

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

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**Prepared by:** Dave Wham   
Standards and Technical Services Section

**Facility:** Chamberlain Investments – Salt Creek  
UPDES No. UT-0025739

**Receiving water:** Salt Creek (2B, 3B, 3D)

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 effluent limitations necessary to maintain designated beneficial uses by evaluating projected effects of a discharge 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 secondary standards, categorical limits, narrative criteria and other conditions determined by staff of the Division of Water Quality.

Discharge

Outfall 001: Salt Creek

The mean monthly design discharge for the facility is 1.0 cfs or .65 MGD.

Chamberlain Investment Company (CIC) is a planned spa resort which may include a restaurant and greenhouses as well as grottos and swimming pools. The State Engineer's office has issued a non-consumptive water right to CIC of 1.0 cubic feet per second (0.65 mgd). There is a cool water well and two hot water wells from which CIC will be able to obtain mineral water for use by the spa. The water from the wells will be pumped from existing ground water in the area; a known geothermal feature (see Crystal Hot Springs discussion below). Water from the cool water well has a temperature of 58.29 °F (14.55 °C) and a TDS concentration of 960 mg/L. The water from the thermal well has a temperature of 122°F (49.94°C) and a TDS concentration of 41,000 mg/L. The only additive to the water prior to the discharge will be chlorine for disinfection purposes as mandated by the Utah Department of Health.

Receiving Water

The proposed discharge would flow into a pond/slough that forms the headwaters of Salt Creek. While there are a number of low flowing warm seeps and springs in the general area, the primary source of Salt Creek is the natural Crystal (Madsen) Hot Springs. The springs consist of two sources located less than 50 feet from each other: 1) a hot spring with temperatures 120 – 134°F (51°C – 57°C) flowing at approximately 3.7 cfs, and; 2) a 65°F – 75°F (18°C – 24°C) cool

spring having a slightly higher flow rate of 4.0 cfs. TDS content of the hot spring is very high, ranging from 39,000 - 46,000 mg/L. The predominant ions in solution are sodium and chloride, making up 95% (by weight) of the TDS (Mundorff, 1970). Chamberlin Investment Company (CIC) discharge would enter Salt Creek approximately 100 yards below Crystal Hot Springs.

Very limited data was available to assess the receiving water flow and chemistry. DWQ does not maintain any monitoring stations in the vicinity of the proposed discharge. Temperature measurements taken approximately 200 feet downstream of the proposed discharge point in March 2008 showed a mean temperature of 80°F (26.7°C). During the same sampling event, Salt Creek temperature approximately 2 miles downstream at the Honeyville Road crossing was 62.7°F (17.1°C).

The waters of Salt Creek are classified as 2B, 3B, 3D, as per UAC R317-2, and are part of the Bear River Drainage.

- *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 3B - Protected for warm water species of game fish and other warm water 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.*

#### MIXING ZONE

CIC discharges into a pond/slough that forms the headwaters of Salt Creek. The discharge is approximately 50 feet from the point where the western edge of the pond forms Salt Creek proper. The flow at this point goes through a culvert under a railroad crossing. Because of the influence of spring inflow/groundwater inflow, and the configuration of the ponds, determining a discrete mixing zone is problematic. Additionally, CIC's well water appears to be from the same source as that of the adjacent Crystal Hot Springs. As a result, a mixing zone was not considered. In-stream water quality standards must be met at end of pipe.

#### TMDL

Salt Creek is not listed as impaired on the 2016 303(d) list.

#### Parameters of Concern

When the CIC Spa is developed, chlorine will be required to be added to the pool water. As a result, total residual chlorine is a parameter of concern. Because of the nature of the thermal discharge, temperature is also a parameter of concern.

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Water Quality Modeling

No modeling was required for this discharge because in-stream standards are required to be met at the point of compliance.

Effluent Limitations

Effluent limitations applicable to 3B and 3D waters for the identified parameters of concern.

Total Residual Chlorine	.011	mg/l
Temperature	27	Degrees C

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 discharge since neither the design capacity or allowable effluent concentration has increased from the previous permit cycle.

References

Mundorff, J. C., 1970. "Major Thermal Springs of Utah." Utah Geological and Mineral Survey Water Resources Bulletin 13, Salt Lake City, UT.