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

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Facility: **Jordan Valley Water Conservancy District Southwest Groundwater Treatment Plant**
UPDES No. UT0025836

Receiving water: **Outfall 001 Transitional Waters of Great Salt Lake, Gilbert Bay of Great Salt Lake (5E, 5A)**

This addendum summarizes the wasteload analyses that were performed to determine water quality based effluent limits (WQBEL) for Outfall 001 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

Outfall 001: 3.0 MGD

Receiving Waters Outfall 001
The receiving waters for Outfalls 001 are the Transitional Waters to Great Salt Lake and Gilbert Bay, Great Salt Lake

Per UAC R317-2-6.5.e., the designated beneficial uses for the Transitional Waters are:

- *Class 5E -- Protected for infrequent primary and secondary contact recreation, waterfowl, shore birds and other water-oriented wildlife including their necessary food chain.*

Per UAC R317-2-6.5.a., the designated beneficial uses for Gilbert Bay are:

- *Class 5A -- Protected for frequent primary and secondary contact recreation, waterfowl, shore birds and other water-oriented wildlife including their necessary food chain.*

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). Outfall 001 discharges to the

mud flats (Transitional Waters) of Gilbert Bay and then flows to Gilbert Bay. Water is present in the discharge channel even when no discharge is occurring but the flows are low and have not be reliably measured. As a result, the annual critical low flow was determined to be zero for the wasteload.

With the exception of the selenium standard for Gilbert Bay, Great Salt Lake has no other numeric criteria. Like other discharges to Great Salt Lake, the wasteload is based on freshwater Class 3D criteria as recommended in the *Interim Methods for Evaluating Use Support for Great Salt Lake, Utah Pollution Discharge Elimination (UPDES) Permits*, Version 1.0 (DWQ, 2016).

The selenium standard for Gilbert Bay is based on bird egg concentration and no water to egg translator is unavailable. In the absence of translator, the wasteload does not directly assess compliance with the selenium criterion. The selenium effluent limits, unchanged from the last permit, are based on the weight of evidence analysis presented in the Fact Sheet/Statement of Basis for the 2011 permit. Selenium continues to be annually measured in bird eggs and other biota as part of the annual Transitional Waters Monitoring Program. The limited number of birds nesting in the area combined with high predation rates has prevented successful collection of at least 5 eggs and in the majority of years, no eggs could be collected. At least 5 eggs are required by the permit to calculate the geometric mean.

As required by the existing permit, JVWCD recently notified DWQ that the selenium concentrations in 3 eggs collected during the 2019 nesting season exceeded 9.8 mg/kg. No additional actions are required at this time because less than 5 eggs are available. However, if the 2019 egg concentrations are an indication that selenium concentrations are increasing in the food web, additional actions may be required in the future. Pictures from the Annual Monitoring Reports suggest that the habitat is evolving with the establishment of vegetation, including phragmites because of the continuous discharge from the JVWCD Outfall 001. If these habitat changes result in an increased usage by birds, a sufficient number of eggs should be available in the future. If less than 5 eggs annually are available during the upcoming permit cycle and concentrations in the available eggs support that selenium concentrations are increasing in the food web, i.e., greater than 9.8 mg/kg, an alternative monitoring approach may be considered.

Selenium concentrations were annually monitored in water and biota in Gilbert Bay. No exceedances were observed or increasing trends observed. Ackerman et al. (2015) reported the selenium and mercury concentrations for over 1,000 eggs collected from Great Salt Lake. The approximately 150 eggs collected from Gilbert Bay support that the selenium standard continues to be met.

TMDL

The water quality of the Transitional Waters and Great Salt Lake are not currently impaired for any pollutant.

Mixing Zone

Because the critical low flow for the receiving water is zero, no mixing zone was considered.

Parameters of Concern

The potential parameter of concern identified for the discharge/receiving water was selenium based on the previous permits and ongoing monitoring. During the last permit cycle, 7 effluent samples were characterized for all potentially present pollutants as part of a WET investigation and routine monitoring was conducted by the permittee. After identifying and removing some non-representative measurements, the similarity in results to previous effluent characterizations support that no other pollutants have reasonable potential. Other pollutants of concern may become apparent as a result of technology based standards, or other factors as determined by the UPDES Permit Writer.

WET Limits

WET requirements for Great Salt Lake discharges are based on the *Utah Pollution Discharge Elimination System Permit and Enforcement Guidance Document for Whole Effluent Toxicity* (DWQ, 2018). 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.

Because the critical low flow of the receiving water was determined to be zero, WET testing for Outfall 001 for IC_{25} should be based on 100% effluent. As documented in the Utah (2018) WET guidance, the chronic testing results are interpreted as an indicator.

Antidegradation Level I and II Reviews

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. Currently, know existing uses were identified that deviate from the designated beneficial uses for the receiving water. Therefore, both existing and designated 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, with no increase in flow or concentration over that which was approved in the existing permit.

Documents:

WLA Document:
Wasteload Analysis: *JVWCD_WLADoc01232019.xlsm*

References:

Ackerman, J. T., et al. 2015. Mercury and selenium contamination in water bird eggs and risk to avian reproduction at Great Salt Lake, Utah, USGS Open File Report 2015-1020 https://pubs.er.usgs.gov/publication/ofr20151020

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

Utah Division of Water Quality. 2016. *Interim Methods for Evaluating Use Support for Great Salt Lake, Utah Pollution Discharge Elimination (UPDES) Permits*, Version 1.0

Utah Division of Water Quality. 2018. *Utah Pollution Discharge Elimination System Permit and Enforcement Guidance Document for Whole Effluent Toxicity*.

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