year, which if added directly from the Water Wells to Cell 1 would take away from the available water flow from those wells to Cell 4B. By simultaneously drawing 100 gpm from Cell 4B while filling Cell 4B at the rate of 300 gpm, rather than diverting 100 gpm from the Water Wells for direct delivery to Cell 1, the same net inflows into Cell 4B would be realized while at the same time preserving the recyclable resource for future use. These are the types of evaluations we

[1] The duration of the simultaneous pumping of solutions from Cell 4B to Cell 1 while fresh water is being pumped from the Water Wells into Cell 4B will depend on the concentrations of uranium and vanadium in Cell 4B, which will be diluted as water from the Water Wells is pumped into Cell 4B. The Mill would continue to pump solutions from Cell 4B into Cell 1 until such time as the concentrations of uranium and vanadium in the solutions pumped to Cell 1 reach the point where recycling the solutions in the future is not viable, which is estimated to be about three to four months of simultaneous pumping.

continuously make at the Mill in order to meet our sustainability objectives and that allow the Mill to achieve its world-leading uranium and vanadium recycling objectives.

This method is the recommended approach, as it allows for the refilling of Cell 4B on a timely basis while also allowing for the future recycling of valuable resources by adding only a small increase in the time frame to refill Cell 4B compared to filling Cell 4B using the full availability of the Water Wells. Given the low radon emanations from the exposed crystals on the bottom of Cell 4B of approximately 4.4 pCi/m^2-sec[2], this small addition of time needed to refill Cell 4B is considered to be inconsequential (the Mill will continue to operate within the radon emission standards set out in its license[3]).

3.3. Pumping Tailings Solutions from Conventional Impoundment Cell 4A into Cell 4B

Under this method, Energy Fuels would pump tailings solutions from conventional impoundment Cell 4A into Cell 4B at a rate of approximately 1,000 gpm combined with the 300 gpm of inflow from the Water Wells, for a total inflow rate of approximately 1,300 gpm.

As discussed in Section 1 above, as of April 8, 2022, a total volume of 130,000,000 gallons of water was required to raise the solution level in the cell enough to cover the bottom of the cell with solutions. This volume includes 85,000,000 gallons for the geometric volume of Cell 4B and 45,000,000 gallons for the evaporation volume associated with the historical evaporation of 48 inches over the warm months of the year.

At a fill rate of approximately 1,300 gpm, a total of approximately 1,872,000 gallons would be expected to be added to the cell per day. Assuming a total volume of 130,000,000 gallons of water would still be required, the total time required to fill the cell would be approximately 70 days. If this method were implemented today, based on these estimations, the floor of Cell 4B would be expected to be covered by the end of July 2022, or likely sooner to the extent the refilling occurs prior to the high evaporation season.

If any water were needed to be added to Cell 1 during that time period, the total time required to cover the bottom of Cell 4B with solutions would only be extended by about 5 days, assuming a rate of transfer to Cell 1 of 100 gpm for the entire campaign.

We do not recommend this method, however, for the following reasons:

- pumping solutions from Cell 4A would ultimately expose more tailings sands in this conventional impoundment and result in higher levels of radon being released to the environment compared to the low levels of radon emanating from the evaporative crystals in Cell 4B. As previously described in Energy Fuels' Response to the Advisory, the results of recent measurements completed on November 5-6, 2021, showed an average radon flux measurement of 4.4 pCi/m^2-sec from the evaporative crystals on the bottom of Cell 4B, which is within the range of flux rates assumed by EPA in its risk analysis for non-conventional impoundments. In comparison, the radon flux standard for exposed tailings sands in a conventional impoundment is about 11 times higher than that, measuring on average about 49 pCi/m^2-sec for exposed tailings sands in conventional impoundment Cell 3 during 2021. Exposing tailings sands in Cell 4A to cover evaporite crystals in Cell 4B in these circumstances would not be operating the Mill facilities in a

[2] See the Response.
[3] Under its Radioactive Materials License, the Mill monitors for radon at eight locations around the perimeter of the Mill to ensure that the radon emissions from the Mill site as a whole, including all tailings cells, meet the strict radon emissions standards set out in 10 CFR Part 20 Appendix B, in addition to and independently of the NESHAP work practice standards.

manner that maintains radioactive emissions as low as reasonably achievable ("**ALARA**") and would be contrary to the Mill's sustainability goals;

- the Mill has managed its tailings system to place all tailings solutions into Cell 4A that are not well-suited for re-introduction into the Mill circuit as process solutions or for recycle for the recovery of uranium or vanadium values. In addition to its sustainability objectives to recycle valuable resources whenever practicable, the Mill also has a sustainability objective to return tailings solutions back to the Mill process circuits in lieu of introducing additional fresh water into the Mill process circuits, in order to minimize the use of fresh water for the Mill process, particularly under the current severe drought conditions. It would therefore not be desirable to place solutions currently in Cell 4A into Cell 4B or Cell 1; and
- because of the foregoing point, it would not be desirable to pump the existing solutions in Cell 4B to Cell 1 for future recycling at the same time Cell 4B is simultaneously being refilled with solutions from Cell 4A, due to the contamination from the Cell 4A solutions. If recycling the Cell 4B solutions were to be encouraged, then Cell 4B would first need to be pumped dry, by pumping the solutions into Cell 1, and then refilling Cell 4B with the combined Cell 4A and Water Well liquids. This would add another month or two to the estimated 70 days required to refill the bottom of Cell 4B under this method.

4. Recommended Approach

As stated above, Energy Fuels recommends that it continue to implement the method described in Section 3.2 above that commenced on April 8, 2022, for refilling Cell 4B as it will 1) result in the crystals on the bottom of Cell 4B being covered on a timely basis (taking only about 40 days longer than the method under which approximately 300 gpm is added to Cell 4B and solutions are not simultaneously transferred to Cell 1, described in Section 3.1 above); (2) be consistent with the Company's sustainability goals and objectives by maintaining radon emissions at the current low levels (4.4 pCi/m^2-sec from the exposed crystals), which is ALARA compared to the method that involves pumping solutions from Cell 4A to Cell 4B, described in Section 3.3 above (which would expose tailings sands in Cell 4A that emit approximately 11 times the radon emissions than the exposed crystals on the bottom of Cell 4B); and 3) allow Energy Fuels to preserve some of the uranium and vanadium resources in the Cell 4B solutions for future recycling in Cell 1, also consistent with the Company's sustainability goals and objectives.

In arriving at this recommendation, Energy Fuels has taken several factors into account including 1) the incremental public health, safety and environmental risks, if any, based on the alternatives available for refilling Cell 4B; 2) the sources of water or tailings solution available and the use of natural resources that are not counter to broader sustainability measures and 3) the ability to preserve valuable vanadium and uranium natural resources for future recovery and recycle consistent with our sustainability goals and objectives.

However, if DAQ disagrees with this plan, please advise at the earliest opportunity and we will alter our plan consistent with DAQ's directive.

If you have any questions or requests for additional information regarding this submittal, please contact me at (303) 389-4132 or sbakken@energyfuels.com.

Sincerely,

ENERGY FUELS RESOURCES (USA) INC.

Scott Bakken
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Scott A. Bakken
Vice President, Regulatory Affairs

cc: J. Morris, C. Kijowski (DAQ), P. Goble (DWMRC)
D. Frydenlund, K. Weinel, L. Shumway, J. Hoffmeier (Energy Fuels)