

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

**Date:** January 23, 2019

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Standards and Technical Services

**Facility:** Wellsville Wastewater Lagoons  
UPDES No. UT-0020371

**Receiving water:** Little Bear River (2B, 3A, 3D, 4)

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

Discharge

Outfall 001: Wastewater Treatment Lagoons to the Little Bear River

The mean monthly design discharge is 0.68 MGD (1.06 cfs) for the facility.

Receiving Water

The receiving water for Outfall 001 is Little Bear River.

Per UAC R317-2-13.3, the designated beneficial uses Little Bear River and tributaries, from Cutler Reservoir to headwaters, (with exceptions) is: 2B, 3A, 3D and 4.

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

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

Typically, the critical flow for the wasteload analysis is considered the lowest stream flow for seven consecutive days with a ten year return frequency (7Q10). Due to a lack of flow records, the 20th percentile of available flow measurements from DWQ monitoring station # 4905580, *Little Bear River above Wellsville Lagoons* for the period 2001-2015 was calculated to approximate the 7Q10 low flow condition. The calculated 7Q10 low flow values are listed in Table 1. Ambient water quality for the receiving water was characterized using data from the same station and time period.

**Table 1: Seasonal critical low flow (cfs)**

Season	Little Bear R. ab Wellsville Lagoons
Summer (July-Sept)	2.0
Fall (Oct -Dec)	3.8
Winter (Jan-Mar)	10.0
Spring (Apr -June)	9.2

### TMDL

Little Bear River from Cutler Reservoir to Hyrum Reservoir (Little Bear River-1 UT16010203-009\_00) is listed as impaired on the 2016 303(d) list for biological dissolved oxygen and temperature for the Class 3A cold water aquatic life use.

A Total Maximum Daily Load (TMDL) for total phosphorous (relating to the dissolved oxygen impairment) was completed for the Little Bear River on May 23, 2000. As part of that TMDL, the Wellsville Wastewater Facility was given a discharge load allocation of 0.27 kg/day. As a result of TP reductions from other sources in the watershed, specifically the elimination of the load attributed to feedlots (1.06 kg/d), Wellsville's allocation was increased to 1.2 kg/day (annual average). As part of that reallocation, and in order to minimize TP discharges to the Little Bear River during the critical summer months, TMDL staff recommended that the 1.2 kg/day load allocation be distributed on a seasonal basis to yield the following effluent limits:

Summer (4 months) June-September , 0.60 kg/day total phosphorous as a seasonal average or 72 total kg for the 4 month season.

Non-summer (8 months) October-May, 1.50 kg/day total phosphorous as a seasonal average or 360 total kg for the 8 month season.

### 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.

Since the receiving water low flow (2.0 cfs) is equal to or less than twice the flow of a point source discharge (1.06 cfs), the combined flows are considered to be totally mixed (r317-2-2.5). Acute and chronic limits were calculated using 100% of the seasonal critical low flow.

#### Parameters of Concern

The potential parameters of concern identified for the discharge/receiving water were total ammonia, total phosphorous, dissolved oxygen and temperature based on review of the past permit and the impairment status of the receiving water. Additional parameters of concern may become apparent as a result of reasonable potential analysis, technology based standards, or other factors as determined by the UPDES Permit Writer.

#### 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<sub>50</sub> (lethal concentration, 50%) percent effluent for acute toxicity and the IC<sub>25</sub> (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<sub>50</sub> is typically 100% effluent and does not need to be determined by the WLA.

**Table 3: WET Limits for IC<sub>25</sub>**

Outfall	Percent Effluent
Outfall 001	34.6

#### Wasteload Allocation Methods

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.

Effluent limits for total phosphorous are based on the approved Little Bea River TMDL (UDWQ 2000).

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

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known that the existing uses deviate from the designated beneficial uses for the receiving water. Therefore, the beneficial uses will be protected if the discharge remains below the WQBELs presented in this wasteload.

A Level II Antidegradation Review (ADR) is required for this facility because it discharges to a 1C drinking water source as outlined in R317-2-3.5d.

Documents:

WLA Document: *Wellsville\_WLADoc\_1-23-19.docx*

Wasteload Analysis and Addendum: *Wellsville\_WLA\_1-10-19.xlsm*

References:

Lewis, B., J. Saunders, and M. Murphy. 2002. *Ammonia Toxicity Model (AMMTOX, Version2): A Tool for Determining Effluent Ammonia Limits*. University of Colorado, Center for Limnology.

Utah Division of Water Quality. 2000. Little Bear River TMDL.

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

22-Jan-19

# WASTELOAD ANALYSIS [WLA] Addendum: Statement of Basis

Facilities: Wellsville City  
Discharging to: Little Bear River  
Effluent Design Flow: 0.683 MGD

UPDES No: UT-0020371

## 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 in terms 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

Little Bear River:	2B, 3A, 3D, 4
Antidegradation Review:	Level I review completed. Level II review not required.

## III. Numeric Stream Standards for Protection of Aquatic Wildlife

Total Ammonia (TNH <sub>3</sub> )	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

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**Acute and Chronic Heavy Metals (Dissolved)**

Parameter	4 Day Average (Chronic) Standard		1 Hour Average (Acute) Standard		
	Concentration	Load*	Concentration	ug/l	Load*
Aluminum	87.00 ug/l**	0.496 lbs/day	750.00	ug/l	4.280 lbs/day
Arsenic	190.00 ug/l	1.084 lbs/day	340.00	ug/l	1.940 lbs/day
Cadmium	1.88 ug/l	0.011 lbs/day	4.95	ug/l	0.028 lbs/day
Chromium III	200.33 ug/l	1.143 lbs/day	4191.34	ug/l	23.916 lbs/day
ChromiumVI	11.00 ug/l	0.063 lbs/day	16.00	ug/l	0.091 lbs/day
Copper	22.49 ug/l	0.128 lbs/day	36.94	ug/l	0.211 lbs/day
Iron			1000.00	ug/l	5.706 lbs/day
Lead	11.81 ug/l	0.067 lbs/day	302.94	ug/l	1.729 lbs/day
Mercury	0.0120 ug/l	0.000 lbs/day	2.40	ug/l	0.014 lbs/day
Nickel	124.68 ug/l	0.711 lbs/day	1121.39	ug/l	6.399 lbs/day
Selenium	4.60 ug/l	0.026 lbs/day	20.00	ug/l	0.114 lbs/day
Silver	N/A ug/l	N/A lbs/day	22.25	ug/l	0.127 lbs/day
Zinc	286.76 ug/l	1.636 lbs/day	286.76	ug/l	1.636 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 280.1 mg/l as CaCO3

**Organics [Pesticides]**

Parameter	4 Day Average (Chronic) Standard		1 Hour Average (Acute) Standard		
	Concentration	Load*	Concentration	ug/l	Load*
Aldrin			1.500	ug/l	0.009 lbs/day
Chlordane	0.004 ug/l	0.071 lbs/day	1.200	ug/l	0.007 lbs/day
DDT, DDE	0.001 ug/l	0.016 lbs/day	0.550	ug/l	0.003 lbs/day
Dieldrin	0.002 ug/l	0.031 lbs/day	1.250	ug/l	0.007 lbs/day
Endosulfan	0.056 ug/l	0.923 lbs/day	0.110	ug/l	0.001 lbs/day
Endrin	0.002 ug/l	0.038 lbs/day	0.090	ug/l	0.001 lbs/day
Guthion			0.010	ug/l	0.000 lbs/day
Heptachlor	0.004 ug/l	0.063 lbs/day	0.260	ug/l	0.001 lbs/day
Lindane	0.080 ug/l	1.318 lbs/day	1.000	ug/l	0.006 lbs/day
Methoxychlor			0.030	ug/l	0.000 lbs/day
Mirex			0.010	ug/l	0.000 lbs/day
Parathion			0.040	ug/l	0.000 lbs/day
PCB's	0.014 ug/l	0.231 lbs/day	2.000	ug/l	0.011 lbs/day
Pentachlorophenol	13.00 ug/l	214.176 lbs/day	20.000	ug/l	0.114 lbs/day
Toxephene	0.0002 ug/l	0.003 lbs/day	0.7300	ug/l	0.004 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			100.0 ug/l	lbs/day
Boron			750.0 ug/l	lbs/day
Cadmium			10.0 ug/l	0.03 lbs/day
Chromium			100.0 ug/l	lbs/day
Copper			200.0 ug/l	lbs/day
Lead			100.0 ug/l	lbs/day
Selenium			50.0 ug/l	lbs/day
TDS, Summer			1200.0 mg/l	3.42 tons/day

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

Metals	4 Day Average (Chronic) Standard		1 Hour Average (Acute) Standard	
	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]**

Toxic Organics	Maximum Conc., ug/l - Acute Standards			
	Class 1C [2 Liters/Day for 70 Kg Person over 70 Yr.]		Class 3A, 3B [6.5 g for 70 Kg Person over 70 Yr.]	
Acenaphthene	ug/l	lbs/day	2700.0 ug/l	44.48 lbs/day
Acrolein	ug/l	lbs/day	780.0 ug/l	12.85 lbs/day
Acrylonitrile	ug/l	lbs/day	0.7 ug/l	0.01 lbs/day
Benzene	ug/l	lbs/day	71.0 ug/l	1.17 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	0.07 lbs/day
Chlorobenzene	ug/l	lbs/day	21000.0 ug/l	345.98 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	1.63 lbs/day

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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	0.69 lbs/day
1,1,2,2-Tetrachloroethane	ug/l	lbs/day	11.0 ug/l	0.18 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	70.84 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	7.74 lbs/day
2-Chlorophenol	ug/l	lbs/day	400.0 ug/l	6.59 lbs/day
1,2-Dichlorobenzene	ug/l	lbs/day	17000.0 ug/l	280.08 lbs/day
1,3-Dichlorobenzene	ug/l	lbs/day	2600.0 ug/l	42.84 lbs/day
1,4-Dichlorobenzene	ug/l	lbs/day	2600.0 ug/l	42.84 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	0.05 lbs/day
1,2-trans-Dichloroethylene	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
2,4-Dichlorophenol	ug/l	lbs/day	790.0 ug/l	13.02 lbs/day
1,2-Dichloropropane	ug/l	lbs/day	39.0 ug/l	0.64 lbs/day
1,3-Dichloropropylene	ug/l	lbs/day	1700.0 ug/l	28.01 lbs/day
2,4-Dimethylphenol	ug/l	lbs/day	2300.0 ug/l	37.89 lbs/day
2,4-Dinitrotoluene	ug/l	lbs/day	9.1 ug/l	0.15 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	477.78 lbs/day
Fluoranthene	ug/l	lbs/day	370.0 ug/l	6.10 lbs/day
4-Chlorophenyl phenyl ether				
4-Bromophenyl phenyl ether				
Bis(2-chloroisopropyl) ether	ug/l	lbs/day	170000.0 ug/l	2800.76 lbs/day
Bis(2-chloroethoxy) methane	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Methylene chloride (HM)	ug/l	lbs/day	1600.0 ug/l	26.36 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	5.93 lbs/day
Dichlorobromomethane	ug/l	lbs/day	22.0 ug/l	0.36 lbs/day
Chlorodibromomethane	ug/l	lbs/day	34.0 ug/l	0.56 lbs/day
Hexachlorobutadiene(c)	ug/l	lbs/day	50.0 ug/l	0.82 lbs/day
Hexachlorocyclopentadiene	ug/l	lbs/day	17000.0 ug/l	280.08 lbs/day
Isophorone	ug/l	lbs/day	600.0 ug/l	9.89 lbs/day
Naphthalene				
Nitrobenzene	ug/l	lbs/day	1900.0 ug/l	31.30 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	230.65 lbs/day
4,6-Dinitro-o-cresol	ug/l	lbs/day	765.0 ug/l	12.60 lbs/day
N-Nitrosodimethylamine	ug/l	lbs/day	8.1 ug/l	0.13 lbs/day
N-Nitrosodiphenylamine	ug/l	lbs/day	16.0 ug/l	0.26 lbs/day
N-Nitrosodi-n-propylamine	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

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Phenol	ug/l	lbs/day	4.6E+06 ug/l	7.58E+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	85.67 lbs/day
Di-n-butyl phthalate	ug/l	lbs/day	12000.0 ug/l	197.70 lbs/day
Di-n-octyl phthlate				
Diethyl phthalate	ug/l	lbs/day	120000.0 ug/l	1977.01 lbs/day
Dimethyl phthlate	ug/l	lbs/day	2.9E+06 ug/l	4.78E+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	181.23 lbs/day
Tetrachloroethylene	ug/l	lbs/day	8.9 ug/l	0.15 lbs/day
Toluene	ug/l	lbs/day	200000 ug/l	3295.02 lbs/day
Trichloroethylene	ug/l	lbs/day	81.0 ug/l	1.33 lbs/day
Vinyl chloride	ug/l	lbs/day	525.0 ug/l	8.65 lbs/day
				lbs/day
				lbs/day
<b>Pesticides</b>				
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				
<b>PCB's</b>				
PCB 1242 (Arochlor 124	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1254 (Arochlor 125	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1221 (Arochlor 122	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1232 (Arochlor 123	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1248 (Arochlor 124	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1260 (Arochlor 126	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1016 (Arochlor 101	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
<b>Pesticide</b>				
Toxaphene	ug/l		0.0 ug/l	0.00 lbs/day
<b>Dioxin</b>				
Dioxin (2,3,7,8-TCDD)	ug/l	lbs/day		

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**Metals**

Antimony	ug/l	lbs/day		
Arsenic	ug/l	lbs/day	4300.00 ug/l	70.84 lbs/day
Asbestos	ug/l	lbs/day		
Beryllium				
Cadmium				
Chromium (III)				
Chromium (VI)				
Copper				
Cyanide	ug/l	lbs/day	2.2E+05 ug/l	3624.52 lbs/day
Lead	ug/l	lbs/day		
Mercury			0.15 ug/l	0.00 lbs/day
Nickel			4600.00 ug/l	75.79 lbs/day
Selenium	ug/l	lbs/day		
Silver	ug/l	lbs/day		
Thallium			6.30 ug/l	0.10 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.

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(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	Temp.	pH	T-NH3	BOD5	DO	TRC	TDS	
	cfs	Deg. C		mg/l as N	mg/l	mg/l	mg/l	mg/l	
Summer (Irrig. Season)	2.00	16.3	7.9	0.10	1.00	7.48	0.00	398.7	
Fall	3.80	7.8	7.9	0.10	1.00	---	0.00	358.9	
Winter	10.00	4.4	8.1	0.10	1.00	---	0.00	353.6	
Spring	9.20	11.3	8.3	0.10	1.00	---	0.00	280.8	
Dissolved Metals	Al	As	Cd	CrIII	CrVI	Copper	Fe	Pb	
All Seasons	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	
All Seasons	9.10	3.70	0.20	1.80	3.975*	2.40	11.6	0.50	
Dissolved Metals	Hg	Ni	Se	Ag	Zn	Boron			
All Seasons	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l			
All Seasons	0.0000	2.50	0.50	0.50	12.50	26.9	* ~80% MDL		

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**Projected Discharge Information**

Season	Flow, MGD	Temp.
Summer	0.68300	17.0
Fall	0.68300	15.0
Winter	0.68300	12.0
Spring	0.68300	15.0

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	0.683 MGD	1.057 cfs
Fall	0.683 MGD	1.057 cfs
Winter	0.683 MGD	1.057 cfs
Spring	0.683 MGD	1.057 cfs

**Flow Requirement or Loading Requirement**

The calculations in this wasteload analysis utilize the maximum effluent discharge flow of 0.683 MGD. If the discharger is allowed to have a flow greater than 0.683 MGD during 7Q10 conditions, and effluent limit concentrations as indicated, then water quality standards will be violated. In order to prevent this from occurring, the permit writers must include the discharge flow limitation 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 segments if the values below are met.

WET Requirements	LC50 >	100.0% Effluent	[Acute]
	IC25 >	34.6% Effluent	[Chronic]

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**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	142.4 lbs/day
Fall	25.0 mg/l as BOD5	142.4 lbs/day
Winter	25.0 mg/l as BOD5	142.4 lbs/day
Spring	25.0 mg/l as BOD5	142.4 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	10.28 mg/l as N	58.5 lbs/day
	1 Hour Avg. - Acute	28.7 mg/l as N	163.2 lbs/day
Fall	4 Day Avg. - Chronic	14.5 mg/l as N	82.9 lbs/day
	1 Hour Avg. - Acute	22.0 mg/l as N	125.5 lbs/day
Winter	4 Day Avg. - Chronic	22.7 mg/l as N	129.4 lbs/day
	1 Hour Avg. - Acute	37.0 mg/l as N	210.9 lbs/day
Spring	4 Day Avg. - Chronic	12.5 mg/l as N	71.1 lbs/day
	1 Hour Avg. - Acute	22.0 mg/l as N	125.1 lbs/day

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

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**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	0.030 mg/l	0.17 lbs/day
	1 Hour Avg. - Acute	0.053 mg/l	0.30 lbs/day
Fall	4 Day Avg. - Chronic	0.047 mg/l	0.27 lbs/day
	1 Hour Avg. - Acute	0.084 mg/l	0.48 lbs/day
Winter	4 Day Avg. - Chronic	0.105 mg/l	0.60 lbs/day
	1 Hour Avg. - Acute	0.189 mg/l	1.08 lbs/day
Spring	4 Day Avg. - Chronic	0.098 mg/l	0.56 lbs/day
	1 Hour Avg. - Acute	0.175 mg/l	1.00 lbs/day

**Effluent Limitations for Total Dissolved Solids based upon Water Quality Standards**

Season		Concentration	Load
Summer	Maximum, Acute	2716.8 mg/l	7.74 tons/day
Fall	Maximum, Acute	2792.1 mg/l	7.95 tons/day
Winter	Maximum, Acute	2802.1 mg/l	7.98 tons/day
Spring	Maximum, Acute	2939.9 mg/l	8.37 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 280.1 mg/l):

	4 Day Average		1 Hour Average		Load
	Concentration	Load	Concentration	Load	
Aluminum*	N/A	N/A	1,451.2	ug/l	8.3 lbs/day
Arsenic*	542.64 ug/l	2.0 lbs/day	658.3	ug/l	3.8 lbs/day
Cadmium	5.05 ug/l	0.0 lbs/day	9.5	ug/l	0.1 lbs/day
Chromium III	576.13 ug/l	2.1 lbs/day	8,156.5	ug/l	46.5 lbs/day
Chromium VI*	24.30 ug/l	0.1 lbs/day	27.4	ug/l	0.2 lbs/day
Copper	60.53 ug/l	0.2 lbs/day	69.6	ug/l	0.4 lbs/day
Iron*	N/A	N/A	1,935.5	ug/l	11.0 lbs/day
Lead	33.20 ug/l	0.1 lbs/day	589.2	ug/l	3.4 lbs/day
Mercury*	0.03 ug/l	0.0 lbs/day	4.7	ug/l	0.0 lbs/day
Nickel	355.94 ug/l	1.3 lbs/day	2,180.3	ug/l	12.4 lbs/day
Selenium*	12.36 ug/l	0.0 lbs/day	38.5	ug/l	0.2 lbs/day
Silver	N/A ug/l	N/A lbs/day	42.8	ug/l	0.2 lbs/day

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Zinc	805.90 ug/l	3.0 lbs/day	546.3	ug/l	3.1 lbs/day
Cyanide*	15.04 ug/l	0.1 lbs/day	42.8	ug/l	0.2 lbs/day

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

**Effluent Limitations for Heat/Temperature based upon  
Water Quality Standards**

Summer	22.1 Deg. C.	71.8 Deg. F
Fall	17.0 Deg. C.	62.6 Deg. F
Winter	25.3 Deg. C.	77.6 Deg. F
Spring	30.7 Deg. C.	87.3 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		1 Hour Average		
	Concentration	Load	Concentration		Load
Aldrin			1.5E+00	ug/l	1.32E-02 lbs/day
Chlordane	4.30E-03 ug/l	2.45E-02 lbs/day	1.2E+00	ug/l	1.06E-02 lbs/day
DDT, DDE	1.00E-03 ug/l	5.70E-03 lbs/day	5.5E-01	ug/l	4.86E-03 lbs/day
Dieldrin	1.90E-03 ug/l	1.08E-02 lbs/day	1.3E+00	ug/l	1.10E-02 lbs/day
Endosulfan	5.60E-02 ug/l	3.19E-01 lbs/day	1.1E-01	ug/l	9.71E-04 lbs/day
Endrin	2.30E-03 ug/l	1.31E-02 lbs/day	9.0E-02	ug/l	7.94E-04 lbs/day
Guthion	0.00E+00 ug/l	0.00E+00 lbs/day	1.0E-02	ug/l	8.83E-05 lbs/day
Heptachlor	3.80E-03 ug/l	2.16E-02 lbs/day	2.6E-01	ug/l	2.30E-03 lbs/day
Lindane	8.00E-02 ug/l	4.56E-01 lbs/day	1.0E+00	ug/l	8.83E-03 lbs/day
Methoxychlor	0.00E+00 ug/l	0.00E+00 lbs/day	3.0E-02	ug/l	2.65E-04 lbs/day
Mirex	0.00E+00 ug/l	0.00E+00 lbs/day	1.0E-02	ug/l	8.83E-05 lbs/day
Parathion	0.00E+00 ug/l	0.00E+00 lbs/day	4.0E-02	ug/l	3.53E-04 lbs/day
PCB's	1.40E-02 ug/l	7.97E-02 lbs/day	2.0E+00	ug/l	1.77E-02 lbs/day
Pentachlorophenol	1.30E+01 ug/l	7.40E+01 lbs/day	2.0E+01	ug/l	1.77E-01 lbs/day
Toxephene	2.00E-04 ug/l	1.14E-03 lbs/day	7.3E-01	ug/l	6.44E-03 lbs/day

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**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:

	<b>1 Hour Average</b>	
	Concentration	Loading
Gross Beta (pCi/l)	50.0 pCi/L	
BOD (mg/l)	5.0 mg/l	28.5 lbs/day
Nitrates as N	4.0 mg/l	22.8 lbs/day
Total Phosphorus as P	0.05 mg/l	0.3 lbs/day
Total Suspended Solids	90.0 mg/l	513.6 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:

	<b>Maximum Concentration</b>	
	Concentration	Load
<b>Toxic Organics</b>		
Acenaphthene	7.81E+03 ug/l	4.45E+01 lbs/day
Acrolein	2.26E+03 ug/l	1.29E+01 lbs/day
Acrylonitrile	1.91E+00 ug/l	1.09E-02 lbs/day
Benzene	2.05E+02 ug/l	1.17E+00 lbs/day
Benzidine	ug/l	lbs/day
Carbon tetrachloride	1.27E+01 ug/l	7.25E-02 lbs/day
Chlorobenzene	6.08E+04 ug/l	3.46E+02 lbs/day
1,2,4-Trichlorobenzene		
Hexachlorobenzene	2.23E-03 ug/l	1.27E-05 lbs/day
1,2-Dichloroethane	2.86E+02 ug/l	1.63E+00 lbs/day
1,1,1-Trichloroethane		
Hexachloroethane	2.57E+01 ug/l	1.47E-01 lbs/day
1,1-Dichloroethane		
1,1,2-Trichloroethane	1.22E+02 ug/l	6.92E-01 lbs/day
1,1,2,2-Tetrachloroethane	3.18E+01 ug/l	1.81E-01 lbs/day
Chloroethane		
Bis(2-chloroethyl) ether	4.05E+00 ug/l	2.31E-02 lbs/day
2-Chloroethyl vinyl ether		
2-Chloronaphthalene	1.24E+04 ug/l	7.08E+01 lbs/day
2,4,6-Trichlorophenol	1.88E+01 ug/l	1.07E-01 lbs/day
p-Chloro-m-cresol		
Chloroform (HM)	1.36E+03 ug/l	7.74E+00 lbs/day
2-Chlorophenol	1.16E+03 ug/l	6.59E+00 lbs/day
1,2-Dichlorobenzene	4.92E+04 ug/l	2.80E+02 lbs/day
1,3-Dichlorobenzene	7.52E+03 ug/l	4.28E+01 lbs/day

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1,4-Dichlorobenzene	7.52E+03 ug/l	4.28E+01 lbs/day
2,4-Dinitrotoluene	2.63E+01 ug/l	1.50E-01 lbs/day
2,6-Dinitrotoluene		
1,2-Diphenylhydrazine	1.56E+00 ug/l	8.90E-03 lbs/day
Ethylbenzene	8.39E+04 ug/l	4.78E+02 lbs/day
Fluoranthene	1.07E+03 ug/l	6.10E+00 lbs/day
4-Chlorophenyl phenyl ether		
4-Bromophenyl phenyl ether		
Bis(2-chloroisopropyl) ether	4.92E+05 ug/l	2.80E+03 lbs/day
Bis(2-chloroethoxy) methane		
Methylene chloride (HM)	4.63E+03 ug/l	2.64E+01 lbs/day
Methyl chloride (HM)		
Methyl bromide (HM)		
Bromoform (HM)	1.04E+03 ug/l	5.93E+00 lbs/day
Dichlorobromomethane(HM)	6.36E+01 ug/l	3.62E-01 lbs/day
Chlorodibromomethane (HM)	9.84E+01 ug/l	5.60E-01 lbs/day
Hexachlorocyclopentadiene	4.92E+04 ug/l	2.80E+02 lbs/day
Isophorone	1.74E+03 ug/l	9.89E+00 lbs/day
Naphthalene		
Nitrobenzene	5.50E+03 ug/l	3.13E+01 lbs/day
2-Nitrophenol		
4-Nitrophenol		
2,4-Dinitrophenol	4.05E+04 ug/l	2.31E+02 lbs/day
4,6-Dinitro-o-cresol	2.21E+03 ug/l	1.26E+01 lbs/day
N-Nitrosodimethylamine	2.34E+01 ug/l	1.33E-01 lbs/day
N-Nitrosodiphenylamine	4.63E+01 ug/l	2.64E-01 lbs/day
N-Nitrosodi-n-propylamine	4.05E+00 ug/l	2.31E-02 lbs/day
Pentachlorophenol	2.37E+01 ug/l	1.35E-01 lbs/day
Phenol	1.33E+07 ug/l	7.58E+04 lbs/day
Bis(2-ethylhexyl)phthalate	1.71E+01 ug/l	9.72E-02 lbs/day
Butyl benzyl phthalate	1.50E+04 ug/l	8.57E+01 lbs/day
Di-n-butyl phthalate	3.47E+04 ug/l	1.98E+02 lbs/day
Di-n-octyl phthlate		
Diethyl phthalate	3.47E+05 ug/l	1.98E+03 lbs/day
Dimethyl phthlate	8.39E+06 ug/l	4.78E+04 lbs/day
Benzo(a)anthracene (PAH)	8.97E-02 ug/l	5.11E-04 lbs/day
Benzo(a)pyrene (PAH)	8.97E-02 ug/l	5.11E-04 lbs/day
Benzo(b)fluoranthene (PAH)	8.97E-02 ug/l	5.11E-04 lbs/day
Benzo(k)fluoranthene (PAH)	8.97E-02 ug/l	5.11E-04 lbs/day
Chrysene (PAH)	8.97E-02 ug/l	5.11E-04 lbs/day
Acenaphthylene (PAH)		
Anthracene (PAH)		
Dibenzo(a,h)anthracene (PAH)	8.97E-02 ug/l	5.11E-04 lbs/day
Indeno(1,2,3-cd)pyrene (PAH)	8.97E-02 ug/l	5.11E-04 lbs/day
Pyrene (PAH)	3.18E+04 ug/l	1.81E+02 lbs/day
Tetrachloroethylene	2.57E+01 ug/l	1.47E-01 lbs/day
Toluene	5.79E+05 ug/l	3.30E+03 lbs/day
Trichloroethylene	2.34E+02 ug/l	1.33E+00 lbs/day
Vinyl chloride	1.52E+03 ug/l	8.65E+00 lbs/day

**Pesticides**

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Aldrin	4.05E-04 ug/l	2.31E-06 lbs/day
Dieldrin	4.05E-04 ug/l	2.31E-06 lbs/day
Chlordane	1.71E-03 ug/l	9.72E-06 lbs/day
4,4'-DDT	1.71E-03 ug/l	9.72E-06 lbs/day
4,4'-DDE	1.71E-03 ug/l	9.72E-06 lbs/day
4,4'-DDD	2.43E-03 ug/l	1.38E-05 lbs/day
alpha-Endosulfan	5.79E+00 ug/l	3.30E-02 lbs/day
beta-Endosulfan	5.79E+00 ug/l	3.30E-02 lbs/day
Endosulfan sulfate	5.79E+00 ug/l	3.30E-02 lbs/day
Endrin	2.34E+00 ug/l	1.33E-02 lbs/day
PCB-1254 (Arochlor 1254)	1.30E-04 ug/l	7.41E-07 lbs/day
PCB-1221 (Arochlor 1221)	1.30E-04 ug/l	7.41E-07 lbs/day
PCB-1232 (Arochlor 1232)	1.30E-04 ug/l	7.41E-07 lbs/day
PCB-1248 (Arochlor 1248)	1.30E-04 ug/l	7.41E-07 lbs/day
PCB-1260 (Arochlor 1260)	1.30E-04 ug/l	7.41E-07 lbs/day
PCB-1016 (Arochlor 1016)	1.30E-04 ug/l	7.41E-07 lbs/day
<b>Pesticide</b>		
Toxaphene	2.17E-03 ug/l	1.24E-05 lbs/day
<b>Metals</b>		
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		
<b>Dioxin</b>		
Dioxin (2,3,7,8-TCDD)	4.05E-08 ug/l	2.31E-10 lbs/day

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

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	<b>Class 4 Acute Agricultural ug/l</b>	<b>Class 3 Acute Aquatic Wildlife ug/l</b>	<b>Acute Toxics Drinking Water Source ug/l</b>	<b>Acute Toxics Wildlife ug/l</b>	<b>1C Acute Health Criteria ug/l</b>	<b>Acute Most Stringent ug/l</b>	<b>Class 3 Chronic Aquatic Wildlife ug/l</b>
Aluminum		1451.2				1451.2	N/A
Antimony				12439.3		12439.3	
Arsenic	289.3	658.3				289.3	542.6
Barium							
Beryllium						0.0	
Cadmium	28.6	9.5				9.5	5.0
Chromium (III)		8156.5				8156.5	576.1
Chromium (VI)	285.9	27.4				27.38	24.30
Copper	574.0	69.6				69.6	60.5
Cyanide		42.8	636429.7			42.8	15.0
Iron		1935.5				1935.5	
Lead	288.3	589.2				288.3	33.2
Mercury		4.67		0.43		0.43	0.035
Nickel		2180.3		13307.2		2180.3	355.9
Selenium	143.7	38.5				38.5	12.4
Silver		42.8				42.8	
Thallium				18.2		18.2	
Zinc		546.3				546.3	805.9
Boron	2118.7					2118.7	
Sulfate	5785.7						

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

	<b>WLA Acute ug/l</b>	<b>WLA Chronic ug/l</b>	
Aluminum	1451.2	N/A	
Antimony	12439.31		
Arsenic	289.3	542.6	Acute Controls
Asbestos			
Barium			
Beryllium			
Cadmium	9.5	5.0	
Chromium (III)	8156.5	576	
Chromium (VI)	27.4	24.3	
Copper	69.6	60.5	
Cyanide	42.8	15.0	
Iron	1935.5		
Lead	288.3	33.2	
Mercury	0.434	0.035	
Nickel	2180.3	356	
Selenium	38.5	12.4	
Silver	42.8	N/A	
Thallium	18.2		
Zinc	546.3	805.9	Acute Controls

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Boron	2118.73	
Sulfate	5785.7	N/A at this Waterbody

Other Effluent Limitations are based upon R317-1.

E. coli                      126.0 organisms per 100 ml

**X. Antidegradation Considerations**

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

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

**XI. Colorado River Salinity Forum Considerations**

Discharges in the Colorado River Basin are required to have their discharge at a TDS loading of less than 1.00 tons/day unless certain exemptions apply. Refer to the Forum's Guidelines for additional information allowing for an exceedence of this value.

**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.