

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

**Date:** June 2, 2023

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Standards and Technical Services

**Facility:** Energy Fuels Inc, Energy Queen Mine  
UPDES Permit No. UT-0025712

**Receiving water:** Dry Wash > W Coyote Ck > Hatch Wash > Kane Springs Ck >  
Colorado River (1C, 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 (DWQ).

Discharge

The three outfalls (Outfall 001, 002, and 003): Dry Wash -> W Coyote Ck -> Hatch Wash -> Kane Springs Ck -> Colorado River

The design flow effluent discharge, presumably, the mean monthly design discharge, is 0.5 MGD for the facility.

Receiving Water

The receiving water for the three outfalls (Outfall 001, 002, and 003) is an unnamed ephemeral Dry Wash, which is tributary of the ephemeral West Coyote Creek, a tributary of ephemeral Hatch Wash, a tributary of Kane Springs Creek, a tributary of the Colorado River.

Per UAC R317-2-13, the designated beneficial use of the affected assessment unit in the immediate area is (13.1): “*Kane Canyon Creek and tributaries, from confluence with Colorado River to headwaters*” is classified 2B, 3C, 4. Since Kane Creek drains to the Colorado River, which is classified with 1C, the 1C criteria is included in the limits in order to ensure protection of downstream sources.

- *Class 1C - Protected for domestic purposes with prior treatment by treatment processes as required by the Utah Division of Drinking Water*

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### Wasteload Analysis

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- *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 receiving water is an ephemeral wash at the point of discharge and there are no available monitoring locations upstream, the 7Q10 critical flow is assumed to be zero.

Ambient, upstream, background receiving water quality was interrogated using DWQ 4956070 WEST COYOTE CK NEAR LASAL JUNCTION. The average seasonal value was calculated for each constituent, where data was available, in the receiving water. If seasonal information was not available, the average annual value of the parameter was used.

Effluent water quality parameters are typically characterized using the discharge monitoring report (DMR) provided by the facility or monitoring location data collected from the effluent. There is no discharge monitoring report available for the period from 2000 through 2023. Therefore, effluent conditions were summarized, where available, using the Compliance Monitoring Well Background Statistics from the 2009 DWQ Ground Water Quality Discharge Permit for the compliance wells.

#### Total Maximum Daily Load (TMDL)

According to the Utah's [Final 2022 Integrated Report on Water Quality](#) dated December 9, 2022, the receiving water for the discharge, "*Kane Canyon Creek and tributaries, from confluence with Colorado River to headwaters (Kane Springs Wash: UT14030005-001\_00)*" was listed as "Not Supporting" for Temperature and Total Dissolved Solids. DWQ has not completed a TMDL for Temperature nor Total Dissolved Solids in Kane Canyon Creek and has set the development priority as "Low".

Effluents limits for TDS and temperature equal to the water quality criteria will ensure that in-stream criteria will not be exceeded at the point of discharge as well as not causing or contributing to the existing impairment downstream in Kane Springs Wash.

#### Mixing Zone

The maximum allowable mixing zone is 15 minutes of travel time for acute conditions, not to exceed 50% of stream width, and for chronic conditions is 2500 ft, per UAC R317-2-5. Water quality standards must be met at the end of the mixing zone.

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Since the receiving water is an ephemeral Dry Wash contributing to a series of ephemeral washes, the critical low flow is considered zero, no mixing zone analysis was considered. Effluent limits revert to end of pipe standards.

Parameters of Concern

The potential parameters of concern identified for the discharge/receiving water were determined in consultation with the UPDES Permit Writer, the Utah Water Quality Assessment Reports, and the industry SIC codes from <https://www.osha.gov/data/sic-search>. The potential parameters of concern for this facility include: radiological parameters (gross alpha, gross beta, Strontium 90, Uranium, Radium 226, 228), Temperature, Total Dissolved Solids, metals, major ions.

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.

**Table 1: WET Limits for IC<sub>25</sub>**

<b>Outfall</b>	<b>Percent Effluent</b>
Outfall 001	99.9%
Outfall 002	99.9%
Outfall 003	99.9%

Wasteload Allocation Methods

Effluent limits were determined for conservative constituents using a simple mass balance mixing analysis (UDWQ, 2021). Therefore, no mixing zone is applied and end of pipe effluent limits are required. The mass balance analysis is summarized in the Wasteload Addendum.

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. However, temperature and ammonia concentration of the effluent were not provided. 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.

Water quality 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.

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A Level II Antidegradation Review (ADR) is NOT required for this facility as the UPDES permit is being renewed and there is no increase in load or concentration over that which was approved in the previous permit, per UAC R317-2-3.

Documents:

Wasteload Document: *Energy\_Queen\_Mine\_WLA\_2023.docx*

Wasteload Analysis and Addendums: *Energy\_Queen\_Mine\_WLA\_2023.xlsm*

References:

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.

Utah Division of Water Quality. 2021. *Utah Wasteload Analysis Procedures Version 2.0*. <https://documents.deq.utah.gov/water-quality/standards-technical-services/DWQ-2021-000684.pdf>

Utah Division of Water Quality. 2022. *Final 2022 Integrated Report on Water Quality*. <https://documents.deq.utah.gov/water-quality/monitoring-reporting/integrated-report/DWQ-2022-002386.pdf>

USEPA, 1986. Quality Criteria for Water (“Gold Book”): Office of Water Regulations and Standards, EPA-440/5-86-001, USEPA, Washington DC. <https://www.epa.gov/sites/default/files/2018-10/documents/quality-criteria-water-1986.pdf>