

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

**Date:** February 9, 2023

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Standards and Technical Services

**Facility:** Jordanelle Special Service District, Keetley Water Treatment Plant  
Heber City, Utah  
UPDES Permit No. UT0022403

**Receiving water:** Jordanelle 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 (DWQ).

Discharge

Outfall 001: The Jordanelle Special Service District, Keetley Water Treatment Plant treats water from the Ontario number 2 drain tunnel for both culinary use and discharge into the Jordanelle Reservoir. The drinking water plant uses lime addition and polymer injection through solids contact clarifiers into an onsite pond and then to the Jordanelle Reservoir. The 2023 Permit Application indicates a design flow rate of 12.00 MGD, annual average flow rate of 5.30 MGD, and maximum daily flow rate of 7.16 MGD. The design flow rate is used in the WLA.

Receiving Water

Effluent discharge from Jordanelle Special Service District, Keetley Water Treatment Plant is discharged to an onsite pond and then to the adjacent Jordanelle Reservoir.

Per UAC R317-2-13.4(a), the designated beneficial use of the assessment unit in the immediate downstream area is: *Jordanelle Reservoir, Uses: 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.*

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- *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.*

Ambient, upstream, background receiving water quality was characterized for Outfall 001. The analysis of water quality was completed using data from monitoring location DWQ Monitoring Station 5914030, JORDANELLE RES NORTH ARM 03. The 80<sup>th</sup> percentile value was calculated for each constituent with available monitoring and sampling data for the period 2000 through 2023.

The effluent discharge parameters were characterized using the limited data available from a combination of the Jordanelle Special Service District, Keetley Water Treatment Plant Discharge Monitoring Report (DMR) and DWQ monitoring location DWQ 4998030, JORDANELLE SPECIAL SERVICES DISTRICT 001.

#### Total Maximum Daily Load (TMDL)

According to the Utah's 2022 303(d) [Water Quality Assessment Report](#) "Final 2022 Integrated Report on Water Quality", the receiving water for the discharge, *Jordanelle Reservoir (UT-L-16020203-003\_00)* was listed as Not Supporting and impaired for pH (Class 3A use). As a result, effluent limits for pH revert to end of pipe criteria (6.5-9).

#### Mixing Zone

As per R317-2-5, the size of the chronic mixing zone in lakes and reservoirs shall not exceed 200 feet and the size of an acute mixing zone shall not exceed 35 feet. Mixing zone calculations were performed using the EPA Region VIII Simplified Mixing Zone Models (Simple Round Jet & Plane Jet) for Shoreline Dischargers to Lakes and Reservoirs.

Per R317-2-5.1., individual mixing zones may be further limited or disallowed in consideration of the factors in the area affected by the discharge which includes the following subheadings: a) bioaccumulation in fish tissues or wildlife, b) biologically important areas such as fish spawning/nursery areas or segments with occurrences of federally listed threatened or endangered species, and /or c) potential human exposure to pollutants resulting from drinking water or recreational activities.

In regard to R317-2-5.1.b., the US Fish and Wildlife Service (US FWS) datasets do not indicate any current endangered species found in this area. However, early life species are present throughout the year in this area, which may limit the incorporation of the mixing zone. In regard to R317-2-5.1.c., the outfall is not to open water when the Jordanelle Reservoir is low, which results in a sinuous open channel to the open water. There is no mixing in this case until the channel meets the open water and may be a basis for disallowing the mixing zone.

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#### Parameters of Concern

The potential parameters of concern identified for the discharge/receiving water were total suspended solids (TSS), aluminum, copper, mercury, lead, zinc and pH. These parameters of concern (POC) were determined in consultation with the UPDES Permit Writer, the Watershed Protection Specialist, and as determined by the existing UPDES Permit and any impairment status of the receiving water.

#### 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.

IC<sub>25</sub> WET limits for Outfalls 001 should be based on 5% effluent.

#### Wasteload Allocation Methods

Effluent limits were determined for all constituents using the EPA Region VIII Simplified Mixing Zone Models (Simple Round Jet & Plane Jet) for Shoreline Dischargers to Lakes and Reservoirs, a mass balance and mixing analysis (UDWQ, 2021). The 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. The EPA Region VIII Simplified Mixing Zone Models (Simple Round Jet & Plane Jet) for Shoreline Dischargers to Lakes and Reservoirs, was used to determine the ammonia effluent limits. 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 as no increase in flow or concentration of pollutants over those authorized in the existing permit is being requested. There is also no change in outfall location. The proposed permit is a simple renewal of an existing

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UPDES permit. However, purported plans to add an additional source contribution not submitted in the application may require modification of the wasteload analysis based on pollutant concentrations and/or loading.

Documents:

WLA Document: *Jordanelle\_DW\_WLA\_2023.docx*

Wasteload Analysis and Addendums: *Jordanelle\_DW\_WLA\_2023\_Jet\_Model.xlsm*

References:

Utah Division of Water Quality. 2022. *Final 2022 Integrated Report on Water Quality*

Utah Division of Water Quality. 2021. *Utah Wasteload Analysis Procedures Version 2.0.*