State of Utah
GARY R HERBERT
Governor

SPENCER J COX
Lieutenant Governor

Department of
Environmental Quality

Amanda Smith
Executive Director

DIVISION OF RADIATION CONTROL
Rusty Lundberg
Director

DRC-2014-001041

January 7, 2014

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

Subject: Energy Fuels Resources (USA) Inc. December 17, 2013 Source Assessment and Literature Search Report, Tetrahydrofuran in MW-1 White Mesa Mill: **DRC Findings and Recommendation**

Dear Ms. Weinel:

The Utah Division of Radiation Control ("DRC") has reviewed the Energy Fuels Resources (USA) Inc. ("EFR") December 17, 2013 Transmittal of Source Assessment and Literature Search Report, Tetrahydrofuran in Monitoring Well MW-1 White Mesa Mill Groundwater Discharge Permit UGW370004 ("SAR"). The SAR was conducted by Energy Fuels Resources (USA) Inc. ("EFR") in response to a Utah Division of Radiation Control ("DRC") Notice of Violation, Docket No. UGW13-05 ("NOV") issued on July 23, 2013. The NOV required EFR to submit a Plan and Time Schedule for investigation of the THF exceedances within 30 calendar days of receipt of the NOV (Letter dated July 25, 2013).

A response to the NOV, which included a Plan and Time Schedule, was subsequently received by DRC on August 27, 2013 and stated that EFR mistakenly assumed that the Source Assessment Report requirements of the White Mesa Mill Ground Water Discharge Permit were not required based on a DRC April 25, 2013 letter which agreed to remove Ground Water Compliance Limits from monitoring well MW-1. EFR committed to submit a Source Assessment Report within 90 days from DRC Director Approval of the Plan and Time Schedule. The August 27, 2013 Plan and Time schedule was approved by the Director on September 17, 2013. The SAR was subsequently dated and received by DRC on December 17, 2013 (via e-mail), and via mail on December 19, 2013.

Findings:

The SAR provides findings that THF well MW-1 is not due to impact from Mill Discharges as follows:

- Measured groundwater elevation at monitoring well MW-1 is approximately 9 feet

higher than the groundwater elevation measured at upgradient portions of the Mill tailings cells,

- MW-1 is approximately 0.4 miles hydraulically up gradient of the Mill facilities.

The SAR additionally includes a summary of three different literature sources which were reviewed to support the claim that monitoring well glues and solvents, used during well construction could be the source of THF at monitoring well MW-1. DRC staff additionally reviewed each of the summarized literature sources to support the EFR claims. A discussion of each of the literature source findings is below:

1. William Martin and C. Chow Lee, 1989[1]: EFR review of Martin and Lee confirmed that in the case of THF contamination due to well joint glues the concentrations will persist for extended periods of time. The SAR quotes the Martin and Lee p. 211 as follows: "*The further increase in THF concentration 2 to 4 days after purging suggests that THF may be rapidly diffusing from the PVC glued joints into fresh formation water entering the well.*" DRC further notes that these effects may last for extended periods of time after well construction as noted on p. 214 "*As these investigations have shown (At least for cement grout and THF contamination) anomalies attributable to well construction can persist for many years, if not for the lifetime of the monitoring well despite repeated development and monitoring.*" Martin and Lee reported groundwater leached concentrations of 460µg/L at 20 days after monitoring well construction.

   The Martin and Lee reference supports the EFR claim that the THF source in monitoring well MW-1 is potentially from glues used during well construction. Analytical results for THF in monitoring well MW-1 are not far outside of concentrations observed by Martin and Lee 20 days after monitoring well construction.

2. United States Geological Survey, 1995[2]: Reference discusses ground water monitoring well materials, design, and installation and interferences that occur based on materials and design. Sections of the reference discuss specific PVC well casing glues and biases that occur in analysis for volatile organic contaminants including THF, MEK, MIBK and Hexanone.

3. United States Geological Survey, 2012[3]: THF concentrations detected in monitoring well samples cannot be attributed to aquifer concentrations due to potential contamination from organic constituents in joint glue and/or decontamination procedures of sampling equipment at the Study Reporting Limits.

---

[1] Martin, William H and C Chow Lee *Persistent pH and Tetrahydrofuran Anomalies Attributable to Well Construction* Woodward-Clyde Consultants, Oakland, California 1989

[2] U S Geological Survey Open File Report 95-398 *Ground-water Date-Collection Protocols and Procedures for the National Water-Quality Assessment Program Selection, Installation, and Documentation of Wells, and Collection of Related Data* 1995

[3] U S Geological Survey *Scientific Investigations Report Evaluation of Volatile Organic Compound (VOC) Blank Data and Application of Study Reporting Levels to Groundwater Data Collected for the California GAMA Priority Basin Project,* May 2004 through September 2010 Pub 2012

Conclusions:

Per review of the EFR Source Assessment and Literature Findings regarding THF exceedances at monitoring well MW-1, DRC concurs that the source of THF contamination does not appear to be due to any White Mesa Mill tailings solution release or operations. Per DRC review of the literature sources, it appears that monitoring well construction including PVC casings with glued joints is a potential and likely source of THF in the monitoring well. DRC notes that the literature sources support long term impacts (organic leaching) due to well construction materials.

Per the SAR, EFR plans to re-evaluate the "*status of THF*" in well MW-1 after the collection of additional accelerated samples through the second quarter of 2014. The SAR then states that "*if THF levels remain below the GWCL during the four quarters ending the second quarter of 2014, EFRI will resume semi-annual monitoring of MW-1 for THF.*" This is inconsistent with prior actions to return wells/parameters to baseline monitoring frequency. DRC does not agree with the EFR conclusion to automatically return monitoring well MW-1 to baseline frequency based on the EFR re-evaluation. DRC additionally notes that the planned approach will not provide at least eight accelerated samples with results below the GWCL.

Accelerated monitoring of THF in monitoring well MW-1 may be discontinued and returned to baseline semi-annual monitoring only if:

1. EFR submits a request to the Director to return MW-1 to baseline monitoring which includes at least eight groundwater sample results for THF below Ground Water Compliance Limits listed in the Permit and the EFR request is subsequently approved, or,
2. GWCL's for monitoring well MW-1 are removed from the Permit by authorization by the Director (Permit Modification) after public hearing and comments have been received and addressed.

Recommendation:

As discussed between representatives of DRC and EFR during a January 7, 2014 phone conference, it is recommended that EFR postpone the submission of additional evaluation until an option for return to baseline monitoring, as listed in the conclusions section above, can be determined.

If you have questions regarding this letter please contact Tom Rushing at (801) 536-0080.

Sincerely,

Rusty Lundberg

Rusty Lundberg, Director

RL:TR:tr

U \MON_WAST\Trushing\Energy Fuels\THF SAR 12-17-13\THF SAR DRC Findings Ltr docx