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

**Date:** **July 12, 2022 (final version August 16, 2022)**

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**Standards and Technical Services**

**Facility:** **Canyon Fuel Company; SUFCO Mine**
**UPDES No. UT0022918**

**Receiving water:** **Quitchupah Creek (2B, 3A, 4) Tributaries**

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.

## Discharges and Receiving Water Body

| Outfall # | Site type | Maximum daily flow (MGD) | Receiving Water Body |
|---|---|---|---|
| 001 | Emergency Mine Discharge | 0.01 | Quitchupah Creek Tributary |
| 002 | Sedimentation Pond Discharge | 0.5 | Quitchupah Creek Tributary |
| 003 | Mine Water Discharge | 8.0 | North Fork of Quitchupah Creek |

## Receiving Water

Per UAC R317-2-13.1, the designated beneficial uses of Quitchupah Creek and Tributaries, from Highway U-10 crossing to headwaters 2B, 3A, 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 3A - Protected for cold water species of game fish and other cold-water 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). Due to a lack of flow records, the 20th percentile of available flow measurements was calculated for the period of record to approximate the 7Q10 low flow condition.

The source of receiving water flow data for discharges 001 and 002 was Station #46 (CONVULSION CANYON AB PUMP HOUSE) retrieved from the Division of Oil, Gas and Mining (DOGM) database. The source of receiving water flow data for discharge 003 were the combined flows from station #6 (S FK OF N FK OF QUITCHUPAH CREEK) and Station #7 (U N FK QUITCHUPAH CK) retrieved from the DOGM database. Ambient water quality for the receiving water for each discharge was characterized using data from these same three stations from the period 2002-2022 (see table below).

| Outfall # | Ambient Water Data Source | Ambient Water Site # | Ambient Water Description | Critical Flow (cfs) 20th percentile | Discharge Data Source | Analysis Period |
|---|---|---|---|---|---|---|
| 001 | Division of Oil, Gas and Mining (DOGM) | 46 | CONVULSION CANYON AB PUMP HOUSE | 0.01 | UT0022918-002 | 2002-2022 |
| 002 | Division of Oil, Gas and Mining (DOGM) | 46 | CONVULSION CANYON AB PUMP HOUSE | 0.01 | UT0022918-002 | 2002-2022 |
| 003 | Division of Oil, Gas and Mining (DOGM) | 6 | S FK OF N FK OF QUITCHUPAH CK | 0.196 | UT0022918-003A | 2002-2022 |
| 003 | Division of Oil, Gas and Mining (DOGM) | 7 | U N FK QUITCHUPAH CK | 0.196 | UT0022918-003A | 2002-2022 |

**TMDL**

According to Utah's 2022 Integrated Report (IR) and its 303(d) list of impaired waterbodies, the receiving water for the discharges, Quitchupah Creek Upper (UT14070002-002_00, Quitchupah

Creek from U-10 to headwaters) was listed as impaired for Benthic Invertebrate Assessment, Dissolved Oxygen and Temperature. A TMDL has not been completed for these parameters on Quitchupah Creek.

## 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.

Since the receiving water low flow is equal to or less than twice the flow of a point source discharge, the combined flows are considered to be totally mixed. 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 were dissolved oxygen, temperature, total dissolved solids and iron, 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 $LC_{50}$ (lethal concentration, 50%) percent effluent for acute toxicity and the $IC_{25}$ (inhibition concentration, 25%) percent effluent for chronic toxicity, as determined by the WET test, needs to be greater than the WET limits, as determined by the WLA (see table below). The WET limit for $LC_{50}$ is typically 100% effluent and does not need to be determined by the WLA.

| Outfall # | IC25 WET (% Effluent) |
|---|---|
| 001 | 60.7% |
| 002 | 98.7% |
| 003 | 98.4% |

## 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 Addendums.

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 Antidegradation Review (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.

## Antidegradation Level II

A Level II ADR is required for this facility as the permit applicant requested an increase in the effluent flow limitations over those authorized in the existing permit.

## Documents:

WLA Document*: SUFCO_WLADoc_2022.docx*

Wasteload Analysis and Addendums:
*SUFCO_003_WLA_2022.xlsm*
*SUFCO_002_WLA_2022.xlsm*
*SUFCO_001_WLA_2022.xlsm*

## References:

Utah Division of Water Quality. 2012. *Utah Wasteload Analysis Procedures Version 1.0.*

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