

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

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Facility: Duchesne Valley Water Treatment Plant, Lagoon Effluent
UPDES Permit No. UT0025801

Receiving water: Starvation Reservoir (1C, 2A, 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

001 Duchesne Valley Water Treatment Plant 0.65 MGD design flow

Receiving Water

Per UAC R317-2-13.2.g, the designated beneficial uses of the Starvation Reservoir are 1C, 2A, 3A, 4.

- *Class 1C - Protected for domestic purposes with prior treatment by treatment processes as required by the Utah Division of Drinking Water.*
- *Class 2A - Protected for frequent primary contact recreation where there is a high likelihood of ingestion of water or a high degree of bodily contact with the water. Examples include, but are not limited to, swimming, rafting, kayaking, diving, and water skiing.*
- *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.*

Flow

Typically, the critical flow for the wasteload analysis is considered the lowest stream flow for

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seven consecutive days with a ten year return frequency (7Q10). The lagoon effluent discharges to Starvation Reservoir, therefore seasonal critical values were not calculated for this waste load analysis and the design flow (0.65 MGD) was used instead.

Receiving water quality was characterized using data from DWQ Monitoring Stations # 4936050 STARVATION RES AB DAM 01 for the period 2000-2020.

The discharge point was characterized using data set sent to UDWQ by the facility for the period 2015-2020.

TMDL

According to the Utah's 2016 303(d) Water Quality Assessment Report, the receiving water for the discharge; Starvation Reservoir (UT-L-14060004-006_00) was not assessed against water quality standards for its beneficial uses due to insufficient data to make the assessment.

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, per UAC R317-2-5. Water quality standards must be met at the end of the mixing zone. The mixing zone model showed complete mixing within 2,500 feet for chronic conditions. Acute limits were calculated using 50% of the seasonal critical low flow.

Parameters of Concern

Based on a discussion with the permit writer, the potential parameters of concern for the discharge were identified as metals (specifically Aluminum and Iron) and TDS, which is consistent with the previous permit's POCs.

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 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.

IC25 WET limits for Outfall 001 should be based on 1.47 % effluent (Table 1).

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Table 1. WET Limits for IC25

Outfall	Percent Effluent
Outfall 001	1.47%

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 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. The proposed permit is a simple renewal of an existing UPDES permit. No increase in flow or concentration of pollutants over those authorized in the the existing permit is being requested.

Documents:

WLA Document: *Duchesne Valley _WTP_WLADoc_3-2-21.docx*

Wasteload Analysis and Addendums: *Duchesne Valley _WTP_WLA_3-2-21.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.