

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

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Facility: Emery County Coal Resources, Inc. – Princess Mine (aka Crandall Canyon Mine), UPDES Permit No. UT0024368

Receiving Water: Crandall Canyon Creek and Huntington Creek (1C, 2B, 3A, 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

Outfall 001: Sediment Pond

Outfall 002-A&B: Mine Water Discharge

Design flow is 0.73 MGD total as previously provided by the permittee.

Receiving Water

The receiving water for these discharges is Crandall Canyon Creek & Huntington Creek.

Per UAC R317-2-13.2(b), Huntington Creek and tributaries, from Highway U-10 crossing to headwaters is 1C, 2B, 3A, 4.

- *Class 1C - Protected for domestic purposes with prior treatment by treatment processes as required by the Utah Division of Drinking Water.*
- *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 3A - Protected for cold water species of game fish and other cold water aquatic life, including the necessary aquatic organisms in their food chain.*

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- *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). Due to a lack of flow records for Huntington Creek, the average flow measurement was calculated for all the data set on an annual basis. The source of flow data was AWQMS sampling site 4930770 (2000-2019).

Table 1: Annual critical low flow (cfs)

Storet	Site Name	Flow Annual (cfs)
4930770	HUNTINGTON CK BL CNFL/ L FK HUNTINGTON CK	58.9

Huntington Creek water quality was characterized based on sampling site 4930770 (2002-2022) from AWQMS.

TMDL

According to Utah’s 2022 Integrated Report (IR) and its 303(d) list of impaired waterbodies, the receiving water for the discharges, Huntington Creek-3-1 (Huntington Creek and tributaries from USFS boundary to headwaters, except Meetinghouse, Rilda, and Bear Canyons), Assessment Unit (UT14060009-003_01), is impaired for dissolved oxygen, pH, and temperature. There have been no updates to the 2004 TMDL.

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.

Based on the results of the mixing zone modeling, plume width was 100% of the creek at 2500 feet. 100% of the seasonal critical flow was used to calculate chronic limits. Acute limits were calculated using 50% of the seasonal critical low flow.

Parameters of Concern

The potential parameters of concern identified for the discharge/receiving water remain unchanged and include; total iron, total dissolved solids, and total aluminum (during mine water treatment operations) 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.

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The LC₅₀ (lethal concentration, 50%) percent effluent for acute toxicity and the IC₂₅ (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 LC₅₀ is typically 100% effluent and does not need to be determined by the WLA.

Table 2: WET Limits for IC₂₅ (Outfall 002-B into Huntington Creek)

Outfall	Percent Effluent
002 B	1.9 %

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 Appendix A.

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).

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 at this time because a previous level II ADR was completed and there are no proposed increases in discharge flows or concentration limits.

Documents:

WLA Document: *PrincessMine_WLADoc_07-1-22_Final.docx*
Wasteload Analysis: *PrincessMine_WLA_2022_Final.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.

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