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

Date:	**September 23, 2013**
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Facility:	**Capital Reef National Park Water Treatment Plant** **Torrey, UT** **UPDES No. UT0025798**
Receiving water:	**Fremont River (1C, 2A, 3A, 4)**

This addendum summarizes the wasteload analysis that was performed to determine water quality based effluent limits (WQBEL) for this discharge.

Discharge
001: Discharge through a 4-inch diameter pipe from a sedimentation pond to the Fremont River.

The design flow for the discharge is 2,880 gallons per day (0.004 cfs), as provided by the permittee.

The discharge is reject water from the reverse osmosis water treatment process. Discharge to the Fremont River only occurs when the pond is full and reaches the height of the outlet pipe.

Receiving Water
The receiving water for the discharge is the Fremont River, which is tributary to the Dirty Devil River, which drains to the Colorado River.

Per UAC R317-2-13, the designated beneficial uses for the Fremont River and tributaries, through Capitol Reef National Park to headwaters are 1C, 2A, 3A and 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.*
- *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.*

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The critical flow for the wasteload analysis was considered the lowest stream flow for seven consecutive days with a ten year return frequency (7Q10). Flow records from USGS stream gage #09330000 Fremont River Near Bicknell, UT, for the period 1909 – 2013 were obtained. Distribution records for the Torrey Canal, the primary diversion immediately downstream of the USGS stream gage, for the period 1976 – 2012 were obtained from the Utah Division of Water Rights. The Torrey Canal diversion flows were subtracted from the USGS stream gage in order to develop a flow record for the Fremont River downstream of Torrey, UT. The 7Q10 critical flow was calculated using the EPA computer software DFLOW V3.1b (Table 1).

Table 1: Fremont River critical low flow (7Q10)

Season	Flow (cfs)
Summer	28.4
Fall	39.7
Winter	64.8
Spring	28.4

Receiving water quality data was obtained from monitoring site 4954390 Fremont River at U12 Crossing. The average seasonal value was calculated for constituents with available data in the receiving water (Table 2).

Table 2: Ambient conditions for #4954390 Fremont River at U12 Crossing (2000-2012)

Parameter	Count	Average
Hardness, Ca + Mg (mg/L)	5	250
pH	25	8.5
Total Dissolved Solids (mg/L)	10	350
Total Suspended Solids (mg/L)	22	55

Mixing Zone

The maximum allowable mixing zone is 15 minutes of travel time for acute conditions, not to exceed 50% of stream width, and 2,500 feet for chronic conditions, per UAC R317-2-5. Water quality standards must be met at the end of the mixing zone.

The EPA Region 8 stream mixing zone analysis (STREAMIX1, 1994), was used to determine the plume width and mixed flow rate. A rectangular channel with a width of 15 feet, channel slope of 0.10 foot/foot, and roughness coefficient of 0.030 was assumed for channel geometry. Mannings equation was used to solve for the flow depth and velocity for the 7Q10 flow. The discharge was estimated to be fully mixed within 70 feet of the outfall.

Parameters of Concern

The parameters of concern for the discharge/receiving water are total dissolved solids (TDS), total suspended solids (TSS), BOD_5, and pH, as provided by the UPDES Permit Writer.

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TMDL

The receiving water segment (Fremont River-3) does not have an approved TMDL for any parameters. However, the receiving water was listed as impaired for benthic macroinvertebrates in the 2010 Integrated Report; the cause of the impairment is unknown.

The downstream segment of the Fremont River (Fremont River-4) has an approved TMDL (UDWQ, 2002) for total dissolved solids (TDS). The TMDL does not include a wasteload allocation for TDS from point sources in the upstream Fremont River segments.

Effluent Limits

Due to the high ratio of receiving water to design discharge (minimum of 6,311:1 for chronic conditions and 3,156:1 for acute conditions during the spring season) and ambient conditions in the receiving water being below water quality standards, WQBELs are not required for this discharge. Therefore, permit limits should be set according to rules found in R-317-1 and categorical UPDES discharge requirements for a design flow of 2,880 gallons per day.

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 required for this discharge since the discharge is to a Class 1C drinking water source.

Documents:

Wasteload Document: *capitol_reef_wla_2013.docx*
Wasteload Model: *capitol_reef_wla_2013.xlsx*

References

Utah Division of Water Quality. 2002. *Fremont River Watershed Water Quality Management Plan*. State of Utah, Department of Environmental Quality, Division of Water Quality.

Utah Division of Water Quality. 2012. *Utah Wasteload Analysis Procedures Version 1.0*. State of Utah, Department of Environmental Quality, Division of Water Quality.