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

Date: **March 30, 2016**

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

Facility: **Perry/Willard Regional WWTP**
UPDES No. UT- 025721
Outfall 001

Receiving water: **Willard Spur Tailrace (2B, 3D) => Great Salt Lake Transitional Wetlands/Bear River National Wildlife Refuge (5E/2B, 3B, 3D)**

This addendum summarizes the wasteload analysis that was performed to determine water quality based effluent limits (WQBEL) for this discharge. Wasteload analyses are performed to determine point source effluent limitations necessary to maintain designated beneficial uses by evaluating projected effects of discharge concentrations on in-stream water quality. The wasteload analysis also takes into account downstream designated uses (UAC R317-2-8). Projected concentrations are compared to numeric water quality standards to determine acceptability. The numeric criteria in this wasteload analysis may be modified by narrative criteria and other conditions determined by staff of the Division of Water Quality.

Discharge
Outfall 001:

The mean monthly discharge for the facility is 2 MGD (3.1 cfs).

Receiving Water
The receiving water for Outfall 001 is the Willard Spur tailrace, and then to the Great Salt Lake Transitional Wetlands/Bear River National Wildlife Refuge.

Willard Spur Tailrace is classified as a 2B, 3E drainage canal/ditch as per UAC R317-2-13.10:

- *Class 2B - Protected for infrequent primary contact recreation. Also protected for secondary contact recreation where there is a low likelihood of ingestion of water or a low degree of bodily contact with the water. Examples include, but are not limited to, wading, hunting, and fishing.*

- *Class 3E -- Severely habitat-limited waters. Narrative standards will be applied to protect these waters for aquatic wildlife.*

The receiving water of the Willard Spur tailrace is a combination of the Great Salt Lake Transitional Wetlands (5E) and the Bear River National Wildlife Refuge (2B, 3B, 3D). GSL Transitional Wetlands are classified as 5E as per UAC R317-2-13.11:

- *Class 5E - Protected for infrequent primary and secondary contact recreation, waterfowl, shore birds and other water-oriented wildlife including their necessary food chain.*

Waters within the Bear River National Wildlife Refuge are classified as 2B, 3B, 3D as per UAC R317-2-13.11:

- *Class 2B - Protected for infrequent primary contact recreation. Also protected for secondary contact recreation where there is a low likelihood of ingestion of water or a low degree of bodily contact with the water. Examples include, but are not limited to, wading, hunting, and fishing.*

- *Class 3B -- Protected for warm water species of game fish and other warm water aquatic life, including the necessary aquatic organisms in their food chain.*

- *Class 3D -- Protected for waterfowl, shore birds and other water-oriented wildlife not included in Classes 3A, 3B, or 3C, including the necessary aquatic organisms in their food chain.*

The hydrology in the area of the area of the Perry/Willard WWTP discharge is complicated and appears to vary considerably both seasonally and in relation to wet and dry climatic periods. A hydrologic assessment of the Willard Spur (CH2M HILL, 2016) summarized the findings of investigations conducted by DWQ and others over the last several years. Willard Spur water levels and the surface area over which the effluent spreads were identified as two most significant factors controlling the quantity of effluent reaching the open waters of the Willard Spur.

Local runoff, irrigation return flow and leakage from Willard Reservoir into the Tailrace were characterized as likely reach the open waters of Willard Spur only during spring runoff and when water levels in Willard Spur are high. Evaporation and more significantly, infiltration rates appear to be high in periods when water levels in Willard Spur are low. The report noted that effluent discharged to the Willard Bay Tailrace was more likely to reach the open water of Willard Spur when water levels were low than if discharged to wetlands simply because the channel is deep and remains connected to the open water for most dry conditions.

Typically, the critical flow for the wasteload analysis is considered the lowest stream flow for seven consecutive days with a ten year return frequency (7Q10) or alternatively, the 20^{th} percentile value of available flow data. Due to a lack of flow records for the Willard Spur tailrace neither approach could be used. The critical low flow condition for Willard Spur tailrace was estimated at 0.1 cfs.

To ensure protection of downstream uses, applicable water quality criteria associated with 2B, 3B and 3D uses classes will be met after complete mixing with the Willard Spur Tailrace. Ambient water quality for the Willard Spur tailrace was characterized by samples collected from DWQ sampling station 4920420, WB-RES-N-OUTLET (2011-2013).

TMDL

None of the receiving waters are listed on the state's 2014 303(d) Water Quality Assessment

Mixing Zone

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

The effluent was consider to be totally mixed as the ratio of receiving water flow (estimated 7Q10) to discharge flow was .03 (<=2). Acute limits were calculated using 50% of the seasonal critical low flow.

Parameters of Concern

The potential parameters of concern identified for the discharge/receiving water were ammonia and nutrients as determined in consultation with the UPDES Permit Writer. Nutrients controls are addressed in a separate document; *Incorporating Results of Willard Spur Scientific Investigations into the UPDES Permit for the Perry-Willard POTW* (DWQ 2016).

WET Limits

The percent of effluent in the receiving water in a fully mixed condition, and acute and chronic dilution in a not fully mixed condition are calculated in the WLA in order to generate WET limits. The LC_{50} (lethal concentration, 50%) percent effluent for acute toxicity and the IC_{25} (inhibition concentration, 25%) percent effluent for chronic toxicity, as determined by the WET test, needs to be below the WET limits, as determined by the WLA. The WET limit for LC_{50} is typically 100% effluent and does not need to be determined by the WLA.

IC25 WET limits for Outfall 011 should be based on 96.9% effluent.

Effluent Limits

Effluent limits were determined for conservative constituents using a simple mass balance mixing analysis (UDWQ 2012). The mass balance analysis is summarized in the Wasteload Addendum.

The water quality standard for chronic ammonia toxicity is dependent on temperature and pH, and the water quality standard for acute ammonia toxicity is dependent on pH. The AMMTOX Model developed by University of Colorado and adapted by Utah DWQ and EPA Region VIII was used to determine ammonia effluent limits (Lewis et al. 2002). The analysis is summarized in the Wasteload Addendum.

Models and supporting documentation are available for review upon request.

Antidegradation Level I Review

The objective of the Level I ADR is to ensure the protection of existing uses, defined as the beneficial uses attained in the receiving water on or after November 28, 1975. No evidence is known that the existing uses deviate from the designated beneficial uses for the receiving water. Therefore, the beneficial uses will be protected if the discharge remains below the WQBELs presented in this wasteload. A Level II Antidegradation Review (ADR) is not required for this discharge since the pollutant concentration and load is not increasing under this permit renewal.

Documents:

WLA Document: *Willard-PerryWLADoc_3-22-16.docx*
Wasteload Analysis and Addendum: *Willard-PerryWLADoc_3-30-16.xlsm*

References:

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

CH2M HILL. 2016. Hydrology Assessment of Willard Spur, Great Salt Lake, 2011-2013: Development of Water Quality Standards for Willard Spur. Final report prepared for Utah Division of Water Quality. January 2016.

DWQ, 2016.Incorporating Results of Willard Spur Scientific Investigations into the UPDES Permit for the Perry-Willard POTW.

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Salt Lake City, Utah

WASTELOAD ANALYSIS [WLA]
Addendum: Statement of Basis
SUMMARY

Discharging Facility:	**Willard/Perry**		
UPDES No:	UT-025721		
Current Flow:	2.00	MGD	Design Flow
Design Flow	2.00	MGD	

Receiving Water:	**Unnamed Ditch => 5E transitional Wetlands=>BRMBR**		
Stream Classification:	2B,3B,3D		
Stream Flows [cfs]:	0.1	Summer (July-Sept)	20th Percentile
	0.1	Fall (Oct-Dec)	20th Percentile
	0.1	Winter (Jan-Mar)	20th Percentile
	0.1	Spring (Apr-June)	20th Percentile
	0.1	Average	
Stream TDS Values:	486.0	Summer (July-Sept)	Average
	486.0	Fall (Oct-Dec)	Average
	486.0	Winter (Jan-Mar)	Average
	486.0	Spring (Apr-June)	Average

Effluent Limits:				**WQ Standard:**
Flow, MGD:	2.00	MGD	Design Flow	
BOD, mg/l:	25.0	Summer	5.0	Indicator
Dissolved Oxygen, mg/l	5.5	Summer	5.5	30 Day Average
TNH3, Chronic, mg/l:	6.4	Summer	Varies	Function of pH and Temperature
TDS, mg/l:	None	Summer	0.0	Site Specific

Modeling Parameters:

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

Level 1 Antidegradation Level Completed: Level II Review not required

Date: 3/30/2016

Permit Writer:		
WLA by:	Dirk A. Wam	3/30/16
WQM Sec. Approval:		
TMDL Sec. Approval:		

WASTELOAD ANALYSIS [WLA]
Addendum: Statement of Basis

24-Oct-11
4:00 PM

Facilities: **Willard/Perry** **UPDES No: UT-025721**
Discharging to: **Unnamed Ditch => 5E transitional Wetlands=>BRMBR**

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

Unnamed Ditch => 5E transitional We 2B,3B,3D
Antidegradation Review: Level I review completed. Level II review not required.

III. Numeric Stream Standards for Protection of Aquatic Wildlife

Total Ammonia (TNH3)	Varies as a function of Temperature and pH Rebound. See Water Quality Standards
Chronic Total Residual Chlorine (TRC)	0.011 mg/l (4 Day Average) 0.019 mg/l (1 Hour Average)
Chronic Dissolved Oxygen (DO)	5.50 mg/l (30 Day Average) 4.00 mg/l (7Day Average) 3.00 mg/l (1 Day Average
Maximum Total Dissolved Solids	N/A mg/l 3ackground

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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**	1.454 lbs/day	750.00 ug/l	12.532 lbs/day
Arsenic	190.00 ug/l	3.175 lbs/day	340.00 ug/l	5.681 lbs/day
Cadmium	0.47 ug/l	0.008 lbs/day	4.53 ug/l	0.076 lbs/day
Chromium III	158.18 ug/l	2.643 lbs/day	3309.43 ug/l	55.297 lbs/day
ChromiumVI	11.00 ug/l	0.184 lbs/day	16.00 ug/l	0.267 lbs/day
Copper	17.58 ug/l	0.294 lbs/day	28.15 ug/l	0.470 lbs/day
Iron			1000.00 ug/l	16.709 lbs/day
Lead	8.18 ug/l	0.137 lbs/day	209.84 ug/l	3.506 lbs/day
Mercury	0.0120 ug/l	0.000 lbs/day	2.40 ug/l	0.040 lbs/day
Nickel	97.68 ug/l	1.632 lbs/day	878.57 ug/l	14.680 lbs/day
Selenium	4.60 ug/l	0.077 lbs/day	20.00 ug/l	0.334 lbs/day
Silver	N/A ug/l	N/A lbs/day	13.55 ug/l	0.226 lbs/day
Zinc	224.58 ug/l	3.753 lbs/day	224.58 ug/l	3.753 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 209.91 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	0.025 lbs/day
Chlordane	0.004 ug/l	0.074 lbs/day	1.200 ug/l	0.020 lbs/day
DDT, DDE	0.001 ug/l	0.017 lbs/day	0.550 ug/l	0.009 lbs/day
Dieldrin	0.002 ug/l	0.033 lbs/day	1.250 ug/l	0.021 lbs/day
Endosulfan	0.056 ug/l	0.964 lbs/day	0.110 ug/l	0.002 lbs/day
Endrin	0.002 ug/l	0.040 lbs/day	0.090 ug/l	0.002 lbs/day
Guthion			0.010 ug/l	0.000 lbs/day
Heptachlor	0.004 ug/l	0.065 lbs/day	0.260 ug/l	0.004 lbs/day
Lindane	0.080 ug/l	1.377 lbs/day	1.000 ug/l	0.017 lbs/day
Methoxychlor			0.030 ug/l	0.001 lbs/day
Mirex			0.010 ug/l	0.000 lbs/day
Parathion			0.040 ug/l	0.001 lbs/day
PCB's	0.014 ug/l	0.241 lbs/day	2.000 ug/l	0.033 lbs/day
Pentachlorophenol	13.00 ug/l	223.804 lbs/day	20.000 ug/l	0.334 lbs/day
Toxephene	0.0002 ug/l	0.003 lbs/day	0.7300 ug/l	0.012 lbs/day

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IV. Numeric Stream Standards for Protection of Agriculture

	4 Day Average (Chronic) Standard		1 Hour Average (Acute) Standard	
	Concentration	Load*	Concentration	Load*
Arsenic			ug/l	lbs/day
Boron			ug/l	lbs/day
Cadmium			ug/l #VALUE!	lbs/day
Chromium			ug/l	lbs/day
Copper			ug/l	lbs/day
Lead			ug/l	lbs/day
Selenium			ug/l	lbs/day
TDS, Summer			mg/l	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	46.48 lbs/day
Acrolein	ug/l	lbs/day	780.0 ug/l	13.43 lbs/day
Acrylonitrile	ug/l	lbs/day	0.7 ug/l	0.01 lbs/day
Benzene	ug/l	lbs/day	71.0 ug/l	1.22 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	0.08 lbs/day
Chlorobenzene	ug/l	lbs/day	21000.0 ug/l	361.53 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	1.70 lbs/day

1,1,1-Trichloroethane					
Hexachloroethane	ug/l	lbs/day	8.9	ug/l	0.15 lbs/day
1,1-Dichloroethane					
1,1,2-Trichloroethane	ug/l	lbs/day	42.0	ug/l	0.72 lbs/day
1,1,2,2-Tetrachloroethai	ug/l	lbs/day	11.0	ug/l	0.19 lbs/day
Chloroethane			0.0	ug/l	0.00 lbs/day
Bis(2-chloroethyl) ether	ug/l	lbs/day	1.4	ug/l	0.02 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	74.03 lbs/day
2,4,6-Trichlorophenol	ug/l	lbs/day	6.5	ug/l	0.11 lbs/day
p-Chloro-m-cresol			0.0	ug/l	0.00 lbs/day
Chloroform (HM)	ug/l	lbs/day	470.0	ug/l	8.09 lbs/day
2-Chlorophenol	ug/l	lbs/day	400.0	ug/l	6.89 lbs/day
1,2-Dichlorobenzene	ug/l	lbs/day	17000.0	ug/l	292.67 lbs/day
1,3-Dichlorobenzene	ug/l	lbs/day	2600.0	ug/l	44.76 lbs/day
1,4-Dichlorobenzene	ug/l	lbs/day	2600.0	ug/l	44.76 lbs/day
3,3'-Dichlorobenzidine	ug/l	lbs/day	0.1	ug/l	0.00 lbs/day
1,1-Dichloroethylene	ug/l	lbs/day	3.2	ug/l	0.06 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	13.60 lbs/day
1,2-Dichloropropane	ug/l	lbs/day	39.0	ug/l	0.67 lbs/day
1,3-Dichloropropylene	ug/l	lbs/day	1700.0	ug/l	29.27 lbs/day
2,4-Dimethylphenol	ug/l	lbs/day	2300.0	ug/l	39.60 lbs/day
2,4-Dinitrotoluene	ug/l	lbs/day	9.1	ug/l	0.16 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	0.01 lbs/day
Ethylbenzene	ug/l	lbs/day	29000.0	ug/l	499.25 lbs/day
Fluoranthene	ug/l	lbs/day	370.0	ug/l	6.37 lbs/day
4-Chlorophenyl phenyl ether					
4-Bromophenyl phenyl ether					
Bis(2-chloroisopropyl) e	ug/l	lbs/day	170000.0	ug/l	2926.66 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	27.55 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	6.20 lbs/day
Dichlorobromomethane	ug/l	lbs/day	22.0	ug/l	0.38 lbs/day
Chlorodibromomethane	ug/l	lbs/day	34.0	ug/l	0.59 lbs/day
Hexachlorobutadiene(c)	ug/l	lbs/day	50.0	ug/l	0.86 lbs/day
Hexachlorocyclopentadi	ug/l	lbs/day	17000.0	ug/l	292.67 lbs/day
Isophorone	ug/l	lbs/day	600.0	ug/l	10.33 lbs/day
Naphthalene					
Nitrobenzene	ug/l	lbs/day	1900.0	ug/l	32.71 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	241.02 lbs/day
4,6-Dinitro-o-cresol	ug/l	lbs/day	765.0	ug/l	13.17 lbs/day
N-Nitrosodimethylamine	ug/l	lbs/day	8.1	ug/l	0.14 lbs/day
N-Nitrosodiphenylamine	ug/l	lbs/day	16.0	ug/l	0.28 lbs/day
N-Nitrosodi-n-propylami	ug/l	lbs/day	1.4	ug/l	0.02 lbs/day
Pentachlorophenol	ug/l	lbs/day	8.2	ug/l	0.14 lbs/day

Phenol	ug/l	lbs/day	4.6E+06	ug/l	7.92E+04 lbs/day
Bis(2-ethylhexyl)phthala	ug/l	lbs/day	5.9	ug/l	0.10 lbs/day
Butyl benzyl phthalate	ug/l	lbs/day	5200.0	ug/l	89.52 lbs/day
Di-n-butyl phthalate	ug/l	lbs/day	12000.0	ug/l	206.59 lbs/day
Di-n-octyl phthlate					
Diethyl phthalate	ug/l	lbs/day	120000.0	ug/l	2065.88 lbs/day
Dimethyl phthlate	ug/l	lbs/day	2.9E+06	ug/l	4.99E+04 lbs/day
Benzo(a)anthracene (P/	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
Benzo(a)pyrene (PAH)	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
Benzo(b)fluoranthene (F	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
Benzo(k)fluoranthene (F	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
Chrysene (PAH)	ug/l	lbs/day	0.0	ug/l	0.00 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	0.00 lbs/day
Indeno(1,2,3-cd)pyrene	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
Pyrene (PAH)	ug/l	lbs/day	11000.0	ug/l	189.37 lbs/day
Tetrachloroethylene	ug/l	lbs/day	8.9	ug/l	0.15 lbs/day
Toluene	ug/l	lbs/day	200000	ug/l	3443.13 lbs/day
Trichloroethylene	ug/l	lbs/day	81.0	ug/l	1.39 lbs/day
Vinyl chloride	ug/l	lbs/day	525.0	ug/l	9.04 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	0.03 lbs/day
beta-Endosulfan	ug/l	lbs/day	2.0	ug/l	0.03 lbs/day
Endosulfan sulfate	ug/l	lbs/day	2.0	ug/l	0.03 lbs/day
Endrin	ug/l	lbs/day	0.8	ug/l	0.01 lbs/day
Endrin aldehyde	ug/l	lbs/day	0.8	ug/l	0.01 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	74.03 lbs/day
Asbestos	ug/l	lbs/day		
Beryllium				
Cadmium				
Chromium (III)				
Chromium (VI)				
Copper				
Cyanide	ug/l	lbs/day	2.2E+05 ug/l	3787.45 lbs/day
Lead	ug/l	lbs/day		
Mercury			0.15 ug/l	0.00 lbs/day
Nickel			4600.00 ug/l	79.19 lbs/day
Selenium	ug/l	lbs/day		
Silver	ug/l	lbs/day		
Thallium			6.30 ug/l	0.11 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)	0.1	16.8	8.0	0.03	0.03	7.17	0.00	486.0
Fall	0.1	16.8	8.0	0.03	0.03	---	0.00	486.0
Winter	0.1	16.8	8.0	0.03	0.03	---	0.00	486.0
Spring	0.1	16.8	8.0	0.03	0.03	---	0.00	486.0

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

	Hg	Ni	Se	Ag	Zn	Boron
Dissolved Metals	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
All Seasons	0.0000	0.53*	1.06*	0.1*	0.053*	10.0

* 1/2 MDL

Projected Discharge Information

Season	Flow, MGD	Temp.	TDS mg/l	TDS tons/day
Summer	2.00000	16.5	536.00	4.46934
Fall	2.00000	16.5		
Winter	2.00000	16.5		
Spring	2.00000	16.5		

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	2.000 MGD	3.094 cfs
Fall	2.000 MGD	3.094 cfs
Winter	2.000 MGD	3.094 cfs
Spring	2.000 MGD	3.094 cfs

Flow Requirement or Loading Requirement

The calculations in this wasteload analysis utilize the maximum effluent discharge flow of 2 MGD. If the discharger is allowed to have a flow greater than 2 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 >	EOP Effluent	[Acute]
	IC25 >	96.9% 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	416.9 lbs/day
Fall	25.0 mg/l as BOD5	416.9 lbs/day
Winter	25.0 mg/l as BOD5	416.9 lbs/day
Spring	25.0 mg/l as BOD5	416.9 lbs/day

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

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

Season	**Concentration**
Summer	5.50
Fall	5.50
Winter	5.50
Spring	5.50

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	6.4	mg/l as N	106.2	lbs/day
	1 Hour Avg. - Acute	30.8	mg/l as N	513.6	lbs/day
Fall	4 Day Avg. - Chronic	6.4	mg/l as N	106.2	lbs/day
	1 Hour Avg. - Acute	31.9	mg/l as N	532.0	lbs/day
Winter	4 Day Avg. - Chronic	6.4	mg/l as N	106.2	lbs/day
	1 Hour Avg. - Acute	32.4	mg/l as N	539.8	lbs/day
Spring	4 Day Avg. - Chronic	6.4	mg/l as N	106.2	lbs/day
	1 Hour Avg. - Acute	31.9	mg/l as N	532.0	lbs/day

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

Effluent Limitation for Total Residual Chlorine based upon Water Quality Standards

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

Season		Concentration		Load	
Summer	4 Day Avg. - Chronic	0.011	mg/l	0.19	lbs/day
	1 Hour Avg. - Acute	0.020	mg/l	0.33	lbs/day
Fall	4 Day Avg. - Chronic	0.011	mg/l	0.19	lbs/day
	1 Hour Avg. - Acute	0.020	mg/l	0.33	lbs/day
Winter	4 Day Avg. - Chronic	0.011	mg/l	0.19	lbs/day
	1 Hour Avg. - Acute	0.020	mg/l	0.33	lbs/day
Spring	4 Day Avg. - Chronic	0.011	mg/l	0.00	lbs/day
	1 Hour Avg. - Acute	0.020	mg/l	0.00	lbs/day

Effluent Limitations for Total Dissolved Solids based upon Water Quality Standards

Season		Concentration		Load	
Summer	Maximum, Acute	None	mg/l	None	tons/day
Fall	Maximum, Acute	None	mg/l	None	tons/day
Winter	Maximum, Acute	None	mg/l	None	tons/day
Spring	4 Day Avg. - Chronic	None	mg/l	None	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 209.91 mg/l):

	4 Day Average Concentration		Load		1 Hour Average Concentration		Load	
Aluminum	N/A		N/A		774.2	ug/l	12.9	lbs/day
Arsenic	196.12	ug/l	2.1	lbs/day	351.0	ug/l	5.9	lbs/day
Cadmium	0.48	ug/l	0.0	lbs/day	4.7	ug/l	0.1	lbs/day
Chromium III	163.27	ug/l	1.8	lbs/day	3,416.4	ug/l	57.1	lbs/day
Chromium VI	11.23	ug/l	0.1	lbs/day	16.4	ug/l	0.3	lbs/day
Copper	18.12	ug/l	0.2	lbs/day	29.0	ug/l	0.5	lbs/day
Iron	N/A		N/A		1,032.3	ug/l	17.2	lbs/day
Lead	8.42	ug/l	0.1	lbs/day	216.6	ug/l	3.6	lbs/day
Mercury	0.01	ug/l	0.0	lbs/day	2.5	ug/l	0.0	lbs/day
Nickel	100.81	ug/l	1.1	lbs/day	906.9	ug/l	15.2	lbs/day
Selenium	4.70	ug/l	0.1	lbs/day	20.6	ug/l	0.3	lbs/day
Silver	N/A	ug/l	N/A	lbs/day	14.0	ug/l	0.2	lbs/day

Zinc	231.84 ug/l	2.5 lbs/day	231.8	ug/l	3.9 lbs/day
Cyanide	5.37 ug/l	0.1 lbs/day	22.7	ug/l	0.4 lbs/day

Effluent Limitations for Heat/Temperature based upon Water Quality Standards

Summer	18.9 Deg. C.	66.0 Deg. F
Fall	18.9 Deg. C.	66.0 Deg. F
Winter	18.9 Deg. C.	66.0 Deg. F
Spring	18.9 Deg. C.	66.0 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	3.88E-02 lbs/day
Chlordane	4.30E-03 ug/l	7.17E-02 lbs/day	1.2E+00 ug/l	3.10E-02 lbs/day
DDT, DDE	1.00E-03 ug/l	1.67E-02 lbs/day	5.5E-01 ug/l	1.42E-02 lbs/day
Dieldrin	1.90E-03 ug/l	3.17E-02 lbs/day	1.3E+00 ug/l	3.23E-02 lbs/day
Endosulfan	5.60E-02 ug/l	9.34E-01 lbs/day	1.1E-01 ug/l	2.84E-03 lbs/day
Endrin	2.30E-03 ug/l	3.84E-02 lbs/day	9.0E-02 ug/l	2.33E-03 lbs/day
Guthion	0.00E+00 ug/l	0.00E+00 lbs/day	1.0E-02 ug/l	2.58E-04 lbs/day
Heptachlor	3.80E-03 ug/l	6.34E-02 lbs/day	2.6E-01 ug/l	6.72E-03 lbs/day
Lindane	8.00E-02 ug/l	1.33E+00 lbs/day	1.0E+00 ug/l	2.58E-02 lbs/day
Methoxychlor	0.00E+00 ug/l	0.00E+00 lbs/day	3.0E-02 ug/l	7.75E-04 lbs/day
Mirex	0.00E+00 ug/l	0.00E+00 lbs/day	1.0E-02 ug/l	2.58E-04 lbs/day
Parathion	0.00E+00 ug/l	0.00E+00 lbs/day	4.0E-02 ug/l	1.03E-03 lbs/day
PCB's	1.40E-02 ug/l	2.33E-01 lbs/day	2.0E+00 ug/l	5.17E-02 lbs/day
Pentachlorophenol	1.30E+01 ug/l	2.17E+02 lbs/day	2.0E+01 ug/l	5.17E-01 lbs/day
Toxephene	2.00E-04 ug/l	3.34E-03 lbs/day	7.3E-01 ug/l	1.89E-02 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	83.5 lbs/day
Nitrates as N	4.0 mg/l	66.8 lbs/day
Total Phosphorus as P	0.05 mg/l	0.8 lbs/day
Total Suspended Solids	90.0 mg/l	1503.8 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	2.79E+03 ug/l	4.65E+01 lbs/day
Acrolein	8.05E+02 ug/l	1.34E+01 lbs/day
Acrylonitrile	6.81E-01 ug/l	1.14E-02 lbs/day
Benzene	7.33E+01 ug/l	1.22E+00 lbs/day
Benzidine	ug/l	lbs/day
Carbon tetrachloride	4.54E+00 ug/l	7.57E-02 lbs/day
Chlorobenzene	2.17E+04 ug/l	3.62E+02 lbs/day
1,2,4-Trichlorobenzene		
Hexachlorobenzene	7.95E-04 ug/l	1.33E-05 lbs/day
1,2-Dichloroethane	1.02E+02 ug/l	1.70E+00 lbs/day
1,1,1-Trichloroethane		
Hexachloroethane	9.19E+00 ug/l	1.53E-01 lbs/day
1,1-Dichloroethane		
1,1,2-Trichloroethane	4.34E+01 ug/l	7.23E-01 lbs/day
1,1,2,2-Tetrachloroethane	1.14E+01 ug/l	1.89E-01 lbs/day
Chloroethane		
Bis(2-chloroethyl) ether	1.45E+00 ug/l	2.41E-02 lbs/day
2-Chloroethyl vinyl ether		
2-Chloronaphthalene	4.44E+03 ug/l	7.40E+01 lbs/day
2,4,6-Trichlorophenol	6.71E+00 ug/l	1.12E-01 lbs/day
p-Chloro-m-cresol		
Chloroform (HM)	4.85E+02 ug/l	8.09E+00 lbs/day
2-Chlorophenol	4.13E+02 ug/l	6.89E+00 lbs/day
1,2-Dichlorobenzene	1.75E+04 ug/l	2.93E+02 lbs/day
1,3-Dichlorobenzene	2.68E+03 ug/l	4.48E+01 lbs/day

1,4-Dichlorobenzene	2.68E+03 ug/l	4.48E+01 lbs/day
3,3'-Dichlorobenzidine	7.95E-02 ug/l	1.33E-03 lbs/day
1,1-Dichloroethylene	3.30E+00 ug/l	5.51E-02 lbs/day
1,2-trans-Dichloroethylene1		
2,4-Dichlorophenol	8.16E+02 ug/l	1.36E+01 lbs/day
1,2-Dichloropropane	4.03E+01 ug/l	6.71E-01 lbs/day
1,3-Dichloropropylene	1.75E+03 ug/l	2.93E+01 lbs/day
2,4-Dimethylphenol	2.37E+03 ug/l	3.96E+01 lbs/day
2,4-Dinitrotoluene	9.39E+00 ug/l	1.57E-01 lbs/day
2,6-Dinitrotoluene		
1,2-Diphenylhydrazine	5.57E-01 ug/l	9.30E-03 lbs/day
Ethylbenzene	2.99E+04 ug/l	4.99E+02 lbs/day
Fluoranthene	3.82E+02 ug/l	6.37E+00 lbs/day
4-Chlorophenyl phenyl ether		
4-Bromophenyl phenyl ether		
Bis(2-chloroisopropyl) ether	1.75E+05 ug/l	2.93E+03 lbs/day
Bis(2-chloroethoxy) methane		
Methylene chloride (HM)	1.65E+03 ug/l	2.75E+01 lbs/day
Methyl chloride (HM)		
Methyl bromide (HM)		
Bromoform (HM)	3.72E+02 ug/l	6.20E+00 lbs/day
Dichlorobromomethane(HM)	2.27E+01 ug/l	3.79E-01 lbs/day
Chlorodibromomethane (HM)	3.51E+01 ug/l	5.85E-01 lbs/day
Hexachlorocyclopentadiene	1.75E+04 ug/l	2.93E+02 lbs/day
Isophorone	6.19E+02 ug/l	1.03E+01 lbs/day
Naphthalene		
Nitrobenzene	1.96E+03 ug/l	3.27E+01 lbs/day
2-Nitrophenol		
4-Nitrophenol		
2,4-Dinitrophenol	1.45E+04 ug/l	2.41E+02 lbs/day
4,6-Dinitro-o-cresol	7.90E+02 ug/l	1.32E+01 lbs/day
N-Nitrosodimethylamine	8.36E+00 ug/l	1.39E-01 lbs/day
N-Nitrosodiphenylamine	1.65E+01 ug/l	2.75E-01 lbs/day
N-Nitrosodi-n-propylamine	1.45E+00 ug/l	2.41E-02 lbs/day
Pentachlorophenol	8.47E+00 ug/l	1.41E-01 lbs/day
Phenol	4.75E+06 ug/l	7.92E+04 lbs/day
Bis(2-ethylhexyl)phthalate	6.09E+00 ug/l	1.02E-01 lbs/day
Butyl benzyl phthalate	5.37E+03 ug/l	8.95E+01 lbs/day
Di-n-butyl phthalate	1.24E+04 ug/l	2.07E+02 lbs/day
Di-n-octyl phthlate		
Diethyl phthalate	1.24E+05 ug/l	2.07E+03 lbs/day
Dimethyl phthlate	2.99E+06 ug/l	4.99E+04 lbs/day
Benzo(a)anthracene (PAH)	3.20E-02 ug/l	5.34E-04 lbs/day
Benzo(a)pyrene (PAH)	3.20E-02 ug/l	5.34E-04 lbs/day
Benzo(b)fluoranthene (PAH)	3.20E-02 ug/l	5.34E-04 lbs/day
Benzo(k)fluoranthene (PAH)	3.20E-02 ug/l	5.34E-04 lbs/day
Chrysene (PAH)	3.20E-02 ug/l	5.34E-04 lbs/day
Acenaphthylene (PAH)		
Anthracene (PAH)		
Dibenzo(a,h)anthracene (PAH)	3.20E-02 ug/l	5.34E-04 lbs/day
Indeno(1,2,3-cd)pyrene (PAH)	3.20E-02 ug/l	5.34E-04 lbs/day

Pyrene (PAH)	1.14E+04 ug/l	1.89E+02 lbs/day
Tetrachloroethylene	9.19E+00 ug/l	1.53E-01 lbs/day
Toluene	2.06E+05 ug/l	3.44E+03 lbs/day
Trichloroethylene	8.36E+01 ug/l	1.39E+00 lbs/day
Vinyl chloride	5.42E+02 ug/l	9.04E+00 lbs/day
Pesticides		
Aldrin	1.45E-04 ug/l	2.41E-06 lbs/day
Dieldrin	1.45E-04 ug/l	2.41E-06 lbs/day
Chlordane	6.09E-04 ug/l	1.02E-05 lbs/day
4,4'-DDT	6.09E-04 ug/l	1.02E-05 lbs/day
4,4'-DDE	6.09E-04 ug/l	1.02E-05 lbs/day
4,4'-DDD	8.67E-04 ug/l	1.45E-05 lbs/day
alpha-Endosulfan	2.06E+00 ug/l	3.44E-02 lbs/day
beta-Endosulfan	2.06E+00 ug/l	3.44E-02 lbs/day
Endosulfan sulfate	2.06E+00 ug/l	3.44E-02 lbs/day
Endrin	8.36E-01 ug/l	1.39E-02 lbs/day
Endrin aldehyde	8.36E-01 ug/l	1.39E-02 lbs/day
Heptachlor	2.17E-04 ug/l	3.62E-06 lbs/day
Heptachlor epoxide		
PCB's		
PCB 1242 (Arochlor 1242)	4.65E-05 ug/l	7.75E-07 lbs/day
PCB-1254 (Arochlor 1254)	4.65E-05 ug/l	7.75E-07 lbs/day
PCB-1221 (Arochlor 1221)	4.65E-05 ug/l	7.75E-07 lbs/day
PCB-1232 (Arochlor 1232)	4.65E-05 ug/l	7.75E-07 lbs/day
PCB-1248 (Arochlor 1248)	4.65E-05 ug/l	7.75E-07 lbs/day
PCB-1260 (Arochlor 1260)	4.65E-05 ug/l	7.75E-07 lbs/day
PCB-1016 (Arochlor 1016)	4.65E-05 ug/l	7.75E-07 lbs/day
Pesticide		
Toxaphene	7.74E-04 ug/l	1.29E-05 lbs/day
Metals		
Antimony	ug/l	lbs/day
Arsenic	ug/l	lbs/day
Asbestos	ug/l	lbs/day
Beryllium		
Cadmium		
Chromium (III)		
Chromium (VI)		
Copper	ug/l	lbs/day
Cyanide	ug/l	lbs/day
Lead		
Mercury	ug/l	lbs/day
Nickel	ug/l	lbs/day
Selenium		
Silver		
Thallium	ug/l	lbs/day
Zinc		

Dioxin		
Dioxin (2,3,7,8-TCDD)	1.45E-08 ug/l	2.41E-10 lbs/day

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

	Class 4 Acute Agricultural ug/l	Class 3 Acute Aquatic Wildlife ug/l	Acute Toxics Drinking Water Source ug/l	Acute Toxics Wildlife ug/l	1C Acute Health Criteria ug/l	Acute Most Stringent ug/l	Class 3 Chronic Aquatic Wildlife ug/l
Aluminum		774.2				774.2	N/A
Antimony				4439.0		4439.0	
Arsenic		351.0			0.0	351.0	196.1
Barium						0.0	
Beryllium						0.0	
Cadmium		4.7			0.0	4.7	0.5
Chromium (III)		3416.4			0.0	3416.4	163.3
Chromium (VI)		16.4			0.0	16.39	11.23
Copper		29.0				29.0	18.1
Cyanide		22.7	227110.5			22.7	5.4
Iron		1032.3				1032.3	
Lead		216.6			0.0	216.6	8.4
Mercury		2.48		0.15	0.0	0.15	0.012
Nickel		906.9		4748.7		906.9	100.8
Selenium		20.6			0.0	20.6	4.7
Silver		14.0			0.0	14.0	
Thallium				6.5		6.5	
Zinc		231.8				231.8	231.8
Boron	774.2					774.2	

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	774.2	N/A
Antimony	4438.98	
Arsenic	351.0	196.1
Asbestos	0.00E+00	
Barium		
Beryllium		
Cadmium	4.7	0.5
Chromium (III)	3416.4	163
Chromium (VI)	16.4	11.2
Copper	29.0	18.1

Cyanide	22.7	5.4
Iron	1032.3	
Lead	216.6	8.4
Mercury	0.155	0.012
Nickel	906.9	101
Selenium	20.6	4.7
Silver	14.0	N/A
Thallium	6.5	
Zinc	231.8	231.8
Boron	774.24	

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 was not 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.

Utah Division of Water Quality
801-538-6052
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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	1.727	99.264	0.000	92.009	0.600	0.469

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	3.453	0.000	0.000	32.000	26.557

BENTHIC DEMAND (SOD)20 gm/m2/day	BENTHIC DEMAND (SOD)T gm/m2/day
1.000	0.817

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

An antidegradation review (ADR) was conducted to determine whether the proposed activity complies with the applicable antidegradation requirements for receiving waters that may be affected. The Level I ADR evaluated the criteria of R317-2-3.5(b) and determined that a Level II Antidegradation Review is not required.