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DIVISION OF WASTE MANAGEMENT  
AND RADIATION CONTROL

Scott T. Anderson  
Director

March 20, 2018

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

RE: Energy Fuels Resources (USA) Inc. August 21, 2017, Source Assessment Report for MW-31  
Groundwater Discharge Permit No. UGW370004 (Permit)  
White Mesa Uranium Mill

Dear Ms. Weinel:

The Division of Waste Management and Radiation Control has completed its review of the Energy Fuels Resources' (EFR) August 21, 2017 document titled *Source Assessment Report for MW-31 White Mesa Uranium Mill* (SAR). The SAR includes an assessment of selenium, sulfate, total dissolved solids (TDS) and uranium in monitoring well MW-31.

Source Assessment

It was noted that Energy Fuels provided a source assessment and calculated, by several methods, proposed revised Ground Water Compliance Limits (GWCLs) for selenium, sulfate, TDS and uranium in monitoring well MW-31. Monitoring well MW-31 is located hydraulically downgradient from the eastern portion of Cell 2 and from the mill processing areas and is within the defined nitrate/chloride plume. In the SAR, EFR notes that all SAR parameters were identified as having an increasing concentration trend since the development of the Existing Wells Background Report. Division data review confirms that the SAR parameters all show increasing concentration trends.

Based on the review of the SAR, it appears that Mill activities are not influencing SAR studied concentrations at monitoring well MW-31. This is based on the findings of several lines of evidence in the SAR including, 1) potential effects from a 2011 well redevelopment project; 2) a change in analytical laboratory in 2012; 3) addition of several pumping wells to the nitrate/ chloride and chloroform corrective action plan (2013, 2014, 2015); 4) decreasing pH trend effects on monitoring well geochemistry; 5) evaluation of tailings solution indicator parameters (chloride, sulfate, fluoride and uranium); 6) site-wide comparison of parameters in MW-31 and upgradient and downgradient wells

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(MW-31 shows relatively low concentrations of SAR parameters); 7) potential effects of pyrite oxidation releasing selenium and sulfate, and other trace metals, into solution; 8) location of MW-31 within the nitrate/chloride plume; 9) findings of the 2007/2008 University of Utah Groundwater Study; and, 10) mass balance Analyses

### Statistical Analysis

Based on the review of the SAR statistical analysis, it was noted that analysis was conducted for the complete historic data set for MW-31 and for a post October 2012 data set. The complete data set showed normal or log normal distribution for uranium but not for selenium, sulfate or TDS. The modified data set did show normality for selenium, sulfate, TDS and uranium. Statistical methods used 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). Proposed GWCLs were calculated based on Mean + 2 Standard Deviation, Highest Historical Value, Fraction of Groundwater Standard, and Background Mean Concentration times 1.5. The calculations and findings are summarized in a table in the SAR (Appendix B-1 of the SAR).

In accordance with the approved statistical flow chart for the White Mesa Mill groundwater monitoring wells, it was noted that if an upward trend is apparent for an analyte, then a modified approach should be considered. The modified approach should allow for a GWCL which considers the increasing concentrations. Based on this, EFR calculated GWCLs according to the Utah Groundwater Rules (Utah Administrative Code R317-6) which allow maximums to be set according to Mean + 2 Standard Deviations, 0.5 times the GWQS (Class III Water) or 1.5 times the background concentration. Division findings note that setting the GWCL at a maximum value for these parameters is reasonable, given that the wells will likely exceed a more conservative GWCL in a short period of time when considering the increasing trends. This is particularly the case for selenium and sulfate in MW-31 which have relatively stronger trends are present at higher concentrations.

Selenium and sulfate additionally show a defined change in background data pre October 2012. In accordance with the EPA 2009 Unified Statistical Guidance Section 5.3, and based on verification that the increases are due to background influences, it is appropriate to use the data collected after the point of inflection and therefore, GWCLs for selenium and sulfate will use the post 2012 data set. It should be noted that the difference between the post 2012 data set mean and the complete data set mean are not significantly different. The TDS time series plot does not show a clear point of inflection and the complete data set will be used. Since uranium GWCL is being reset based on the fraction of the GWQS, the specific data sets are not used except for comparisons.

Therefore, when comparing the various calculated GWCLs, it is appropriate to set GWCLs for selenium and sulfate and TDS according to 1.5 times background for post 2012 data sets (Se and SO<sub>4</sub>) or the complete data set (TDS). Uranium will be set according to 0.5 times the GWQS. These values are in conformance with the approved statistical flow chart, the Utah Groundwater Rules, EPA Statistical Guidance and consider the increasing data trends.

### MW-31 Approved Modified GWCLs

Based on the review of the SAR regarding proposed modifications to the GWCLs and statistical analysis of the data and a telephone conference with Division representatives and EFR representatives on March 8, 2018, it was agreed that the GWCLs will be modified in the White Mesa Uranium Mill Ground Water Permit for monitoring well MW-31 as summarized on the table below:

Well Number	Parameter	Current GWCL	Modified GWCL	Method of Analysis
MW-31	Selenium	86.81 µg/L	119.4 µg/L	Background X 1.5 <sup>*</sup>
MW-31	Sulfate	697.6 mg/L	993 mg/L	Background X 1.5 <sup>*</sup>
MW-31	TDS	1700 mg/L	2132 mg/L	Background X 1.5 <sup>**</sup>
MW-31	Uranium	9.1µg/L	15 µg/L	Fraction (0.5) of GWQS

\*Based on 1.5 times the mean of the post Oct. 2012 data set for MW-31

\*\*Based on 1.5 times the mean of the complete data set for MW-31

Please note that the modified GWCLs will not be effective until future issuance of a revised Groundwater Discharge Permit and that the modifications will be subject to formal public notice and public participation requirements. This is expected to take place in fall or winter of 2018.

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

Sincerely,



Scott T. Anderson, Director  
Division of Waste Management and Radiation Control

STA/TR/ka

c: Kirk Bengé, Health Officer, San Juan Public Health Department  
Rick Meyer, Environmental Health Director, San Juan Public Health Department  
Scott Hacking, P.E., DEQ District Engineer