


**Utah Division of Water Quality  
Statement of Basis  
ADDENDUM  
Wasteload Analysis and Antidegradation Level I Review**

**Date:** March 3, 2016

**Prepared by:** Dave Wham   
Standards and Technical Services

**Facility:** Energy Fuels Resources (USA), Inc., Rim Mine  
UPDES No. UT-0023922

**Receiving water:** Unnamed ephemeral drainage => East Canyon Wash =>  
Hatch Wash => Kane Springs Creek (2B, 3C, 4)

This addendum summarizes the wasteload analysis that was performed to determine water quality based effluent limits (WQBEL) for this discharge. Wasteload analyses are performed to determine point source effluent limitations necessary to maintain designated beneficial uses by evaluating projected effects of discharge concentrations on in-stream water quality. The wasteload analysis also takes into account downstream designated uses (UAC R317-2-8). Projected concentrations are compared to numeric water quality standards to determine acceptability. The numeric criteria in this wasteload analysis may be modified by narrative criteria and other conditions determined by staff of the Division of Water Quality.

Discharge

This facility is an underground uranium mine. The water that is being discharged is groundwater from the underground mine workings. This water is being pumped 710 feet to the surface into a primary settling pond. Water is then pumped to a treatment plant where barium chloride is added as a flocculent to settle metals and solids. The treated water is then directed to a final settling pond before it is discharged to UPDES Outfall 001.

The mean monthly design discharge is for the facility is .03 MGD.

Receiving Water

The Rim Mine is located on a dry plateau (rim). All drainages in the area are ephemeral. The receiving for Outfall 001 is an unnamed ephemeral drainage which flows approximately 2 miles northeast to East Canyon Wash; then approximately 10 miles to Hatch Wash, then to Kane Canyon Wash, and finally to Kane Canyon Creek.

Per UAC R317-2-13.1, the designated beneficial uses of Kane Canyon Creek and tributaries, from confluence with the Colorado River to headwaters is 2B, 3C, and 4.

- *Class 2B - Protected for infrequent primary contact recreation. Also protected for secondary contact recreation where there is a low likelihood of ingestion of water or a*

*low degree of bodily contact with the water. Examples include, but are not limited to, wading, hunting, and fishing.*

- *Class 3C - Protected for nongame fish and other aquatic life, including the necessary aquatic organisms in their food chain.*
- *Class 4 - Protected for agricultural uses including irrigation of crops and stock watering.*

Typically, the critical flow for the wasteload analysis is considered the lowest stream flow for seven consecutive days with a ten year return frequency (7Q10). Because the discharge is to an ephemeral wash, the critical low flow condition (7Q10) of the receiving water would be zero. As a result, effluent limits revert to the water quality standards. Water Quality Standards are presented in the WLA Addendum.

#### TMDL

According to the Utah's 2014 303(d) Water Quality Assessment, Kane Spring Wash from confluence with Colorado River to headwaters is listed as impaired for temperature (3C Use Class) and Total Dissolved Solids (Use Class 4). No TMDL has been completed at this time.

#### Mixing Zone

The maximum allowable mixing zone is 15 minutes of travel time for acute conditions, not to exceed 50% of stream width, and 2,500 feet for chronic conditions, per UAC R317-2-5. Water quality standards must be met at the end of the mixing zone.

No mixing zone was considered as the annual critical flow in the receiving water for Outfall 001 was considered to be 0.

#### Parameters of Concern

The potential parameters of concern identified for the discharge/receiving water were total dissolved solids, total uranium, radium and zinc as determined in consultation with the UPDES Permit Writer.

#### WET Limits

The percent of effluent in the receiving water in a fully mixed condition, and acute and chronic dilution in a not fully mixed condition are calculated in the WLA in order to generate WET limits. The LC<sub>50</sub> (lethal concentration, 50%) percent effluent for acute toxicity and the IC<sub>25</sub> (inhibition concentration, 25%) percent effluent for chronic toxicity, as determined by the WET test, needs to be below the WET limits, as determined by the WLA. The WET limit for LC<sub>50</sub> is typically 100% effluent and does not need to be determined by the WLA.

#### Wasteload Allocation Methods

Effluent limits were determined for conservative constituents using a simple mass balance mixing analysis (UDWQ 2012). The mass balance analysis is summarized in the Wasteload Addendum.

Utah Division of Water Quality  
Wasteload Analysis  
Energy Fuels Resources (USA), Inc., Rim Mine  
UPDES No. UT-0023922

The water quality standard for chronic ammonia toxicity is dependent on temperature and pH, and the water quality standard for acute ammonia toxicity is dependent on pH. The AMMTOX Model developed by University of Colorado and adapted by Utah DWQ and EPA Region VIII was used to determine ammonia effluent limits (Lewis et al. 2002). The analysis is summarized in the Wasteload Addendum.

Models and supporting documentation are available for review upon request.

Antidegradation Level I Review

The objective of the Level I ADR is to ensure the protection of existing uses, defined as the beneficial uses attained in the receiving water on or after November 28, 1975. No evidence is known that the existing uses deviate from the designated beneficial uses for the receiving water. Therefore, the beneficial uses will be protected if the discharge remains below the WQBELs presented in this wasteload.

A Level II Antidegradation Review (ADR) is not required for this facility because there is no increase in permitted concentrations or flow over the previous permit.

Documents:

WLA Document: *RimMine\_WLADoc\_3-3-16.docx*  
Wasteload Analysis and Addendum: *RimMine\_WLA\_3-3-16.xlsm*

References:

Utah Division of Water Quality. 2012. *Utah Wasteload Analysis Procedures Version 1.0*.  
Lewis, B., J. Saunders, and M. Murphy. 2002. *Ammonia Toxicity Model (AMMTOX, Version2): A Tool for Determining Effluent Ammonia Limits*. University of Colorado, Center for Limnology.