

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

**Date:** November 2, 2021

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Standards and Technical Services

**Facility:** Kane Springs Water Company  
Moab, Utah  
UPDES Permit No. UT-0026204

**Receiving water:** Colorado River

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 design flow for the MBR treatment plant is 0.27 MGD. The annual average flow is 0.135 MGD. The maximum daily flow is 0.27 MGD.

Receiving Water

The receiving water for Outfall 001 is the Colorado River, just upstream from Kane Creek.

Per UAC R317-2-13.1(b), the designated beneficial use of the assessment unit in the immediate downstream area is: *Colorado River and tributaries, from Lake Powell to state line except as listed below: 1C,2A,3B,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.*

Utah Division of Water Quality  
Wasteload Analysis  
Kane Springs Water Company, UPDES Permit No. UT-0026204

- *Class 3B -- Protected for warm water species of game fish and other warm 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 averaged over seven consecutive days with a ten year return frequency (7Q10). The USGS 09180500 COLORADO RIVER NEAR CISCO, UT stream gauge located approximately 45 miles upgradient was initially used to evaluate ambient or background flow conditions. The stream gauge has a daily average flow record from 1914 to present. Therefore, DWQ used the minimum of the 7Q10 over the entire period to estimate the seasonal critical flow in the receiving water (Table 1). The average annual critical low flow condition is 969.3 ft<sup>3</sup>/s.

**Table 1: Seasonal Flow Data at USGS 09180500 COLORADO RIVER NEAR CISCO, UT.**

Season	Minimum 7Q10 flow (ft <sup>3</sup> /s)
Summer	736.0
Fall	1265.7
Winter	1567.1
Spring	1350.0
<b>Annual Overall</b>	<b>969.3</b>

Ambient, upstream, background receiving water quality was characterized using data from DWQ 4956540 COLORADO R BL MOAB WWTP OUTFALL. Initially, the average seasonal value was calculated for each constituent with available monitoring and sampling data in the upstream receiving water. Effluent discharge parameters were not available, as the MBR facility has not been constructed. The parameters were therefore, characterized using data supplied in the permit application, from the facility engineer, or assumed not available.

Per R317-2-5.1.b., individual mixing zones may be further limited or disallowed in consideration of the factors in the area affected by the discharge which includes, biologically important areas such as fish spawning/nursery areas or segments with occurrences of federally listed threatened or endangered species. According to US Fish and Wildlife Service (US FWS), endangered species in this area include, Razorback Sucker (*xyrauchen texanus*), Humpback Chub (*Gila cypha*), Colorado Pikeminnow (*Ptychocheilus Lucius*), and Bonytail (*Gila elegans*). Because the critical habitat of these species is potentially affected, authorized additional study is required from agencies including but not limited to US EPA, US FWS, Utah Division of Wildlife Resources. Therefore, no mixing zone is granted at this time and effluent limits must be met at the point of discharge (end-of-pipe).

Total Maximum Daily Load (TMDL)

According to the Utah's 2021 303(d) [Water Quality Assessment Report](#) "Combined 2018/2020 Integrated Report Version 1.0", the receiving water for the discharge, Colorado River from Green River confluence to Moab (UT14030005-003\_00) was listed for selenium with an approved TMDL.

**Utah Division of Water Quality  
Wasteload Analysis  
Kane Springs Water Company, UPDES Permit No. UT-0026204**

DWQ completed a TMDL for selenium in the Colorado River Watershed in 2014 (UDWQ, 2014). The TMDL allocated a selenium load to the Moab Wastewater Treatment Plant that was derived by applying the in-stream chronic selenium standard (4.6 ug/l) times the plant's design flow rate. Using his approach for the Moab facility (4.6 ug/l x 1.50 MGD x 3.79 conversion factor) yielded a selenium load of 26.1 g/d. Using the same approach for this new facility would yield a selenium load of 2.35 g/d as calculated.

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. Individual mixing zones may be further limited or disallowed in consideration of the following factors in the area affected by the discharge: Zone of passage for migrating fish or other species (including access to tributaries).

As stated previously, individual mixing zones may be disallowed in consideration of site-specific factors. For the project location, biologically important areas such as fish spawning/nursery areas or segments with occurrences of federally listed threatened or endangered species are present (R317-2-5.1.b.). According to US Fish and Wildlife Service (US FWS), endangered species in this area include, Razorback Sucker (*xyrauchen texanus*), Humpback Chub (*Gila cypha*), Colorado Pikeminnow (*Ptychocheilus Lucius*), and Bonytail (*Gila elegans*). Because the critical habitat of these species is potentially affected, authorized additional study is required from agencies including but not limited to US EPA, US FWS, Utah Division of Wildlife Resources. Therefore, no mixing zone is granted at this time and effluent limits must be met at the point of discharge (end-of-pipe).

Parameters of Concern

The potential parameters of concern identified for the discharge/receiving water were total dissolved solids (TDS), total suspended solids (TSS), selenium, E. coli, and ammonia, as determined in consultation with the UPDES Permit Writer and the Watershed Protection Specialist.

Wasteload Allocation Methods

Effluent limits were determined for conservative constituents using a simple mass balance mixing analysis (UDWQ, 2021). 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, pH, 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.

Models and supporting documentation are available for review upon request.

Antidegradation Level I Review

**Utah Division of Water Quality**  
**Wasteload Analysis**  
**Kane Springs Water Company, UPDES Permit No. UT-0026204**

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 required for this facility because the facility has previously not been permitted and this is a new discharge.

Documents:

WLA Document: *211102-Kane\_Creek\_ELS\_EOP\_WLA\_2021.docx*

Wasteload Analysis and Addendums: *211102-Kane\_Creek\_ELS\_EOP\_WLA\_2021.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. 2014, *TMDL for Selenium in the Colorado River Watershed*

Utah Division of Water Quality. 2021. *Combined 2018/2020 Integrated Report Version 1.0*

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