Official Draft Public Notice Version **July 11th, 2025**
The findings, determinations, and assertions contained in this document are not final and subject to change following the public comment period.

FACT SHEET
CASTLE VALLEY SPECIAL SERVICE DISTRICT
CASTLE DALE LAGOONS
RENEWAL PERMIT: DISCHARGE
UPDES PERMIT NUMBER: UT0023663
MINOR MUNICIPAL

FACILITY CONTACTS

Operator Name:	Castle Valley Special Service District
Contact:	Jacob Sharp, P.E.
Position:	District Manager
Phone Number:	(435) 381-5333
Permittee Name:	Castle Valley Special Service District
Facility Name:	Castle Dale Lagoons
Mailing and Facility Address:	Castle Valley Special Service District P.O. Box 877 20 South 100 East, Castle Dale, Utah 84513
Telephone:	(435) 381-5333
Actual Address:	Just Southeast of Castle Dale City off Hwy 10 in Emery County

DESCRIPTION OF FACILITY

Castle Valley Special Service District (CVSSD) operates the Castle Dale Lagoons (Castle Dale) domestic wastewater treatment facility, known as a Publicly Owned Treatment Works (POTW). The Facility is a four-cell, flow-thru lagoon system serving the population of Castle Dale and Orangeville Cities with no significant industrial users on the system. The first cell is the largest, 30 acres, followed by three smaller cells, 6-7 acres each, and then three alternating sand filters. The first cells are mechanically aerated with multiple aerators currently in service. The outfall is located after the final lagoon cell and the three sand filters and discharges into Cottonwood Creek. Chlorination facilities are available, but have not been used for a number of years.

The Facility is an intermittent discharger based on seasonal loading and precipitation events with discharges occurring 2-3 times each year on average. Castle Dale has an average monthly design capacity of 0.7 million gallon per day (MGD). On July 1, 2018, an effluent loading cap of 324 lbs/year for phosphorus went into effect. Effluent from Castle Dale has been in compliance with this loading cap.

SUMMARY OF CHANGES FROM PREVIOUS PERMIT

The only change proposed with this Permit is regarding Total Dissolved Solids (TDS). The TDS loading limits and monitoring requirements are being updated to be consistent with the Colorado River Basin Salinity Control Forum requirements (CRBSCF) and other similar UPDES Permits subject to the CRBSCF.

The TDS loading limit previously was indicated as 1 ton/day as a maximum, but the requirement is that over the year the average should not be greater than 1 ton/day or 366 tons/year total, as discussed further in the **BASIS FOR EFFLUENT LIMITATIONS** section of this Fact Sheet.

DISCHARGE

DESCRIPTION OF DISCHARGE

CVSSD has been reporting self-monitoring results on Discharge Monitoring Reports (DMRs) on a monthly basis. Castle Dale is an intermittent discharger based on seasonal loading and precipitation events with discharges occurring 2-3 times each year on average. No discharge occurred during the previous permit life cycle. There have been no violations or discharges since 2005.

Outfall	Description of Discharge Point
001	Located at latitude 39°11'30" and longitude 111°00'30". The discharge is through sand filter beds and by pipe to Cottonwood Creek.

RECEIVING WATERS AND STREAM CLASSIFICATION

When a discharge occurs, it is by gravity flow to Cottonwood Creek, which is part of the San Rafael and Colorado River systems. Cottonwood Creek is classified a Class 2B, 3C, and 4 according to Utah Administrative Code (UAC) R317-2-13:

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.

TOTAL MAXIMUM DAILY LOAD (TMDL) REQUIREMENTS

Cottonwood Creek from the confluence with Huntington Creek to Highway 57 (UT14060009-011_00) was listed as impaired for pH and TDS according to the 303(d) list in Utah's 2024 Integrated Report.

SITE SPECIFIC TOTAL DISSOLVED SOLIDS CRITERION

Per UAC R317-2-14, Cottonwood Creek from the confluence with Huntington Creek to U-57 has a site-specific criterion for TDS concentration of 3,500 mg/L; that is based upon the EPA approved TMDL *Price River, San Rafael River, and Muddy Creek TMDLs for Total Dissolved Solids, West Colorado Watershed Management Unit, Utah (MFG Inc., 2004)*.

BASIS FOR EFFLUENT LIMITATIONS

Limitations on total suspended solids (TSS), biochemical oxygen demand (BOD5), *E. coli*, pH and percent removal for BOD5 and TSS are based on current Utah Secondary Treatment Standards, UAC R317-1-3.2. The oil & grease is based on best professional judgment (BPJ). Total residual chlorine (TRC) and dissolved oxygen are based on the Wasteload Analysis (WLA), which is attached. Ammonia limits were maintained from the previous permit in accordance with UAC R317-8-4.2(11). The Phosphorus load is based on the

loading cap provided in accordance with the Technology Baded Phosphorus Effluent Limits Rule, UAC R317-1-3.3. It has been determined that this discharge will not cause a violation of water quality standards. An Antidegradation Level II review is not required since the Level I review shows that water quality impacts are minimal. The Permittee is expected to be able to comply with these limitations.

The TDS concentration limit of 3500 mg/L is based upon the approved TMDL study for the San Rafael River watershed (which includes Cottonwood Creek), in which a site-specific criterion was developed for TDS and can be found in Table A-12 of the document entitled, *"Price River, San Rafael River, and Muddy Creek TMDLs for Total Dissolved Solids, West Colorado Watershed Management Unit, Utah" (MFG Inc., 2004).*

The TDS mass loading limitations are based upon the CRBSCF Policy for mass loading values when applicable as authorized in UAC R317-2-4. CRBSCF has established a Policy for the reasonable increase of salinity for municipal discharges to any portion of the Colorado River stream system that has an impact on the lower main stem. The CRBSCF Policy entitled "NPDES Permit Program Policy for Implementation of Colorado River Salinity Standards" (Policy), with the most current version dated October 2023, states that the incremental increase in salinity shall be 400 mg/L or less, which is considered to be a reasonable incremental increase above the flow weighted average salinity of the intake water supply, unless a demonstration is made and upon request for an alternative requirement. The Permittee previously requested an alternative salt loading (TDS) of 1 ton/day average, or 366 tons/year in lieu of the requirement that the effluent not exceeding the culinary source water intake by more than 400 mg/L of TDS, which is allowable under CRBSCF Policy and is consistent with other similar permits in Utah.

Reasonable Potential Analysis
Since January 1, 2016, The Division of Water Quality (DWQ) has conducted reasonable potential analysis (RP) on all new and renewal applications received after that date. RP for this permit renewal was conducted following DWQ's September 10, 2015 Reasonable Potential Analysis Guidance (RP Guidance). There are four outcomes defined in the RP Guidance: Outcome A, B, C, or D. These Outcomes provide a frame work for what routine monitoring or effluent limitations are required.

Previously, a qualitative RP check was performed on the pollutants of concern to determine if there was enough data to perform a reasonable potential analysis on the outfall. Castle Dale is a minor discharger with no known industrial dischargers and a low reasonable potential for toxics to be present in the effluent, therefore they have not been required to monitor metals, and RP is not required to be run on their effluent at this time. If and when this changes, metals monitoring may be added to the Permit.

The Permit limitations are:

Parameter	Effluent Limitations [1]				
	Maximum Monthly Avg	Maximum Weekly Avg	Yearly Average	Daily Minimum	Daily Maximum
Total Flow, MGD	0.7	-	-	-	-
BOD_5, mg/L	25	35	-	-	-
BOD_5 Min. % Removal	85	-	-	-	-
TSS, mg/L	25	35	-	-	-
TSS Min. % Removal	85	-	-	-	-
Dissolved Oxygen, mg/L	-	-	-	5.0	-

Parameter	Effluent Limitations [1]				
	Maximum Monthly Avg	Maximum Weekly Avg	Yearly Average	Daily Minimum	Daily Maximum
Total Ammonia (as N), mg/L					
Summer (Jul-Sep)	4.3	-	-	-	9.5
Fall (Oct-Dec)	4.7	-	-	-	9.1
Winter (Jan-Mar)	4.7	-	-	-	9.3
Spring (Apr-Jun)	4.8	-	-	-	9.1
TDS, mg/L	-	-	-	-	3500
TRC, mg/L[2]	-	-	-	-	0.024
Oil & Grease, mg/L	-	-	-	-	10.0
E. coli, No./100mL	126	157	-	-	-
pH, Standard Units	-	-	-	6.5	9
Mass Loading Limits					
Parameter	Annual Avg. Daily	Maximum Monthly Avg	Annual Max		
Total Phosphorus, lbs	-	-	324	-	-
TDS, Ton/Day [3]	1	Report	-	-	-
Tons/Year	-	-	366	-	-

1. See Definitions, Part VIII, for definition of terms.
2. Analytical results less than 0.06 mg/l will not be considered out of compliance with the permit. For purposes of calculating averages and reporting on the Discharge Monitoring Report form, the following will apply:
   a. Analytical values less than 0.02 mg/L shall be considered zero; and
   b. Analytical values less than 0.06 mg/L and equal to or greater than 0.02 mg/L will be recorded as measured.
3. The salt loading (TDS) limit is 1 ton/day, or 366 tons/year.

SELF-MONITORING AND REPORTING REQUIREMENTS

The following self-monitoring requirements have been modified to be consistent with the CRBSCF as described above. The Permit requires reports to be submitted monthly and annually, as applicable, on DMR forms due 28 days after the end of the monitoring period. Lab sheets for biomonitoring, metals and toxic organics shall be attached to the DMRs.

Self-Monitoring and Reporting Requirements [1]			
Parameter	Frequency	Sample Type	Units
Total Flow [4], [5]	Continuous	Recorder	MGD
BOD_5, Influent [6]	Twice Monthly	Composite	mg/L
Effluent	Twice Monthly	Composite	mg/L
TSS, Influent [6]	Twice Monthly	Composite	mg/L
Effluent	Twice Monthly	Composite	mg/L
E. coli	Twice Monthly	Grab	No./100mL
pH	Twice Monthly	Grab	SU
Total Ammonia (as N)	Twice Monthly	Composite	mg/L
DO	Twice Monthly	Grab	mg/L
TRC, mg/L, [7]	Daily	Grab	mg/L
Oil & Grease [8]	When Sheen Observed	Grab	mg/L
TDS, mg/L	Twice Monthly	Composite	mg/L

Self-Monitoring and Reporting Requirements [1]			
Parameter	Frequency	Sample Type	Units
TDS, Average Daily Ton	Annually [9]	Composite	mg/L
TDS, Total Tons	Annually	Composite	mg/L
Orthophosphate (as P)	Monthly	Composite	mg/L
Total Phosphorus (as P), [6]			
Influent	Monthly	Composite	mg/L
Effluent	Monthly	Composite	mg/L
Total Kjeldahl Nitrogen TKN (as N), [6]			
Influent	Monthly	Composite	mg/L
Effluent	Monthly	Composite	mg/L
Nitrate, NO3	Monthly	Composite	mg/L
Nitrite, NO2	Monthly	Composite	mg/L
1. See Definitions, Part VIII, for definition of terms.			
4. Flow measurements of influent/effluent volume shall be made in such a manner that the Permittee can affirmatively demonstrate that representative values are being obtained.			
5. If the rate of discharge is controlled, the rate and duration of discharge shall be reported.			
6. In addition to monitoring the final discharge, influent samples shall be taken and analyzed for this constituent at the same frequency as required for this constituent in the discharge.			
7. Total residual chlorine monitoring frequency is Daily, but only if the facility is chlorinating the effluent during monitoring period. If not chlorinating, a no data indicator (NODI) code of 9 (Conditional Monitoring -Not Required This Period).			
8. Oil & Grease sampled when sheen is present or visible. If no sheen is present or visible, report a no data indicator (NODI) code of 9 (Conditional Monitoring -Not Required This Period).			
9. For clarification, annual and quarterly monitoring requirements and limits are based on the calendar year.			

BIOSOLIDS

The State of Utah has adopted the 40 Code of Federal Regulations (C.F.R.) § Part 503 federal regulations for the disposal of sewage sludge (biosolids) by reference. However, since this facility is a lagoon, there is not any regular sludge production. Therefore 40 C.F.R. § 503 shall not apply at this time. In the future, if the sludge needs to be removed from the lagoons and is disposed in some way, the DWQ must be contacted prior to the removal of the sludge to ensure that all applicable state and federal regulations are met.

STORM WATER

Multi Sector General Permit (MSGP) coverage is required for Treatment Works treating domestic sewage or any other sewage sludge or wastewater treatment device or system, used in the storage, treatment, recycling, and reclamation of municipal or domestic sewage, including lands dedicated to the disposal of sewage sludge that are located within the confines of the facility, with a design flow of 1.0 MGD or more, or required to have an approved pretreatment program under 40 C.F.R. § Part 403.

Because the design flow is less than 1.0 MGD a storm water UPDES permit is not required. Therefore, storm water permit provisions have not been included with the permit renewal. However, at any time during the lifetime of this permit it may be re-opened and modified, following proper administrative procedures as per UAC R317-8, to include any applicable storm water provisions and requirements.

Information on storm water permit requirements can be found at http://stormwater.utah.gov

PRETREATMENT REQUIREMENTS

CVSSD does not have an Approved POTW Pretreatment Program (Program). This is due to the flow through the plant being less than five (5) MGD and no known Significant Industrial Users.

CVSSD does not need to develop a Program; however, information regarding Industrial Users discharging to the Publicly Owned Treatment Works (POTW) must be submitted as stated in Part II of the permit. This information will assist in determining the needs of DWQ to assist CVSSD with implementing the Pretreatment Standards and Requirements. Updates must be submitted within 60 days of any changes occurring with an existing Industrial User or a new Industrial User that begins discharging to the POTW.

Any wastewater discharged to the POTW from an Industrial User is subject to Federal, State and local regulations. Pursuant to Section 307 of the Clean Water Act, CVSSD and the Industrial Users discharging to the POTW shall comply with all applicable Federal General Pretreatment Regulations promulgated, found in 40 CFR 403, and the State Pretreatment Requirements found in UAC R317-8-8.

It is required that any Local Limits be submitted to DWQ for review. If Local Limits are developed, it is required that CVSSD perform an annual evaluation of the need to revise or develop technically based Local Limits for pollutants of concern to implement the general and specific prohibitions 40 CFR, Part 403.5(a) and Part 403.5(b). This evaluation may indicate that present Local Limits are sufficiently protective, need to be revised or should be developed.

BIOMONITORING REQUIREMENTS

A nationwide effort to control toxic discharges where effluent toxicity is an existing or potential concern is regulated in accordance with the Utah Pollutant Discharge Elimination System Permit and Enforcement Guidance Document for Whole Effluent Toxicity Control (biomonitoring), dated February 2018. Authority to require effluent biomonitoring is provided in Permit Conditions, UAC R317-8-4.2, Permit Provisions, UAC R317-8-5.3 and Water Quality Standards, UAC R317-2-5 and R317 -2-7.2.

The Permittee is a minor municipal facility that will be infrequently discharging a minimal amount of effluent, in which toxicity is neither an existing concern, nor likely to be present. Based on these considerations there is no reasonable potential for toxicity in the permittee's discharge (per State of Utah Permitting and Enforcement Guidance Document for WET Control). As such, there will be no numerical WET limitations or WET monitoring requirements in this Permit. However, the Permit will contain a toxicity limitation re-opener provision that allows for modification of the Permit should additional information indicate the presence of toxicity in the discharge.

PERMIT DURATION

It is recommended that this permit be effective for a duration of five (5) years.

Drafted and Reviewed by
Daniel Griffin, Discharge Permit Writer,
Biosolids, Reasonable Potential Analysis
Jennifer Robinson, Pretreatment
Lonnie Shull, Biomonitoring
Jordan Bryant, Storm Water
Amy Dickey, TMDL/Watershed Protection
Suzan Tahir, Wasteload Analysis/ADR
Utah Division of Water Quality, (801) 536-4300

PUBLIC NOTICE INFORMATION (to be updated after)

Began: Month Day, 2025
Ended: Month Day, 2025

Comments will be received at: 195 North 1950 West
PO Box 144870
Salt Lake City, UT 84114-4870

The Public Notice of the draft permit was published on State of Utah and/or DWQ's website for at least 30 days as required.

During the public notice and comment period provided under UAC R317-8-6.5, any interested person may submit written comments on the draft permit and may request a public hearing, if no hearing has already been scheduled. A request for a public hearing shall be in writing and shall state the nature of the issues proposed to be raised in the hearing. All comments will be considered in making the final decision and shall be answered as provided in UAC R317-8-6.12.

ADDENDUM TO FACT SHEET

During finalization of the Permit certain dates, spelling edits and minor language corrections were completed. Due to the nature of these changes, they are considered minor changes and the permit is not required to be re Public Noticed as provided in UAC R317-8-5.6(3)

Responsiveness Summary

(Explain any comments received and response sent. Actual letters can be referenced, but not required to be included).

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ATTACHMENT 1

Industrial Waste Survey

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Industrial Pretreatment Wastewater Survey

Do you periodically experience any of the following treatment works problems:

foam, floaties or unusual colors
plugged collection lines caused by grease, sand, flour, etc.
discharging excessive suspended solids, even in the winter
smells unusually bad
waste treatment facility doesn't seem to be treating the waste right

Perhaps the solution to a problem like one of these may lie in investigating the types and amounts of wastewater entering the sewer system from industrial users.

An industrial user (IU) is defined as a non-domestic user discharging to the waste treatment facility which meets any of the following criteria:

1. **has a lot of process wastewater (5% of the flow at the waste treatment facility or more than 25,000 gallons per work day.)**

   Examples: Food processor, dairy, slaughterhouse, industrial laundry.

2. **is subject to Federal Categorical Pretreatment Standards**;

   Examples: metal plating, cleaning or coating of metals, blueing of metals, aluminum extruding, circuit board manufacturing, tanning animal skins, pesticide formulating or packaging, and pharmaceutical manufacturing or packaging,

3. **is a concern to the POTW.**

   Examples: septage hauler, restaurant and food service, car wash, hospital, photo lab, carpet cleaner, commercial laundry.

All users of the water treatment facility are **prohibited** from making the following types of discharges:

1. A discharge which creates a fire or explosion hazard in the collection system.

2. A discharge which creates toxic gases, vapor or fumes in the collection system.

3. A discharge of solids or thick liquids which creates flow obstructions in the collection system.

4. An acidic discharge (low pH) which causes corrosive damage to the collection system.

5. Petroleum oil, nonbiodegradable cutting oil, or products of mineral oil origin in amounts that will cause problems in the collection system or at the waste treatment facility.

6. Waste haulers are prohibited from discharging without permission. (No midnight dumping!)

When the solution to a sewer system problem may be found by investigating the types and amounts of wastewater entering the sewer system discharged from IUs, it's appropriate to conduct an Industrial Waste Survey.

An Industrial Waste Survey consists of:

Step 1: Identify Industrial Users

Make a list of all the commercial and industrial sewer connections.

Sources for the list:

business license, building permits, water and wastewater billing, Chamber of Commerce, newspaper, telephone book, yellow pages.

Split the list into two groups:

domestic wastewater only-no further information needed
everyone else (IUs)

Step 2: Preliminary Inspection

Go visit each IU identified on the "everybody else" list.

Fill out the **Preliminary Inspection Form** during the site visit.

Step 3: Informing the State

Please fax or send a copy of the Preliminary inspection form (both sides) to:

Jennifer Robinson

Division of Water Quality
288 North 1460 West
P.O. Box 144870
Salt Lake City, UT 84114-4870

Phone: (801) 536-4383
Fax: (801) 536-4301
E-mail: jenrobinson@utah.gov

PRELIMINARY INSPECTION FORM

INSPECTION DATE ___ / ____ /

Name of Business **Person Contacted** _____
Address _____ **Phone Number** _____
_____

Description of Business _____

Principal product or service: _____

Raw Materials used: _____
_____

Production process is: [ ] Batch [ ] Continuous [ ] Both

Is production subject to seasonal variation? [ ] yes [ ] no
If yes, briefly describe seasonal production cycle.
_____

This facility generates the following types of wastes (check all that apply):

1. [ ] Domestic wastes (Restrooms, employee showers, etc.)
2. [ ] Cooling water, non-contact **3. [ ] Boiler/Tower blowdown**
4. [ ] Cooling water, contact **5. [ ] Process**
6. [ ] Equipment/Facility washdown **7. [ ] Air Pollution Control Unit**
8. [ ] Storm water runoff to sewer **9. [ ] Other describe**

Wastes are discharged to (check all that apply):

[ ] Sanitary sewer **[ ] Storm sewer**
[ ] Surface water **[ ] Ground water**
[ ] Waste haulers **[ ] Evaporation**
[ ] Other (describe)
Name of waste hauler(s), if used
_____

Is a grease trap installed? Yes No
Is it operational? Yes No

Does the business discharge a lot of process wastewater?
- **More than 5% of the flow to the waste treatment facility? Yes No**
- **More than 25,000 gallons per work day? Yes No**

Does the business do any of the following:

[ ] Adhesives
[ ] Aluminum Forming
[ ] Battery Manufacturing
[ ] Copper Forming
[ ] Electric & Electronic Components
[ ] Explosives Manufacturing
[ ] Foundries
[ ] Inorganic Chemicals Mfg. or Packaging
[ ] Industrial Porcelain Ceramic Manufacturing
[ ] Iron & Steel
[ ] Metal Finishing, Coating or Cleaning
[ ] Mining
[ ] Nonferrous Metals Manufacturing
[ ] Organic Chemicals Manufacturing or Packaging
[ ] Paint & Ink Manufacturing
[ ] Pesticides Formulating or Packaging
[ ] Petroleum Refining
[ ] Pharmaceuticals Manufacturing or Packaging
[ ] Plastics Manufacturing
[ ] Rubber Manufacturing
[ ] Soaps & Detergents Manufacturing
[ ] Steam Electric Generation
[ ] Tanning Animal Skins
[ ] Textile Mills

[ ] Car Wash
[ ] Carpet Cleaner
[ ] Dairy
[ ] Food Processor
[ ] Hospital
[ ] Laundries
[ ] Photo Lab
[ ] Restaurant & Food Service
[ ] Septage Hauler
[ ] Slaughter House

Are any process changes or expansions planned during the next three years? Yes No
If yes, attach a separate sheet to this form describing the nature of planned changes or expansions.

_____
Inspector

_____
Waste Treatment Facility

Please send a copy of the preliminary inspection form (both sides) to:

Jennifer Robinson
Division of Water Quality
P. O. Box 144870
Salt Lake City, Utah 84114-4870

Phone: (801) 536-4383
Fax: (801) 536-4301
E-Mail: jenrobinson@utah.gov

	Industrial User	Jurisdiction	SIC Codes	Categorical Standard Number	Total Average Process Flow (gpd)	Total Average Facility Flow (gpd)	Facility Description
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							

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ATTACHMENT 2

Wasteload Analysis

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

Date: **July 1, 2025**

Prepared by: **Suzan Tahir**
Standards and Technical Services

Facility: **Castle Dale Wastewater Treatment Facility**
Castle Valley Special Service District
UPDES No. UT0026663

Receiving water: **Cottonwood Creek (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.

Discharge

Outfall 001: Cottonwood Creek

The maximum daily design discharge is 0.95 MGD and the maximum monthly design discharge is 0.70 MGD for the facility.

Receiving Water

The receiving water for Outfall 001 is Cottonwood Creek, which is tributary to Huntington Creek, which drains to the San Rafael River and the Colorado River.

Per UAC R317-2-13.1(b), the designated beneficial uses for Cottonwood Creek from confluence with Huntington Creek to Highway U-57 crossing are 2B, 3C and 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.*

Critical Flow

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). Due to a lack of flow records for Cottonwood Creek, the 20th percentile of flow measurements taken upstream of the outfall at the Highway U-10 crossing was calculated to estimate annual critical flow in the receiving water (Table 1).

Table 1: Annual critical low flow for Cottonwood Creek at U-10 crossing

Season	Flow (cfs)
Annual	1.71

Receiving water quality data were obtained from monitoring site COTTONWOOD CK BL U10 XING IN CASTLEDALE for the period 2015-2025. The average seasonal value was calculated for each constituent with available data in the receiving water.

Effluent parameters were characterized using data from monitoring site 4930900 Castle Dale Lagoons Outfall for the period 2015-2025.

Mixing Zone

Per UAC R317-2-5, "*Streams with a flow equal to or less than twice the flow of a point source discharge may be considered to be totally mixed*", thus this discharge is considered instantaneously fully mixed.

Parameters of Concern

The potential parameters of concern identified for the discharge/receiving water were total suspended solids (TSS), total dissolved solids (TDS), dissolved oxygen (DO), Biochemical Oxygen Demand (BOD_5), total phosphorus (TP), total nitrogen (TN), total ammonia (NH3-N), E. coli, pH, and total residual chlorine (TRC) as determined in consultation with the UPDES Permit Writer.

TMDL

Cottonwood Creek from the confluence with Huntington Creek to Highway 57 (UT14060009-011_00) was listed as impaired for pH and total dissolved solids according to the 303(d) list in Utah's 2024 Integrated Report.

Protection of Downstream Uses

Per UAC R317-2-8, *all actions to control waste discharges under these rules shall be modified as necessary to protect downstream designated uses*. For this discharge, 3C numeric aquatic life use criteria apply to the immediate receiving water (Cottonwood Creek).

Site Specific Total Dissolved Solids Criterion

Per UAC R317-2-14, Cottonwood Creek from the confluence with Huntington Creek to U-57 has a site-specific criterion for TDS concentration of 3,500 mg/L that is based upon the EPA approved Total Maximum Daily Load (TMDL) *Price River, San Rafael River, and Muddy Creek TMDLs for Total Dissolved Solids, West Colorado Watershed Management Unit, Utah* (MFG Inc., 2004).

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.

Table 2: WET Limits for IC_{25}

Season	Percent Effluent
Annual	38.8%

Water Quality Modeling

Effluent limits for conservative pollutants were determined using a mass balance mixing analysis (UDWQ 2012). The inputs and results of the mass balance analysis is summarized in the Addendum of SOB.

Model and supporting documentation are available for review upon request.

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.

Antidegradation Level II Review

A Level II Antidegradation Review (ADR) is not required for this discharge since the pollutant concentration and load is not increasing under this permit renewal.

Documents:

WLA Document:

CastleDaleWLA_04-29-2025.docx

Wasteload Analysis:

CastleDaleWLA_04-29-2025.xlsm
CastleDaleWLA_SOB_04-29-2025.pdf

References:

Utah Division of Water Quality. 2024. *Final 2024 Integrated Report on Water Quality*

Utah Division of Water Quality. 2021. *Utah Wasteload Analysis Procedures Version 2.0*.

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.

MFG Inc. 2004. *Price River, San Rafael River, and Muddy Creek TMDLs for Total Dissolved Solids, West Colorado Watershed Management Unit, Utah*. Utah Division of Water Quality.

WASTELOAD ANALYSIS [WLA]
Addendum: Statement of Basis

29-Apr-25
4:00 PM

Facilities: **Castle Dale Lagoons** **UPDES No: UT-UT-0026663**
Discharging to: **Cottonwood Creek**

I. Introduction

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 [R317-2-8, UAC]. Projected concentrations are compared to numeric water quality standards to determine acceptability. The anti-degradation policy and procedures are also considered. The primary in-stream parameters of concern may include metals (as a function of hardness), total dissolved solids (TDS), total residual chlorine (TRC), un-ionized ammonia (as a function of pH and temperature, measured and evaluated interms of total ammonia), and dissolved oxygen.

Mathematical water quality modeling is employed to determine stream quality response to point source discharges. Models aid in the effort of anticipating stream quality at future effluent flows at critical environmental conditions (e.g., low stream flow, high temperature, high pH, etc).

The numeric criteria in this wasteload analysis may always be modified by narrative criteria and other conditions determined by staff of the Division of Water Quality.

II. Receiving Water and Stream Classification

Cottonwood Creek:	2B, 3C, 4
Antidegradation Review:	Level I review completed. Level II review not required.

III. Numeric Stream Standards for Protection of Aquatic Wildlife

Total Ammonia (TNH3)	Varies as a function of Temperature and pH Rebound. See Water Quality Standards		
Chronic Total Residual Chlorine (TRC)	0.011	mg/l (4 Day Average)	
	0.019	mg/l (1 Hour Average)	
Dissolved Oxygen (DO)	5.00	mg/l (30 Day Average)	
	N/A	mg/l (7 Day Average)	
	3.00	mg/l (Instantaneous)	
Maximum Total Dissolved Solids	3500.0	mg/l	Background

Acute and Chronic Heavy Metals (Dissolved)

Parameter	4 Day Average (Chronic) Standard Concentration		Load*	1 Hour Average (Acute) Standard Concentration		Load*	
Aluminum	87.00	ug/l**	0.508 lbs/day	750.00	ug/l	4.378	lbs/day
Arsenic	150.00	ug/l	0.876 lbs/day	340.00	ug/l	1.985	lbs/day
Cadmium	2.34	ug/l	0.014 lbs/day	7.21	ug/l	0.042	lbs/day
Chromium III	262.96	ug/l	1.535 lbs/day	5501.59	ug/l	32.112	lbs/day
ChromiumVI	11.00	ug/l	0.064 lbs/day	16.00	ug/l	0.093	lbs/day
Copper	29.88	ug/l	0.174 lbs/day	50.52	ug/l	0.295	lbs/day
Iron				1000.00	ug/l	5.837	lbs/day
Lead	18.02	ug/l	0.105 lbs/day	462.35	ug/l	2.699	lbs/day
Mercury	0.0120	ug/l	0.000 lbs/day	2.40	ug/l	0.014	lbs/day
Nickel	165.13	ug/l	0.964 lbs/day	1485.21	ug/l	8.669	lbs/day
Selenium	4.60	ug/l	0.027 lbs/day	18.40	ug/l	0.107	lbs/day
Silver	N/A	ug/l	N/A lbs/day	39.40	ug/l	0.230	lbs/day
Zinc	379.96	ug/l	2.218 lbs/day	379.96	ug/l	2.218	lbs/day

* Allowed below discharge
**Chronic Aluminum standard applies only to waters with a pH < 7.0 and a Hardness < 50 mg/l as CaCO3

Metals Standards Based upon a Hardness of 390.44 mg/l as CaCO3

Organics [Pesticides]

Parameter	4 Day Average (Chronic) Standard Concentration		Load*		1 Hour Average (Acute) Standard Concentration		Load*	
Aldrin					1.500	ug/l	0.009	lbs/day
Chlordane	0.004	ug/l	0.065	lbs/day	1.200	ug/l	0.007	lbs/day
DDT, DDE	0.001	ug/l	0.015	lbs/day	0.550	ug/l	0.003	lbs/day
Dieldrin	0.056	ug/l	0.843	lbs/day	0.240	ug/l	0.001	lbs/day
Endosulfan	0.056	ug/l	0.843	lbs/day	0.110	ug/l	0.001	lbs/day
Endrin	0.036	ug/l	0.542	lbs/day	0.086	ug/l	0.001	lbs/day
Guthion					0.010	ug/l	0.000	lbs/day
Heptachlor	0.004	ug/l	0.057	lbs/day	0.260	ug/l	0.002	lbs/day
Lindane	0.080	ug/l	1.204	lbs/day	1.000	ug/l	0.006	lbs/day
Methoxychlor					0.030	ug/l	0.000	lbs/day
Mirex					0.010	ug/l	0.000	lbs/day
Parathion					0.066	ug/l	0.000	lbs/day
PCB's	0.014	ug/l	0.211	lbs/day	N/A	ug/l	#VALUE!	lbs/day
Pentachlorophenol	15.00	ug/l	225.774	lbs/day	19.000	ug/l	0.111	lbs/day
Toxephene	0.0002	ug/l	0.003	lbs/day	0.7300	ug/l	0.004	lbs/day

IV. Numeric Stream Standards for Protection of Agriculture

	4 Day Average (Chronic) Standard Concentration	Load*	1 Hour Average (Acute) Standard Concentration		Load*	
Arsenic			100.0	ug/l		lbs/day
Boron			750.0	ug/l		lbs/day
Cadmium			10.0	ug/l	0.03	lbs/day
Chromium			100.0	ug/l		lbs/day
Copper			200.0	ug/l		lbs/day
Lead			100.0	ug/l		lbs/day
Selenium			50.0	ug/l		lbs/day
TDS, Summer			3500.0	mg/l	10.21	tons/day

V. Numeric Stream Standards for Protection of Human Health (Class 1C Waters)

Metals	4 Day Average (Chronic) Standard Concentration	Load*	1 Hour Average (Acute) Standard Concentration		Load*	
Arsenic				ug/l		lbs/day
Barium				ug/l		lbs/day
Cadmium				ug/l		lbs/day
Chromium				ug/l		lbs/day
Lead				ug/l		lbs/day
Mercury				ug/l		lbs/day
Selenium				ug/l		lbs/day
Silver				ug/l		lbs/day
Fluoride (3)				ug/l		lbs/day
to				ug/l		lbs/day
Nitrates as N				ug/l		lbs/day
Chlorophenoxy Herbicides						
2,4-D				ug/l		lbs/day
2,4,5-TP				ug/l		lbs/day
Endrin				ug/l		lbs/day
orocyclohexane (Lindane)				ug/l		lbs/day
Methoxychlor				ug/l		lbs/day
Toxaphene				ug/l		lbs/day

VI. Numeric Stream Standards the Protection of Human Health from Water & Fish Consumption [Toxics]

	Maximum Conc., ug/l - Acute Standards				
	Class 1C		**Class 3A, 3B**		
Toxic Organics	[2 Liters/Day for 70 Kg Person over 70 Yr.]		[6.5 g for 70 Kg Person over 70 Yr.]		
Acenaphthene	ug/l	lbs/day	90.0 ug/l	1.35	lbs/day
Acrolein	ug/l	lbs/day	400.0 ug/l	6.02	lbs/day
Acrylonitrile	ug/l	lbs/day	7.0 ug/l	0.11	lbs/day
Benzene	ug/l	lbs/day	51.0 ug/l	0.77	lbs/day
Benzidine	ug/l	lbs/day	0.0 ug/l	0.00	lbs/day
Carbon tetrachloride	ug/l	lbs/day	5.0 ug/l	0.08	lbs/day
Chlorobenzene	ug/l	lbs/day	800.0 ug/l	12.04	lbs/day
1,2,4-Trichlorobenzene					
Hexachlorobenzene	ug/l	lbs/day	0.0 ug/l	0.00	lbs/day
1,2-Dichloroethane	ug/l	lbs/day	2000.0 ug/l	30.10	lbs/day
1,1,1-Trichloroethane					
Hexachloroethane	ug/l	lbs/day	0.1 ug/l	0.00	lbs/day
1,1-Dichloroethane					
1,1,2-Trichloroethane	ug/l	lbs/day	8.9 ug/l	0.13	lbs/day
1,1,2,2-Tetrachloroethane	ug/l	lbs/day	3.0 ug/l	0.05	lbs/day
Chloroethane			0.0 ug/l	0.00	lbs/day
Bis(2-chloroethyl) ether	ug/l	lbs/day	2.2 ug/l	0.03	lbs/day
2-Chloroethyl vinyl ether	ug/l	lbs/day	0.0 ug/l	0.00	lbs/day
2-Chloronaphthalene	ug/l	lbs/day	1000.0 ug/l	15.05	lbs/day
2,4,6-Trichlorophenol	ug/l	lbs/day	2.8 ug/l	0.04	lbs/day
p-Chloro-m-cresol			0.0 ug/l	0.00	lbs/day
Chloroform (HM)	ug/l	lbs/day	2000.0 ug/l	30.10	lbs/day
2-Chlorophenol	ug/l	lbs/day	800.0 ug/l	12.04	lbs/day
1,2-Dichlorobenzene	ug/l	lbs/day	3000.0 ug/l	45.15	lbs/day
1,3-Dichlorobenzene	ug/l	lbs/day	10.0 ug/l	0.15	lbs/day
1,4-Dichlorobenzene	ug/l	lbs/day	900.0 ug/l	13.55	lbs/day
3,3'-Dichlorobenzidine	ug/l	lbs/day	0.2 ug/l	0.00	lbs/day
1,1-Dichloroethylene	ug/l	lbs/day	20000.0 ug/l	301.03	lbs/day
1,2-trans-Dichloroethylene	ug/l	lbs/day	4000.0 ug/l	60.21	lbs/day
2,4-Dichlorophenol	ug/l	lbs/day	60.0 ug/l	0.90	lbs/day
1,2-Dichloropropane	ug/l	lbs/day	31.0 ug/l	0.47	lbs/day
1,3-Dichloropropylene	ug/l	lbs/day	1700.0 ug/l	25.59	lbs/day
2,4-Dimethylphenol	ug/l	lbs/day	3000.0 ug/l	45.15	lbs/day
2,4-Dinitrotoluene	ug/l	lbs/day	1.7 ug/l	0.03	lbs/day
2,6-Dinitrotoluene	ug/l	lbs/day	0.0 ug/l	0.00	lbs/day
1,2-Diphenylhydrazine	ug/l	lbs/day	0.2 ug/l	0.00	lbs/day
Ethylbenzene	ug/l	lbs/day	130.0 ug/l	1.96	lbs/day
Fluoranthene	ug/l	lbs/day	20.0 ug/l	0.30	lbs/day
4-Chlorophenyl phenyl ether					
4-Bromophenyl phenyl ether					
Bis(2-chloroisopropyl) eth	ug/l	lbs/day	65000.0 ug/l	9.78E+02	lbs/day
Bis(2-chloroethoxy) metha	ug/l	lbs/day	0.0 ug/l	0.00	lbs/day
Methylene chloride (HM)	ug/l	lbs/day	1000.0 ug/l	15.05	lbs/day
Methyl chloride (HM)	ug/l	lbs/day	0.0 ug/l	0.00	lbs/day
Methyl bromide (HM)	ug/l	lbs/day	10000.0 ug/l	150.52	lbs/day
Bromoform (HM)	ug/l	lbs/day	120.0 ug/l	1.81	lbs/day
Dichlorobromomethane(H	ug/l	lbs/day	27.0 ug/l	0.41	lbs/day
Chlorodibromomethane (H	ug/l	lbs/day	21.0 ug/l	0.32	lbs/day
Hexachlorobutadiene(c)	ug/l	lbs/day	0.0 ug/l	0.00	lbs/day
Hexachlorocyclopentadien	ug/l	lbs/day	4.0 ug/l	0.06	lbs/day
Isophorone	ug/l	lbs/day	1800.0 ug/l	27.09	lbs/day
Naphthalene					
Nitrobenzene	ug/l	lbs/day	600.0 ug/l	9.03	lbs/day
2-Nitrophenol	ug/l	lbs/day	0.0 ug/l	0.00	lbs/day
4-Nitrophenol	ug/l	lbs/day	0.0 ug/l	0.00	lbs/day
2,4-Dinitrophenol	ug/l	lbs/day	14000.0 ug/l	210.72	lbs/day
4,6-Dinitro-o-cresol	ug/l	lbs/day	765.0 ug/l	11.51	lbs/day
N-Nitrosodimethylamine	ug/l	lbs/day	3.0 ug/l	0.05	lbs/day
N-Nitrosodiphenylamine	ug/l	lbs/day	6.0 ug/l	0.09	lbs/day
N-Nitrosodi-n-propylamine	ug/l	lbs/day	0.5 ug/l	0.01	lbs/day
Pentachlorophenol	ug/l	lbs/day	0.0 ug/l	0.00	lbs/day
Phenol	ug/l	lbs/day	3.0E+05 ug/l	4.52E+03	lbs/day
Bis(2-ethylhexyl)phthalate	ug/l	lbs/day	0.4 ug/l	0.01	lbs/day
Butyl benzyl phthalate	ug/l	lbs/day	0.1 ug/l	0.00	lbs/day

Di-n-butyl phthalate	ug/l	lbs/day	30.0	ug/l	0.45 lbs/day
Di-n-octyl phthlate					
Diethyl phthalate	ug/l	lbs/day	600.0	ug/l	9.03 lbs/day
Dimethyl phthlate	ug/l	lbs/day	2.0E+03	ug/l	3.01E+01 lbs/day
Benzo(a)anthracene (PAH	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
Benzo(a)pyrene (PAH)	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
Benzo(b)fluoranthene (PA	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
Benzo(k)fluoranthene (PA	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
Chrysene (PAH)	ug/l	lbs/day	0.1	ug/l	0.00 lbs/day
Acenaphthylene (PAH)					
Anthracene (PAH)	ug/l	lbs/day	400.0	ug/l	6.02 lbs/day
Dibenzo(a,h)anthracene (I	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
Indeno(1,2,3-cd)pyrene (P	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
Pyrene (PAH)	ug/l	lbs/day	30.0	ug/l	0.45 lbs/day
Tetrachloroethylene	ug/l	lbs/day	520.0	ug/l	7.83 lbs/day
Toluene	ug/l	lbs/day	520	ug/l	7.83 lbs/day
Trichloroethylene	ug/l	lbs/day	7.0	ug/l	0.11 lbs/day
Vinyl chloride	ug/l	lbs/day	1.6	ug/l	0.02 lbs/day
					lbs/day
Pesticides					lbs/day
Aldrin	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
Dieldrin	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
Chlordane	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
4,4'-DDT	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
4,4'-DDE	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
4,4'-DDD	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
alpha-Endosulfan	ug/l	lbs/day	30.0	ug/l	0.45 lbs/day
beta-Endosulfan	ug/l	lbs/day	40.0	ug/l	0.60 lbs/day
Endosulfan sulfate	ug/l	lbs/day	40.0	ug/l	0.60 lbs/day
Endrin	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
Endrin aldehyde	ug/l	lbs/day	1.0	ug/l	0.02 lbs/day
Heptachlor	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
Heptachlor epoxide					
PCB's					
PCB 1242 (Arochlor 1242	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
PCB-1254 (Arochlor 1254	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
PCB-1221 (Arochlor 1221	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
PCB-1232 (Arochlor 1232	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
PCB-1248 (Arochlor 1248	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
PCB-1260 (Arochlor 1260	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
PCB-1016 (Arochlor 1016	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
Pesticide					
Toxaphene	ug/l		0.0	ug/l	0.00 lbs/day
Dioxin					
Dioxin (2,3,7,8-TCDD)	ug/l	lbs/day			

Metals				
Antimony	ug/l	lbs/day		
Arsenic	ug/l	lbs/day	640.00 ug/l	9.63 lbs/day
Asbestos	ug/l	lbs/day		
Beryllium				
Cadmium				
Chromium (III)				
Chromium (VI)				
Copper				
Cyanide	ug/l	lbs/day	4.0E+02 ug/l	6.02 lbs/day
Lead	ug/l	lbs/day		
Mercury			0.15 ug/l	0.00 lbs/day
Nickel			4600.00 ug/l	69.24 lbs/day
Selenium	ug/l	lbs/day		
Silver	ug/l	lbs/day		
Thallium			0.47 ug/l	0.01 lbs/day
Zinc				

There are additional standards that apply to this receiving water, but were not considered in this modeling/waste load allocation analysis.

VII. Mathematical Modeling of Stream Quality

Model configuration was accomplished utilizing standard modeling procedures. Data points were plotted and coefficients adjusted as required to match observed data as closely as possible.

The modeling approach used in this analysis included one or a combination of the following models.

(1) The Utah River Model, Utah Division of Water Quality, 1992. Based upon STREAMDO IV (Region VIII) and Supplemental Ammonia Toxicity Models; EPA Region VIII, Sept. 1990 and QUAL2E (EPA, Athens, GA).

(2) Utah Ammonia/Chlorine Model, Utah Division of Water Quality, 1992.

(3) AMMTOX Model, University of Colorado, Center of Limnology, and EPA Region 8

(4) Principles of Surface Water Quality Modeling and Control. Robert V. Thomann, et.al. Harper Collins Publisher, Inc. 1987, pp. 644.

Coefficients used in the model were based, in part, upon the following references:

(1) Rates, Constants, and Kinetics Formulations in Surface Water Quality Modeling. Environmental Research Laboratory, Office of Research and Development, U.S. Environmental Protection Agency, Athens Georgia. EPA/600/3-85/040 June 1985.

(2) Principles of Surface Water Quality Modeling and Control. Robert V. Thomann, et.al. Harper Collins Publisher, Inc. 1987, pp. 644.

VIII. Modeling Information

The required information for the model may include the following information for both the upstream conditions at low flow and the effluent conditions:

Flow, Q, (cfs or MGD)	D.O. mg/l
Temperature, Deg. C.	Total Residual Chlorine (TRC), mg/l
pH	Total NH3-N, mg/l
BOD5, mg/l	Total Dissolved Solids (TDS), mg/l
Metals, ug/l	Toxic Organics of Concern, ug/l

Other Conditions

In addition to the upstream and effluent conditions, the models require a variety of physical and biological coefficients and other technical information. In the process of actually establishing the permit limits for an effluent, values are used based upon the available data, model calibration, literature values, site visits and best professional judgement.

Model Inputs

The following is upstream and discharge information that was utilized as inputs for the analysis. Dry washes are considered to have an upstream flow equal to the flow of the discharge.

Current Upstream Information

	Stream Critical Low Flow cfs	Temp. Deg. C	pH	T-NH3 mg/l as N	BOD5 mg/l	DO mg/l	TRC mg/l	TDS mg/l
Summer	1.71	17.2	8.0	0.03	1.83	7.03	0.00	708.7
Fall	1.71	4.1	8.4	0.03	1.50	---	0.00	601.3
Winter	1.71	5.2	8.6	0.03	1.50	---	0.00	523.0
Spring	1.71	9.5	8.4	0.02	1.50	---	0.00	315.3

Dissolved	Al	As	Cd	CrIII	CrVI	Copper	Fe	Pb
Metals	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
All Seasons	2.385*	0.795*	0.0795*	0.795*	3.975*	0.8*	1.25*	0.795*

Dissolved	Hg	Ni	Se	Ag	Zn	Boron		
Metals	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l		
All Seasons	0.0000	0.795*	1.59*	0.25	0.0795*	1.59*		* ~80% MDL

Projected Discharge Information

Season	Flow, MGD	Temp.
Summer	0.70000	11.2
Fall	0.70000	11.2
Winter	0.70000	7.0
Spring	0.70000	12.4

All model numerical inputs, intermediate calculations, outputs and graphs are available for discussion, inspection and copy at the Division of Water Quality.

IX. Effluent Limitations

Current State water quality standards are required to be met under a variety of conditions including in-stream flows targeted to the 7-day, 10-year low flow (R317-2-9).

Other conditions used in the modeling effort coincide with the environmental conditions expected at low stream flows.

Effluent Limitation for Flow based upon Water Quality Standards

In-stream criteria of downstream segments will be met with an effluent flow maximum value as follows:

Season	Daily Average	
Summer	0.700 MGD	1.083 cfs
Fall	0.700 MGD	1.083 cfs
Winter	0.700 MGD	1.083 cfs
Spring	0.700 MGD	1.083 cfs

Flow Requirement or Loading Requirement

The calculations in this wasteload analysis utilize the maximum effluent discharge flow of 0.7 MGD. If the discharger is allowed to have a flow greater than 0.7 MGD during 7Q10 conditions, and effluent limit concentrations as indicated, then water quality standards will be violated. In order to prevent this from occuring, the permit writers must include the discharge flow limititation as indicated above; or, include loading effluent limits in the permit.

Effluent Limitation for Whole Effluent Toxicity (WET) based upon WET Policy

Effluent Toxicity will not occur in downstream segements if the values below are met.

WET Requirements	LC50 >	100.0%	Effluent	[Acute]
	IC25 >	38.8%	Effluent	[Chronic]

Effluent Limitation for Biological Oxygen Demand (BOD) based upon Water Quality Standards or Regulations

In-stream criteria of downstream segments for Dissolved Oxygen will be met with an effluent BOD limitation as follows:

Season	Concentration	
Summer	25.0 mg/l as BOD5	145.9 lbs/day
Fall	25.0 mg/l as BOD5	145.9 lbs/day
Winter	25.0 mg/l as BOD5	145.9 lbs/day
Spring	25.0 mg/l as BOD5	145.9 lbs/day

Effluent Limitation for Dissolved Oxygen (DO) based upon Water Quality Standards

In-stream criteria of downstream segments for Dissolved Oxygen will be met with an effluent D.O. limitation as follows:

Season	**Concentration**
Summer	5.00
Fall	5.00
Winter	5.00
Spring	5.00

Effluent Limitation for Total Ammonia based upon Water Quality Standards

In-stream criteria of downstream segments for Total Ammonia will be met with an effluent limitation (expressed as Total Ammonia as N) as follows:

Season		**Concentration**		**Load**	
Summer	4 Day Avg. - Chronic	7.33	mg/l as N	42.8	lbs/day
	1 Hour Avg. - Acute	27.5	mg/l as N	160.3	lbs/day
Fall	4 Day Avg. - Chronic	6.6	mg/l as N	38.2	lbs/day
	1 Hour Avg. - Acute	16.6	mg/l as N	97.0	lbs/day
Winter	4 Day Avg. - Chronic	6.7	mg/l as N	39.2	lbs/day
	1 Hour Avg. - Acute	10.9	mg/l as N	63.5	lbs/day
Spring	4 Day Avg. - Chronic	6.5	mg/l as N	38.1	lbs/day
	1 Hour Avg. - Acute	14.6	mg/l as N	85.4	lbs/day

Acute limit calculated with an Acute Zone of Initial Dilution (ZID) to be equal to 100.%.

Effluent Limitation for Total Residual Chlorine based upon Water Quality Standards

In-stream criteria of downstream segments for Total Residual Chlorine will be met with an effluent limitation as follows:

Season		**Concentration**		**Load**	
Summer	4 Day Avg. - Chronic	0.032	mg/l	0.19	lbs/day
	1 Hour Avg. - Acute	0.034	mg/l	0.20	lbs/day
Fall	4 Day Avg. - Chronic	0.032	mg/l	0.19	lbs/day
	1 Hour Avg. - Acute	0.034	mg/l	0.20	lbs/day
Winter	4 Day Avg. - Chronic	0.032	mg/l	0.19	lbs/day
	1 Hour Avg. - Acute	0.034	mg/l	0.20	lbs/day
Spring	4 Day Avg. - Chronic	0.032	mg/l	0.19	lbs/day
	1 Hour Avg. - Acute	0.034	mg/l	0.20	lbs/day

Effluent Limitations for Total Dissolved Solids based upon Water Quality Standards

Season		Concentration		Load	
Summer	Maximum, Acute	7906.7	mg/l	23.08	tons/day
Fall	Maximum, Acute	8076.2	mg/l	23.57	tons/day
Winter	Maximum, Acute	8199.9	mg/l	23.93	tons/day
Spring	Maximum, Acute	8527.8	mg/l	24.89	tons/day
Colorado Salinity Forum Limits		Determined by Permitting Section			

Effluent Limitations for Total Recoverable Metals based upon Water Quality Standards

In-stream criteria of downstream segments for Dissolved Metals will be met with an effluent limitation as follows (based upon a hardness of 390.44 mg/l):

	4 Day Average Concentration		Load		1 Hour Average Concentration		Load	
Aluminum*	N/A		N/A		1,340.1	ug/l	7.8	lbs/day
Arsenic*	385.55	ug/l	1.5	lbs/day	607.8	ug/l	3.5	lbs/day
Cadmium	5.91	ug/l	0.0	lbs/day	12.8	ug/l	0.1	lbs/day
Chromium III	676.84	ug/l	2.6	lbs/day	9,843.7	ug/l	57.5	lbs/day
Chromium VI*	22.09	ug/l	0.1	lbs/day	25.5	ug/l	0.1	lbs/day
Copper	75.78	ug/l	0.3	lbs/day	89.8	ug/l	0.5	lbs/day
Iron*	N/A		N/A		1,788.4	ug/l	10.4	lbs/day
Lead	45.21	ug/l	0.2	lbs/day	826.7	ug/l	4.8	lbs/day
Mercury*	0.03	ug/l	0.0	lbs/day	4.3	ug/l	0.0	lbs/day
Nickel	424.56	ug/l	1.6	lbs/day	2,656.9	ug/l	15.5	lbs/day
Selenium*	9.35	ug/l	0.0	lbs/day	31.7	ug/l	0.2	lbs/day
Silver	N/A	ug/l	N/A	lbs/day	70.3	ug/l	0.4	lbs/day
Zinc	979.69	ug/l	3.7	lbs/day	679.8	ug/l	4.0	lbs/day
Cyanide*	13.41	ug/l	0.1	lbs/day	39.4	ug/l	0.2	lbs/day

*Limits for these metals are based on the dissolved standard.

Effluent Limitations for Heat/Temperature based upon Water Quality Standards

Summer	27.5 Deg. C.	81.5 Deg. F
Fall	14.5 Deg. C.	58.0 Deg. F
Winter	15.5 Deg. C.	59.9 Deg. F
Spring	19.8 Deg. C.	67.7 Deg. F

Effluent Limitations for Organics [Pesticides] Based upon Water Quality Standards

In-stream criteria of downstream segments for Organics [Pesticides] will be met with an effluent limit as follows:

	4 Day Average Concentration		Load		1 Hour Average Concentration		Load	
Aldrin					1.5E+00	ug/l	1.35E-02	lbs/day
Chlordane	4.30E-03	ug/l	2.51E-02	lbs/day	1.2E+00	ug/l	1.08E-02	lbs/day
DDT, DDE	1.00E-03	ug/l	5.84E-03	lbs/day	5.5E-01	ug/l	4.97E-03	lbs/day
Dieldrin	5.60E-02	ug/l	3.27E-01	lbs/day	2.4E-01	ug/l	2.17E-03	lbs/day
Endosulfan	5.60E-02	ug/l	3.27E-01	lbs/day	1.1E-01	ug/l	9.93E-04	lbs/day
Endrin	3.60E-02	ug/l	2.10E-01	lbs/day	8.6E-02	ug/l	7.77E-04	lbs/day
Guthion	0.00E+00	ug/l	0.00E+00	lbs/day	1.0E-02	ug/l	9.03E-05	lbs/day
Heptachlor	3.80E-03	ug/l	2.22E-02	lbs/day	2.6E-01	ug/l	2.35E-03	lbs/day
Lindane	8.00E-02	ug/l	4.67E-01	lbs/day	1.0E+00	ug/l	9.03E-03	lbs/day
Methoxychlor	0.00E+00	ug/l	0.00E+00	lbs/day	3.0E-02	ug/l	2.71E-04	lbs/day
Mirex	0.00E+00	ug/l	0.00E+00	lbs/day	1.0E-02	ug/l	9.03E-05	lbs/day
Parathion	1.30E-02	ug/l	7.59E-02	lbs/day	6.6E-02	ug/l	5.96E-04	lbs/day
PCB's	1.40E-02	ug/l	8.17E-02	lbs/day	N/A	ug/l	#VALUE!	lbs/day
Pentachlorophenol	1.50E+01	ug/l	8.76E+01	lbs/day	1.9E+01	ug/l	1.72E-01	lbs/day
Toxephene	2.00E-04	ug/l	1.17E-03	lbs/day	7.3E-01	ug/l	6.59E-03	lbs/day

Effluent Limitations for Protection of Human Health [Toxics Rule]
Based upon Water Quality Standards (Most stringent of 1C or 3A & 3B as appropriate.)

In-stream criteria of downstream segments for Protection of Human Health [Toxics] will be met with an effluent limit as follows:

	Concentration		Maximum Concentration Load	
Toxic Organics				
Acenaphthene	2.32E+02	ug/l	1.35E+00	lbs/day
Acrolein	1.03E+03	ug/l	6.02E+00	lbs/day
Acrylonitrile	1.81E+01	ug/l	1.05E-01	lbs/day
Benzene	1.32E+02	ug/l	7.68E-01	lbs/day
Benzidine		ug/l		lbs/day
Carbon tetrachloride	1.29E+01	ug/l	7.53E-02	lbs/day
Chlorobenzene	2.06E+03	ug/l	1.20E+01	lbs/day
1,2,4-Trichlorobenzene				
Hexachlorobenzene	2.04E-04	ug/l	1.19E-06	lbs/day
1,2-Dichloroethane	5.16E+03	ug/l	3.01E+01	lbs/day
1,1,1-Trichloroethane				
Hexachloroethane	2.58E-01	ug/l	1.51E-03	lbs/day
1,1-Dichloroethane				
1,1,2-Trichloroethane	2.30E+01	ug/l	1.34E-01	lbs/day
1,1,2,2-Tetrachloroethane	7.74E+00	ug/l	4.52E-02	lbs/day
Chloroethane				
Bis(2-chloroethyl) ether	5.67E+00	ug/l	3.31E-02	lbs/day
2-Chloroethyl vinyl ether				
2-Chloronaphthalene	2.58E+03	ug/l	1.51E+01	lbs/day
2,4,6-Trichlorophenol	7.22E+00	ug/l	4.21E-02	lbs/day
p-Chloro-m-cresol				
Chloroform (HM)	5.16E+03	ug/l	3.01E+01	lbs/day
2-Chlorophenol	2.06E+03	ug/l	1.20E+01	lbs/day
1,2-Dichlorobenzene	7.74E+03	ug/l	4.52E+01	lbs/day
1,3-Dichlorobenzene	2.58E+01	ug/l	1.51E-01	lbs/day
1,4-Dichlorobenzene	2.32E+03	ug/l	1.35E+01	lbs/day
3,3'-Dichlorobenzidine	3.87E-01	ug/l	2.26E-03	lbs/day
1,1-Dichloroethylene	5.16E+04	ug/l	3.01E+02	lbs/day
1,2-trans-Dichloroethylene1				
2,4-Dichlorophenol	1.55E+02	ug/l	9.03E-01	lbs/day
1,2-Dichloropropane	7.99E+01	ug/l	4.67E-01	lbs/day
1,3-Dichloropropylene	4.38E+03	ug/l	2.56E+01	lbs/day
2,4-Dimethylphenol	7.74E+03	ug/l	4.52E+01	lbs/day
2,4-Dinitrotoluene	4.38E+00	ug/l	2.56E-02	lbs/day
2,6-Dinitrotoluene				
1,2-Diphenylhydrazine	5.16E-01	ug/l	3.01E-03	lbs/day
Ethylbenzene	3.35E+02	ug/l	1.96E+00	lbs/day
Fluoranthene	5.16E+01	ug/l	3.01E-01	lbs/day
4-Chlorophenyl phenyl ether				
4-Bromophenyl phenyl ether				
Bis(2-chloroisopropyl) ether	1.68E+05	ug/l	9.78E+02	lbs/day
Bis(2-chloroethoxy) methane				
Methylene chloride (HM)	2.58E+03	ug/l	1.51E+01	lbs/day
Methyl chloride (HM)				
Methyl bromide (HM)				
Bromoform (HM)	3.09E+02	ug/l	1.81E+00	lbs/day
Dichlorobromomethane(HM)	6.96E+01	ug/l	4.06E-01	lbs/day
Chlorodibromomethane (HM)	5.42E+01	ug/l	3.16E-01	lbs/day
Hexachlorocyclopentadiene	1.03E+01	ug/l	6.02E-02	lbs/day
Isophorone	4.64E+03	ug/l	2.71E+01	lbs/day
Naphthalene				
Nitrobenzene	1.55E+03	ug/l	9.03E+00	lbs/day
2-Nitrophenol				
4-Nitrophenol				
2,4-Dinitrophenol	3.61E+04	ug/l	2.11E+02	lbs/day
4,6-Dinitro-o-cresol	1.97E+03	ug/l	1.15E+01	lbs/day
N-Nitrosodimethylamine	7.74E+00	ug/l	4.52E-02	lbs/day
N-Nitrosodiphenylamine	1.55E+01	ug/l	9.03E-02	lbs/day
N-Nitrosodi-n-propylamine	1.32E+00	ug/l	7.68E-03	lbs/day
Pentachlorophenol	1.03E-01	ug/l	6.02E-04	lbs/day
Phenol	7.74E+05	ug/l	4.52E+03	lbs/day
Bis(2-ethylhexyl)phthalate	9.54E-01	ug/l	5.57E-03	lbs/day
Butyl benzyl phthalate	2.58E-01	ug/l	1.51E-03	lbs/day

Di-n-butyl phthalate	7.74E+01	ug/l	4.52E-01	lbs/day
Di-n-octyl phthlate				
Diethyl phthalate	1.55E+03	ug/l	9.03E+00	lbs/day
Dimethyl phthlate	5.16E+03	ug/l	3.01E+01	lbs/day
Benzo(a)anthracene (PAH)	3.35E-03	ug/l	1.96E-05	lbs/day
Benzo(a)pyrene (PAH)	3.35E-04	ug/l	1.96E-06	lbs/day
Benzo(b)fluoranthene (PAH)	3.35E-03	ug/l	1.96E-05	lbs/day
Benzo(k)fluoranthene (PAH)	3.35E-02	ug/l	1.96E-04	lbs/day
Chrysene (PAH)	3.35E-01	ug/l	1.96E-03	lbs/day
Acenaphthylene (PAH)				
Anthracene (PAH)				
Dibenzo(a,h)anthracene (PAH)	3.35E-04	ug/l	1.96E-06	lbs/day
Indeno(1,2,3-cd)pyrene (PAH)	3.35E-02	ug/l	1.96E-04	lbs/day
Pyrene (PAH)	7.74E+01	ug/l	4.52E-01	lbs/day
Tetrachloroethylene	1.34E+03	ug/l	7.83E+00	lbs/day
Toluene	1.34E+03	ug/l	7.83E+00	lbs/day
Trichloroethylene	1.81E+01	ug/l	1.05E-01	lbs/day
Vinyl chloride	4.13E+00	ug/l	2.41E-02	lbs/day
Pesticides				
Aldrin	1.99E-06	ug/l	1.16E-08	lbs/day
Dieldrin	3.09E-06	ug/l	1.81E-08	lbs/day
Chlordane	8.25E-04	ug/l	4.82E-06	lbs/day
4,4'-DDT	7.74E-05	ug/l	4.52E-07	lbs/day
4,4'-DDE	4.64E-05	ug/l	2.71E-07	lbs/day
4,4'-DDD	3.09E-04	ug/l	1.81E-06	lbs/day
alpha-Endosulfan	7.74E+01	ug/l	4.52E-01	lbs/day
beta-Endosulfan	1.03E+02	ug/l	6.02E-01	lbs/day
Endosulfan sulfate	1.03E+02	ug/l	6.02E-01	lbs/day
Endrin	7.74E-02	ug/l	4.52E-04	lbs/day
Endrin aldehyde	2.58E+00	ug/l	1.51E-02	lbs/day
Heptachlor	1.52E-05	ug/l	8.88E-08	lbs/day
Heptachlor epoxide				
PCB's				
PCB 1242 (Arochlor 1242)	1.16E-04	ug/l	6.77E-07	lbs/day
PCB-1254 (Arochlor 1254)	1.16E-04	ug/l	6.77E-07	lbs/day
PCB-1221 (Arochlor 1221)	1.16E-04	ug/l	6.77E-07	lbs/day
PCB-1232 (Arochlor 1232)	1.16E-04	ug/l	6.77E-07	lbs/day
PCB-1248 (Arochlor 1248)	1.16E-04	ug/l	6.77E-07	lbs/day
PCB-1260 (Arochlor 1260)	1.16E-04	ug/l	6.77E-07	lbs/day
PCB-1016 (Arochlor 1016)	1.16E-04	ug/l	6.77E-07	lbs/day
Pesticide				
Toxaphene	1.83E-03	ug/l	1.07E-05	lbs/day

Metals				
Antimony		ug/l		lbs/day
Arsenic		ug/l		lbs/day
Asbestos		ug/l		lbs/day
Beryllium				
Cadmium				
Chromium (III)				
Chromium (VI)				
Copper		ug/l		lbs/day
Cyanide		ug/l		lbs/day
Lead				
Mercury		ug/l		lbs/day
Nickel		ug/l		lbs/day
Selenium				
Silver				
Thallium		ug/l		lbs/day
Zinc				
Dioxin				
Dioxin (2,3,7,8-TCDD)	3.61E-08	ug/l	2.11E-10	lbs/day

Metals Effluent Limitations for Protection of All Beneficial Uses
Based upon Water Quality Standards and Toxics Rule

	Class 4 Acute Agricultural ug/l	Class 3 Acute Aquatic Wildlife ug/l	Acute Toxics Drinking Water Source ug/l	Acute Toxics Wildlife ug/l	1C Acute Health Criteria ug/l	Acute Most Stringent ug/l	Class 3 Chronic Aquatic Wildlife ug/l
Aluminum		1340.1				1340.1	N/A
Antimony				1650.4		1650.4	
Arsenic	257.9	607.8				257.9	385.6
Barium							
Beryllium						0.0	
Cadmium	25.7	12.8				12.8	5.9
Chromium (III)		9843.7				9843.7	676.8
Chromium (VI)	256.6	25.5				25.49	22.09
Copper	514.5	89.8				89.8	75.8
Cyanide		39.4	1031.5			39.4	13.4
Iron		1788.4				1788.4	
Lead	256.6	826.7				256.6	45.2
Mercury		4.29		0.39		0.39	0.031
Nickel		2656.9		11862.1		2656.9	424.6
Selenium	126.4	31.7				31.7	9.4
Silver		70.3				70.3	
Thallium				1.2		1.2	
Zinc		679.8				679.8	979.7
Boron	1934.0					1934.0	
Sulfate	5157.4					5157.4	

Summary Effluent Limitations for Metals [Wasteload Allocation, TMDL]
[If Acute is more stringent than Chronic, then the Chronic takes on the Acute value.]

	WLA Acute ug/l	WLA Chronic ug/l	
Aluminum	1340.1	N/A	
Antimony	1650.38		
Arsenic	257.9	385.6	Acute Controls
Asbestos			
Barium			
Beryllium			
Cadmium	12.8	5.9	
Chromium (III)	9843.7	677	
Chromium (VI)	25.5	22.1	
Copper	89.8	75.8	
Cyanide	39.4	13.4	
Iron	1788.4		
Lead	256.6	45.2	
Mercury	0.387	0.031	
Nickel	2656.9	425	
Selenium	31.7	9.4	
Silver	70.3	N/A	
Thallium	1.2		
Zinc	679.8	979.7	Acute Controls
Boron	1934.04		
Sulfate	5157.4		N/A at this Waterbody

Other Effluent Limitations are based upon R317-1.
E. coli 126.0 organisms per 100 ml

X. Antidegradation Considerations

The Utah Antidegradation Policy allows for degradation of existing quality where it is determined that such lowering of water quality is necessary to accommodate important economic or social development in the area in which the waters are protected [R317-2-3]. It has been determined that certain chemical parameters introduced by this discharge will cause an increase of the concentration of said parameters in the receiving waters. Under no conditions will the increase in concentration be allowed to interfere with existing instream water uses.

An Antidegradation Level I Review was conducted on this discharge and its effect on the receiving water. Based upon that review, it has been determined that an Antidegradation Level II Review is not required. The proposed permit is a simple renewal with no increase in flow or concentration over that which was approved in the previous permit.

XI. Colorado River Salinity Forum Considerations

Discharges in the Colorado River Basin are required to have their discharge at a TDS loading of less than 1.00 tons/day unless certain exemptions apply. Refer to the Forum's Guidelines for additional information allowing for an exceedence of this value.
This doesn't apply to facilities that do not discharge to the Colorado River Basin.

XII. Summary Comments

The mathematical modeling and best professional judgement indicate that violations of receiving water beneficial uses with their associated water quality standards, including important down-stream segments, will not occur for the evaluated parameters of concern as discussed above if the effluent limitations indicated above are met.

ATTACHMENT 3

Reasonable Potential Analysis

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REASONABLE POTENTIAL ANALYSIS

Water Quality has worked to improve our reasonable potential analysis (RP) for the inclusion of limits for parameters in the permit by using an EPA provided model. As a result of the model, more parameters may be included in the renewal permit. A Copy of the Reasonable Potential Analysis Guidance (RP Guide) is available at water Quality. There are four outcomes for the RP Analysis[1]. They are;

Outcome A:	A new effluent limitation will be placed in the permit.
Outcome B:	No new effluent limitation. Routine monitoring requirements will be placed or increased from what they are in the permit,
Outcome C:	No new effluent limitation. Routine monitoring requirements maintained as they are in the permit,
Outcome D:	No limitation or routine monitoring requirements are in the permit.

Castle Dale is a minor discharger with no known industrial dischargers with a low reasonable potential for toxics to be in the effluent, therefore they are not required to monitor metals, and RP is not required to be run on their effluent at this time. If and when this changes, metals monitoring may be added to the Permit.

[1] See Reasonable Potential Analysis Guidance for definitions of terms