

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

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UPDES Permit No. UT-0024759

Receiving water: Grassy Trail Creek > Icelander Creek > Price River (2B, 3C, 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

There are eleven UPDES discharge outfalls with nine design flow effluent discharges to Icelander Creek. However, no effluent discharge is expected during this permit cycle.

Table 1. UPDES Sunnyside Cogeneration Discharge Points

UPDES Discharge	Description	Receiving Water	Maximum Design Flow (MGD)
002	Water Supply Pipeline	Grassy Trail Creek	0.0
003	Water Supply Pipeline	Grassy Trail Creek	0.0
007	Rail Cut Sedimentation Pond	Icelander Creek	0.12
008	Old Coarse Refuse Road Sedimentation Pond	Icelander Creek	0.13
009	Pasture Sedimentation Pond	Icelander Creek	0.14
012	Coarse Refuse Toe Sedimentation Pond	Icelander Creek	0.29
013	Cogeneration Facility Sedimentation Pond	Icelander Creek	0.21
014	Coal Pile Sedimentation Pond	Icelander Creek	0.09
016	Borrow Area Sedimentation Pond	Icelander Creek	0.45
017	SCA #1 Ash Landfill Sedimentation Pond	Icelander Creek	0.15
018	SCA #2 Ash Landfill Sedimentation Pond	Icelander Creek	0.17
		Total	1.76

The design flow effluent discharge, presumably, the mean monthly design discharge, is 1.76 MGD for the facility.

Receiving Water

Icelander and Grassy Trail Creeks are tributary to the Price River. Per UAC R317-2-13.1(b), the designated beneficial use of the affected assessment unit in the immediate area is: “Price River and tributaries from confluence with Green River to confluence with Soldier Creek” and are classified as 2B, 3C, 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 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 for seven consecutive days with a ten year return frequency (7Q10). Because the receiving water, both Icelander and Grassy Trail Creeks, are intermittent drainages or ephemeral washes at the point of discharge and there are limited monitoring locations upstream, the 7Q10 critical flow is assumed to be zero. Effluent discharge limits revert to end of pipe water quality standards.

Very limited receiving water quality data is available as Icelander Creek is intermittent. Discharge data is also very limited. Facility only discharges rarely in response to very large storm events. Only discharge in the recent permit cycles was in response to a greater than 100-year return interval storm. Ambient, upstream, background receiving water quality was interrogated using several DWQ monitoring locations throughout the area. Monitoring location DWQ 4932020 SUNNYSIDE COAL CO 015 was used for background in-situ parameters, monitoring location DWQ 4932150 SUNNYSIDE COGENERATION UPPER SEEP was used for metals water quality analysis, and monitoring location DWQ 4932050 SUNNYSIDE COGENERATION ASSOC 004 was used to estimate upstream boron concentrations and nutrients. The average seasonal value was calculated for each constituent, where data was available, in the receiving water. If seasonal information was not available, the average annual value of the parameter was used.

Effluent water quality parameters are typically characterized using the discharge monitoring report (DMR) provided by the facility or monitoring location data collected from the effluent. There is no data available for effluent water temperature, BOD, total ammonia, total residual chlorine, or TDS and therefore, the previous wasteload assessment was utilized.

As per R317-2-14, Table 2.14.1 (Footnote 4), the Price River and tributaries from confluence with Green River to the confluence with Soldier Creek, has a site-specific standard for total dissolved solids of 3,000 mg/l. This value was the basis for the TDS limit contained in the wasteload analysis.

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Total Maximum Daily Load (TMDL)

According to the Utah’s [Final 2022 Integrated Report on Water Quality](#) dated December 9, 2022, the receiving water for the discharge, “*Price River and tributaries from confluence with Green River to confluence with Soldier Creek (Grassy Trail Creek Lower: UT14060007-012_00)*” was listed as “Insufficient Data”.

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.

Since the receiving water is an ephemeral or intermittent creek, the critical low flow is considered zero, no mixing zone analysis was considered. Effluent limits revert to end of pipe standards.

Parameters of Concern

The potential parameters of concern identified for the discharge/receiving water were determined in consultation with the UPDES Permit Writer, the Utah Water Quality Assessment Reports, and the industry SIC codes from <https://www.osha.gov/data/sic-search>. The potential parameters of concern for this facility include: Temperature, Total Dissolved Solids, metals, and major ions.

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.

Table 2: WET Limits for IC₂₅

Outfall	Percent Effluent
Outfall 001	100%

Wasteload Allocation Methods

Effluent limits were determined for conservative constituents using a simple mass balance mixing analysis (UDWQ, 2021). Therefore, no mixing zone is applied and end of pipe effluent limits are required. 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 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.

Water quality models and supporting documentation are available for review upon request.

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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 the UPDES permit is being renewed and there is no increase in load or concentration over that which was approved in the previous permit, per UAC R317-2-3.

Documents:

Wasteload Document: *Sunnyside_Cogen_WLA_2023.docx*

Wasteload Analysis and Addendums: *Sunnyside_Cogen_WLA_2023.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. 2021. *Utah Wasteload Analysis Procedures Version 2.0*. <https://documents.deq.utah.gov/water-quality/standards-technical-services/DWQ-2021-000684.pdf>

Utah Division of Water Quality. 2022. *Final 2022 Integrated Report on Water Quality*. <https://documents.deq.utah.gov/water-quality/monitoring-reporting/integrated-report/DWQ-2022-002386.pdf>

USEPA, 1986. Quality Criteria for Water (“Gold Book”): Office of Water Regulations and Standards, EPA-440/5-86-001, USEPA, Washington DC. <https://www.epa.gov/sites/default/files/2018-10/documents/quality-criteria-water-1986.pdf>