



State of Utah

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DIVISION OF WASTE MANAGEMENT
AND RADIATION CONTROL

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Director

May 5, 2022

Kathy Weinel, Quality Assurance Manager
Energy Fuels Resources (USA) Inc.
225 Union Blvd., Suite 600
Lakewood, CO 80228

RE: Energy Fuels Resources (USA) Inc. January 28, 2022, Source Assessment Report for Uranium and Selenium in Monitoring Well MW-30, White Mesa Uranium Mill
Utah Groundwater Discharge Permit No. UGW370004

Dear Ms. Weinel:

The Division of Waste Management and Radiation Control (Division) has reviewed the Energy Fuels Resources (USA) Inc. (EFRI), January 28, 2022, document titled "*White Mesa Uranium Mill, State of Utah Groundwater Discharge Permit No. UGW370004, Source Assessment Report Under Part I.G.4 for Exceedances in MW-30 in the Third Quarter of 2021*" (SAR). The SAR includes an evaluation of "out of compliance" (OOC) parameters (uranium and selenium) in monitoring well MW-30. Monitoring Well MW-30 is located hydraulically downgradient from cell 2, and the Mill processing areas. Per EFRI delineation of the nitrate/chloride plume (Figure 1B of the SAR), the monitoring well screen for MW-30 is within the plume.

Per Section 3.6.3 of the SAR, EFRI finds that based on assessment and factors demonstrating that MW-30 has not been impacted by seepage from the tailings cell, that current changes in groundwater chemistry and uranium and selenium OOC at monitoring well MW-30 are due to groundwater background. The SAR includes discussion of the assessment and Section 3.6.3 lists the 6 factors supporting that EFRI conclusion. Specifically, per the SAR:

1. *Indicator parameters fluoride and sulfate are decreasing.*
2. *Bicarbonate is increasing (since 2016).*
3. *pH is increasing (since 2016).*
4. *Iron and Manganese are decreasing (since 2009).*

(Over)

5. *Chloride, uranium, and selenium could not be increasing simultaneously due to substantially different K_d expected at the measured pH conditions (uranium increase should be substantially delayed relative to chloride and selenium; and selenium increase should be substantially delayed relative to chloride).*
6. *If the water level increase resulted from potential TMS seepage, then chloride, fluoride, sulfate, uranium, and selenium concentrations would be orders of magnitude higher than measured.”*

Per Division review of the SAR and historical data for MW-30, the out-of-compliance status for uranium and selenium in monitoring well MW-30 does not appear to be associated with contamination from a tailing wastewater source or other Mill activities. Division findings are detailed in a separate SAR review memorandum. Based on these findings it is appropriate to adjust the uranium Permit groundwater compliance limit for uranium and selenium in MW-30, consistent with the currently Division approved groundwater data statistical process flow chart for the Mill and associated guidance.

Statistical Analysis

Based on Division review of the SAR statistical analysis it was noted that analysis was conducted for the complete historic data set for MW-30 (uranium and selenium) and for a post 2016 data set. Division notes that per the SAR the post 2016 data set is supported by the change in pH from decreasing to increasing at that time. Per Division review of time plots for MW-30 uranium and selenium, the data does appear to show less variability at year 2016. The increasing trend is still evident for both constituents. It is noted that long term trend stabilization may occur due to increasing pH. Statistical evaluation of the uranium plot for all data and for the post 2016 data set showed normal distribution. The selenium data did not show normal distribution for the entire data set but did show normal data for the post 2016 data set. Per the SAR, the use of the post 2016 data set is recommended since there is a data shift due to a change from decreasing to increasing pH. Per Division findings, the use of a culled data set is recommended by EPA guidance¹ when a point of inflection is identified, and the use of the post 2016 data set appears to be appropriate.

EFRI Statistical methods used in the SAR included: 1. Descriptive statistics for the complete and modified data sets; 2. Mean and Standard Deviation Calculation; 3. Shapiro-Wilk Test for normality; and 4. Mann-Kendall Trend Analysis (non-normally distributed data sets) and Linear Trend Analysis. Proposed GWCL's were calculated based on Mean + 2σ of the complete and post 2016 data sets, Highest Historical Value, Fraction of the Groundwater Quality Standard, and Mean X 1.5. The calculations and findings are summarized on a table in the SAR (Appendix B-1 of the SAR).

Per the SAR Section 4.2, EFRI proposed that GWCL's be adjusted according to 1.5 times the uranium and selenium background (Mean X 1.5) for the post 2016 data sets. The Division approved statistical flow chart for the White Mesa Mill groundwater monitoring wells clarifies that if an upward trend is apparent for a constituent, then a modified approach should be considered. The modified approach should allow for a GWCL which considers the increasing concentrations. The Division notes that calculations by 1.5 X Background are the highest proposed GWCL's and are reflective of the increasing uranium and selenium trends. The use of the post 2016 data set may reflect a potential decrease in the trend due to increasing pH in the MW-30 groundwater.

MW-30 Approved Modified GWCLs

¹ United States Environmental Protection Agency. 2009. *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance*. EPA 530/R-09-007.

Per review of the SAR Section regarding proposed modifications to the GWCL and statistical analysis of the data the GWCL will be modified in the White Mesa Uranium Mill Groundwater Permit for monitoring well MW-30 uranium and selenium as summarized on the table below:

Well Number	Parameter	Current GWCL	Modified GWCL	Method of Analysis
MW-30	Uranium	9.8 µg/L	13.11 µg/L*	1.5 X Background*
MW-30	Selenium	53.6 µg/L	72.52 µg/L*	1.5 X Background*

*Based on 1.5 X background of the Selenium background data mean of the post 2016 data set for monitoring well MW-30

Note that the modified GWCL's will not be effective until future issuance of a modified Permit, and that the modifications will be subject to formal public notice and public participation requirements. These Permit modifications are anticipated to be made during calendar year 2022.

If you have any questions, please call Tom Rushing at (801) 536-0080.

Sincerely,



Phil Goble, Uranium Mills and Radioactive Materials Manager
Division of Waste Management and Radiation Control

PG/TR/wa

- c: Grant Sunada, Health Director, San Juan Public Health Department
Ronnie Nieves, Environmental Health Director, San Juan Public Health Department
Russell Seeley, District Engineer, UDEQ