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

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Facility: **Park City Corporation Spiro Tunnel, UPDES Permit No. UT0025461**

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.

Discharge

001 Spiro Tunnel mine water bulkhead discharge: 880 gpm (1.96 cfs) average flow
002 Spiro Tunnel portal mine water discharge: 2930 gpm (6.53 cfs) average flow

Receiving Water

These waters discharge into north and east golf course ditches which flow through a series of ponds on Park City Municipal Corporation's golf course. Thereafter flows enter McCleod Creek and through diversion structures into East Canyon Creek and/or Silver Creek drainages.

Per UAC R317-2-13.4, the designated beneficial uses Weber River and tributaries, from Stoddard diversion to headwaters, (with exceptions) are: 1C, 2B, 3A, 4. Silver Creek and tributaries, from confluence with Tollgate Creek to headwaters, hold these same beneficial use designations, with the addition of a site specific standard for TDS.

- *Class 1C – Protected for domestic purposes with prior treatment by treatment processes as required by the Utah Division of Drinking Water.*

- *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 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.*

Flow
Typically, the critical flow for the receiving water in a wasteload analysis is considered the lowest stream flow for seven consecutive days with a ten year return frequency (7Q10). Because the Spiro Tunnel discharge essentially forms the headwaters of McCleod Creek, the annual critical low flow was determined to be zero. As a result, water quality based effluent limits revert to end-of-pipe water quality standards.

TMDL
According to the Utah's 2016 303(d) Water Quality Assessment Report, Silver Creek and tributaries from confluence with Weber River to headwaters (Assessment Unit UT16020101-020_00) have the following impairments:

Use Class 1C: cadmium, nitrate as total N, pH, arsenic;
Use Class 2B: pH;
Use Class 3A: pH, dissolved oxygen, OE bioassessment, cadmium, zinc;
Use Class 4: cadmium, pH, total dissolved solids

A Total Maximum Daily Load for this segment of Silver Creek addressing the zinc and cadmium impairments was approved August 4th, 2004. No load allocation was given to the Spiro Tunnel discharge at that time because it was determined to be a small source compared to much larger zinc and cadmium loadings downstream. End-of-pipe water quality standards apply.

According to the Utah's 2016 303(d) Water Quality Assessment Report, Kimball Creek and tributaries from East Canyon Creek confluence to headwaters, including McLeod Creek (assessment Unit UT16020102-027_00) have the following impairments:

Use Class 1C: arsenic;
Use Class 2B: none;
Use Class 3A: OE bioassessment;
Use Class 4: none

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, per UAC R317-2-5. Water quality standards must be met at the end of the mixing zone.

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

Parameters of Concern
Potential parameters of concern identified for the discharge based on review of the impairment

status of the receiving water and review of the previous permit include: antimony, arsenic, cadmium, dissolved oxygen, lead, mercury, nitrate as N, pH, total dissolved solids and zinc.

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.

Because the critical low flow of the receiving water was determined to be zero, WET limits for Outfall 001 for IC25 should be based on 100% effluent.

Wasteload Allocation Methods

Effluent limits were determined for conservative constituents using a simple mass balance mixing analysis (UDWQ 2012).

Effluent Limits

The water quality standards for some metals are dependent on hardness (total as CaCO3). Spiro Tunnel effluent data provided by Park City from 2014-2019 showed an average hardness of 411 mg/l for the 001 Bulkhead discharge and 514 for the 002 Portal discharge. As per R317-2-14.2(7), a hardness value of 400 mg/l will be used for calculating metals standards for waters having hardness greater than 400 mg/l.

Effluent limits are presented in Table 1.

Table 1. WQBELs for Total Recoverable Metals (ug/l), Outfall 001 and 002

Metal	Acute 1-hr Average	Chronic 4-day Average
Aluminum	750	n/a
Antimony	n/a	5.6
Arsenic	10.0	10.0
Asbestos	n/a	7.00E+6
Barium	1000	1000
Beryllium	4.0	n/a
Cadmium	7.38	2.39
Chromium (total)	50.0	n/a
Chromium (III)	5,611.7	268.22
Chromium (VI)	16.0	11.0
Copper	51.68	30.50
Cyanide	22.0	5.2
Iron	1,000	n/a
Lead	476.82	476.82
Mercury	2.4	0.012
Nickel	1515.92	100

Selenium	20.0	4.6
Silver	41.07	n/a
Thallium	n/a	0.24
Zinc	387.83	387.83
Boron	750	n/a

Because of the impairment status of the receiving water, in addition to the above metals values, the effluent limits in Table 2 also apply:

Table 2.

Dissolved oxygen	5 mg/l
Nitrates as N	10 mg/l
pH	6.5 -9.0
TDS	1,200 mg/l[a]

[a] Silver Creek and tributaries, from confluence with Tollgate Creek to headwaters has a TDS site specific standard of 1,900 mg/L. However discharge waters may also be diverted to the East Canyon Creek drainage which does not currently hold a site specific standard for TDS.

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: *ParkCity_Spiro_WLADoc_9-12-19.doc*

References:

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