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

Date: **December 19, 2022**

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Standards and Technical Services

Facility: **Centerfield Regional Culinary Water Treatment Plant**
Mayfield, Utah
UPDES Permit No. UT0025704

Receiving water: **Twelve Mile Creek (2B, 3C, 3D, 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: design flow rate of 0.30 MGD, Annual average flow rate of 0.03 MGD, and maximum daily flow rate of 0.09 MGD. Use the design flow rate.

Receiving Water
Effluent discharge from Centerfield Regional Culinary Water Treatment RO Plant is discharged to Twelve Mile Creek.

Per UAC R317-2-13.4(a), the designated beneficial use of the assessment unit in the immediate downstream area is: *San Pitch River and tributaries, from confluence with Sevier River to Highway U-132 crossing except as listed below: 2B,3C,3D,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 3C - Protected for nongame fish and other aquatic life, including the necessary aquatic organisms in their food chain.*

- *Class 3D -- Protected for waterfowl, shore birds and other water-oriented wildlife not included in Classes 3A, 3B, or 3C, 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). Due to the lack of flow records, the seasonal critical flow on Twelve Mile Creek was calculated using all available data from DWQ Monitoring Station 4946160, TWELVE MILE CK @ U-137 XING IN MAYFIELD for the period 2000 - 2022. The 20th percentile seasonal value was calculated for critical low flow conditions. The average annual critical low flow condition is 17.8 ft3/s.

Ambient, upstream, background receiving water quality was characterized for Outfall 001 using data from monitoring location DWQ Monitoring Station 4946160, TWELVE MILE CK @ U-137 XING IN MAYFIELD. The 20th percentile seasonal value was calculated for each constituent with available monitoring and sampling data in the upstream receiving water.

Limited effluent discharge parameters were provided in the renewal application and DWQ does not currently monitor effluent conditions at Outfall 001. The parameters were therefore, characterized using the limited data available from the Discharge Monitoring Report (DMR) and the provided facility monitoring data. Several analytes were not available including effluent water temperature, total nitrogen ammonia as N, total residual chlorine, and hardness. In addition, monitoring data is only available for summer and fall. Therefore, the average value was used for additional seasonal requirements.

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, *San Pitch River and tributaries from confluence with Sevier River to tailwaters of Gunnison Reservoir (excluding all of Sixmile Creek and Twelvemile Creek above USFS boundary), (AU UT16030004-001_00)* is listed as impaired for total dissolved solids (TDS). A TMDL addressing TDS for the San Pitch River was completed November 18, 2003.

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. 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

The potential parameter of concern identified for the discharge/receiving water is total dissolved solids (TDS). This parameter of concern (POC) was determined in consultation with the UPDES Permit Writer and the Watershed Protection Specialist, and as determined by the existing UPDES Permit and the 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_{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 below the WET limits, as determined by the WLA. The WET limit for LC_{50} is typically 100% effluent and does not need to be determined by the WLA.

IC25 WET limits for Outfall 001 should be based on 12.2% effluent. LC50 WET limits for Outfall 001 should be based on 46.5% effluent.

Wasteload Allocation Methods

Effluent limits were determined for all constituents using the Utah Rivers Model, 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. However, temperature, pH, and ammonia concentration of the effluent were not provided. Background temperature and pH values were used in the analysis. 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*: Centerfield_WLA_2022.docx*
Wasteload Analysis and Addendums: *Centerfield _WLA_2022.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.*