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

Date: **January 24, 2019**

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Standards and Technical Services

Facility: **Springdale Wastewater Lagoons**
UPDES No. UT-025224

Receiving water: **Virgin River (1C, 2B, 3C, 4)**

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

Discharge

Outfall 001: Virgin River

The maximum monthly average design flow for the facility is 0.29 MGD (0.54 cfs).

Receiving Water
The receiving water for Outfall 001 is the Virgin River.

Per UAC R317-2-13.2(a), the designated beneficial uses for the Virgin River and tributaries from the Quail Creek Diversion to headwaters (with exceptions) are 1C, 2B, 3C and 4.

- *Class 1C -- Protected for domestic purposes with prior treatment by treatment processes as required by the Utah Division of Drinking Water*

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

- *Class 3C - Protected for nongame fish and other aquatic life, including the necessary aquatic organisms in their food chain.*

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

Critical Low Flow

Typically, the critical flow for the wasteload analysis is considered the lowest stream flow for seven consecutive days with a ten year return frequency (7Q10). The 7Q10 was calculated using daily average flow values from USGS station #09406000 Virgin River at Virgin, UT for the period 1999-2018. Receiving water quality was characterized using data from DWQ Monitoring Station #4950850, Virgin River 1 Mile East of Virgin for the period 2001-2013.

The calculated annual 7Q10 is 49.5 cfs.

Both of the above monitoring stations are below Springdale's discharge location. However, review of available stations and data led to the conclusion that they are the most appropriate sites to characterize the receiving water. Upstream stations on the Virgin River are upstream of the confluence with major tributaries (East Fork of the Virgin River). Discharge data from Springdale's Lagoons indicate that they discharge on a very intermittent basis (on the order of 4 times per year). Additionally, the lagoon discharge rate (.45 cfs) is very small compared to the receiving water flow (even at critical low flow of 49.5 cfs). Given these factors, it is unlikely that downstream data is significantly influence by the lagoon discharge.

TMDL

According to DWQ's 2016 303(d) Assessment, the Virgin River and tributaries from North Creek confluence to North Fork Virgin River (Assessment Unit UT15010008-012_00), is fully supporting its beneficial uses.

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.

Modeling results show that the effluent was totally mixed with the receiving water within the chronic mixing zone. Acute limits were calculated using 50% of the seasonal critical low flow.

Parameters of Concern

No specific parameters of concern were identified by based on review of the past permit and the impairment status of the receiving water. Addition 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_{50} (lethal concentration, 50%) percent effluent for acute toxicity and the IC_{25} (inhibition concentration, 25%) percent effluent for chronic toxicity, as determined by the WET test, needs to be below the WET limits, as determined by the WLA. The WET limit for LC_{50} is typically 100% effluent and does not need to be determined by the WLA.

Table 1: WET Limits for IC_{25}

Outfall	Percent Effluent
Outfall 001	0.9%

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.

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 facility. The proposed permit is a simple renewal, with no increase in flow or concentration over that which was approved in the existing permit.

Documents:

WLA Document: *Springdale_WLADoc_1-24-19.docx*
Wasteload Analysis and Addendum: *Springdale_WLA_1-25-19.xls*

References:

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

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

WASTELOAD ANALYSIS [WLA]
Addendum: Statement of Basis
SUMMARY

Discharging Facility:	**Springdale Lagoons**		
UPDES No:	UT-025224		
Design Flow	0.29	MGD	

Receiving Water:	**Springdale_WLA_1-25-19.xls**		
Stream Classification:	1C, 2B, 3C, 4		
Stream Flows [cfs]:	49.50	Summer (July-Sept)	7Q10
	49.50	Fall (Oct-Dec)	7Q10
	49.50	Winter (Jan-Mar)	7Q10
	49.50	Spring (Apr-June)	7Q10
	0.0	Average	
Stream TDS Values:	480.8	Summer (July-Sept)	Average
	492.2	Fall (Oct-Dec)	Average
	457.3	Winter (Jan-Mar)	Average
	512.2	Spring (Apr-June)	Average

Effluent Limits:				**WQ Standard:**
Flow, MGD:	0.29	MGD	Design Flow	
BOD, mg/l:	35.0	Summer	5.0	Indicator
Dissolved Oxygen, mg/l	4.0	Summer	5.0	30 Day Average
TNH3, Chronic, mg/l:	108.0	Summer	Varies	Function of pH and Temperature
TDS, mg/l:	80553.6	Summer	1200.0	

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

Level 1 Antidegradation Level Completed: Level II Review not required.

Date: 1/25/2019

WASTELOAD ANALYSIS [WLA]
Addendum: Statement of Basis

25-Jan-19
4:00 PM

Facilities: **Springdale Lagoons** **UPDES No: UT-025224**
Discharging to: **Springdale_WLA_1-25-19.xls**

THIS IS A DRAFT DOCUMENT

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

Virgin River:	1C, 2B, 3C, 4
Antidegradation Review:	Level I review completed. Level II review not required.

III. Numeric Stream Standards for Protection of Aquatic Wildlife

Total Ammonia (TNH3)	Varies as a function of Temperature and pH Rebound. See Water Quality Standards
Chronic Total Residual Chlorine (TRC)	0.011 mg/l (4 Day Average) 0.019 mg/l (1 Hour Average)
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

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**	0.211 lbs/day	750.00 ug/l	1.817 lbs/day
Arsenic	190.00 ug/l	0.460 lbs/day	340.00 ug/l	0.824 lbs/day
Cadmium	2.01 ug/l	0.005 lbs/day	5.40 ug/l	0.013 lbs/day
Chromium III	215.32 ug/l	0.522 lbs/day	4504.99 ug/l	10.915 lbs/day
ChromiumVI	11.00 ug/l	0.027 lbs/day	16.00 ug/l	0.039 lbs/day
Copper	24.25 ug/l	0.059 lbs/day	40.14 ug/l	0.097 lbs/day
Iron			1000.00 ug/l	2.423 lbs/day
Lead	13.21 ug/l	0.032 lbs/day	338.90 ug/l	0.821 lbs/day
Mercury	0.0120 ug/l	0.000 lbs/day	2.40 ug/l	0.006 lbs/day
Nickel	134.33 ug/l	0.325 lbs/day	1208.18 ug/l	2.927 lbs/day
Selenium	4.60 ug/l	0.011 lbs/day	20.00 ug/l	0.048 lbs/day
Silver	N/A ug/l	N/A lbs/day	25.89 ug/l	0.063 lbs/day
Zinc	308.99 ug/l	0.749 lbs/day	308.99 ug/l	0.749 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 305.9 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	1.158 lbs/day	1.200 ug/l	0.003 lbs/day
DDT, DDE	0.001 ug/l	0.269 lbs/day	0.550 ug/l	0.001 lbs/day
Dieldrin	0.002 ug/l	0.512 lbs/day	1.250 ug/l	0.003 lbs/day
Endosulfan	0.056 ug/l	15.076 lbs/day	0.110 ug/l	0.000 lbs/day
Endrin	0.002 ug/l	0.619 lbs/day	0.090 ug/l	0.000 lbs/day
Guthion			0.010 ug/l	0.000 lbs/day
Heptachlor	0.004 ug/l	1.023 lbs/day	0.260 ug/l	0.001 lbs/day
Lindane	0.080 ug/l	21.538 lbs/day	1.000 ug/l	0.002 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	3.769 lbs/day	2.000 ug/l	0.005 lbs/day
Pentachlorophenol	13.00 ug/l	3499.901 lbs/day	20.000 ug/l	0.048 lbs/day
Toxephene	0.0002 ug/l	0.054 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	0.91 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	1.45 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			50.0 ug/l	13.461 lbs/day
Barium			1000.0 ug/l	269.223 lbs/day
Cadmium			10.0 ug/l	2.692 lbs/day
Chromium			50.0 ug/l	13.461 lbs/day
Lead			50.0 ug/l	13.461 lbs/day
Mercury			2.0 ug/l	0.538 lbs/day
Selenium			10.0 ug/l	2.692 lbs/day
Silver			50.0 ug/l	13.461 lbs/day
Fluoride (3)			1.4 ug/l	0.377 lbs/day
to			2.4 ug/l	0.646 lbs/day
Nitrates as N			10.0 ug/l	2.692 lbs/day
Chlorophenoxy Herbicides				
2,4-D			100.0 ug/l	26.922 lbs/day
2,4,5-TP			10.0 ug/l	2.692 lbs/day
Endrin			0.2 ug/l	0.054 lbs/day
ocyclohexane (Lindane)			4.0 ug/l	1.077 lbs/day
Methoxychlor			100.0 ug/l	26.922 lbs/day
Toxaphene			5.0 ug/l	1.346 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	1200.00 ug/l	323.07 lbs/day	2700.0 ug/l	726.90 lbs/day
Acrolein	320.00 ug/l	86.15 lbs/day	780.0 ug/l	209.99 lbs/day
Acrylonitrile	0.06 ug/l	0.02 lbs/day	0.7 ug/l	0.18 lbs/day
Benzene	1.20 ug/l	0.32 lbs/day	71.0 ug/l	19.11 lbs/day
Benzidine	0.00012 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
Carbon tetrachloride	0.25 ug/l	0.07 lbs/day	4.4 ug/l	1.18 lbs/day
Chlorobenzene	680.00 ug/l	183.07 lbs/day	21000.0 ug/l	5653.69 lbs/day
1,2,4-Trichlorobenzene				
Hexachlorobenzene	0.00075 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
1,2-Dichloroethane	0.38 ug/l	0.10 lbs/day	99.0 ug/l	26.65 lbs/day

1,1,1-Trichloroethane				
Hexachloroethane	1.90 ug/l	0.51 lbs/day	8.9 ug/l	2.40 lbs/day
1,1-Dichloroethane				
1,1,2-Trichloroethane	0.61 ug/l	0.16 lbs/day	42.0 ug/l	11.31 lbs/day
1,1,2,2-Tetrachloroethai	0.17 ug/l	0.05 lbs/day	11.0 ug/l	2.96 lbs/day
Chloroethane			0.0 ug/l	0.00 lbs/day
Bis(2-chloroethyl) ether	0.03 ug/l	0.01 lbs/day	1.4 ug/l	0.38 lbs/day
2-Chloroethyl vinyl ether	0.00 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
2-Chloronaphthalene	1700.00 ug/l	457.68 lbs/day	4300.0 ug/l	1157.66 lbs/day
2,4,6-Trichlorophenol	2.10 ug/l	0.57 lbs/day	6.5 ug/l	1.75 lbs/day
p-Chloro-m-cresol			0.0 ug/l	0.00 lbs/day
Chloroform (HM)	5.70 ug/l	1.53 lbs/day	470.0 ug/l	126.53 lbs/day
2-Chlorophenol	120.00 ug/l	32.31 lbs/day	400.0 ug/l	107.69 lbs/day
1,2-Dichlorobenzene	2700.00 ug/l	726.90 lbs/day	17000.0 ug/l	4576.79 lbs/day
1,3-Dichlorobenzene	400.00 ug/l	107.69 lbs/day	2600.0 ug/l	699.98 lbs/day
1,4-Dichlorobenzene	400.00 ug/l	107.69 lbs/day	2600.0 ug/l	699.98 lbs/day
3,3'-Dichlorobenzidine	0.04 ug/l	0.01 lbs/day	0.1 ug/l	0.02 lbs/day
1,1-Dichloroethylene	0.06 ug/l	0.02 lbs/day	3.2 ug/l	0.86 lbs/day
1,2-trans-Dichloroethyle	700.00 ug/l	188.46 lbs/day	0.0 ug/l	0.00 lbs/day
2,4-Dichlorophenol	93.00 ug/l	25.04 lbs/day	790.0 ug/l	212.69 lbs/day
1,2-Dichloropropane	0.52 ug/l	0.14 lbs/day	39.0 ug/l	10.50 lbs/day
1,3-Dichloropropylene	10.00 ug/l	2.69 lbs/day	1700.0 ug/l	457.68 lbs/day
2,4-Dimethylphenol	540.00 ug/l	145.38 lbs/day	2300.0 ug/l	619.21 lbs/day
2,4-Dinitrotoluene	0.11 ug/l	0.03 lbs/day	9.1 ug/l	2.45 lbs/day
2,6-Dinitrotoluene	0.00 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
1,2-Diphenylhydrazine	0.04 ug/l	0.01 lbs/day	0.5 ug/l	0.15 lbs/day
Ethylbenzene	3100.00 ug/l	834.59 lbs/day	29000.0 ug/l	7807.47 lbs/day
Fluoranthene	300.00 ug/l	80.77 lbs/day	370.0 ug/l	99.61 lbs/day
4-Chlorophenyl phenyl ether				
4-Bromophenyl phenyl ether				
Bis(2-chloroisopropyl) e	1400.00 ug/l	376.91 lbs/day	170000.0 ug/l	45767.93 lbs/day
Bis(2-chloroethoxy) met	0.00 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
Methylene chloride (HM	4.70 ug/l	1.27 lbs/day	1600.0 ug/l	430.76 lbs/day
Methyl chloride (HM)	0.00 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
Methyl bromide (HM)	0.00 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
Bromoform (HM)	4.30 ug/l	1.16 lbs/day	360.0 ug/l	96.92 lbs/day
Dichlorobromomethane	0.27 ug/l	0.07 lbs/day	22.0 ug/l	5.92 lbs/day
Chlorodibromomethane	0.41 ug/l	0.11 lbs/day	34.0 ug/l	9.15 lbs/day
Hexachlorobutadiene(c)	0.44 ug/l	0.12 lbs/day	50.0 ug/l	13.46 lbs/day
Hexachlorocyclopentadi	240.00 ug/l	64.61 lbs/day	17000.0 ug/l	4576.79 lbs/day
Isophorone	8.40 ug/l	2.26 lbs/day	600.0 ug/l	161.53 lbs/day
Naphthalene				
Nitrobenzene	17.00 ug/l	4.58 lbs/day	1900.0 ug/l	511.52 lbs/day
2-Nitrophenol	0.00 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
4-Nitrophenol	0.00 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
2,4-Dinitrophenol	70.00 ug/l	18.85 lbs/day	14000.0 ug/l	3769.12 lbs/day
4,6-Dinitro-o-cresol	13.00 ug/l	3.50 lbs/day	765.0 ug/l	205.96 lbs/day
N-Nitrosodimethylamine	0.00069 ug/l	0.00 lbs/day	8.1 ug/l	2.18 lbs/day
N-Nitrosodiphenylamine	5.00 ug/l	1.35 lbs/day	16.0 ug/l	4.31 lbs/day
N-Nitrosodi-n-propylami	0.01 ug/l	0.00 lbs/day	1.4 ug/l	0.38 lbs/day
Pentachlorophenol	0.28 ug/l	0.08 lbs/day	8.2 ug/l	2.21 lbs/day

Phenol	2.10E+04 ug/l	5.65E+03 lbs/day	4.6E+06 ug/l	1.24E+06 lbs/day
Bis(2-ethylhexyl)phthala	1.80 ug/l	0.48 lbs/day	5.9 ug/l	1.59 lbs/day
Butyl benzyl phthalate	3000.00 ug/l	807.67 lbs/day	5200.0 ug/l	1399.96 lbs/day
Di-n-butyl phthalate	2700.00 ug/l	726.90 lbs/day	12000.0 ug/l	3230.68 lbs/day
Di-n-octyl phthlate				
Diethyl phthalate	23000.00 ug/l	6192.13 lbs/day	120000.0 ug/l	32306.77 lbs/day
Dimethyl phthlate	3.13E+05 ug/l	8.43E+04 lbs/day	2.9E+06 ug/l	7.81E+05 lbs/day
Benzo(a)anthracene (P/	0.0028 ug/l	0.00 lbs/day	0.0 ug/l	0.01 lbs/day
Benzo(a)pyrene (PAH)	0.0028 ug/l	0.00 lbs/day	0.0 ug/l	0.01 lbs/day
Benzo(b)fluoranthene (F	0.0028 ug/l	0.00 lbs/day	0.0 ug/l	0.01 lbs/day
Benzo(k)fluoranthene (F	0.0028 ug/l	0.00 lbs/day	0.0 ug/l	0.01 lbs/day
Chrysene (PAH)	0.0028 ug/l	0.00 lbs/day	0.0 ug/l	0.01 lbs/day
Acenaphthylene (PAH)				
Anthracene (PAH)	9600.00 ug/l	2584.54 lbs/day	0.0 ug/l	0.00 lbs/day
Dibenzo(a,h)anthracene	0.0028 ug/l	0.00 lbs/day	0.0 ug/l	0.01 lbs/day
Indeno(1,2,3-cd)pyrene	0.0028 ug/l	0.00 lbs/day	0.0 ug/l	0.01 lbs/day
Pyrene (PAH)	960.00 ug/l	258.45 lbs/day	11000.0 ug/l	2961.45 lbs/day
Tetrachloroethylene	0.80 ug/l	0.22 lbs/day	8.9 ug/l	2.40 lbs/day
Toluene	6800.00 ug/l	1830.72 lbs/day	200000 ug/l	53844.62 lbs/day
Trichloroethylene	2.70 ug/l	0.73 lbs/day	81.0 ug/l	21.81 lbs/day
Vinyl chloride	2.00 ug/l	0.54 lbs/day	525.0 ug/l	141.34 lbs/day
			0.0	0.00 lbs/day
Pesticides			0.0	0.00 lbs/day
Aldrin	0.0001 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
Dieldrin	0.0001 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
Chlordane	0.0006 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
4,4'-DDT	0.0006 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
4,4'-DDE	0.0006 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
4,4'-DDD	0.0008 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
alpha-Endosulfan	0.9300 ug/l	0.25 lbs/day	2.0 ug/l	0.54 lbs/day
beta-Endosulfan	0.9300 ug/l	0.25 lbs/day	2.0 ug/l	0.54 lbs/day
Endosulfan sulfate	0.9300 ug/l	0.25 lbs/day	2.0 ug/l	0.54 lbs/day
Endrin	0.7600 ug/l	0.20 lbs/day	0.8 ug/l	0.22 lbs/day
Endrin aldehyde	0.7600 ug/l	0.20 lbs/day	0.8 ug/l	0.22 lbs/day
Heptachlor	0.0002 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
Heptachlor epoxide				
PCB's				
PCB 1242 (Arochlor 12/	0.000044 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1254 (Arochlor 12	0.000044 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1221 (Arochlor 12	0.000044 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1232 (Arochlor 12	0.000044 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1248 (Arochlor 12/	0.000044 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1260 (Arochlor 12	0.000044 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1016 (Arochlor 10	0.000044 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
Pesticide				
Toxaphene	0.000750 ug/l	0.00	0.0 ug/l	0.00 lbs/day
Dioxin				
Dioxin (2,3,7,8-TCDD)	1.30E-08 ug/l	0.00 lbs/day	1.40E-08	0.00

Metals				
Antimony	14.0 ug/l	3.77 lbs/day		
Arsenic	50.0 ug/l	13.46 lbs/day	4300.00 ug/l	1157.66 lbs/day
Asbestos	7.00E+06 ug/l	1.88E+06 lbs/day		
Beryllium				
Cadmium				
Chromium (III)				
Chromium (VI)				
Copper				
Cyanide	1.30E+03 ug/l	349.99 lbs/day	2.2E+05 ug/l	59229.09 lbs/day
Lead	700.0 ug/l	188.46 lbs/day		
Mercury			0.15 ug/l	0.04 lbs/day
Nickel			4600.00 ug/l	1238.43 lbs/day
Selenium	0.1 ug/l	0.04 lbs/day		
Silver	610.0 ug/l	164.23 lbs/day		
Thallium			6.30 ug/l	1.70 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)	49.50	21.7	8.3	0.01	1.00	6.97	0.00	480.8
Fall	49.50	10.1	8.2	0.01	1.00	---	0.00	492.2
Winter	49.50	7.8	8.1	0.01	1.00	---	0.00	457.3
Spring	49.50	15.7	8.1	0.01	1.00	---	0.00	512.2

	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	11.20	1.30	0.20	1.80	3.975*	2.80	12.2	0.60

	Hg	Ni	Se	Ag	Zn	Boron
Dissolved Metals	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
All Seasons	0.0000	3.00	0.50	0.50	10.50	69.9

* ~80% MDL

Projected Discharge Information

Season	Flow, MGD	Temp.
Summer	0.29000	22.0
Fall	0.29000	12.0
Winter	0.29000	8.0
Spring	0.29000	12.0

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	0.290 MGD	0.449 cfs
Fall	0.290 MGD	0.449 cfs
Winter	0.290 MGD	0.449 cfs
Spring	0.290 MGD	0.449 cfs

Flow Requirement or Loading Requirement

The calculations in this wasteload analysis utilize the maximum effluent discharge flow of 0.29 MGD. If the discharger is allowed to have a flow greater than 0.29 MGD during 7Q10 conditions, and effluent limit concentrations as indicated, then water quality standards will be violated. In order to prevent this from occuring, the permit writers must include the discharge flow limititation as indicated above; or, include loading effluent limits in the permit.

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

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

WET Requirements	LC50 >	100.0% Effluent	[Acute]
	IC25 >	0.9% 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	35.0 mg/l as BOD5	84.6 lbs/day
Fall	35.0 mg/l as BOD5	84.6 lbs/day
Winter	35.0 mg/l as BOD5	84.6 lbs/day
Spring	35.0 mg/l as BOD5	84.6 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	4.00
Fall	4.00
Winter	4.00
Spring	4.00

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	107.98	mg/l as N	261.1	lbs/day
	1 Hour Avg. - Acute	182.5	mg/l as N	441.4	lbs/day
Fall	4 Day Avg. - Chronic	218.2	mg/l as N	527.6	lbs/day
	1 Hour Avg. - Acute	266.4	mg/l as N	644.3	lbs/day
Winter	4 Day Avg. - Chronic	220.1	mg/l as N	532.3	lbs/day
	1 Hour Avg. - Acute	264.4	mg/l as N	639.3	lbs/day
Spring	4 Day Avg. - Chronic	187.6	mg/l as N	453.7	lbs/day
	1 Hour Avg. - Acute	218.2	mg/l as N	527.7	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	1.112	mg/l	2.69	lbs/day
	1 Hour Avg. - Acute	1.010	mg/l	2.44	lbs/day
Fall	4 Day Avg. - Chronic	1.112	mg/l	2.69	lbs/day
	1 Hour Avg. - Acute	1.010	mg/l	2.44	lbs/day
Winter	4 Day Avg. - Chronic	1.112	mg/l	2.69	lbs/day
	1 Hour Avg. - Acute	1.010	mg/l	2.44	lbs/day
Spring	4 Day Avg. - Chronic	1.112	mg/l	2.69	lbs/day
	1 Hour Avg. - Acute	1.010	mg/l	2.44	lbs/day

Effluent Limitations for Total Dissolved Solids based upon Water Quality Standards

Season		Concentration		Load	
Summer	Maximum, Acute	80553.6	mg/l	97.39	tons/day
Fall	Maximum, Acute	79295.8	mg/l	95.87	tons/day
Winter	Maximum, Acute	83146.5	mg/l	100.53	tons/day
Spring	Maximum, Acute	77089.0	mg/l	93.21	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 305.9 mg/l):

	4 Day Average Concentration		Load	1 Hour Average Concentration		Load
Aluminum*	N/A		N/A	41,508.1	ug/l	100.6 lbs/day
Arsenic*	21,010.39	ug/l	32.8 lbs/day	19,025.4	ug/l	46.1 lbs/day
Cadmium	202.01	ug/l	0.3 lbs/day	292.0	ug/l	0.7 lbs/day
Chromium III	23,774.69	ug/l	37.2 lbs/day	252,937.0	ug/l	612.8 lbs/day
Chromium VI*	786.11	ug/l	1.2 lbs/day	679.4	ug/l	1.6 lbs/day
Copper	2,391.24	ug/l	3.7 lbs/day	2,100.3	ug/l	5.1 lbs/day
Iron*	N/A		N/A	55,494.9	ug/l	134.5 lbs/day
Lead	1,404.15	ug/l	2.2 lbs/day	19,002.2	ug/l	46.0 lbs/day
Mercury*	1.33	ug/l	0.0 lbs/day	134.8	ug/l	0.3 lbs/day
Nickel	14,624.34	ug/l	22.9 lbs/day	67,695.5	ug/l	164.0 lbs/day
Selenium*	456.98	ug/l	0.7 lbs/day	1,095.8	ug/l	2.7 lbs/day
Silver	N/A	ug/l	N/A lbs/day	1,426.8	ug/l	3.5 lbs/day

Zinc	33,243.26	ug/l	52.0	lbs/day	16,776.1	ug/l	40.6 lbs/day
Cyanide*	578.95	ug/l	0.9	lbs/day	1,235.7	ug/l	3.0 lbs/day

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

Effluent Limitations for Heat/Temperature based upon Water Quality Standards

Summer	467.0 Deg. C.	872.7 Deg. F
Fall	455.4 Deg. C.	851.8 Deg. F
Winter	453.1 Deg. C.	847.7 Deg. F
Spring	461.0 Deg. C.	861.9 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	5.62E-03	lbs/day
Chlordane	4.30E-03	ug/l	1.04E-02	lbs/day	1.2E+00	ug/l	4.50E-03	lbs/day
DDT, DDE	1.00E-03	ug/l	2.42E-03	lbs/day	5.5E-01	ug/l	2.06E-03	lbs/day
Dieldrin	1.90E-03	ug/l	4.59E-03	lbs/day	1.3E+00	ug/l	4.69E-03	lbs/day
Endosulfan	5.60E-02	ug/l	1.35E-01	lbs/day	1.1E-01	ug/l	4.12E-04	lbs/day
Endrin	2.30E-03	ug/l	5.56E-03	lbs/day	9.0E-02	ug/l	3.37E-04	lbs/day
Guthion	0.00E+00	ug/l	0.00E+00	lbs/day	1.0E-02	ug/l	3.75E-05	lbs/day
Heptachlor	3.80E-03	ug/l	9.19E-03	lbs/day	2.6E-01	ug/l	9.75E-04	lbs/day
Lindane	8.00E-02	ug/l	1.93E-01	lbs/day	1.0E+00	ug/l	3.75E-03	lbs/day
Methoxychlor	0.00E+00	ug/l	0.00E+00	lbs/day	3.0E-02	ug/l	1.12E-04	lbs/day
Mirex	0.00E+00	ug/l	0.00E+00	lbs/day	1.0E-02	ug/l	3.75E-05	lbs/day
Parathion	0.00E+00	ug/l	0.00E+00	lbs/day	4.0E-02	ug/l	1.50E-04	lbs/day
PCB's	1.40E-02	ug/l	3.39E-02	lbs/day	2.0E+00	ug/l	7.50E-03	lbs/day
Pentachlorophenol	1.30E+01	ug/l	3.14E+01	lbs/day	2.0E+01	ug/l	7.50E-02	lbs/day
Toxephene	2.00E-04	ug/l	4.84E-04	lbs/day	7.3E-01	ug/l	2.74E-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	12.1 lbs/day
Nitrates as N	4.0 mg/l	9.7 lbs/day
Total Phosphorus as P	0.05 mg/l	0.1 lbs/day
Total Suspended Solids	90.0 mg/l	218.1 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	1.34E+05 ug/l	3.23E+02 lbs/day
Acrolein	3.56E+04 ug/l	8.62E+01 lbs/day
Acrylonitrile	6.57E+00 ug/l	1.59E-02 lbs/day
Benzene	1.34E+02 ug/l	3.23E-01 lbs/day
Benzidine	ug/l	lbs/day
Carbon tetrachloride	2.78E+01 ug/l	6.73E-02 lbs/day
Chlorobenzene	7.57E+04 ug/l	1.83E+02 lbs/day
1,2,4-Trichlorobenzene		
Hexachlorobenzene	8.35E-02 ug/l	2.02E-04 lbs/day
1,2-Dichloroethane	4.23E+01 ug/l	1.02E-01 lbs/day
1,1,1-Trichloroethane		
Hexachloroethane	2.12E+02 ug/l	5.12E-01 lbs/day
1,1-Dichloroethane		
1,1,2-Trichloroethane	6.79E+01 ug/l	1.64E-01 lbs/day
1,1,2,2-Tetrachloroethane	1.89E+01 ug/l	4.58E-02 lbs/day
Chloroethane		
Bis(2-chloroethyl) ether	3.45E+00 ug/l	8.35E-03 lbs/day
2-Chloroethyl vinyl ether		
2-Chloronaphthalene	1.89E+05 ug/l	4.58E+02 lbs/day
2,4,6-Trichlorophenol	2.34E+02 ug/l	5.65E-01 lbs/day
p-Chloro-m-cresol		
Chloroform (HM)	6.35E+02 ug/l	1.53E+00 lbs/day
2-Chlorophenol	1.34E+04 ug/l	3.23E+01 lbs/day
1,2-Dichlorobenzene	3.01E+05 ug/l	7.27E+02 lbs/day
1,3-Dichlorobenzene	4.45E+04 ug/l	1.08E+02 lbs/day

1,4-Dichlorobenzene	4.45E+04 ug/l	1.08E+02 lbs/day
3,3'-Dichlorobenzidine	4.45E+00 ug/l	1.08E-02 lbs/day
1,1-Dichloroethylene	6.35E+00 ug/l	1.53E-02 lbs/day
1,2-trans-Dichloroethylene1		
2,4-Dichlorophenol	1.04E+04 ug/l	2.50E+01 lbs/day
1,2-Dichloropropane	5.79E+01 ug/l	1.40E-01 lbs/day
1,3-Dichloropropylene	1.11E+03 ug/l	2.69E+00 lbs/day
2,4-Dimethylphenol	6.01E+04 ug/l	1.45E+02 lbs/day
2,4-Dinitrotoluene	1.22E+01 ug/l	2.96E-02 lbs/day
2,6-Dinitrotoluene		
1,2-Diphenylhydrazine	4.45E+00 ug/l	1.08E-02 lbs/day
Ethylbenzene	3.45E+05 ug/l	8.35E+02 lbs/day
Fluoranthene	3.34E+04 ug/l	8.08E+01 lbs/day
4-Chlorophenyl phenyl ether		
4-Bromophenyl phenyl ether		
Bis(2-chloroisopropyl) ether	1.56E+05 ug/l	3.77E+02 lbs/day
Bis(2-chloroethoxy) methane		
Methylene chloride (HM)	5.23E+02 ug/l	1.27E+00 lbs/day
Methyl chloride (HM)		
Methyl bromide (HM)		
Bromoform (HM)	4.79E+02 ug/l	1.16E+00 lbs/day
Dichlorobromomethane(HM)	3.01E+01 ug/l	7.27E-02 lbs/day
Chlorodibromomethane (HM)	4.56E+01 ug/l	1.10E-01 lbs/day
Hexachlorocyclopentadiene	2.67E+04 ug/l	6.46E+01 lbs/day
Isophorone	9.35E+02 ug/l	2.26E+00 lbs/day
Naphthalene		
Nitrobenzene	1.89E+03 ug/l	4.58E+00 lbs/day
2-Nitrophenol		
4-Nitrophenol		
2,4-Dinitrophenol	7.79E+03 ug/l	1.88E+01 lbs/day
4,6-Dinitro-o-cresol	1.45E+03 ug/l	3.50E+00 lbs/day
N-Nitrosodimethylamine	7.68E-02 ug/l	1.86E-04 lbs/day
N-Nitrosodiphenylamine	5.57E+02 ug/l	1.35E+00 lbs/day
N-Nitrosodi-n-propylamine	5.57E-01 ug/l	1.35E-03 lbs/day
Pentachlorophenol	3.12E+01 ug/l	7.54E-02 lbs/day
Phenol	2.34E+06 ug/l	5.65E+03 lbs/day
Bis(2-ethylhexyl)phthalate	2.00E+02 ug/l	4.85E-01 lbs/day
Butyl benzyl phthalate	3.34E+05 ug/l	8.08E+02 lbs/day
Di-n-butyl phthalate	3.01E+05 ug/l	7.27E+02 lbs/day
Di-n-octyl phthlate		
Diethyl phthalate	2.56E+06 ug/l	6.19E+03 lbs/day
Dimethyl phthlate	3.48E+07 ug/l	8.43E+04 lbs/day
Benzo(a)anthracene (PAH)	3.12E-01 ug/l	7.54E-04 lbs/day
Benzo(a)pyrene (PAH)	3.12E-01 ug/l	7.54E-04 lbs/day
Benzo(b)fluoranthene (PAH)	3.12E-01 ug/l	7.54E-04 lbs/day
Benzo(k)fluoranthene (PAH)	3.12E-01 ug/l	7.54E-04 lbs/day
Chrysene (PAH)	3.12E-01 ug/l	7.54E-04 lbs/day
Acenaphthylene (PAH)		
Anthracene (PAH)		
Dibenzo(a,h)anthracene (PAH)	3.12E-01 ug/l	7.54E-04 lbs/day
Indeno(1,2,3-cd)pyrene (PAH)	3.12E-01 ug/l	7.54E-04 lbs/day

Pyrene (PAH)	1.07E+05 ug/l	2.58E+02 lbs/day
Tetrachloroethylene	8.91E+01 ug/l	2.15E-01 lbs/day
Toluene	7.57E+05 ug/l	1.83E+03 lbs/day
Trichloroethylene	3.01E+02 ug/l	7.27E-01 lbs/day
Vinyl chloride	2.23E+02 ug/l	5.38E-01 lbs/day
Pesticides		
Aldrin	1.45E-02 ug/l	3.50E-05 lbs/day
Dieldrin	1.56E-02 ug/l	3.77E-05 lbs/day
Chlordane	6.35E-02 ug/l	1.53E-04 lbs/day
4,4'-DDT	6.57E-02 ug/l	1.59E-04 lbs/day
4,4'-DDE	6.57E-02 ug/l	1.59E-04 lbs/day
4,4'-DDD	9.24E-02 ug/l	2.23E-04 lbs/day
alpha-Endosulfan	1.04E+02 ug/l	2.50E-01 lbs/day
beta-Endosulfan	1.04E+02 ug/l	2.50E-01 lbs/day
Endosulfan sulfate	1.04E+02 ug/l	2.50E-01 lbs/day
Endrin	8.46E+01 ug/l	2.05E-01 lbs/day
Endrin aldehyde	8.46E+01 ug/l	2.05E-01 lbs/day
Heptachlor	2.34E-02 ug/l	5.65E-05 lbs/day
Heptachlor epoxide		
PCB's		
PCB 1242 (Arochlor 1242)	4.90E-03 ug/l	1.18E-05 lbs/day
PCB-1254 (Arochlor 1254)	4.90E-03 ug/l	1.18E-05 lbs/day
PCB-1221 (Arochlor 1221)	4.90E-03 ug/l	1.18E-05 lbs/day
PCB-1232 (Arochlor 1232)	4.90E-03 ug/l	1.18E-05 lbs/day
PCB-1248 (Arochlor 1248)	4.90E-03 ug/l	1.18E-05 lbs/day
PCB-1260 (Arochlor 1260)	4.90E-03 ug/l	1.18E-05 lbs/day
PCB-1016 (Arochlor 1016)	4.90E-03 ug/l	1.18E-05 lbs/day
Pesticide		
Toxaphene	8.13E-02 ug/l	1.97E-04 lbs/day
Metals		
Antimony	1558.70 ug/l	3.77 lbs/day
Arsenic	5423.36 ug/l	13.11 lbs/day
Asbestos	7.79E+08 ug/l	1.88E+06 lbs/day
Beryllium		
Cadmium		
Chromium (III)		
Chromium (VI)		
Copper	144736.69 ug/l	349.99 lbs/day
Cyanide	77935.14 ug/l	188.46 lbs/day
Lead	0.00	0.00
Mercury	15.59 ug/l	0.04 lbs/day
Nickel	67914.91 ug/l	164.23 lbs/day
Selenium	0.00	0.00
Silver	0.00	0.00
Thallium	189.27 ug/l	0.46 lbs/day
Zinc		

Dioxin		
Dioxin (2,3,7,8-TCDD)	1.45E-06 ug/l	3.50E-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		41508.1				41508.1	N/A
Antimony			1558.7	478744.4		1558.7	
Arsenic	11133.6	19025.4	5423.4			5423.4	21010.4
Barium					111335.9	111335.9	
Beryllium						0.0	
Cadmium	1091.3	292.0				292.0	202.0
Chromium (III)		252937.0				252937.0	23774.7
Chromium (VI)	10935.0	679.4				679.39	786.11
Copper	21958.2	2100.3	144736.7			2100.3	2391.2
Cyanide		1235.7	24493900.5			1235.7	578.9
Iron		55494.9				55494.9	
Lead	11067.4	19002.2				11067.4	1404.1
Mercury		134.80	15.6	16.70		15.59	1.335
Nickel		67695.5	67914.9	512145.2		67695.5	14624.3
Selenium	5511.6	1095.8				1095.8	457.0
Silver		1426.8				1426.8	
Thallium			189.3	701.4		189.3	
Zinc		16776.1				16776.1	33243.3
Boron	75789.5					75789.5	
Sulfate	222671.8					222671.8	

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	41508.1	N/A	
Antimony	1558.70		
Arsenic	5423.4	21010.4	Acute Controls
Asbestos	7.79E+08		
Barium			
Beryllium			
Cadmium	292.0	202.0	
Chromium (III)	252937.0	23775	
Chromium (VI)	679.4	786.1	Acute Controls
Copper	2100.3	2391.2	Acute Controls

Cyanide	1235.7	578.9	
Iron	55494.9		
Lead	11067.4	1404.1	
Mercury	15.586	1.335	
Nickel	67695.5	14624	
Selenium	1095.8	457.0	
Silver	1426.8	N/A	
Thallium	189.3		
Zinc	16776.1	33243.3	Acute Controls
Boron	75789.45		
Sulfate	222671.8		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.