FACT SHEET STATEMENT OF BASIS
BLUFFDALE COOLING WATER DISCHARGE.
UPDES PERMIT NUMBER: UT0025968
MINOR INDUSTRIAL

FACILITY CONTACTS

Person Name:	Michael Fazio
Position:	City Engineer
Telephone:	(801) 858-0490
Person Name:	Blain Dietrich
Position:	Public Works Director
Telephone:	(801) 858-0490
Facility Name:	Bluffdale Cooling Water Effluent Reuse
Facility Mailing Address:	14175 South Redwood Road Bluffdale, Utah 84065
Facility Mailing Location:	16891 Camp Williams Road Bluffdale, Utah 84065

DESCRIPTION OF FACILITY

Bluffdale City is providing culinary water for use as non-contact cooling water in the climate control system at a data center that is under construction on property at Camp Williams. The culinary water will be used in the system and cycled through a holding tank then out to be discharged. The primary outfall will be to the Jordan River just below the Narrows Diversion Dam for canals in Salt Lake County. The secondary outfall will be to the Utah and Salt Lake Canal at the same area as the primary point. A third outfall will be to the pressurized irrigation system in Bluffdale.

The heat exchange process is by its nature a very clean process, and does not impact the cooling water beyond the transfer of heat from the climate control system to the water. The result is a high quality effluent. Though the process water is evaporated, and any constituent that is in the source water is concentrated. The concentration of these constituents in the cooling water is what makes them a pollutant, and requires permitting to be discharged. The high quality of the effluent does make it eligible to be used in a pressurized irrigation system as Reuse Water.

The option to discharge to a Publicly Owned Treatment Works (POTW) was evaluated and rejected based on two major concerns. The first is that it was desired that the facility be more "Green" and reduce the impact on the environment, so the option of discharging to a pressurized irrigation system was developed. While this is not a year round solution it will reduce the amount of fresh water that is diverted to this use, and reduce the impact of removing that water from the environment.

Secondly, the cooling water would be considered very clean when compared to what the POTW would normally receive and would be a dilution of the water in the POTW. This cooling water flow would also have an adverse impact on the capacity of the sanitary system between the

facility and POTW. Together these would result in a major increase in the construction costs, and ongoing operation cost for the facility.

Together these reasons lead the facility to work with Bluffdale to develop a plan for reuse, utilizing the effluent for irrigation during the summer.

In cooling systems there is occasionally a need to treat the system for biological growth and/or deposits in the system. To accomplish this, a facility may need to do single time dosing of the system or start continuous treatment. The permittee is liable for any adverse water quality impacts from use of treatment chemicals pursuant to the Narrative Standard. The permittee must submit a plan for treatment and obtain DWQ approval prior to use of these types of chemicals in order to comply with the Narrative Standard provisions of the permit. DWQ will evaluate the plan and product information to determine the scope and likelihood of environmental impact and if a modification to the permit should be initiated to include any new sampling/monitoring that might be needed.
Since the source water is culinary, and no domestic sewage will be involved in the process the permit is not requiring pathogen monitoring. If the source waters change and the likelihood of pathogen exposure in the system increases, the permit will need to be modified to include pathogen reduction and monitoring provisions prior to the changes taking place for it to remain in effect.

The rules governing Reuse are in the *Utah Administrative Code (UAC) R317-1-*.4, and a permitting program for Reuse facilities has been developed. These normal Reuse provisions for a POTW do not apply directly to this industrial cooling water system. The system is not exposed to municipal sewage removing the chance of pathogen exposure in the source water and during the heat exchange process. *UAC R317-1-*.5 dictates the oversight of industrial Reuse. To cover the Reuse discharge, the normal Reuse permitting program will be modified to fit an industrial application. This will result in a reduction of parameters limits and monitoring requirements.

To make the monitoring Program less complicated, the parameters and frequency will be the same for all three outfalls. Allowing for one sampling location to be used while the desired discharge Outfall can easily be switched. This will also reduce the confusion about how often and where to sample when the discharge is shifted from one outfall to the other during the year. This means that the permittee will always be sampling for the same parameters and at the same frequency year round. If they chose to have a sample point located above the control point for directing which outfall is going to be used, the sampling at this point will be considered acceptable for all discharge outfalls. In other words, they may sample out of one point and have it be representative for all outfalls, as long as the point is properly located above any diversion point.

The temperature limit developed in the WLA for Outfall 001 set the limit as 100°C (212°F) for water to enter the Jordan River. This is due to the difference in flows between the two waters. The discharge is significantly less than the river (only 1.8 % of river flows) such that the calculations come up with the default maximum value of the boiling point of water. This is not considered a safe or practical value for discharge. It is also very unlikely that the discharge effluent would reach that temperature. This means that if a temperature limit is to be included it must be developed using Best Professional Judgment (BPJ). In the materials supplied in the permit application it has been put fourth that the system will operate in a rather steady state

during normal operations, and the outfall temperature will be easily related to the outdoor air temperature. As the ambient air temperature increases, the outfall temperature will increase and above a certain temperature, the system will switch to a high number of cycles in the heat exchange process, and increase to another temperature range. To allow for a more consistent operation of the outfalls, the temperature limit for Outfall 001 will be set above the expected discharge temperature, but limited to protect the health and safety of anyone or thing that might come in direct contact with the effluent. The limit will be set at 65°F (18.3°C), or the estimated process effluent temperature plus 10°F.

There is not a numeric temperature standard for canals with a 2B and 4 beneficial use classification. As a result there is no temperature limit developed in the WLA for Outfall 002. There is also no requirement that a temperature limit be included. If there was a numeric standard when the canal is in operation, due to the difference in canal flows, and the discharge flow the limit would be the same as for outfall 001, 100°C (212°F). Just as with outfall 001, this is not considered a safe value for discharge, and it is also very unlikely that the discharge effluent would reach that temperature. If a temperature limit is to be included it also must be developed using BPJ. Setting the value 10°F higher than Outfall 001 is would be protective for health and safety. Therefore the limit will be 75°F (23.9°C).

The sampling for parameters such as Metals, Oil and Grease can be reduced and/or eliminated after sufficient sampling results show a low enough reasonable potential for impairment of the receiving streams.

SURFACE WATER DISCHARGE

DESCRIPTION OF SURFACE WATER DISCHARGE

The cooling system will discharge approximately 340,000 gallons of non-contact cooling water effluent per day. It is this water that will be discharged into the Jordan River and/or Salt Lake Utah Canal unless it is utilized as irrigation water under reuse provisions. During the months when the Bluffdale secondary irrigation system is in use, the water will be piped into it as reuse water. During the winter months the water will be discharged to the Jordan River, and during any months in between, the non-contact cooling water will be discharged into the canal. This will allow the city to have several discharge options.

Outfall	Description of Surface Water Discharge Point
001	Located at latitude 40°26’ and longitude 111°55’. The discharge is through a 10” pipe to the Jordan River.
002	Located at latitude 40°26’ and longitude 111°55’. The discharge is through a 10” pipe to the Utah and Salt Lake Canal.

Outfall	Description of Reuse Water Discharge Point
003R	Located at latitude 40°26’ and longitude 111°55’. The discharge is through a 16” pipe to the Bluffdale pressurized irrigation system.

RECEIVING WATERS AND STREAM CLASSIFICATION

The discharge flows into the Jordan River and/or the Utah and Salt Lake Canal. The Jordan River segment is above Bluffdale Road, and below the Narrows diversion, and is classified 2B, 3A and 4 at this location according to *Utah Administrative Code (UAC) R317-2-13*.5

Class 2B -Protected for secondary contact recreation such as boating, wading, or similar uses.

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.

The Utah and Salt Lake Canal is classified as 2B and 4 according to *Utah Administrative Code (UAC) R317-2-13.9*

Class 2B -Protected for secondary contact recreation such as boating, wading, or similar uses.

Class 4 -Protected for agricultural uses including irrigation of crops and stock watering.

BASIS FOR EFFLUENT LIMITATIONS

The total suspended solids (TSS) and pH limits are based on current Utah Secondary Treatment Standards, *UAC R317-1-3.2*. Oil and Grease is based on Best Professional Judgment (BPJ), and shall not exceed 10 mg/L as a maximum per sample. Temperature is based on the WLA and BPJ. Dissolved oxygen (DO) is from the waste load analysis (WLA).

Based on effluent monitoring data and the existing treatment facility, the permittee is expected to be able to comply with these limitations. The WLAs indicate that these limitations should be sufficiently protective of water quality, in order to meet State standards in the receiving waters.

The permit limitations for Outfall 001 (Jordan River) are:

Parameter	Effluent Limitations *c			
	Max Monthly Average	Max Weekly Average	Minimum	Maximum
Flow, MGD				
Winter (Jan-Mar)	NA	NA	NA	0.34
Spr (Apr-Jun)	NA	NA	NA	0 *d
Sum (Jul-Sept)	NA	NA	NA	0 *d
Fall (Oct-Dec)	NA	NA	NA	0.34
Temperature, °F				
Winter (Jan-Mar)	NA	NA	NA	65
Spr (Apr-Jun)	NA	NA	NA	NA
Sum (Jul-Sept)	NA	NA	NA	NA
Fall (Oct-Dec)	NA	NA	NA	65

TRC, mg/L Winter (Jan-Mar) Spr (Apr-Jun) Sum (Jul-Sept) Fall (Oct-Dec)	 NA NA NA NA	 NA NA NA NA	 NA NA NA NA	 0.7 NA NA 0.8
TSS, mg/L	25	35	NA	NA
DO, mg/L	NA	NA	5.0	NA
Oil & Grease, mg/L	NA	NA	NA	10.0
pH, Standard Units	NA	NA	6.5	9.0

The permit limitations for Outfall 002 (Utah and Salt Lake Canal) are:

Parameter	Effluent Limitations *b *c			
	Max Monthly Average	Max Weekly Average	Minimum	Maximum
Flow, MGD	NA	NA	NA	0.34
Temperature, °F	NA	NA	NA	75
TSS, mg/L	25	35	NA	NA
Oil & Grease, mg/L	NA	NA	NA	10.0
pH, Standard Units	NA	NA	6.5	9.0
TDS, mg/L	NA	NA	NA	1200

The permit limitations for Outfall 003R (Reuse) are:

Parameter	Reuse Effluent Limitations			
	Max Monthly Average	Max Weekly Average	Minimum	Maximum
pH, Standard Units	NA	NA	6.5	9.0

NA – Not Applicable.

SELF-MONITORING AND REPORTING REQUIREMENTS

The permit will require reports to be submitted quarterly, as applicable, on Discharge Monitoring Report (DMR) forms due 28 days after the end of the monitoring period.

Self-Monitoring and Reporting Requirements *a			
Parameter	Frequency	Sample Type	Units
Total Flow	Continuous	Recorder	MGD
Temperature	Continuous	Recorder	^{o}F
TRC	Weekly	Grab	mg/L
DO	Weekly	Grab	mg/L
TDS	Weekly	Grab	mg/L
pH	Weekly	Grab	SU
TSS, Effluent	Monthly	Grab	mg/L

Oil & Grease	Quarterly	Grab	mg/L
Metals	Quarterly	Grab	mg/L

NA – Not Applicable

*a See Definitions, Part VI for definition of terms.

*b There shall be no visible sheen or floating solids or visible foam in other than trace amounts.

*c There shall be no discharge of sanitary wastes.

*d There will be no discharge through Outfall 001 during the Spring and Summer (April through September).

STORM WATER

STORMWATER REQUIREMENTS

The Utah Administrative Code (UAC) R-317-8-3.9 requires storm water permit provisions to include the development of a storm water pollution prevention plan for waste water treatment facilities if the facility meets one or both of the following criteria.

1. Waste water treatment facilities with a design flow of 1.0 MGD or greater, and/or,
2. Waste water treatment facilities with an approved pretreatment program as described in 40CFR Part 403,

Bluffdale does not meet either of the above criteria; therefore this permit does not include storm water provisions. The permit does however include a storm water re-opener provision.

PRETREATMENT REQUIREMENTS

Any process wastewater that the facility may discharge to the sanitary sewer, either as direct discharge or as a hauled waste, is subject to federal, state and local pretreatment regulations. Pursuant to section 307 of the Clean Water Act, the permittee shall comply with all applicable Federal General Pretreatment Regulations promulgated, found in 40 CFR Section 403, the State Pretreatment Requirements found in *UAC R317-8-8,* and any specific local discharge limitations developed by the Publicly Owned Treatment Works (POTW) accepting the waste.

BIOMONITORING REQUIREMENTS

As part of the nationwide effort to control toxics, biomonitoring requirements are being included in all major permits and in minor permits for facilities where effluent toxicity is an existing or potential concern. Authorization for requiring effluent biomonitoring is provided for in *UAC R317-8-4.2* and *R317-8-5.3*. *The Whole Effluent Toxicity (WET) Control Guidance Document*, February 15, 1991, outlines guidance to be used by Utah Division of Water Quality staff and by permittee's for implementation of WET control through the UPDES discharge permit program.

Bluffdale is a minor facility discharging approximately 340,000 gallons per day of non-contact cooling water. The critical low flow level for the critical flow season (winter), for the Jordan River is 21,000,000 gallons per day. Comparison of the effluent and river flow volumes in the waste load analysis show the effluent will make up approximately 1.8% of the receiving stream, Jordan River, which is below the threshold of 5% in the WET guidance for inclusion of WET testing. Therefore the Bluffdale cooling water discharge is not likely to be toxic. As a result, biomonitoring of the effluent will not be required. However, the permit will contain a WET reopener provision.

TOTAL MAXIMUM DAILY LOAD REQUIREMENTS

Bluffdale discharges cooling water into a segment of the Jordan River, which has been identified as impaired for Temperature and Total Dissolved Solids (TDS) based on the 2004, 303(d) assessment process as defined in the Clean Water Act. As required under federal regulation a total maximum daily load (TMDL) will be developed for all impaired waters. The TMDL will focus on developing limitations for those parameters of concern (POC) that were identified during the 305(b) and 303(d) assessment process. POC's are parameters that are in violation of water quality standards or that contribute to impairment of a beneficial use (a major component of the water quality standards).

Since this segment of the Jordan River is currently listed as impaired for Temperature and TDS, it is required by *UAC R317-8-2.2* that the discharge will not cause or contribute to a violation of water quality standards.

The impairment for temperature along this segment of the river is during the Spring and Summer months (April to September). During these months the discharge will not be permitted to go to the river, but will be directed to the irrigation canal and the Bluffdale pressurized irrigation system. This will prevent the thermal component of the cooling water from causing or contributing to further impairment of the river segment. The Standard for the river is 68°F (20°C). The effluent temperature for the system is not expected to exceed 55°F (12.8 °C) during the winter and fall, and has a limit set at 65°F (18.3°C). This will further prevent the discharge from degrading the river with regard to temperature.

The WLA developed TDS limits for the Bluffdale cooling water discharge to Outfall001, as developed in the WLA, is set as 1200 mg/L as a maximum value for any sample collected. This limit does not exceed the TDS standard for the river. As shown in Table 36 and 37 in Cirrus (2010) (reproduced below), in-stream TDS concentrations collected at the Narrow location (STORET 4994720) and Bluffdale Road location (STORET 4994600) from 1995 to 2008 hover near the 1200 mg/L water quality standard, with some concentrations exceeding the standard, leading to the impaired listing. As the discharger is expected to be able to meet this limit without difficulty and therefore will not exceed the 1200 mg/L standard, DWQ does not believe that the TDS concentrations of the discharge will further degrade the in-stream water quality. This is also the TDS standard for the river. The discharger is expected to be able to meet this limit without difficulty. At or below this limit the discharge will not cause a violation of water quality standards. It should also not impair the designated use for the river ..

Table 36. TDS concentrations at the Narrows (4994720) in Segment 8, ranked by concentration (1995-2008).

Date	TDS Concentration (mg/L)
9/15/2004	1,730
8/19/2004	1,456
12/8/2004	1,312
90th Percentile	
1/17/1995	1,284
7/5/2004	1,272
2/21/1995	1,170
3/9/1995	1,164
1/27/2005	1,164
12/10/1999	1,134
1/12/2000	1,132
5/3/1995	1,076
11/2/2004	1,070
3/23/1995	1,038
6/14/1995	838
6/7/2000	834
2/29/2000	782
10/7/1999	778
5/24/2000	758
8/26/1999	742
5/18/1995	738
5/5/2000	726
7/15/1999	688
5/31/1995	670
4/5/1995	650
3/27/2000	650
4/19/1995	530

Table 37. TDS concentrations at Bluffdale Road (4994600) between Segment 7 and Segment 6, ranked by concentration.

Date	TDS Concen-tration (mg/L)	Date	TDS Concen-tration (mg/L)	Date	TDS Concen-tration (mg/L)	Date	TDS Concen-tration (mg/L)
9/15/2004	1,528	3/3/2004	1,316	7/7/2004	1,312	8/29/1996	1,290
8/19/2004	1,396	7/1/2004	1,316	6/29/2004	1,310		
7/14/2004	1,366	7/5/2004	1,314	10/23/2002	1,292		
90th Percentile							
9/10/2003	1,282	11/21/1996	1,108	10/15/1997	914	8/26/1999	792
7/29/2003	1,278	2/13/2001	1,102	5/10/2001	908	5/24/2000	792
12/8/2004	1,272	1/27/2005	1,090	6/18/2007	904	2/29/2000	786
1/8/2004	1,256	6/3/2003	1,048	10/5/2000	902	1/13/1999	772
6/24/2004	1,256	11/2/2004	1,048	1/22/1997	894	4/25/2006	770
3/19/2003	1,240	3/9/1995	1,046	9/6/2006	880	3/27/2000	758
6/16/2004	1,228	12/10/1999	1,044	6/17/2008	876	6/1/2006	758
1/8/2008	1,222	1/12/2000	1,042	5/2/1996	860	5/18/1995	742
6/22/2004	1,208	8/7/2001	1,024	6/7/2000	858	6/25/1997	738
1/11/2006	1,208	11/14/2000	1,022	6/28/2000	856	5/31/1995	736
2/21/1995	1,202	9/7/1995	1,004	6/14/1995	852	5/5/2000	734
11/20/2003	1,200	5/22/2002	994	9/9/1997	852	10/14/1998	726
2/12/2008	1,200	10/10/1996	982	4/25/2007	844	12/3/1998	726
3/7/2006	1,190	10/12/1995	974	4/9/1996	836	8/12/1998	724
1/29/2008	1,188	7/17/1996	950	10/19/2006	836	4/14/2004	716
1/7/2003	1,180	3/18/1998	944	5/20/2008	822	3/16/1999	712
1/23/2002	1,178	1/11/1996	938	3/7/2007	814	5/6/1999	706
6/2/2004	1,160	2/20/1996	938	3/12/1997	812	4/5/1995	702
6/9/2004	1,160	10/24/2006	936	7/12/2006	808	7/15/1999	702
7/9/2002	1,156	4/16/2008	936	5/1/1997	802	5/3/1995	688
1/17/1995	1,154	9/25/2007	924	7/23/1997	798	10/10/2001	672
11/28/2001	1,148	3/23/1995	922	12/2/1997	796	6/5/1998	640
2/11/2003	1,134	7/25/2007	920	4/19/1995	794	4/18/2002	554
1/23/2007	1,134	7/25/1995	914	10/5/1999	794	11/9/1995	118
3/5/2002	1,130						

Currently, a TMDL evaluation is underway for the Jordan River. If the results of the TMDL process establish effluent limits for any of the POC's that are different than the current effluent limits, then it would be required by (40 CFR Part 130) to include these effluent limits in the UPDES permits. Therefore, it is strongly recommended that the facility staff participate in the TMDL development process. The staff at the Division of Water Quality are responsible for scheduling and facilitating stakeholder involvement in TMDL work. Please contact your UPDES permit writer for information on how to be included in notifications of scheduled TMDL meetings.

PERMIT DURATION

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

Drafted by
Daniel R Griffin P.E., Discharge
Michael George, Storm Water

ADDENDUM TO FSSOB

A public notice for the draft permit will be published in the Salt Lake Tribune on October 22, 2012. Proof of publication as supplied by the Tribune will be attached to the final record.

If comments are received during the during the public notice period that started on October 22, 2012and closed on November 24, 2012.

Level II Antidegradation Review

for the

Bluffdale Culinary Water Recycling Project

September 2012

Prepared by:

HORROCKS
ENGINEERS

2162 West Grove Parkway, Suite 400
Pleasant Grove, Utah 84062

8/21/2012

Introduction

In compliance with Utah Administrative Code R317-2, we are submitting this antidegradation review (ADR) to assist the applicant and the Division of Water Quality (DWQ) staff in preparing the permit application for disposing of culinary water, during the winter months, that was used in a cooling system by a Bluffdale City customer. This ADR will explain the water source, water quality and intended disposal method.

The first step in preparing the ADR is completing the permit application. Parts A, B and D must be filled out, while C and D are only required for Level II reviews. In this circumstance, it is believed that a Level II ADR is required and we have filled out the permit application accordingly.

Second, as required in Part C, we have prepared a discussion on the social, economic and environmental impacts and benefits of the project. The section explains the project in terms of infrastructure, methods and uses of the recycled water.

Third, Part D requires an analysis of parameters of concern. We have provided detailed information on the designated class of the proposed receiving waters, ambient concentrations and design concentrations of the proposed cooling water.

Finally, the Appendix includes additional information for use in reviewing and analyzing the permit.

Antidegradation Review:

Application for the
Bluffdale Culinary Water Recycling Project

Utah Division of Water Quality

June 2012

8/21/2012

ANTIDEGRADATION REVIEW FORM
UTAH DIVISION OF WATER QUALITY

Instructions

The objective of antidegradation rules and policies is to protect existing high quality waters and set forth a process for determining where and how much degradation is allowable for socially and/or economically important reasons. In accordance with Utah Administrative Code (UAC R317-2-3), an antidegradation review (ADR) is a permit requirement for any project that will increase the level of pollutants in waters of the state. The rule outlines requirements for both Level I and Level II ADRs, as well as public comment procedures. This review form is intended to assist the applicant and Division of Water Quality (DWQ) staff in complying with the rule but is not a substitute for the complete rule in R317-2-3.5. Additional details can be found in the *Utah Antidegradation Implementation Guidance* and relevant sections of the guidance are cited in this review form.

ADRs should be among the first steps of an application for a UPDES permit because the review helps establish treatment expectations. The level of effort and amount of information required for the ADR depends on the nature of the project and the characteristics of the receiving water. To avoid unnecessary delays in permit issuance, the Division of Water Quality (DWQ) recommends that the process be initiated at least one year prior to the date a final approved permit is required.

DWQ will determine if the project will impair beneficial uses (Level I ADR) using information provided by the applicant and whether a Level II ADR is required. The applicant is responsible for conducting the Level II ADR. For the permit to be approved, the Level II ADR must document that all feasible measures have been undertaken to minimize pollution for socially, environmentally or economically beneficial projects resulting in an increase in pollution to waters of the state.

For permits requiring a Level II ADR, this antidegradation form must be completed and approved by DWQ before any UPDES permit can be issued. Typically, the ADR form is completed in an iterative manner in consultation with DWQ. The applicant should first complete the statement of social, environmental and economic importance (SEEI) in Part C and determine the parameters of concern (POC) in Part D. Once the POCs are agreed upon by DWQ, the alternatives analysis and selection of preferred alternative in Part E can be conducted based on minimizing degradation resulting from discharge of the POCs. Once the applicant and DWQ agree upon the preferred alternative, the review is considered complete, and the form must be signed, dated, and submitted to DWQ.

For additional clarification on the antidegradation review process and procedures, please contact Nicholas von Stackelberg (801-536-4374) or Jeff Ostermiller (801-536-4370).

Antidegradation Review Form

Part A: Applicant Information

Facility Name: Bluffdale Culinary Water Recycling System

Facility Owner: Bluffdale City

Facility Location: Bluffdale City – South end

Form Prepared By: Horrocks Engineers – Brent Ventura, P.E.

Outfall Number: 2

Receiving Water: Utah & Salt Lake Canal and/or the Jordan River

What Are the Designated Uses of the Receiving Water (R317-2-6)?

	Utah & Salt Lake Canal	Jordan River
Domestic Water Supply:	None	None
Recreation:	2B	2B
Aquatic Life:	3E	3A
Agricultural Water Supply:	4	4
Great Salt Lake:	None	None

Category of Receiving Water (R317-2-3.2, -3.3, and -3.4): Utah & Salt Lake Canal – Category 3, Jordan River – Category 3

UPDES Permit Number (if applicable):

Effluent Flow Reviewed: 238 gpm
Typically, this should be the maximum daily discharge at the design capacity of the facility. Exceptions should be noted.

What is the application for? (check all that apply)

☒ A UPDES permit for a new facility, project, or outfall.

☐ A UPDES permit renewal with an expansion or modification of an existing wastewater treatment works.

☐ A UPDES permit renewal requiring limits for a pollutant not covered by the previous permit and/or an increase to existing permit limits.

☐ A UPDES permit renewal with no changes in facility operations.

Part B. Is a Level II ADR required?

This section of the form is intended to help applicants determine if a Level II ADR is required for specific permitted activities. In addition, the Executive Secretary may require a Level II ADR for an activity with the potential for major impact on the quality of waters of the state (R317-2-3.5a.1).

B1. The receiving water or downstream water is a Class 1C drinking water source.

☐ **Yes** A Level II ADR is required (Proceed to Part C of the Form)

☒ **No** (Proceed to Part B2 of the Form)

B2. The UPDES permit is new or is being renewed and the proposed effluent concentration and loading limits are higher than the concentration and loading limits in the previous permit and any previous antidegradation review(s).

☒ **Yes** (Proceed to Part B3 of the Form)

☐ **No** No Level II ADR is required and there is no need to proceed further with review questions.

B3. Will any pollutants use assimilative capacity of the receiving water, i.e. do the pollutant concentrations in the effluent exceed those in the receiving waters at critical conditions? For most pollutants, effluent concentrations that are higher than the ambient concentrations require an antidegradation review? For a few pollutants such as dissolved oxygen, an antidegradation review is required if the effluent concentrations are less than the ambient concentrations in the receiving water. (Section 3.3.3 of Implementation Guidance)

☒ **Yes** (Proceed to Part B4 of the Form)

☐ **No** No Level II ADR is required and there is no need to proceed further with review questions.

B4. Are water quality impacts of the proposed project temporary and limited (Section 3.3.4 of Implementation Guidance)? Proposed projects that will have temporary and limited effects on water quality can be exempted from a Level II ADR.

☐ **Yes** Identify the reasons used to justify this determination in Part B4.1 and proceed to Part G. No Level II ADR is required.

☒ **No** A Level II ADR is required (Proceed to Part C)

B4.1 Complete this question only if the applicant is requesting a Level II review exclusion for temporary and limited projects (see R317-2-3.5(b)(3) and R317-2-3.5(b)(4)). For projects requesting a temporary and limited exclusion please indicate the factor(s) used to justify this determination (check all that apply and provide details as appropriate) (Section 3.3.4 of Implementation Guidance):

☐ Water quality impacts will be temporary and related exclusively to sediment or turbidity and fish spawning will not be impaired.

Factors to be considered in determining whether water quality impacts will be temporary and limited:

a) The length of time during which water quality will be lowered:
b) The percent change in ambient concentrations of pollutants:
c) Pollutants affected:
d) Likelihood for long-term water quality benefits:
e) Potential for any residual long-term influences on existing uses:
f) Impairment of fish spawning, survival and development of aquatic fauna excluding fish removal efforts:

Additional justification, as needed:

Level II ADR

Part C, D, E, and F of the form constitute the Level II ADR Review. The applicant must provide as much detail as necessary for DWQ to perform the antidegradation review. Questions are provided for the convenience of applicants; however, for more complex permits it may be more effective to provide the required information in a separate report. Applicants that prefer a separate report should record the report name here and proceed to Part G of the form.

Optional Report Name: *Work Plan and Statement of Social, Environmental and Economic Importance for the Bluffdale Culinary Water Recycling Project*

Part C. Is the degradation from the project socially and economically necessary to accommodate important social or economic development in the area in which the waters are located?

The applicant must provide as much detail as necessary for DWQ to concur that the project is socially and economically necessary when answering the questions in this section. More information is available in Section 6.2 of the Implementation Guidance.

C1. Describe the social and economic benefits that would be realized through the proposed project, including the number and nature of jobs created and anticipated tax revenues.

C2. Describe any environmental benefits to be realized through implementation of the proposed project.

C3. Describe any social and economic losses that may result from the project, including impacts to recreation or commercial development.

C4. Summarize any supporting information from the affected communities on preserving assimilative capacity to support future growth and development.

C5. Please describe any structures or equipment associated with the project that will be placed within or adjacent to the receiving water.

Part D. Identify and rank (from increasing to decreasing potential threat to designated uses) the parameters of concern. *Parameters of concern are parameters in the effluent at concentrations greater than ambient concentrations in the receiving water. The applicant is responsible for identifying parameter concentrations in the effluent and DWQ will provide parameter concentrations for the receiving water. More information is available in Section 3.3.3 of the Implementation Guidance.*

Parameters of Concern:

Rank	Pollutant	Ambient Concentration	Effluent Concentration
1	Selenium	1.65 ug/L	5.6 ug/L
2	Mercury	0.00 ug/L	0.08 ug/L
3	Arsenic	0.53 ug/L	6.00 ug/L
4	Copper	0.53 ug/L	870.0 ug/L
5	Iron	0.83 ug/L	132.0 ug/L
6	Zinc	0.053 ug/L	64.0 ug/L
7	BOD	1 mg/L	2.1 mg/L

Pollutants Evaluated that are not Considered Parameters of Concern:

Pollutant	Ambient Concentration	Effluent Concentration	Justification
Temperature	41 F	45-55 F	Water will only be discharged in the winter. Jordan River Reach 7 is impaired.
TDS	1284 mg/l	856 mg/l	Effluent concentrations do not reach ambient loads.

Part E. Alternative Analysis Requirements of a Level II Antidegradation Review.

Level II ADRs require the applicant to determine whether there are feasible less-degrading alternatives to the proposed project. More information is available in Section 5.5 and 5.6 of the Implementation Guidance.

E1. The UPDES permit is being renewed without any changes to flow or concentrations. Alternative treatment and discharge options including changes to operations and maintenance were considered and compared to the current processes. No economically feasible treatment or discharge alternatives were identified that were not previously considered for any previous antidegradation review(s).

☒ **Yes** (Proceed to Part F)

☐ **No or Does Not Apply** (Proceed to E2)

E2. Attach as an appendix to this form a report that describes the following factors for all alternative treatment options (see 1) a technical description of the treatment process, including construction costs and continued operation and maintenance expenses, 2) the mass and concentration of discharge constituents, and 3) a description of the reliability of the system, including the frequency where recurring operation and maintenance may lead to temporary increases in discharged pollutants. Most of this information is typically available from a Facility Plan, if available.

Report Name: *Alternatives Analysis for the Bluffdale Culinary Water Recycling Project*

E3. Describe the proposed method and cost of the baseline treatment alternative. The baseline treatment alternative is the minimum treatment required to meet water quality based effluent limits (WQBEL) as determined by the preliminary or final wasteload analysis (WLA) and any secondary or categorical effluent limits.

Alternative	Feasible	Reason Not Feasible/Affordable
Pollutant Trading	**No**	There are no significant amounts of useful pollutants to collect or trade
Water Recycling/Reuse	Yes	
Land Application	Yes	
Connection to Other Facilities	Yes	
Upgrade to Existing Facility	**No**	Treating the water to reach culinary grades would be unaffordable
Total Containment	**No**	Containing would require a retention facility that might adversely affect local drinking water and would require costly disposal of collected pollutants
Improved O&M of Existing Systems	**No**	There is not existing system aside from culinary water to supplement

Seasonal or Controlled Discharge	Yes	
New Construction	Yes	
No Discharge	**No**	We plan to pursue this alternative. The City would like to collect the water year round, but currently has no facilities large enough to collect all of the winter flows.

E4. Were any of the following alternatives feasible and affordable?

E5. From the applicant's perspective, what is the preferred treatment option?

As described in the Appendix, the Recycle for Secondary Use Alternative

E6. Is the preferred option also the least polluting feasible alternative?

☒ **Yes**

☐ **No**

If no, what were less degrading feasible alternative(s)?

If no, provide a summary of the justification for not selecting the least polluting feasible alternative and if appropriate, provide a more detailed justification as an attachment.

Part F. Optional Information

F1. Does the applicant want to conduct optional public review(s) in addition to the mandatory public review? Level II ADRs are public noticed for a thirty day comment period. More information is available in Section 3.7.1 of the Implementation Guidance.

☒ **No**

☐ **Yes**

F2. Does the project include an optional mitigation plan to compensate for the proposed water quality degradation?

☒ **No**

☐ **Yes**

Report Name: ☐

Part G. Certification of Antidegradation Review

G1. Applicant Certification

The form should be signed by the same responsible person who signed the accompanying permit application or certification.

Based on my inquiry of the person(s) who manage the system or those persons directly responsible for gathering the information, the information in this form and associated documents is, to the best of my knowledge and belief, true, accurate, and complete.

Print Name: BRENT VENTURA

Signature: [signature]

Date: 10/15/12

G2. DWQ Approval

To the best of my knowledge, the ADR was conducted in accordance with the rules and regulations outlined in UAC R-317-2-3.

Water Quality Management Section

Print Name: _____

Signature: _____

Date: _____

Part G. Certification of Antidegradation Review

G1. Applicant Certification

The form should be signed by the same responsible person who signed the accompanying permit application or certification.

Based on my inquiry of the person(s) who manage the system or those persons directly responsible for gathering the information, the information in this form and associated documents is, to the best of my knowledge and belief, true, accurate, and complete.

Print Name: BRENT VENTURA

Signature: [signature]

Date: 10/15/12

G2. DWQ Approval

To the best of my knowledge, the ADR was conducted in accordance with the rules and regulations outlined in UAC R-317-2-3.

Water Quality Management Section

Print Name: NICHOLAS VON STACKELBERG

Signature: [signature]

Date: 10/15/12

APPENDIX

Work Plan and Statement of Social, Environmental and Economic Importance (SEEI)
for the
Bluffdale Culinary Water Recycling Project

Introduction and Purpose

Bluffdale City wishes to construct a secondary water system for the southern portion of its city by collecting and distributing recycled culinary water i.e. blow down) from one of its largest customers, the new Utah Data Center (UDC). The system will require disposal of the recycled culinary water during the winter months. As such, Bluffdale City has proposed to construct a piping system and two new outfalls, one in the Jordan River just north of the diversion dam and one in the Utah & Salt Lake Canal.

Bluffdale has prepared and submitted an NPDES discharge permit with the EPA (form 3510-2A), a Forestry, Fire and State Lands Easement permit with the Department of Natural Resources and a Stream Alteration Permit with the Department of Natural Resources as well. These applications are intended to assist in securing permits to construct a new outfall to deliver recycled culinary water to either the Utah & Salt Lake Canal or the Jordan River.

As a part of the discharge permit, an antidegradation review (ADR) is required. This project is somewhat unusual in scope and uncommon. Therefore, DWQ staff has requested that Bluffdale prepare a Level II ADR, since it will provide more in-depth information for consideration and evaluation. This document contains the Level II ADR.

Project Description

Affected Community

Bluffdale City is a city of approximately 8,000 residents. During the construction boom several years ago, it was growing rapidly. As with every community in recent years, growth has slowed considerably. Bluffdale's growth has always been residential. Until recently, the vast majority of the city was zoned for residential growth. Therefore its tax base has always been very small. However, recently the City has begun to realize that it needs some revenue sources to support its growing population. The City's master plan now includes some significant areas zoned for commercial and mixed use applications. Likewise, it is looking for economical ways to provide services due, in part, to its minimal tax base. This project concept provides the City with a very economical and environmentally sound way to reduce the use of expensive culinary water on public parks and on private properties. Furthermore, it adds to the attractiveness of the area to new commercial developments.

Social for Project Implementation

The Utah Data Center (UDC) is a facility designed for use in our national security system. The facility will house over 1 million square feet of computer systems that require constant cooling. The UDC requires a facility that can accept and dispose of water from its cooling system around the clock, year round. This project will provide facilities to dispose of the cooling system waters and allow a national security facility to operate without interruption.

Existing Facilities

Bluffdale has always been dependent on culinary water and on private secondary systems for its outdoor watering needs. Although Bluffdale does not own or operate a city-wide secondary water system, its standards have required, for years, that secondary water lines be installed with each new development. Therefore, the City has a network of secondary water lines, but no secondary source of water to energize the lines with.

Proposed Facilities

The new Utah Data Center (UDC) facility that is being constructed in south Bluffdale is purchasing culinary water from the City to operate its cooling system. Upon cycling the water four times through the system, the remaining water must be disposed of. Currently, the water is turned directly into the sewer system and runs directly to the Jordan River Reclamation Facility and is eventually discarded in the Jordan River. However, Bluffdale City plans to recycle the discarded water for use in a new City owned secondary water system.

The infrastructure required for the project will consist of a 10" water line from the UDC boundary to the canal (Outfall 001) and to the river (Outfall 002), a mixing facility, a 2 million gallon tank, and a 16" trunk line from the tank to the city park. The following page illustrates the proposed system graphically.

System Operation
During the irrigation season, all water from the UDC will be collected in the Bluffdale tank, combined with additional water and distributed to the Bluffdale secondary system for use as irrigation water. During the winter months, the water that Bluffdale cannot store will be disposed of in the Jordan River or the Utah and Salt Lake Canal.

The UDC will operate two chiller plants, CP1 and CP2. Each plant consists of both a chilled water system and a condenser water system. The chilled water system contributes no water to the blow down. Therefore, this study will focus only on the attributes of the condenser water system. The condenser system will circulate a total of 90,000 gpm for four cycles resulting in approximately 75% evaporation. To maintain a quality system, 4,000 gallons of makeup water will be introduced into the system every eight minutes, after which 1,000 gallons of water will be released (blowdown) over an approximate five minute period.

Cooling towers within the system are controlled electronically by a Pulsablue C3400 controller that monitors conductivity, oxidation reduction potential (ORP) and pH. The controller regulates pumps, timers and alarms for generating flows, pumping chemical feed solutions and releasing blowdown.

The notable characteristics of cooling tower blowdown are the heat and the Total Dissolved Solids (TDS). TDS is increased as water is recycled through the cooling towers and water is evaporated. This system is designed to cycle water only four times in order to meet TDS target concentrations.

As with any well-managed cooling tower system, the UDC has implemented a water treatment program. The treatment program goal is to maintain a clean heat transfer system, control corrosion, minimize water consumption and meet discharge requirements. Control parameters in pH, conductivity and ORP. Chemicals that will be used in the system include Superquest, Sodium Hypochlorite, MCT 512 and BromMax (if needed).

Identification of Parameters of Concern

In this section we will discuss the elimination or inclusion of parameters of concern based upon their relative levels in the proposed disposal water compared to ambient levels in the receiving waters. We have evaluated the parameters set forth in the Wasteload Analysis – Statement of Basis provided by the Utah Division of Water Quality. Loads anticipated in the disposal waters were obtained by using actual cooling water samples where possible or water sample data from the Jordan Valley Water Conservation District combined with designed evaporation rates (.746) in the UDC cooling system where no actual data was available.

Receiving Water Classifications

Utah & Salt Lake Canal (USLC):	2B, 3E, 4
Jordan River:	2B, 3A, 4

WET

No Wet testing will be performed due to the minute loads.

Temperature

Temperature is not considered in the ADR due to the fact that it is inherently considered a POC in the permit. However, it should be noted that Jordan River, Reach 7 is impaired for temperature, TDS and benthic macroinvertebrates and therefore, temperature and TDS are not considered POC's. As described, no discharge will occur during the irrigation months. Bluffdale intends to use or capture the discharge water outside of the winter months.

BOD

Ambient Load:

Utah Salt & Lake Canal:	1.0 mg/L
Jordan River:	1.0 mg/L

Evaluation:

Discharge Load:	2.1 mg/L

BOD discharge is a parameter of concern.

Dissolved Oxygen

Ambient Load:

Utah & Salt Lake Canal:	NA mg/L
Jordan River:	NA mg/L

Evaluation:

It is not clear how DO loads will affect the Jordan River. However, there are no DO requirements in the canal or river, therefore, criteria for the canal has been met.

Total Ammonia

Ambient Load:

Utah & Salt Lake Canal:	NA mg/L
Jordan River:	varies

Evaluation:

There is no ammonia being introduced into the system. Therefore, there will be no detectible ammonia introduced into the receiving waters and ammonia can be eliminated as a parameter of concern.

Chronic Total Residual Chlorine (TRC)

Ambient Load:

Utah & Salt Lake Canal:	0.0 mg/L
Jordan River:	0.0 mg/L

Evaluation:

Discharge Load: 0.0 mg/L

Although water delivered to the UDC will have a level of TRC, it is anticipated that all TRC will be decayed long before discharge of the water. Therefore, TRC is not a parameter of concern.

Maximum Total Dissolved Solids (TDS)

Ambient Load:

Utah & Salt Lake Canal:	1284.0 mg/L
Jordan River:	1284.0 mg/L

Evaluation:

JVWCD Load:	214 mg/L
Discharge Load:	856 mg/L

TDS discharge does not exceed the standards for either the river or the canal and is, therefore, a not parameter of concern.

Total Recoverable Metals

Ambient Load:

	Utah & Salt Lake Canal:	Jordan River
Aluminum	1.59 ug/L	1.59 ug/L
Arsenic	0.53 ug/L	0.53 ug/L
Cadmium	0.053 ug/L	0.053 ug/L
Chromium III	0.53 ug/L	0.53 ug/L
Chromium VI	2.65 ug/L	2.65ug/L
Copper	0.53 ug/L	0.53 ug/L
Iron	0.83 ug/L	0.83 ug/L
Lead	0.53 ug/L	0.53 ug/L
Mercury	0.00 ug/L	0.00 ug/L
Nickel	0.53 ug/L	0.53ug/L
Selenium	1.65 ug/L	1.65 ug/L
Silver	0.10 ug/L	0.10 ug/L
Zinc	0.053 ug/L	0.053 ug/L
Boron	10.0 ug/L	10.0 ug/L

Evaluation:

Discharge Load:

Aluminum	ND ug/L
Arsenic	6.00 ug/L
Cadmium	.04 ug/L
Chromium III	ND ug/L
Chromium VI	ND ug/L
Copper	870.00 ug/L
Iron	132 ug/L
Lead	0.40 ug/L

Mercury	0.08 ug/L
Nickel	ND ug/L
Selenium	5.6 ug/L
Silver	ND ug/L
Zinc	64.00 ug/L
Boron	ND mg/L

Six recoverable metals are over the ambient loads and are, therefore, considered POC's. The six include Arsenic, Copper, Iron, Mercury, Selenium and Zinc.

Organics (Pesticides)

No pesticides will be used in the process. Therefore, no organics will be designated as parameters of concern.

Conclusions

This ADR identifies the parameters of concern that exceed ambient loads in the discharge water. These parameters should be considered in the permit and reviewed against allowable standards for this segment of the river and canal.

Alternatives Analysis
for the
Bluffdale Culinary Water Recycling Project

Introduction and Purpose

Bluffdale City wishes to construct a secondary water system for the southern portion of its city by collecting and distributing recycled culinary water i.e. blow down) from one of its largest customers, the new Utah Data Center (UDC). The system will require disposal of the recycled culinary water during the winter months. As such, Bluffdale City has proposed to construct a piping system and two new outfalls, one in the Jordan River just north of the diversion dam and one in the Utah & Salt Lake Canal.

This Alternatives Analysis illustrates that the applicant has considered numerous project concept alternative. The various alternatives are described below as well as evaluations of each with regards to feasibility, degradation impact, POC control.

Attach as an appendix to this form a report that describes the following factors for all alternative treatment options (see 1) a technical description of the treatment process, including construction costs and continued operation and maintenance expenses, 2) the mass and concentration of discharge constituents, and 3) a description of the reliability of the system, including the frequency where recurring operation and maintenance may lead to temporary increases in discharged pollutants. Most of this information is typically available from a Facility Plan, if available.

Alternative #1 – Do Nothing

Description: This alternative requires nothing to be done. In this alternative, cooling tower waters from the UDC would bypass Bluffdale and flow into the South Valley Sewer District system for eventual discharge into the Jordan River. It does not require the City operate or maintain anything in the future.

Cost: $0.00
O&M Costs: $0.00

Mass and Concentration of Discharge Constituents:
The effluent loads will be the same in this alternative as identified in the SEEI.

System Reliability: This alternative does not allow for any special treatment of the water or parameters of concern. If there are temporary increases in discharge pollutants for any reason, there is no method of treating specific parameters.

Alternative #2 – Recycle for Culinary Use
Description: This alternative requires installation of a collection line, a major treatment facility and delivery lines into Bluffdale City. Water could be used year round to supplement the City's current culinary water source. No water would be disposed of directly into the environment.

Cost: $10 million +
O&M Costs: Very High (would include power consumption, running a treatment facility, constant monitoring and disposing of brine)

Mass and Concentration of Discharge Constituents:
This alternative would deliver severely high concentrations of pollutants (brine) to some undetermined location in the environment.

System Reliability: This alternative is reliable in the sense that if varying amounts of pollutants are sent, a treatment facility such as reverse osmosis (RO) would remove both the anticipated pollutants and any higher quantities with no special operation. However, this alternative also introduces complicated systems that will require regular maintenance and increase the possibility of mechanical failure. This would not increase pollutants per say, but diminishes the benefits of the system to the City.

Alternative #3a – Recycle for Secondary Use (Selected)
Description: This alternative requires installation of a collection line, a minor treatment facility, delivery lines into Bluffdale City and a disposal outfall in the River/Canal. Water could be used during the irrigation season to alleviate the City's current dependence on culinary water for all of its indoor and outdoor needs.

Cost: $4 million approx.
O&M Costs: Very Low (would include regular monitoring, running a mixing station, semiannual system configuration)

Mass and Concentration of Discharge Constituents:
This alternative would concentrations of pollutants as described in the SEEI.

System Reliability: This alternative is very reliable since it minimizes mechanization. The system consists of manual valves and one automatic valve operated by SCADA. This system would be configured to treat water as required. When it is determined that higher quantities of pollutants would enter the system, the treatment facility can be adjusted to accommodate them without discharging them to the environment.

Alternative #3b – Recycle for Secondary Use with Retention
Description: This alternative requires installation of a collection line, a minor treatment facility, delivery lines into Bluffdale City and a disposal outfall into a detention pond. Water could be used during the irrigation season to alleviate the City's current dependence on culinary water for all of its indoor and outdoor needs.

Cost: $4.5 million approx.
O&M Costs: Medium (would include regular monitoring, running a mixing station, semiannual system configuration, and retention pond dredging and disposal)

Mass and Concentration of Discharge Constituents:
This alternative would not dispose of any concentrations of pollutants into the River or Canal.

System Reliability: This alternative relies on the ability of a retention pond to accept water constantly from the UDC. It also minimizes mechanization. However, it introduces the need to constantly clean a retention facility and possibly to dispose of the collected pollutants in some other manner. The system would consist of manual valves and one automatic valve operated by SCADA. This system would be configured to treat water as required. When it is determined that higher quantities of pollutants would enter the system, the treatment facility can be adjusted to accommodate them without discharging them to the environment. This alternative has a slightly higher initial cost due to land purchase. The ongoing maintenance costs drastically exceed alternative 3a and it is very unlikely that a parcel could be acquired large enough and flat enough to accept the disposal water.

Alternative #3c – Recycle for Secondary Use with Major Treatment
Description: This alternative requires installation of a collection line, a major treatment facility, delivery lines into Bluffdale City and a disposal outfall into the Jordan River and the Utah & Salt Lake Canal. Water could be used during the irrigation season to alleviate the City's current dependence on culinary water for all of its indoor and outdoor needs.

Cost: $10 million +.
O&M Costs: Very High (would include regular monitoring, running a treatment facility, semiannual system configuration, and disposal of brine)

Mass and Concentration of Discharge Constituents:
This alternative could be designed to discharge the desired level of pollutants. However, the more pollutants that are removed, the more expensive the system is. This type of treatment would not be necessary to produce secondary quality water.

System Reliability: This alternative is reliable in the sense that if varying amounts of pollutants are sent, a treatment facility such as reverse osmosis (RO) would remove both the anticipated pollutants and any higher quantities with no special operation. However, this alternative also introduces complicated systems that will require regular maintenance and increase the possibility of mechanical failure. This would not increase pollutants per say, but diminishes the benefits of the system to the City.

Utah Division of Water Quality
Salt Lake City, Utah

WASTELOAD ANALYSIS [WLA]
Addendum: Statement of Basis
SUMMARY

Discharging Facility:	**Bluffdale Cooling Water**		
UPDES No:	UT-		
Current Flow:	0.34	MGD	Design Flow
Design Flow	0.34	MGD	

Receiving Water:	**Jordan River**		
Stream Classification:	2B, 3A, 4		
Stream Flows [cfs]:	44.0	Summer (July-Sept)	20th Percentile
	39.0	Fall (Oct-Dec)	20th Percentile
	33.0	Winter (Jan-Mar)	20th Percentile
	49.0	Spring (Apr-June)	20th Percentile
	245.0	Average	
Stream TDS Values:	1098.0	Summer (July-Sept)	Average
	1226.0	Fall (Oct-Dec)	Average
	1284.0	Winter (Jan-Mar)	Average
	938.0	Spring (Apr-June)	Average

				WQ Standard:
Effluent Limits:				
Flow, MGD:	0.34	MGD	Design Flow	
BOD, mg/l:	25.0	Summer	5.0	Indicator
Dissolved Oxygen, mg/l	5.0	Summer	6.5	30 Day Average
TNH3, Chronic, mg/l:	64.4	Summer	Varies	Function of pH and Temperature
TDS, mg/l:	1200.0	Summer	1200.0	

Modeling Parameters:

Acute River Width:	50.0%
Chronic River Width:	100.0%

Level 1 Antidegradation Level Completed: Level II Review required.

Date: 7/30/2012

Permit Writer:		10-12-12
WLA by:		10-9-12
WQM Sec. Approval:		10-10-12
TMDL Sec. Approval:		10/12/12

WASTELOAD ANALYSIS [WLA]
Addendum: Statement of Basis

12-Oct-12
4:00 PM

Facilities: **Bluffdale Cooling Water** **UPDES No: UT-**
Discharging to: **Jordan River**

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

Jordan River:	2B, 3A, 4
Antidegradation Review:	Level I review completed. Level II review 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)
Chronic Dissolved Oxygen (DO)	6.50 mg/l (30 Day Average) 5.00 mg/l (7Day Average) 4.00 mg/l (1 Day Average
Maximum Total Dissolved Solids	1200.0 mg/l

Utah Division of Water Quality
Salt Lake City, Utah

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**	0.249 lbs/day	750.00 ug/l	2.145 lbs/day
Arsenic	190.00 ug/l	0.543 lbs/day	340.00 ug/l	0.972 lbs/day
Cadmium	0.84 ug/l	0.002 lbs/day	10.01 ug/l	0.029 lbs/day
Chromium III	299.52 ug/l	0.857 lbs/day	6266.62 ug/l	17.923 lbs/day
ChromiumVI	11.00 ug/l	0.031 lbs/day	16.00 ug/l	0.046 lbs/day
Copper	34.22 ug/l	0.098 lbs/day	58.68 ug/l	0.168 lbs/day
Iron			1000.00 ug/l	2.860 lbs/day
Lead	22.06 ug/l	0.063 lbs/day	566.07 ug/l	1.619 lbs/day
Mercury	0.0120 ug/l	0.000 lbs/day	2.40 ug/l	0.007 lbs/day
Nickel	188.90 ug/l	0.540 lbs/day	1699.01 ug/l	4.859 lbs/day
Selenium	4.60 ug/l	0.013 lbs/day	20.00 ug/l	0.057 lbs/day
Silver	N/A ug/l	N/A lbs/day	51.79 ug/l	0.148 lbs/day
Zinc	434.75 ug/l	1.243 lbs/day	434.75 ug/l	1.243 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 457.72 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	0.004 lbs/day
Chlordane	0.004 ug/l	1.032 lbs/day	1.200 ug/l	0.003 lbs/day
DDT, DDE	0.001 ug/l	0.240 lbs/day	0.550 ug/l	0.002 lbs/day
Dieldrin	0.002 ug/l	0.456 lbs/day	1.250 ug/l	0.004 lbs/day
Endosulfan	0.056 ug/l	13.441 lbs/day	0.110 ug/l	0.000 lbs/day
Endrin	0.002 ug/l	0.552 lbs/day	0.090 ug/l	0.000 lbs/day
Guthion			0.010 ug/l	0.000 lbs/day
Heptachlor	0.004 ug/l	0.912 lbs/day	0.260 ug/l	0.001 lbs/day
Lindane	0.080 ug/l	19.202 lbs/day	1.000 ug/l	0.003 lbs/day
Methoxychlor			0.030 ug/l	0.000 lbs/day
Mirex			0.010 ug/l	0.000 lbs/day
Parathion			0.040 ug/l	0.000 lbs/day
PCB's	0.014 ug/l	3.360 lbs/day	2.000 ug/l	0.006 lbs/day
Pentachlorophenol	13.00 ug/l	3120.261 lbs/day	20.000 ug/l	0.057 lbs/day
Toxephene	0.0002 ug/l	0.048 lbs/day	0.7300 ug/l	0.002 lbs/day

IV. Numeric Stream Standards for Protection of Agriculture

	4 Day Average (Chronic) Standard		1 Hour Average (Acute) Standard	
	Concentration	Load*	Concentration	Load*
Arsenic			100.0 ug/l	lbs/day
Boron			750.0 ug/l	lbs/day
Cadmium			10.0 ug/l	0.01 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			1200.0 mg/l	1.72 tons/day

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

	4 Day Average (Chronic) Standard		1 Hour Average (Acute) Standard	
Metals	Concentration	Load*	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
ocyclohexane (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	2700.0 ug/l	648.05 lbs/day
Acrolein	ug/l	lbs/day	780.0 ug/l	187.22 lbs/day
Acrylonitrile	ug/l	lbs/day	0.7 ug/l	0.16 lbs/day
Benzene	ug/l	lbs/day	71.0 ug/l	17.04 lbs/day
Benzidine	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Carbon tetrachloride	ug/l	lbs/day	4.4 ug/l	1.06 lbs/day
Chlorobenzene	ug/l	lbs/day	21000.0 ug/l	5040.42 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	99.0 ug/l	23.76 lbs/day

1,1,1-Trichloroethane					
Hexachloroethane	ug/l	lbs/day	8.9	ug/l	2.14 lbs/day
1,1-Dichloroethane					
1,1,2-Trichloroethane	ug/l	lbs/day	42.0	ug/l	10.08 lbs/day
1,1,2,2-Tetrachloroethai	ug/l	lbs/day	11.0	ug/l	2.64 lbs/day
Chloroethane			0.0	ug/l	0.00 lbs/day
Bis(2-chloroethyl) ether	ug/l	lbs/day	1.4	ug/l	0.34 lbs/day
2-Chloroethyl vinyl ether	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
2-Chloronaphthalene	ug/l	lbs/day	4300.0	ug/l	1032.09 lbs/day
2,4,6-Trichlorophenol	ug/l	lbs/day	6.5	ug/l	1.56 lbs/day
p-Chloro-m-cresol			0.0	ug/l	0.00 lbs/day
Chloroform (HM)	ug/l	lbs/day	470.0	ug/l	112.81 lbs/day
2-Chlorophenol	ug/l	lbs/day	400.0	ug/l	96.01 lbs/day
1,2-Dichlorobenzene	ug/l	lbs/day	17000.0	ug/l	4080.34 lbs/day
1,3-Dichlorobenzene	ug/l	lbs/day	2600.0	ug/l	624.05 lbs/day
1,4-Dichlorobenzene	ug/l	lbs/day	2600.0	ug/l	624.05 lbs/day
3,3'-Dichlorobenzidine	ug/l	lbs/day	0.1	ug/l	0.02 lbs/day
1,1-Dichloroethylene	ug/l	lbs/day	3.2	ug/l	0.77 lbs/day
1,2-trans-Dichloroethyle	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
2,4-Dichlorophenol	ug/l	lbs/day	790.0	ug/l	189.62 lbs/day
1,2-Dichloropropane	ug/l	lbs/day	39.0	ug/l	9.36 lbs/day
1,3-Dichloropropylene	ug/l	lbs/day	1700.0	ug/l	408.03 lbs/day
2,4-Dimethylphenol	ug/l	lbs/day	2300.0	ug/l	552.05 lbs/day
2,4-Dinitrotoluene	ug/l	lbs/day	9.1	ug/l	2.18 lbs/day
2,6-Dinitrotoluene	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
1,2-Diphenylhydrazine	ug/l	lbs/day	0.5	ug/l	0.13 lbs/day
Ethylbenzene	ug/l	lbs/day	29000.0	ug/l	6960.58 lbs/day
Fluoranthene	ug/l	lbs/day	370.0	ug/l	88.81 lbs/day
4-Chlorophenyl phenyl ether					
4-Bromophenyl phenyl ether					
Bis(2-chloroisopropyl) e	ug/l	lbs/day	170000.0	ug/l	40803.41 lbs/day
Bis(2-chloroethoxy) met	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
Methylene chloride (HM	ug/l	lbs/day	1600.0	ug/l	384.03 lbs/day
Methyl chloride (HM)	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
Methyl bromide (HM)	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
Bromoform (HM)	ug/l	lbs/day	360.0	ug/l	86.41 lbs/day
Dichlorobromomethane	ug/l	lbs/day	22.0	ug/l	5.28 lbs/day
Chlorodibromomethane	ug/l	lbs/day	34.0	ug/l	8.16 lbs/day
Hexachlorobutadiene(c)	ug/l	lbs/day	50.0	ug/l	12.00 lbs/day
Hexachlorocyclopentadi	ug/l	lbs/day	17000.0	ug/l	4080.34 lbs/day
Isophorone	ug/l	lbs/day	600.0	ug/l	144.01 lbs/day
Naphthalene					
Nitrobenzene	ug/l	lbs/day	1900.0	ug/l	456.04 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	3360.28 lbs/day
4,6-Dinitro-o-cresol	ug/l	lbs/day	765.0	ug/l	183.62 lbs/day
N-Nitrosodimethylamine	ug/l	lbs/day	8.1	ug/l	1.94 lbs/day
N-Nitrosodiphenylamine	ug/l	lbs/day	16.0	ug/l	3.84 lbs/day
N-Nitrosodi-n-propylami	ug/l	lbs/day	1.4	ug/l	0.34 lbs/day
Pentachlorophenol	ug/l	lbs/day	8.2	ug/l	1.97 lbs/day

Phenol	ug/l	lbs/day	4.6E+06	ug/l	1.10E+06 lbs/day
Bis(2-ethylhexyl)phthala	ug/l	lbs/day	5.9	ug/l	1.42 lbs/day
Butyl benzyl phthalate	ug/l	lbs/day	5200.0	ug/l	1248.10 lbs/day
Di-n-butyl phthalate	ug/l	lbs/day	12000.0	ug/l	2880.24 lbs/day
Di-n-octyl phthlate					
Diethyl phthalate	ug/l	lbs/day	120000.0	ug/l	28802.41 lbs/day
Dimethyl phthlate	ug/l	lbs/day	2.9E+06	ug/l	6.96E+05 lbs/day
Benzo(a)anthracene (P/	ug/l	lbs/day	0.0	ug/l	0.01 lbs/day
Benzo(a)pyrene (PAH)	ug/l	lbs/day	0.0	ug/l	0.01 lbs/day
Benzo(b)fluoranthene (F	ug/l	lbs/day	0.0	ug/l	0.01 lbs/day
Benzo(k)fluoranthene (F	ug/l	lbs/day	0.0	ug/l	0.01 lbs/day
Chrysene (PAH)	ug/l	lbs/day	0.0	ug/l	0.01 lbs/day
Acenaphthylene (PAH)					
Anthracene (PAH)	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
Dibenzo(a,h)anthracene	ug/l	lbs/day	0.0	ug/l	0.01 lbs/day
Indeno(1,2,3-cd)pyrene	ug/l	lbs/day	0.0	ug/l	0.01 lbs/day
Pyrene (PAH)	ug/l	lbs/day	11000.0	ug/l	2640.22 lbs/day
Tetrachloroethylene	ug/l	lbs/day	8.9	ug/l	2.14 lbs/day
Toluene	ug/l	lbs/day	200000	ug/l	48004.01 lbs/day
Trichloroethylene	ug/l	lbs/day	81.0	ug/l	19.44 lbs/day
Vinyl chloride	ug/l	lbs/day	525.0	ug/l	126.01 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	2.0	ug/l	0.48 lbs/day
beta-Endosulfan	ug/l	lbs/day	2.0	ug/l	0.48 lbs/day
Endosulfan sulfate	ug/l	lbs/day	2.0	ug/l	0.48 lbs/day
Endrin	ug/l	lbs/day	0.8	ug/l	0.19 lbs/day
Endrin aldehyde	ug/l	lbs/day	0.8	ug/l	0.19 lbs/day
Heptachlor	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
Heptachlor epoxide					
PCB's					
PCB 1242 (Arochlor 12/	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
PCB-1254 (Arochlor 12!	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
PCB-1221 (Arochlor 12:	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
PCB-1232 (Arochlor 12:	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
PCB-1248 (Arochlor 12/	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
PCB-1260 (Arochlor 12(	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
PCB-1016 (Arochlor 10'	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	4300.00 ug/l	1032.09 lbs/day
Asbestos	ug/l	lbs/day		
Beryllium				
Cadmium				
Chromium (III)				
Chromium (VI)				
Copper				
Cyanide	ug/l	lbs/day	2.2E+05 ug/l	52804.41 lbs/day
Lead	ug/l	lbs/day		
Mercury			0.15 ug/l	0.04 lbs/day
Nickel			4600.00 ug/l	1104.09 lbs/day
Selenium	ug/l	lbs/day		
Silver	ug/l	lbs/day		
Thallium			6.30 ug/l	1.51 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 (Irrig. Season)	44.0	21.6	8.2	0.42	1.00	6.83	0.00	1098.0
Fall	39.0	8.8	8.0	0.29	1.00	---	0.00	1226.0
Winter	33.0	5.0	7.9	0.27	1.00	---	0.00	1284.0
Spring	49.0	15.4	8.2	0.19	1.00	---	0.00	938.0

Dissolved Metals	Al ug/l	As ug/l	Cd ug/l	CrIII ug/l	CrVI ug/l	Copper ug/l	Fe ug/l	Pb ug/l
All Seasons	1.59*	0.53*	0.053*	0.53*	2.65*	0.53*	0.83*	0.53*

Dissolved Metals	Hg ug/l	Ni ug/l	Se ug/l	Ag ug/l	Zn ug/l	Boron ug/l	
All Seasons	0.0000	0.53*	1.65	0.1*	0.053*	10.0	* 1/2 MDL

Projected Discharge Information

Season	Flow, MGD	Temp.	TDS mg/l	TDS tons/day
Summer	0.34300	NA	1200.00	1.71603
Fall	0.34300	NA		
Winter	0.34300	NA		
Spring	0.34300	NA		

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	0.343 MGD	0.531 cfs
Fall	0.343 MGD	0.531 cfs
Winter	0.343 MGD	0.531 cfs
Spring	0.343 MGD	0.531 cfs

Flow Requirement or Loading Requirement

The calculations in this wasteload analysis utilize the maximum effluent discharge flow of 0.343 MGD. If the discharger is allowed to have a flow greater than 0.343 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 >	8.0% Effluent	[Acute]
	IC25 >	1.2% 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	71.5 lbs/day
Fall	25.0 mg/l as BOD5	71.5 lbs/day
Winter	25.0 mg/l as BOD5	71.5 lbs/day
Spring	25.0 mg/l as BOD5	71.5 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	64.4	mg/l as N	184.3	lbs/day
	1 Hour Avg. - Acute	101.2	mg/l as N	289.6	lbs/day
Fall	4 Day Avg. - Chronic	191.0	mg/l as N	546.2	lbs/day
	1 Hour Avg. - Acute	146.2	mg/l as N	418.3	lbs/day
Winter	4 Day Avg. - Chronic	421.5	mg/l as N	1,205.5	lbs/day
	1 Hour Avg. - Acute	849.4	mg/l as N	2,429.3	lbs/day
Spring	4 Day Avg. - Chronic	153.2	mg/l as N	0.0	lbs/day
	1 Hour Avg. - Acute	117.9	mg/l as N	0.0	lbs/day

Acute limit calculated with an Acute Zone of Initial Dilution (ZID) to be equal to 50.%.

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	0.915	mg/l	2.62	lbs/day
	1 Hour Avg. - Acute	0.803	mg/l	2.30	lbs/day
Fall	4 Day Avg. - Chronic	0.812	mg/l	2.32	lbs/day
	1 Hour Avg. - Acute	0.714	mg/l	2.04	lbs/day
Winter	4 Day Avg. - Chronic	0.689	mg/l	1.97	lbs/day
	1 Hour Avg. - Acute	0.607	mg/l	1.74	lbs/day
Spring	4 Day Avg. - Chronic	1.018	mg/l	0.00	lbs/day
	1 Hour Avg. - Acute	0.892	mg/l	0.00	lbs/day

Effluent Limitations for Total Dissolved Solids based upon Water Quality Standards

Season		Concentration		Load	
Summer	Maximum, Acute	1200.0	mg/l	1.72	tons/day
Fall	Maximum, Acute	1200.0	mg/l	1.72	tons/day
Winter	Maximum, Acute	1200.0	mg/l	1.72	tons/day
Spring	Maximum, Acute	1200.0	mg/l	1.72	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 457.72 mg/l):

	4 Day Average Concentration		Load	1 Hour Average Concentration		Load
Aluminum	N/A		N/A	31,746.8	ug/l	90.8 lbs/day
Arsenic	15,879.20	ug/l	29.4 lbs/day	14,403.7	ug/l	41.2 lbs/day
Cadmium	63.50	ug/l	0.1 lbs/day	421.9	ug/l	1.2 lbs/day
Chromium III	25,070.62	ug/l	46.3 lbs/day	266,052.9	ug/l	760.9 lbs/day
Chromium VI	593.53	ug/l	1.1 lbs/day	514.6	ug/l	1.5 lbs/day
Copper	2,806.07	ug/l	5.2 lbs/day	2,458.8	ug/l	7.0 lbs/day
Iron	N/A		N/A	42,409.0	ug/l	121.3 lbs/day
Lead	1,785.29	ug/l	3.3 lbs/day	24,002.7	ug/l	68.6 lbs/day
Mercury	1.01	ug/l	0.0 lbs/day	101.9	ug/l	0.3 lbs/day
Nickel	15,786.65	ug/l	29.2 lbs/day	72,108.5	ug/l	206.2 lbs/day
Selenium	249.22	ug/l	0.5 lbs/day	780.8	ug/l	2.2 lbs/day
Silver	N/A	ug/l	N/A lbs/day	2,198.9	ug/l	6.3 lbs/day

Zinc	36,478.20	ug/l	67.4 lbs/day	18,456.5	ug/l	52.8 lbs/day
Cyanide	436.39	ug/l	0.8 lbs/day	934.1	ug/l	2.7 lbs/day

Effluent Limitations for Heat/Temperature based upon Water Quality Standards

Summer	20.0 Deg. C.	68.0 Deg. F
Fall	100.0 Deg. C.	212.0 Deg. F
Winter	100.0 Deg. C.	212.0 Deg. F
Spring	100.0 Deg. C.	212.0 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	6.64E-03	lbs/day
Chlordane	4.30E-03	ug/l	1.23E-02	lbs/day	1.2E+00	ug/l	5.31E-03	lbs/day
DDT, DDE	1.00E-03	ug/l	2.86E-03	lbs/day	5.5E-01	ug/l	2.43E-03	lbs/day
Dieldrin	1.90E-03	ug/l	5.43E-03	lbs/day	1.3E+00	ug/l	5.53E-03	lbs/day
Endosulfan	5.60E-02	ug/l	1.60E-01	lbs/day	1.1E-01	ug/l	4.87E-04	lbs/day
Endrin	2.30E-03	ug/l	6.58E-03	lbs/day	9.0E-02	ug/l	3.98E-04	lbs/day
Guthion	0.00E+00	ug/l	0.00E+00	lbs/day	1.0E-02	ug/l	4.42E-05	lbs/day
Heptachlor	3.80E-03	ug/l	1.09E-02	lbs/day	2.6E-01	ug/l	1.15E-03	lbs/day
Lindane	8.00E-02	ug/l	2.29E-01	lbs/day	1.0E+00	ug/l	4.42E-03	lbs/day
Methoxychlor	0.00E+00	ug/l	0.00E+00	lbs/day	3.0E-02	ug/l	1.33E-04	lbs/day
Mirex	0.00E+00	ug/l	0.00E+00	lbs/day	1.0E-02	ug/l	4.42E-05	lbs/day
Parathion	0.00E+00	ug/l	0.00E+00	lbs/day	4.0E-02	ug/l	1.77E-04	lbs/day
PCB's	1.40E-02	ug/l	4.00E-02	lbs/day	2.0E+00	ug/l	8.85E-03	lbs/day
Pentachlorophenol	1.30E+01	ug/l	3.72E+01	lbs/day	2.0E+01	ug/l	8.85E-02	lbs/day
Toxephene	2.00E-04	ug/l	5.72E-04	lbs/day	7.3E-01	ug/l	3.23E-03	lbs/day

Effluent Targets for Pollution Indicators
Based upon Water Quality Standards

In-stream criteria of downstream segments for Pollution Indicators will be met with an effluent limit as follows:

	1 Hour Average	
	Concentration	Loading
Gross Beta (pCi/l)	50.0 pCi/L	
BOD (mg/l)	5.0 mg/l	14.3 lbs/day
Nitrates as N	4.0 mg/l	11.4 lbs/day
Total Phosphorus as P	0.05 mg/l	0.1 lbs/day
Total Suspended Solids	90.0 mg/l	257.4 lbs/day

Note: Pollution indicator targets are for information purposes only.

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:

	Maximum Concentration	
	Concentration	**Load**
Toxic Organics		
Acenaphthene	2.27E+05 ug/l	6.48E+02 lbs/day
Acrolein	6.55E+04 ug/l	1.87E+02 lbs/day
Acrylonitrile	5.54E+01 ug/l	1.58E-01 lbs/day
Benzene	5.96E+03 ug/l	1.70E+01 lbs/day
Benzidine	ug/l	lbs/day
Carbon tetrachloride	3.69E+02 ug/l	1.06E+00 lbs/day
Chlorobenzene	1.76E+06 ug/l	5.04E+03 lbs/day
1,2,4-Trichlorobenzene		
Hexachlorobenzene	6.46E-02 ug/l	1.85E-04 lbs/day
1,2-Dichloroethane	8.31E+03 ug/l	2.38E+01 lbs/day
1,1,1-Trichloroethane		
Hexachloroethane	7.47E+02 ug/l	2.14E+00 lbs/day
1,1-Dichloroethane		
1,1,2-Trichloroethane	3.52E+03 ug/l	1.01E+01 lbs/day
1,1,2,2-Tetrachloroethane	9.23E+02 ug/l	2.64E+00 lbs/day
Chloroethane		
Bis(2-chloroethyl) ether	1.17E+02 ug/l	3.36E-01 lbs/day
2-Chloroethyl vinyl ether		
2-Chloronaphthalene	3.61E+05 ug/l	1.03E+03 lbs/day
2,4,6-Trichlorophenol	5.45E+02 ug/l	1.56E+00 lbs/day
p-Chloro-m-cresol		
Chloroform (HM)	3.94E+04 ug/l	1.13E+02 lbs/day
2-Chlorophenol	3.36E+04 ug/l	9.60E+01 lbs/day
1,2-Dichlorobenzene	1.43E+06 ug/l	4.08E+03 lbs/day
1,3-Dichlorobenzene	2.18E+05 ug/l	6.24E+02 lbs/day

1,4-Dichlorobenzene	2.18E+05 ug/l	6.24E+02 lbs/day
3,3'-Dichlorobenzidine	6.46E+00 ug/l	1.85E-02 lbs/day
1,1-Dichloroethylene	2.69E+02 ug/l	7.68E-01 lbs/day
1,2-trans-Dichloroethylene1		
2,4-Dichlorophenol	6.63E+04 ug/l	1.90E+02 lbs/day
1,2-Dichloropropane	3.27E+03 ug/l	9.36E+00 lbs/day
1,3-Dichloropropylene	1.43E+05 ug/l	4.08E+02 lbs/day
2,4-Dimethylphenol	1.93E+05 ug/l	5.52E+02 lbs/day
2,4-Dinitrotoluene	7.64E+02 ug/l	2.18E+00 lbs/day
2,6-Dinitrotoluene		
1,2-Diphenylhydrazine	4.53E+01 ug/l	1.30E-01 lbs/day
Ethylbenzene	2.43E+06 ug/l	6.96E+03 lbs/day
Fluoranthene	3.11E+04 ug/l	8.88E+01 lbs/day
4-Chlorophenyl phenyl ether		
4-Bromophenyl phenyl ether		
Bis(2-chloroisopropyl) ether	1.43E+07 ug/l	4.08E+04 lbs/day
Bis(2-chloroethoxy) methane		
Methylene chloride (HM)	1.34E+05 ug/l	3.84E+02 lbs/day
Methyl chloride (HM)		
Methyl bromide (HM)		
Bromoform (HM)	3.02E+04 ug/l	8.64E+01 lbs/day
Dichlorobromomethane(HM)	1.85E+03 ug/l	5.28E+00 lbs/day
Chlorodibromomethane (HM)	2.85E+03 ug/l	8.16E+00 lbs/day
Hexachlorocyclopentadiene	1.43E+06 ug/l	4.08E+03 lbs/day
Isophorone	5.04E+04 ug/l	1.44E+02 lbs/day
Naphthalene		
Nitrobenzene	1.59E+05 ug/l	4.56E+02 lbs/day
2-Nitrophenol		
4-Nitrophenol		
2,4-Dinitrophenol	1.17E+06 ug/l	3.36E+03 lbs/day
4,6-Dinitro-o-cresol	6.42E+04 ug/l	1.84E+02 lbs/day
N-Nitrosodimethylamine	6.80E+02 ug/l	1.94E+00 lbs/day
N-Nitrosodiphenylamine	1.34E+03 ug/l	3.84E+00 lbs/day
N-Nitrosodi-n-propylamine	1.17E+02 ug/l	3.36E-01 lbs/day
Pentachlorophenol	6.88E+02 ug/l	1.97E+00 lbs/day
Phenol	3.86E+08 ug/l	1.10E+06 lbs/day
Bis(2-ethylhexyl)phthalate	4.95E+02 ug/l	1.42E+00 lbs/day
Butyl benzyl phthalate	4.36E+05 ug/l	1.25E+03 lbs/day
Di-n-butyl phthalate	1.01E+06 ug/l	2.88E+03 lbs/day
Di-n-octyl phthlate		
Diethyl phthalate	1.01E+07 ug/l	2.88E+04 lbs/day
Dimethyl phthlate	2.43E+08 ug/l	6.96E+05 lbs/day
Benzo(a)anthracene (PAH)	2.60E+00 ug/l	7.44E-03 lbs/day
Benzo(a)pyrene (PAH)	2.60E+00 ug/l	7.44E-03 lbs/day
Benzo(b)fluoranthene (PAH)	2.60E+00 ug/l	7.44E-03 lbs/day
Benzo(k)fluoranthene (PAH)	2.60E+00 ug/l	7.44E-03 lbs/day
Chrysene (PAH)	2.60E+00 ug/l	7.44E-03 lbs/day
Acenaphthylene (PAH)		
Anthracene (PAH)		
Dibenzo(a,h)anthracene (PAH)	2.60E+00 ug/l	7.44E-03 lbs/day
Indeno(1,2,3-cd)pyrene (PAH)	2.60E+00 ug/l	7.44E-03 lbs/day

Pyrene (PAH)	9.23E+05 ug/l	2.64E+03 lbs/day
Tetrachloroethylene	7.47E+02 ug/l	2.14E+00 lbs/day
Toluene	1.68E+07 ug/l	4.80E+04 lbs/day
Trichloroethylene	6.80E+03 ug/l	1.94E+01 lbs/day
Vinyl chloride	4.41E+04 ug/l	1.26E+02 lbs/day
Pesticides		
Aldrin	1.17E-02 ug/l	3.36E-05 lbs/day
Dieldrin	1.17E-02 ug/l	3.36E-05 lbs/day
Chlordane	4.95E-02 ug/l	1.42E-04 lbs/day
4,4'-DDT	4.95E-02 ug/l	1.42E-04 lbs/day
4,4'-DDE	4.95E-02 ug/l	1.42E-04 lbs/day
4,4'-DDD	7.05E-02 ug/l	2.02E-04 lbs/day
alpha-Endosulfan	1.68E+02 ug/l	4.80E-01 lbs/day
beta-Endosulfan	1.68E+02 ug/l	4.80E-01 lbs/day
Endosulfan sulfate	1.68E+02 ug/l	4.80E-01 lbs/day
Endrin	6.80E+01 ug/l	1.94E-01 lbs/day
Endrin aldehyde	6.80E+01 ug/l	1.94E-01 lbs/day
Heptachlor	1.76E-02 ug/l	5.04E-05 lbs/day
Heptachlor epoxide		
PCB's		
PCB 1242 (Arochlor 1242)	3.78E-03 ug/l	1.08E-05 lbs/day
PCB-1254 (Arochlor 1254)	3.78E-03 ug/l	1.08E-05 lbs/day
PCB-1221 (Arochlor 1221)	3.78E-03 ug/l	1.08E-05 lbs/day
PCB-1232 (Arochlor 1232)	3.78E-03 ug/l	1.08E-05 lbs/day
PCB-1248 (Arochlor 1248)	3.78E-03 ug/l	1.08E-05 lbs/day
PCB-1260 (Arochlor 1260)	3.78E-03 ug/l	1.08E-05 lbs/day
PCB-1016 (Arochlor 1016)	3.78E-03 ug/l	1.08E-05 lbs/day
Pesticide		
Toxaphene	6.29E-02 ug/l	1.80E-04 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)	1.17E-06 ug/l	3.36E-09 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		31746.8				31746.8	N/A
Antimony				360863.3		360863.3	
Arsenic	8392.2	14403.7			0.0	8392.2	15879.2
Barium						0.0	
Beryllium						0.0	
Cadmium	832.6	421.9			0.0	421.9	63.5
Chromium (III)		266052.9			0.0	266052.9	25070.6
Chromium (VI)	8326.2	514.6			0.0	514.57	593.53
Copper	16718.4	2458.8				2458.8	2806.1
Cyanide		934.1	########			934.1	436.4
Iron		42409.0				42409.0	
Lead	8326.2	24002.7			0.0	8326.2	1785.3
Mercury		101.91		12.59	0.0	12.59	1.007
Nickel		72108.5		386039.9		72108.5	15786.7
Selenium	4059.3	780.8			0.0	780.8	249.2
Silver		2198.9			0.0	2198.9	
Thallium				528.7		528.7	
Zinc		18456.5				18456.5	36478.2
Boron	62941.3					62941.3	

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	31746.8	N/A	
Antimony	360863.35		
Arsenic	8392.2	15879.2	Acute Controls
Asbestos	0.00E+00		
Barium			
Beryllium			
Cadmium	421.9	63.5	
Chromium (III)	266052.9	25071	
Chromium (VI)	514.6	593.5	Acute Controls
Copper	2458.8	2806.1	Acute Controls

Cyanide	934.1	436.4	
Iron	42409.0		
Lead	8326.2	1785.3	
Mercury	12.588	1.007	
Nickel	72108.5	15787	
Selenium	780.8	249.2	
Silver	2198.9	N/A	
Thallium	528.7		
Zinc	18456.5	36478.2	Acute Controls
Boron	62941.28		

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.

The antidegradation rules and procedures allow for modification of effluent limits less than those based strictly upon mass balance equations utilizing 100% of the assimilative capacity of the receiving water. Additional factors include considerations for "Blue-ribbon" fisheries, special recreational areas, threatened and endangered species, and drinking water sources.

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 required.

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.

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.

XIII. Notice of UPDES Requirement

This Addendum to the Statement of Basis does not authorize any entity or party to discharge to the waters of the State of Utah. That authority is granted through a UPDES permit issued by the Utah Division of Water Quality. The numbers presented here may be changed as a function of other factors. Dischargers are strongly urged to contact the Permits Section for further information. Permit writers may utilize other information to adjust these limits and/or to determine other limits based upon best available technology and other considerations provided that the values in this wasteload analysis [TMDL] are not compromised. See special provisions in Utah Water Quality Standards for adjustments in the Total Dissolved Solids values based upon background concentration.

THIS IS A DRAFT DOCUMENT

Utah Division of Water Quality
801-538-6052
File Name: Bluffdale_Cooling _WLA_7-30-12

APPENDIX - Coefficients and Other Model Information

CBOD Coeff. (Kd)20 1/day	CBOD Coeff. FORCED (Kd)/day	CBOD Coeff. (Ka)T 1/day	REAER. Coeff. (Ka)20 (Ka)/day	REAER. Coeff. FORCED 1/day	REAER. Coeff. (Ka)T 1/day	NBOD Coeff. (Kn)20 1/day	NBOD Coeff. (Kn)T 1/day
2.000	0.000	2.153	16.860	0.000	17.516	0.600	0.679

Open Coeff. (K4)20 1/day	Open Coeff. (K4)T 1/day	NH3 LOSS (K5)20 1/day	NH3 (K5)T 1/day	NO2+NO3 LOSS (K6)20 1/day	NO2+NO3 (K6)T 1/day	TRC Decay K(Cl)20 1/day	TRC K(Cl)(T) 1/day
0.000	0.000	4.000	4.307	0.000	0.000	32.000	35.147

BENTHIC DEMAND (SOD)20 gm/m2/day	BENTHIC DEMAND (SOD)T gm/m2/day
1.000	1.107

K1 CBOD {theta}	K2 Reaer. {theta}	K3 NH3 {theta}	K4 Open {theta}	K5 NH3 Loss {theta}	K6 NO2+3 {theta}	K(Cl) TRC {theta}	S Benthic {theta}
1.0	1.0	1.1	1.0	1.0	1.0	1.1	1.1

Utah Division of Water Quality
Salt Lake City, Utah

WASTELOAD ANALYSIS [WLA]
Addendum: Statement of Basis
SUMMARY

Discharging Facility:	**Bluffdale Cooling Water**		
UPDES No:	UT-		
Current Flow:	0.34	MGD	Design Flow
Design Flow	0.34	MGD	

Receiving Water:	**Utah Salt Lake Canal**		
Stream Classification:	2B, 4		
Stream Flows [cfs]:	50.0	Summer (July-Sept)	20th Percentile
	0.0	Fall (Oct-Dec)	20th Percentile
	0.0	Winter (Jan-Mar)	20th Percentile
	50.0	Spring (Apr-June)	20th Percentile
	75.0	Average	
Stream TDS Values:	1098.0	Summer (July-Sept)	Average
	1226.0	Fall (Oct-Dec)	Average
	1284.0	Winter (Jan-Mar)	Average
	938.0	Spring (Apr-June)	Average

Effluent Limits:				**WQ Standard:**
Flow, MGD:	0.34	MGD	Design Flow	
BOD, mg/l:	25.0	Summer	5.0	Indicator
Dissolved Oxygen, mg/l	NA	Summer	5.0	30 Day Average
TNH3, Chronic, mg/l:	NA	Summer	Varies	Function of pH and Temperature
TDS, mg/l:	10811.4	Summer	1200.0	

Modeling Parameters:

Acute River Width:	50.0%	
Chronic River Width:	95.1%	Plume Model Used

Level 1 Antidegradation Level Completed: Level II Review required.

Date: 7/30/2012

Permit Writer:		10/12/12
WLA by:		9-7-12
WQM Sec. Approval:		9/10/12
TMDL Sec. Approval:		9/6/12

WASTELOAD ANALYSIS [WLA]
Addendum: Statement of Basis

30-Jul-12
4:00 PM

Facilities: **Bluffdale Cooling Water** **UPDES No: UT-**
Discharging to: **Utah Salt Lake Canal**

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

Utah Salt Lake Canal:	2B, 4
Antidegradation Review:	Level I review completed. Level II review 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)
Chronic Dissolved Oxygen (DO)	5.00 mg/l (30 Day Average) N/A mg/l (7Day Average) 3.00 mg/l (1 Day Average
Maximum Total Dissolved Solids	1200.0 mg/l

Utah Division of Water Quality
Salt Lake City, Utah

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**	0.249 lbs/day	750.00 ug/l	2.145 lbs/day
Arsenic	190.00 ug/l	0.543 lbs/day	340.00 ug/l	0.972 lbs/day
Cadmium	0.83 ug/l	0.002 lbs/day	10.01 ug/l	0.029 lbs/day
Chromium III	299.41 ug/l	0.856 lbs/day	6264.33 ug/l	17.916 lbs/day
ChromiumVI	11.00 ug/l	0.031 lbs/day	16.00 ug/l	0.046 lbs/day
Copper	34.21 ug/l	0.098 lbs/day	58.66 ug/l	0.168 lbs/day
Iron			1000.00 ug/l	2.860 lbs/day
Lead	22.05 ug/l	0.063 lbs/day	565.75 ug/l	1.618 lbs/day
Mercury	0.0120 ug/l	0.000 lbs/day	2.40 ug/l	0.007 lbs/day
Nickel	188.83 ug/l	0.540 lbs/day	1698.37 ug/l	4.857 lbs/day
Selenium	4.60 ug/l	0.013 lbs/day	20.00 ug/l	0.057 lbs/day
Silver	N/A ug/l	N/A lbs/day	51.75 ug/l	0.148 lbs/day
Zinc	434.58 ug/l	1.243 lbs/day	434.58 ug/l	1.243 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 457.51 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	0.004 lbs/day
Chlordane	0.004 ug/l	1.099 lbs/day	1.200 ug/l	0.003 lbs/day
DDT, DDE	0.001 ug/l	0.256 lbs/day	0.550 ug/l	0.002 lbs/day
Dieldrin	0.002 ug/l	0.486 lbs/day	1.250 ug/l	0.004 lbs/day
Endosulfan	0.056 ug/l	14.318 lbs/day	0.110 ug/l	0.000 lbs/day
Endrin	0.002 ug/l	0.588 lbs/day	0.090 ug/l	0.000 lbs/day
Guthion			0.010 ug/l	0.000 lbs/day
Heptachlor	0.004 ug/l	0.972 lbs/day	0.260 ug/l	0.001 lbs/day
Lindane	0.080 ug/l	20.454 lbs/day	1.000 ug/l	0.003 lbs/day
Methoxychlor			0.030 ug/l	0.000 lbs/day
Mirex			0.010 ug/l	0.000 lbs/day
Parathion			0.040 ug/l	0.000 lbs/day
PCB's	0.014 ug/l	3.579 lbs/day	2.000 ug/l	0.006 lbs/day
Pentachlorophenol	13.00 ug/l	3323.713 lbs/day	20.000 ug/l	0.057 lbs/day
Toxephene	0.0002 ug/l	0.051 lbs/day	0.7300 ug/l	0.002 lbs/day

IV. Numeric Stream Standards for Protection of Agriculture

	4 Day Average (Chronic) Standard		1 Hour Average (Acute) Standard	
	Concentration	Load*	Concentration	Load*
Arsenic			100.0 ug/l	lbs/day
Boron			750.0 ug/l	lbs/day
Cadmium			10.0 ug/l	0.01 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			1200.0 mg/l	1.72 tons/day

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

	4 Day Average (Chronic) Standard		1 Hour Average (Acute) Standard	
Metals	Concentration	Load*	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
ocyclohexane (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	2700.0 ug/l	690.31 lbs/day
Acrolein	ug/l	lbs/day	780.0 ug/l	199.42 lbs/day
Acrylonitrile	ug/l	lbs/day	0.7 ug/l	0.17 lbs/day
Benzene	ug/l	lbs/day	71.0 ug/l	18.15 lbs/day
Benzidine	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Carbon tetrachloride	ug/l	lbs/day	4.4 ug/l	1.12 lbs/day
Chlorobenzene	ug/l	lbs/day	21000.0 ug/l	5369.07 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	99.0 ug/l	25.31 lbs/day

1,1,1-Trichloroethane					
Hexachloroethane	ug/l	lbs/day	8.9	ug/l	2.28 lbs/day
1,1-Dichloroethane					
1,1,2-Trichloroethane	ug/l	lbs/day	42.0	ug/l	10.74 lbs/day
1,1,2,2-Tetrachloroethai	ug/l	lbs/day	11.0	ug/l	2.81 lbs/day
Chloroethane			0.0	ug/l	0.00 lbs/day
Bis(2-chloroethyl) ether	ug/l	lbs/day	1.4	ug/l	0.36 lbs/day
2-Chloroethyl vinyl ether	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
2-Chloronaphthalene	ug/l	lbs/day	4300.0	ug/l	1099.38 lbs/day
2,4,6-Trichlorophenol	ug/l	lbs/day	6.5	ug/l	1.66 lbs/day
p-Chloro-m-cresol			0.0	ug/l	0.00 lbs/day
Chloroform (HM)	ug/l	lbs/day	470.0	ug/l	120.16 lbs/day
2-Chlorophenol	ug/l	lbs/day	400.0	ug/l	102.27 lbs/day
1,2-Dichlorobenzene	ug/l	lbs/day	17000.0	ug/l	4346.39 lbs/day
1,3-Dichlorobenzene	ug/l	lbs/day	2600.0	ug/l	664.74 lbs/day
1,4-Dichlorobenzene	ug/l	lbs/day	2600.0	ug/l	664.74 lbs/day
3,3'-Dichlorobenzidine	ug/l	lbs/day	0.1	ug/l	0.02 lbs/day
1,1-Dichloroethylene	ug/l	lbs/day	3.2	ug/l	0.82 lbs/day
1,2-trans-Dichloroethyle	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
2,4-Dichlorophenol	ug/l	lbs/day	790.0	ug/l	201.98 lbs/day
1,2-Dichloropropane	ug/l	lbs/day	39.0	ug/l	9.97 lbs/day
1,3-Dichloropropylene	ug/l	lbs/day	1700.0	ug/l	434.64 lbs/day
2,4-Dimethylphenol	ug/l	lbs/day	2300.0	ug/l	588.04 lbs/day
2,4-Dinitrotoluene	ug/l	lbs/day	9.1	ug/l	2.33 lbs/day
2,6-Dinitrotoluene	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
1,2-Diphenylhydrazine	ug/l	lbs/day	0.5	ug/l	0.14 lbs/day
Ethylbenzene	ug/l	lbs/day	29000.0	ug/l	7414.44 lbs/day
Fluoranthene	ug/l	lbs/day	370.0	ug/l	94.60 lbs/day
4-Chlorophenyl phenyl ether					
4-Bromophenyl phenyl ether					
Bis(2-chloroisopropyl) e	ug/l	lbs/day	170000.0	ug/l	43463.94 lbs/day
Bis(2-chloroethoxy) met	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
Methylene chloride (HM	ug/l	lbs/day	1600.0	ug/l	409.07 lbs/day
Methyl chloride (HM)	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
Methyl bromide (HM)	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
Bromoform (HM)	ug/l	lbs/day	360.0	ug/l	92.04 lbs/day
Dichlorobromomethane	ug/l	lbs/day	22.0	ug/l	5.62 lbs/day
Chlorodibromomethane	ug/l	lbs/day	34.0	ug/l	8.69 lbs/day
Hexachlorobutadiene(c)	ug/l	lbs/day	50.0	ug/l	12.78 lbs/day
Hexachlorocyclopentadi	ug/l	lbs/day	17000.0	ug/l	4346.39 lbs/day
Isophorone	ug/l	lbs/day	600.0	ug/l	153.40 lbs/day
Naphthalene					
Nitrobenzene	ug/l	lbs/day	1900.0	ug/l	485.77 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	3579.38 lbs/day
4,6-Dinitro-o-cresol	ug/l	lbs/day	765.0	ug/l	195.59 lbs/day
N-Nitrosodimethylamine	ug/l	lbs/day	8.1	ug/l	2.07 lbs/day
N-Nitrosodiphenylamine	ug/l	lbs/day	16.0	ug/l	4.09 lbs/day
N-Nitrosodi-n-propylami	ug/l	lbs/day	1.4	ug/l	0.36 lbs/day
Pentachlorophenol	ug/l	lbs/day	8.2	ug/l	2.10 lbs/day

Phenol	ug/l	lbs/day	4.6E+06	ug/l	1.18E+06 lbs/day
Bis(2-ethylhexyl)phthala	ug/l	lbs/day	5.9	ug/l	1.51 lbs/day
Butyl benzyl phthalate	ug/l	lbs/day	5200.0	ug/l	1329.49 lbs/day
Di-n-butyl phthalate	ug/l	lbs/day	12000.0	ug/l	3068.04 lbs/day
Di-n-octyl phthlate					
Diethyl phthalate	ug/l	lbs/day	120000.0	ug/l	30680.42 lbs/day
Dimethyl phthlate	ug/l	lbs/day	2.9E+06	ug/l	7.41E+05 lbs/day
Benzo(a)anthracene (P/	ug/l	lbs/day	0.0	ug/l	0.01 lbs/day
Benzo(a)pyrene (PAH)	ug/l	lbs/day	0.0	ug/l	0.01 lbs/day
Benzo(b)fluoranthene (F	ug/l	lbs/day	0.0	ug/l	0.01 lbs/day
Benzo(k)fluoranthene (F	ug/l	lbs/day	0.0	ug/l	0.01 lbs/day
Chrysene (PAH)	ug/l	lbs/day	0.0	ug/l	0.01 lbs/day
Acenaphthylene (PAH)					
Anthracene (PAH)	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
Dibenzo(a,h)anthracene	ug/l	lbs/day	0.0	ug/l	0.01 lbs/day
Indeno(1,2,3-cd)pyrene	ug/l	lbs/day	0.0	ug/l	0.01 lbs/day
Pyrene (PAH)	ug/l	lbs/day	11000.0	ug/l	2812.37 lbs/day
Tetrachloroethylene	ug/l	lbs/day	8.9	ug/l	2.28 lbs/day
Toluene	ug/l	lbs/day	200000	ug/l	51134.04 lbs/day
Trichloroethylene	ug/l	lbs/day	81.0	ug/l	20.71 lbs/day
Vinyl chloride	ug/l	lbs/day	525.0	ug/l	134.23 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	2.0	ug/l	0.51 lbs/day
beta-Endosulfan	ug/l	lbs/day	2.0	ug/l	0.51 lbs/day
Endosulfan sulfate	ug/l	lbs/day	2.0	ug/l	0.51 lbs/day
Endrin	ug/l	lbs/day	0.8	ug/l	0.21 lbs/day
Endrin aldehyde	ug/l	lbs/day	0.8	ug/l	0.21 lbs/day
Heptachlor	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
Heptachlor epoxide					
PCB's					
PCB 1242 (Arochlor 12	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
PCB-1254 (Arochlor 12	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
PCB-1221 (Arochlor 12	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
PCB-1232 (Arochlor 12	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
PCB-1248 (Arochlor 12	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
PCB-1260 (Arochlor 12	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
PCB-1016 (Arochlor 10	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	4300.00 ug/l	1099.38 lbs/day
Asbestos	ug/l	lbs/day		
Beryllium				
Cadmium				
Chromium (III)				
Chromium (VI)				
Copper				
Cyanide	ug/l	lbs/day	2.2E+05 ug/l	56247.45 lbs/day
Lead	ug/l	lbs/day		
Mercury			0.15 ug/l	0.04 lbs/day
Nickel			4600.00 ug/l	1176.08 lbs/day
Selenium	ug/l	lbs/day		
Silver	ug/l	lbs/day		
Thallium			6.30 ug/l	1.61 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 (Irrig. Season)	50.0	21.6	8.2	0.42	1.00	6.83	0.00	1098.0
Fall	0.0	8.8	8.0	0.29	1.00	---	0.00	1226.0
Winter	0.0	5.0	7.9	0.27	1.00	---	0.00	1284.0
Spring	50.0	15.4	8.2	0.19	1.00	---	0.00	938.0

Dissolved Metals	Al ug/l	As ug/l	Cd ug/l	CrIII ug/l	CrVI ug/l	Copper ug/l	Fe ug/l	Pb ug/l
All Seasons	1.59*	0.53*	0.053*	0.53*	2.65*	0.53*	0.83*	0.53*

Dissolved Metals	Hg ug/l	Ni ug/l	Se ug/l	Ag ug/l	Zn ug/l	Boron ug/l	
All Seasons	0.0000	0.53*	1.65	0.1*	0.053*	10.0	* 1/2 MDL

Projected Discharge Information

Season	Flow, MGD	Temp.	TDS mg/l	TDS tons/day
Summer	0.34300	NA	1200.00	1.71603
Fall	0.34300	NA		
Winter	0.34300	NA		
Spring	0.34300	NA		

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	0.343 MGD	0.531 cfs
Fall	0.343 MGD	0.531 cfs
Winter	0.343 MGD	0.531 cfs
Spring	0.343 MGD	0.531 cfs

Flow Requirement or Loading Requirement

The calculations in this wasteload analysis utilize the maximum effluent discharge flow of 0.343 MGD. If the discharger is allowed to have a flow greater than 0.343 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 >	7.1% Effluent	[Acute]
	IC25 >	1.1% 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	71.5 lbs/day
Fall	25.0 mg/l as BOD5	71.5 lbs/day
Winter	25.0 mg/l as BOD5	71.5 lbs/day
Spring	25.0 mg/l as BOD5	71.5 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	NA
Fall	NA
Winter	NA
Spring	NA

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	NA mg/l as N	NA lbs/day
	1 Hour Avg. - Acute	NA mg/l as N	NA lbs/day
Fall	4 Day Avg. - Chronic	NA mg/l as N	NA lbs/day
	1 Hour Avg. - Acute	NA mg/l as N	NA lbs/day
Winter	4 Day Avg. - Chronic	NA mg/l as N	NA lbs/day
	1 Hour Avg. - Acute	NA mg/l as N	NA lbs/day
Spring	4 Day Avg. - Chronic	NA mg/l as N	NA lbs/day
	1 Hour Avg. - Acute	NA mg/l as N	NA lbs/day

Acute limit calculated with an Acute Zone of Initial Dilution (ZID) to be equal to 50.%.

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	NA	mg/l	NA	lbs/day
	1 Hour Avg. - Acute	NA	mg/l	NA	lbs/day
Fall	4 Day Avg. - Chronic	NA	mg/l	NA	lbs/day
	1 Hour Avg. - Acute	NA	mg/l	NA	lbs/day
Winter	4 Day Avg. - Chronic	NA	mg/l	NA	lbs/day
	1 Hour Avg. - Acute	NA	mg/l	NA	lbs/day
Spring	4 Day Avg. - Chronic	NA	mg/l	NA	lbs/day
	1 Hour Avg. - Acute	NA	mg/l	NA	lbs/day

Effluent Limitations for Total Dissolved Solids based upon Water Quality Standards

Season		Concentration		Load	
Summer	Maximum, Acute	10811.4	mg/l	15.46	tons/day
Fall	Maximum, Acute	1098.0	mg/l	1.57	tons/day
Winter	Maximum, Acute	1098.0	mg/l	1.57	tons/day
Spring	Maximum, Acute	25888.1	mg/l	37.02	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 457.51 mg/l):

	4 Day Average Concentration		Load		1 Hour Average Concentration		Load	
Aluminum	N/A		N/A		35,973.6	ug/l	102.9	lbs/day
Arsenic	17,148.57	ug/l	31.7	lbs/day	16,321.5	ug/l	46.7	lbs/day
Cadmium	68.55	ug/l	0.1	lbs/day	477.8	ug/l	1.4	lbs/day
Chromium III	27,064.89	ug/l	50.0	lbs/day	301,368.4	ug/l	861.9	lbs/day
Chromium VI	640.66	ug/l	1.2	lbs/day	582.6	ug/l	1.7	lbs/day
Copper	3,029.15	ug/l	5.6	lbs/day	2,784.9	ug/l	8.0	lbs/day
Iron	N/A		N/A		48,055.7	ug/l	137.4	lbs/day
Lead	1,926.82	ug/l	3.6	lbs/day	27,183.1	ug/l	77.7	lbs/day
Mercury	1.09	ug/l	0.0	lbs/day	115.5	ug/l	0.3	lbs/day
Nickel	17,042.18	ug/l	31.5	lbs/day	81,679.0	ug/l	233.6	lbs/day
Selenium	269.01	ug/l	0.5	lbs/day	884.6	ug/l	2.5	lbs/day
Silver	N/A	ug/l	N/A	lbs/day	2,489.8	ug/l	7.1	lbs/day

Zinc	39,379.52	ug/l	72.8	lbs/day	20,906.1	ug/l	59.8 lbs/day
Cyanide	471.28	ug/l	0.9	lbs/day	1,058.5	ug/l	3.0 lbs/day

Effluent Limitations for Heat/Temperature based upon Water Quality Standards

Summer	NA	Deg. C.	NA	Deg. F
Fall	NA	Deg. C.	NA	Deg. F
Winter	NA	Deg. C.	NA	Deg. F
Spring	NA	Deg. C.	NA	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	6.64E-03	lbs/day
Chlordane	4.30E-03	ug/l	1.23E-02	lbs/day	1.2E+00	ug/l	5.31E-03	lbs/day
DDT, DDE	1.00E-03	ug/l	2.86E-03	lbs/day	5.5E-01	ug/l	2.43E-03	lbs/day
Dieldrin	1.90E-03	ug/l	5.43E-03	lbs/day	1.3E+00	ug/l	5.53E-03	lbs/day
Endosulfan	5.60E-02	ug/l	1.60E-01	lbs/day	1.1E-01	ug/l	4.87E-04	lbs/day
Endrin	2.30E-03	ug/l	6.58E-03	lbs/day	9.0E-02	ug/l	3.98E-04	lbs/day
Guthion	0.00E+00	ug/l	0.00E+00	lbs/day	1.0E-02	ug/l	4.42E-05	lbs/day
Heptachlor	3.80E-03	ug/l	1.09E-02	lbs/day	2.6E-01	ug/l	1.15E-03	lbs/day
Lindane	8.00E-02	ug/l	2.29E-01	lbs/day	1.0E+00	ug/l	4.42E-03	lbs/day
Methoxychlor	0.00E+00	ug/l	0.00E+00	lbs/day	3.0E-02	ug/l	1.33E-04	lbs/day
Mirex	0.00E+00	ug/l	0.00E+00	lbs/day	1.0E-02	ug/l	4.42E-05	lbs/day
Parathion	0.00E+00	ug/l	0.00E+00	lbs/day	4.0E-02	ug/l	1.77E-04	lbs/day
PCB's	1.40E-02	ug/l	4.00E-02	lbs/day	2.0E+00	ug/l	8.85E-03	lbs/day
Pentachlorophenol	1.30E+01	ug/l	3.72E+01	lbs/day	2.0E+01	ug/l	8.85E-02	lbs/day
Toxephene	2.00E-04	ug/l	5.72E-04	lbs/day	7.3E-01	ug/l	3.23E-03	lbs/day

Effluent Targets for Pollution Indicators
Based upon Water Quality Standards

In-stream criteria of downstream segments for Pollution Indicators will be met with an effluent limit as follows:

	1 Hour Average Concentration	Loading
Gross Beta (pCi/l)	50.0 pCi/L	
BOD (mg/l)	5.0 mg/l	14.3 lbs/day
Nitrates as N	4.0 mg/l	11.4 lbs/day
Total Phosphorus as P	0.05 mg/l	0.1 lbs/day
Total Suspended Solids	90.0 mg/l	257.4 lbs/day

Note: Pollution indicator targets are for information purposes only.

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:

	Maximum Concentration Concentration	Load
Toxic Organics		
Acenaphthene	2.57E+05 ug/l	7.35E+02 lbs/day
Acrolein	7.43E+04 ug/l	2.12E+02 lbs/day
Acrylonitrile	6.29E+01 ug/l	1.80E-01 lbs/day
Benzene	6.76E+03 ug/l	1.93E+01 lbs/day
Benzidine	ug/l	lbs/day
Carbon tetrachloride	4.19E+02 ug/l	1.20E+00 lbs/day
Chlorobenzene	2.00E+06 ug/l	5.72E+03 lbs/day
1,2,4-Trichlorobenzene		
Hexachlorobenzene	7.33E-02 ug/l	2.10E-04 lbs/day
1,2-Dichloroethane	9.43E+03 ug/l	2.70E+01 lbs/day
1,1,1-Trichloroethane		
Hexachloroethane	8.48E+02 ug/l	2.42E+00 lbs/day
1,1-Dichloroethane		
1,1,2-Trichloroethane	4.00E+03 ug/l	1.14E+01 lbs/day
1,1,2,2-Tetrachloroethane	1.05E+03 ug/l	3.00E+00 lbs/day
Chloroethane		
Bis(2-chloroethyl) ether	1.33E+02 ug/l	3.81E-01 lbs/day
2-Chloroethyl vinyl ether		
2-Chloronaphthalene	4.09E+05 ug/l	1.17E+03 lbs/day
2,4,6-Trichlorophenol	6.19E+02 ug/l	1.77E+00 lbs/day
p-Chloro-m-cresol		
Chloroform (HM)	4.48E+04 ug/l	1.28E+02 lbs/day
2-Chlorophenol	3.81E+04 ug/l	1.09E+02 lbs/day
1,2-Dichlorobenzene	1.62E+06 ug/l	4.63E+03 lbs/day
1,3-Dichlorobenzene	2.48E+05 ug/l	7.08E+02 lbs/day

1,4-Dichlorobenzene	2.48E+05 ug/l	7.08E+02 lbs/day
3,3'-Dichlorobenzidine	7.33E+00 ug/l	2.10E-02 lbs/day
1,1-Dichloroethylene	3.05E+02 ug/l	8.72E-01 lbs/day
1,2-trans-Dichloroethylene1		
2,4-Dichlorophenol	7.52E+04 ug/l	2.15E+02 lbs/day
1,2-Dichloropropane	3.71E+03 ug/l	1.06E+01 lbs/day
1,3-Dichloropropylene	1.62E+05 ug/l	4.63E+02 lbs/day
2,4-Dimethylphenol	2.19E+05 ug/l	6.26E+02 lbs/day
2,4-Dinitrotoluene	8.67E+02 ug/l	2.48E+00 lbs/day
2,6-Dinitrotoluene		
1,2-Diphenylhydrazine	5.14E+01 ug/l	1.47E-01 lbs/day
Ethylbenzene	2.76E+06 ug/l	7.90E+03 lbs/day
Fluoranthene	3.52E+04 ug/l	1.01E+02 lbs/day
4-Chlorophenyl phenyl ether		
4-Bromophenyl phenyl ether		
Bis(2-chloroisopropyl) ether	1.62E+07 ug/l	4.63E+04 lbs/day
Bis(2-chloroethoxy) methane		
Methylene chloride (HM)	1.52E+05 ug/l	4.36E+02 lbs/day
Methyl chloride (HM)		
Methyl bromide (HM)		
Bromoform (HM)	3.43E+04 ug/l	9.80E+01 lbs/day
Dichlorobromomethane(HM)	2.10E+03 ug/l	5.99E+00 lbs/day
Chlorodibromomethane (HM)	3.24E+03 ug/l	9.26E+00 lbs/day
Hexachlorocyclopentadiene	1.62E+06 ug/l	4.63E+03 lbs/day
Isophorone	5.71E+04 ug/l	1.63E+02 lbs/day
Naphthalene		
Nitrobenzene	1.81E+05 ug/l	5.17E+02 lbs/day
2-Nitrophenol		
4-Nitrophenol		
2,4-Dinitrophenol	1.33E+06 ug/l	3.81E+03 lbs/day
4,6-Dinitro-o-cresol	7.29E+04 ug/l	2.08E+02 lbs/day
N-Nitrosodimethylamine	7.71E+02 ug/l	2.21E+00 lbs/day
N-Nitrosodiphenylamine	1.52E+03 ug/l	4.36E+00 lbs/day
N-Nitrosodi-n-propylamine	1.33E+02 ug/l	3.81E-01 lbs/day
Pentachlorophenol	7.81E+02 ug/l	2.23E+00 lbs/day
Phenol	4.38E+08 ug/l	1.25E+06 lbs/day
Bis(2-ethylhexyl)phthalate	5.62E+02 ug/l	1.61E+00 lbs/day
Butyl benzyl phthalate	4.95E+05 ug/l	1.42E+03 lbs/day
Di-n-butyl phthalate	1.14E+06 ug/l	3.27E+03 lbs/day
Di-n-octyl phthlate		
Diethyl phthalate	1.14E+07 ug/l	3.27E+04 lbs/day
Dimethyl phthlate	2.76E+08 ug/l	7.90E+05 lbs/day
Benzo(a)anthracene (PAH)	2.95E+00 ug/l	8.44E-03 lbs/day
Benzo(a)pyrene (PAH)	2.95E+00 ug/l	8.44E-03 lbs/day
Benzo(b)fluoranthene (PAH)	2.95E+00 ug/l	8.44E-03 lbs/day
Benzo(k)fluoranthene (PAH)	2.95E+00 ug/l	8.44E-03 lbs/day
Chrysene (PAH)	2.95E+00 ug/l	8.44E-03 lbs/day
Acenaphthylene (PAH)		
Anthracene (PAH)		
Dibenzo(a,h)anthracene (PAH)	2.95E+00 ug/l	8.44E-03 lbs/day
Indeno(1,2,3-cd)pyrene (PAH)	2.95E+00 ug/l	8.44E-03 lbs/day

Pyrene (PAH)	1.05E+06 ug/l	3.00E+03 lbs/day
Tetrachloroethylene	8.48E+02 ug/l	2.42E+00 lbs/day
Toluene	1.90E+07 ug/l	5.45E+04 lbs/day
Trichloroethylene	7.71E+03 ug/l	2.21E+01 lbs/day
Vinyl chloride	5.00E+04 ug/l	1.43E+02 lbs/day
Pesticides		
Aldrin	1.33E-02 ug/l	3.81E-05 lbs/day
Dieldrin	1.33E-02 ug/l	3.81E-05 lbs/day
Chlordane	5.62E-02 ug/l	1.61E-04 lbs/day
4,4'-DDT	5.62E-02 ug/l	1.61E-04 lbs/day
4,4'-DDE	5.62E-02 ug/l	1.61E-04 lbs/day
4,4'-DDD	8.00E-02 ug/l	2.29E-04 lbs/day
alpha-Endosulfan	1.90E+02 ug/l	5.45E-01 lbs/day
beta-Endosulfan	1.90E+02 ug/l	5.45E-01 lbs/day
Endosulfan sulfate	1.90E+02 ug/l	5.45E-01 lbs/day
Endrin	7.71E+01 ug/l	2.21E-01 lbs/day
Endrin aldehyde	7.71E+01 ug/l	2.21E-01 lbs/day
Heptachlor	2.00E-02 ug/l	5.72E-05 lbs/day
Heptachlor epoxide		
PCB's		
PCB 1242 (Arochlor 1242)	4.29E-03 ug/l	1.23E-05 lbs/day
PCB-1254 (Arochlor 1254)	4.29E-03 ug/l	1.23E-05 lbs/day
PCB-1221 (Arochlor 1221)	4.29E-03 ug/l	1.23E-05 lbs/day
PCB-1232 (Arochlor 1232)	4.29E-03 ug/l	1.23E-05 lbs/day
PCB-1248 (Arochlor 1248)	4.29E-03 ug/l	1.23E-05 lbs/day
PCB-1260 (Arochlor 1260)	4.29E-03 ug/l	1.23E-05 lbs/day
PCB-1016 (Arochlor 1016)	4.29E-03 ug/l	1.23E-05 lbs/day
Pesticide		
Toxaphene	7.14E-02 ug/l	2.04E-04 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)	1.33E-06 ug/l	3.81E-09 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						0.0	N/A
Antimony				409485.6		409485.6	
Arsenic	9522.9				0.0	9522.9	
Barium						0.0	
Beryllium						0.0	
Cadmium	944.8				0.0	944.8	
Chromium (III)					0.0	0.0	
Chromium (VI)	9448.0				0.0	9448.01	
Copper	18970.9					18970.9	
Cyanide		1058.5	########			########	471.3
Iron						0.0	
Lead	9448.0				0.0	9448.0	
Mercury				14.28	0.0	14.28	
Nickel				438054.4		438054.4	
Selenium	4606.0				0.0	4606.0	
Silver					0.0	0.0	
Thallium				599.9		599.9	
Zinc						0.0	
Boron	71421.9					71421.9	

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	0.0	N/A	
Antimony	409485.62		
Arsenic	9522.9		Acute Controls
Asbestos	0.00E+00		
Barium			
Beryllium			
Cadmium	944.8		Acute Controls
Chromium (III)	0.0		Acute Controls
Chromium (VI)	9448.0		Acute Controls
Copper	18970.9		Acute Controls

Cyanide	########	471.3	
Iron	0.0		
Lead	9448.0		Acute Controls
Mercury	14.284		Acute Controls
Nickel	438054.4		Acute Controls
Selenium	4606.0		Acute Controls
Silver	0.0	N/A	
Thallium	599.9		
Zinc	0.0		Acute Controls
Boron	71421.91		

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.

The antidegradation rules and procedures allow for modification of effluent limits less than those based strictly upon mass balance equations utilizing 100% of the assimilative capacity of the receiving water. Additional factors include considerations for "Blue-ribbon" fisheries, special recreational areas, threatened and endangered species, and drinking water sources.

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 required.

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.

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.

XIII. Notice of UPDES Requirement

This Addendum to the Statement of Basis does not authorize any entity or party to discharge to the waters of the State of Utah. That authority is granted through a UPDES permit issued by the Utah Division of Water Quality. The numbers presented here may be changed as a function of other factors. Dischargers are strongly urged to contact the Permits Section for further information. Permit writers may utilize other information to adjust these limits and/or to determine other limits based upon best available technology and other considerations provided that the values in this wasteload analysis [TMDL] are not compromised. See special provisions in Utah Water Quality Standards for adjustments in the Total Dissolved Solids values based upon background concentration.

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Utah Division of Water Quality
801-538-6052
File Name: Bluffdale_Cooling _WLA_Canal8-07-12

APPENDIX - Coefficients and Other Model Information

CBOD Coeff. (Kd)20 1/day	CBOD Coeff. FORCED (Kd)/day	CBOD Coeff. (Ka)T 1/day	REAER. Coeff. (Ka)20 (Ka)/day	REAER. Coeff. FORCED 1/day	REAER. Coeff. (Ka)T 1/day	NBOD Coeff. (Kn)20 1/day	NBOD Coeff. (Kn)T 1/day
2.000	0.000	2.153	12.195	0.000	12.670	0.600	0.679

Open Coeff. (K4)20 1/day	Open Coeff. (K4)T 1/day	NH3 LOSS (K5)20 1/day	NH3 (K5)T 1/day	NO2+NO3 LOSS (K6)20 1/day	NO2+NO3 (K6)T 1/day	TRC Decay K(Cl)20 1/day	TRC K(Cl)(T) 1/day
0.000	0.000	4.000	4.307	0.000	0.000	32.000	35.147

BENTHIC DEMAND (SOD)20 gm/m2/day	BENTHIC DEMAND (SOD)T gm/m2/day
1.000	1.107

K1 CBOD {theta}	K2 Reaer. {theta}	K3 NH3 {theta}	K4 Open {theta}	K5 NH3 Loss {theta}	K6 NO2+3 {theta}	K(Cl) TRC {theta}	S Benthic {theta}
1.0	1.0	1.1	1.0	1.0	1.0	1.1	1.1

Antidegredation Review