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

Date: **September 17, 2020**

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

Facility: **Gunlock Water Treatment Facility**
UPDES No. UT0026123

Receiving water: **Santa Clara River (1C, 2B, 3B, 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
The design flow of the facility is 0.02 MGD.

Receiving Water
Per UAC R317-2-13.2(a), the designated beneficial uses of the Santa Clara River from confluence with Virgin River to Gunlock Reservoir are 1C, 2B, 3B 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 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 4 - Protected for agricultural uses including irrigation of crops and stock watering.*

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). There was very limited data therefore the 20th percentile flow values were used for each season using monitoring station #4950500, SANTA CLARA RIVER BELOW GUNLOCK RESERVOIR (2000-2020). The calculated critical low flow values for each season are listed in Table 1.

Table 1. Seasonal Flow Values (20th percentile)

Season	Average Flow (cfs)
Summer	0.89
Fall	0.61
Winter	0.42
Spring	0.68
Overall	55.54

Ambient receiving water quality was characterized using DWQ monitoring station #4950500 (SANTA CLARA RIVER BELOW GUNLOCK RESERVOIR) for the period 2000-2020.

There was no DWQ monitoring station for the discharge point (new facility), therefore the discharge was characterized using very limited data provided in the Gunlock and Sand Hollow Water Treatment Preliminary Design Report prepared by Alpha Engineering and Carollo in 2018 (Alpha Engineering & Carollo, 2018).

Total Maximum Daily Load (TMDL)

According to the Utah's 2016 303(d) Water Quality Assessment Report, the receiving water for the discharge, Santa Clara-1, Santa Clara River from confluence with Virgin River to Gunlock Reservoir (UT15010008-001_00) is not supporting all assessed uses and exhibits evidence of water quality impairments for arsenic, temperature, and boron.

Historically, the receiving segment of the Santa Clara River (Santa Clara-1) was included on Utah's 2002 303(d) list for temperature, selenium and total dissolved solids. The TMDL that addressed those parameters was approved by EPA in 2004 and can be found at the following link: https://documents.deq.utah.gov/water-quality/watershed-protection/total-maximum-daily-loads/DWQ-2015-006610.pdf

Mixing Zone

The maximum allowable mixing zone is 15 minutes of travel time for acute conditions, not to exceed 50% of stream width, and for chronic conditions is 2500 ft, per UAC R317-2-5. Water quality standards must be met at the end of the mixing zone.

Based on the results of the mixing zone modeling, plume width was 100 % of the river at 2500 feet. 100 % of the seasonal critical low flow was used to calculate chronic limits. Acute limits

were calculated using 50% of the seasonal critical low flow.

Parameters of Concern

Potential parameters of concern were identified as arsenic, total suspended solids, iron and manganese.

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 001 should be based on 3.4% effluent.

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 Addendums.

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 required because the Gunlock Water Treatment Facility will be a newly constructed facility.

Documents:

WLA Document*: Gunlcok_WLA_09-17-2020.docx*
Wasteload Analysis and Addendums: *Gunlock_WLA_09-17-2020.xlsm*

References:

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

Alpha Engineering , & Carollo. (2018). *Technical Memorandum 1 Gunlock & Sand Hollow Water Treatment Preliminary Design Report.* St. George.

Utah Division of Water Quality
Salt Lake City, Utah

WASTELOAD ANALYSIS [WLA] **20-Aug-20**
Addendum: Statement of Basis **4:00 PM**

Facilities: **Gunlock Water Treatment Facility** **UPDES No: UT-UT0026123**
Discharging to: **Santa Clara River**

I. Introduction

Wasteload analyses are performed to determine point source effluent limitations necessary to maintain designated beneficial uses by evaluating projected effects of discharge concentrations on in-stream water quality. The wasteload analysis also takes into account downstream designated uses [R317-2-8, UAC]. Projected concentrations are compared to numeric water quality standards to determine acceptability. The anti-degradation policy and procedures are also considered. The primary in-stream parameters of concern may include metals (as a function of hardness), total dissolved solids (TDS), total residual chlorine (TRC), un-ionized ammonia (as a function of pH and temperature, measured and evaluated interms of total ammonia), and dissolved oxygen.

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

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

II. Receiving Water and Stream Classification

Santa Clara River:	1C, 2B, 3B, 4
Antidegradation Review:	Level I review completed. Level II review is 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	1200.0	mg/l

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Acute and Chronic Heavy Metals (Dissolved)

	4 Day Average (Chronic) Standard			1 Hour Average (Acute) Standard		
Parameter	**Concentration**		**Load***	**Concentration**		**Load***
Aluminum	87.00	ug/l**	0.015 lbs/day	750.00	ug/l	0.125 lbs/day
Arsenic	190.00	ug/l	0.032 lbs/day	340.00	ug/l	0.057 lbs/day
Cadmium	0.51	ug/l	0.000 lbs/day	5.10	ug/l	0.001 lbs/day
Chromium III	173.91	ug/l	0.029 lbs/day	3638.50	ug/l	0.607 lbs/day
ChromiumVI	11.00	ug/l	0.002 lbs/day	16.00	ug/l	0.003 lbs/day
Copper	19.41	ug/l	0.003 lbs/day	31.40	ug/l	0.005 lbs/day
Iron				1000.00	ug/l	0.167 lbs/day
Lead	9.48	ug/l	0.002 lbs/day	243.15	ug/l	0.041 lbs/day
Mercury	0.0120	ug/l	0.000 lbs/day	2.40	ug/l	0.000 lbs/day
Nickel	107.73	ug/l	0.018 lbs/day	968.95	ug/l	0.162 lbs/day
Selenium	4.60	ug/l	0.001 lbs/day	20.00	ug/l	0.003 lbs/day
Silver	N/A	ug/l	N/A lbs/day	16.53	ug/l	0.003 lbs/day
Zinc	247.72	ug/l	0.041 lbs/day	247.72	ug/l	0.041 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 235.67 mg/l as CaCO3

Organics [Pesticides]

	4 Day Average (Chronic) Standard			1 Hour Average (Acute) Standard		
Parameter	**Concentration**		**Load***	**Concentration**		**Load***
Aldrin				1.500	ug/l	0.000 lbs/day
Chlordane	0.004	ug/l	0.021 lbs/day	1.200	ug/l	0.000 lbs/day
DDT, DDE	0.001	ug/l	0.005 lbs/day	0.550	ug/l	0.000 lbs/day
Dieldrin	0.002	ug/l	0.009 lbs/day	1.250	ug/l	0.000 lbs/day
Endosulfan	0.056	ug/l	0.278 lbs/day	0.110	ug/l	0.000 lbs/day
Endrin	0.002	ug/l	0.011 lbs/day	0.090	ug/l	0.000 lbs/day
Guthion				0.010	ug/l	0.000 lbs/day
Heptachlor	0.004	ug/l	0.019 lbs/day	0.260	ug/l	0.000 lbs/day
Lindane	0.080	ug/l	0.397 lbs/day	1.000	ug/l	0.000 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	0.069 lbs/day	2.000	ug/l	0.000 lbs/day
Pentachlorophenol	13.00	ug/l	64.530 lbs/day	20.000	ug/l	0.003 lbs/day
Toxephene	0.0002	ug/l	0.001 lbs/day	0.7300	ug/l	0.000 lbs/day

IV. Numeric Stream Standards for Protection of Agriculture

	4 Day Average (Chronic) Standard		1 Hour Average (Acute) Standard		
	Concentration	**Load***	**Concentration**		**Load***
Arsenic			100.0	ug/l	lbs/day
Boron			750.0	ug/l	lbs/day
Cadmium			10.0	ug/l	0.00 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	0.10 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	13.40 lbs/day
Acrolein	ug/l	lbs/day	780.0	ug/l	3.87 lbs/day
Acrylonitrile	ug/l	lbs/day	0.7	ug/l	0.00 lbs/day
Benzene	ug/l	lbs/day	71.0	ug/l	0.35 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	0.02 lbs/day
Chlorobenzene	ug/l	lbs/day	21000.0	ug/l	104.24 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	0.49 lbs/day
1,1,1-Trichloroethane					
Hexachloroethane	ug/l	lbs/day	8.9	ug/l	0.04 lbs/day
1,1-Dichloroethane					
1,1,2-Trichloroethane	ug/l	lbs/day	42.0	ug/l	0.21 lbs/day
1,1,2,2-Tetrachloroethai	ug/l	lbs/day	11.0	ug/l	0.05 lbs/day
Chloroethane			0.0	ug/l	0.00 lbs/day
Bis(2-chloroethyl) ether	ug/l	lbs/day	1.4	ug/l	0.01 lbs/day
2-Chloroethyl vinyl ethei	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
2-Chloronaphthalene	ug/l	lbs/day	4300.0	ug/l	21.34 lbs/day

2,4,6-Trichlorophenol	ug/l	lbs/day	6.5	ug/l	0.03	lbs/day
p-Chloro-m-cresol			0.0	ug/l	0.00	lbs/day
Chloroform (HM)	ug/l	lbs/day	470.0	ug/l	2.33	lbs/day
2-Chlorophenol	ug/l	lbs/day	400.0	ug/l	1.99	lbs/day
1,2-Dichlorobenzene	ug/l	lbs/day	17000.0	ug/l	84.39	lbs/day
1,3-Dichlorobenzene	ug/l	lbs/day	2600.0	ug/l	12.91	lbs/day
1,4-Dichlorobenzene	ug/l	lbs/day	2600.0	ug/l	12.91	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	0.02	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	3.92	lbs/day
1,2-Dichloropropane	ug/l	lbs/day	39.0	ug/l	0.19	lbs/day
1,3-Dichloropropylene	ug/l	lbs/day	1700.0	ug/l	8.44	lbs/day
2,4-Dimethylphenol	ug/l	lbs/day	2300.0	ug/l	11.42	lbs/day
2,4-Dinitrotoluene	ug/l	lbs/day	9.1	ug/l	0.05	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	0.00	lbs/day
Ethylbenzene	ug/l	lbs/day	29000.0	ug/l	143.95	lbs/day
Fluoranthene	ug/l	lbs/day	370.0	ug/l	1.84	lbs/day
4-Chlorophenyl phenyl ether						
4-Bromophenyl phenyl ether						
Bis(2-chloroisopropyl) e	ug/l	lbs/day	170000.0	ug/l	843.86	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	7.94	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	1.79	lbs/day
Dichlorobromomethane(	ug/l	lbs/day	22.0	ug/l	0.11	lbs/day
Chlorodibromomethane	ug/l	lbs/day	34.0	ug/l	0.17	lbs/day
Hexachlorobutadiene(c)	ug/l	lbs/day	50.0	ug/l	0.25	lbs/day
Hexachlorocyclopentadi	ug/l	lbs/day	17000.0	ug/l	84.39	lbs/day
Isophorone	ug/l	lbs/day	600.0	ug/l	2.98	lbs/day
Naphthalene						
Nitrobenzene	ug/l	lbs/day	1900.0	ug/l	9.43	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	69.49	lbs/day
4,6-Dinitro-o-cresol	ug/l	lbs/day	765.0	ug/l	3.80	lbs/day
N-Nitrosodimethylamine	ug/l	lbs/day	8.1	ug/l	0.04	lbs/day
N-Nitrosodiphenylamine	ug/l	lbs/day	16.0	ug/l	0.08	lbs/day
N-Nitrosodi-n-propylami	ug/l	lbs/day	1.4	ug/l	0.01	lbs/day
Pentachlorophenol	ug/l	lbs/day	8.2	ug/l	0.04	lbs/day
Phenol	ug/l	lbs/day	4.6E+06	ug/l	2.28E+04	lbs/day
Bis(2-ethylhexyl)phthala	ug/l	lbs/day	5.9	ug/l	0.03	lbs/day
Butyl benzyl phthalate	ug/l	lbs/day	5200.0	ug/l	25.81	lbs/day
Di-n-butyl phthalate	ug/l	lbs/day	12000.0	ug/l	59.57	lbs/day
Di-n-octyl phthlate						
Diethyl phthalate	ug/l	lbs/day	120000.0	ug/l	595.66	lbs/day
Dimethyl phthlate	ug/l	lbs/day	2.9E+06	ug/l	1.44E+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	54.60	lbs/day
Tetrachloroethylene	ug/l	lbs/day	8.9	ug/l	0.04	lbs/day
Toluene	ug/l	lbs/day	200000	ug/l	992.77	lbs/day
Trichloroethylene	ug/l	lbs/day	81.0	ug/l	0.40	lbs/day
Vinyl chloride	ug/l	lbs/day	525.0	ug/l	2.61	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	0.01 lbs/day
beta-Endosulfan	ug/l	lbs/day	2.0	ug/l	0.01 lbs/day
Endosulfan sulfate	ug/l	lbs/day	2.0	ug/l	0.01 lbs/day
Endrin	ug/l	lbs/day	0.8	ug/l	0.00 lbs/day
Endrin aldehyde	ug/l	lbs/day	0.8	ug/l	0.00 lbs/day
Heptachlor	ug/l	lbs/day	0.0	ug/l	0.00 lbs/day
Heptachlor epoxide					
PCB's					
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
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	21.34 lbs/day
Asbestos	ug/l	lbs/day			
Beryllium					
Cadmium					
Chromium (III)					
Chromium (VI)					
Copper					
Cyanide	ug/l	lbs/day	2.2E+05	ug/l	1092.05 lbs/day
Lead	ug/l	lbs/day			
Mercury			0.15	ug/l	0.00 lbs/day
Nickel			4600.00	ug/l	22.83 lbs/day
Selenium	ug/l	lbs/day			
Silver	ug/l	lbs/day			
Thallium			6.30	ug/l	0.03 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)	0.9	22.0	8.2	0.03	1.00	6.91	0.00	262.3
Fall	0.6	9.7	8.1	0.02	1.00	---	0.00	303.8
Winter	0.4	6.4	8.2	0.02	1.00	---	0.00	292.5
Spring	0.7	15.2	8.3	0.02	1.00	---	0.00	266.5

Dissolved Metals	Al	As	Cd	CrIII	CrVI	Copper	Fe	Pb
	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
All Seasons	18.72	12.98	0.05	2.50	2.65*	1.40	15.0	0.21

Dissolved Metals	Hg	Ni	Se	Ag	Zn	Boron		
	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l		
All Seasons	0.1000	2.50	0.50	0.25	7.08	10.0		* 1/2 MDL

Projected Discharge Information

Season	Flow, MGD	Temp.	TDS mg/l	TDS tons/day
Summer	0.02000	15.5	361.00	0.03010
Fall	0.02000	12.0		
Winter	0.02000	15.5		
Spring	0.02000	12.3		

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	0.020 MGD	0.031 cfs
Fall	0.020 MGD	0.031 cfs
Winter	0.020 MGD	0.031 cfs
Spring	0.020 MGD	0.031 cfs

Flow Requirement or Loading Requirement

The calculations in this wasteload analysis utilize the maximum effluent discharge flow of 0.02 MGD. If the discharger is allowed to have a flow greater than 0.02 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 >	23.2%	Effluent	[Acute]
	IC25 >	3.4%	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	4.2 lbs/day
Fall	25.0 mg/l as BOD5	4.2 lbs/day
Winter	25.0 mg/l as BOD5	4.2 lbs/day
Spring	25.0 mg/l as BOD5	4.2 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	38.9	mg/l as N	6.5	lbs/day
	1 Hour Avg. - Acute	87.8	mg/l as N	14.6	lbs/day
Fall	4 Day Avg. - Chronic	54.9	mg/l as N	9.2	lbs/day
	1 Hour Avg. - Acute	79.8	mg/l as N	13.3	lbs/day
Winter	4 Day Avg. - Chronic	107.4	mg/l as N	17.9	lbs/day
	1 Hour Avg. - Acute	342.3	mg/l as N	57.1	lbs/day
Spring	4 Day Avg. - Chronic	50.0	mg/l as N	0.0	lbs/day
	1 Hour Avg. - Acute	74.1	mg/l as N	0.0	lbs/day

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

Effluent Limitation for Total Residual Chlorine based upon Water Quality Standards

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

Season		Concentration		Load	
Summer	4 Day Avg. - Chronic	0.325	mg/l	0.05	lbs/day
	1 Hour Avg. - Acute	0.291	mg/l	0.05	lbs/day
Fall	4 Day Avg. - Chronic	0.226	mg/l	0.04	lbs/day
	1 Hour Avg. - Acute	0.205	mg/l	0.03	lbs/day
Winter	4 Day Avg. - Chronic	0.159	mg/l	0.03	lbs/day
	1 Hour Avg. - Acute	0.147	mg/l	0.02	lbs/day
Spring	4 Day Avg. - Chronic	0.251	mg/l	0.00	lbs/day
	1 Hour Avg. - Acute	0.227	mg/l	0.00	lbs/day

Effluent Limitations for Total Dissolved Solids based upon Water Quality Standards

Season		Concentration		Load	
Summer	Maximum, Acute	28173.0	mg/l	2.35	tons/day
Fall	Maximum, Acute	26979.5	mg/l	2.25	tons/day
Winter	Maximum, Acute	27304.6	mg/l	2.28	tons/day
Spring	4 Day Avg. - Chronic	28053.6	mg/l	2.34	tons/day

Colorado Salinity Forum Limits Determined by Permitting Section
Concentration limit is based on limits developed in the West Colorado Watershed TMDL, approved by EPA in 2004.

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 235.67 mg/l):

	4 Day Average Concentration		Load		1 Hour Average Concentration		Load	
Aluminum	N/A		N/A		11,267.8	ug/l	1.9	lbs/day
Arsenic	5,282.04	ug/l	0.6	lbs/day	5,043.4	ug/l	0.8	lbs/day
Cadmium	13.76	ug/l	0.0	lbs/day	77.7	ug/l	0.0	lbs/day
Chromium III	5,104.53	ug/l	0.6	lbs/day	55,933.8	ug/l	9.3	lbs/day
Chromium VI	213.08	ug/l	0.0	lbs/day	189.0	ug/l	0.0	lbs/day
Copper	537.39	ug/l	0.1	lbs/day	462.8	ug/l	0.1	lbs/day
Iron	N/A		N/A		15,166.9	ug/l	2.5	lbs/day
Lead	275.99	ug/l	0.0	lbs/day	3,737.2	ug/l	0.6	lbs/day
Mercury	(2.52)	ug/l	0.0	lbs/day	35.5	ug/l	0.0	lbs/day
Nickel	3,134.66	ug/l	0.3	lbs/day	14,869.1	ug/l	2.5	lbs/day
Selenium	122.54	ug/l	0.0	lbs/day	300.5	ug/l	0.1	lbs/day
Silver	N/A	ug/l	N/A	lbs/day	250.7	ug/l	0.0	lbs/day
Zinc	7,169.92	ug/l	0.8	lbs/day	3,708.8	ug/l	0.6	lbs/day
Cyanide	154.78	ug/l	0.0	lbs/day	338.4	ug/l	0.1	lbs/day

Effluent Limitations for Heat/Temperature based upon Water Quality Standards

Summer	100.0	Deg. C.	212.0	Deg. F
Fall	92.6	Deg. C.	198.6	Deg. F
Winter	64.7	Deg. C.	148.5	Deg. F
Spring	100.0	Deg. C.	212.0	Deg. F

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

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

	4 Day Average Concentration		Load		1 Hour Average Concentration		Load	
Aldrin					1.5E+00	ug/l	3.87E-04	lbs/day
Chlordane	4.30E-03	ug/l	7.17E-04	lbs/day	1.2E+00	ug/l	3.10E-04	lbs/day
DDT, DDE	1.00E-03	ug/l	1.67E-04	lbs/day	5.5E-01	ug/l	1.42E-04	lbs/day
Dieldrin	1.90E-03	ug/l	3.17E-04	lbs/day	1.3E+00	ug/l	3.22E-04	lbs/day
Endosulfan	5.60E-02	ug/l	9.34E-03	lbs/day	1.1E-01	ug/l	2.84E-05	lbs/day
Endrin	2.30E-03	ug/l	3.84E-04	lbs/day	9.0E-02	ug/l	2.32E-05	lbs/day
Guthion	0.00E+00	ug/l	0.00E+00	lbs/day	1.0E-02	ug/l	2.58E-06	lbs/day
Heptachlor	3.80E-03	ug/l	6.34E-04	lbs/day	2.6E-01	ug/l	6.71E-05	lbs/day
Lindane	8.00E-02	ug/l	1.33E-02	lbs/day	1.0E+00	ug/l	2.58E-04	lbs/day
Methoxychlor	0.00E+00	ug/l	0.00E+00	lbs/day	3.0E-02	ug/l	7.74E-06	lbs/day
Mirex	0.00E+00	ug/l	0.00E+00	lbs/day	1.0E-02	ug/l	2.58E-06	lbs/day
Parathion	0.00E+00	ug/l	0.00E+00	lbs/day	4.0E-02	ug/l	1.03E-05	lbs/day
PCB's	1.40E-02	ug/l	2.33E-03	lbs/day	2.0E+00	ug/l	5.16E-04	lbs/day
Pentachlorophenol	1.30E+01	ug/l	2.17E+00	lbs/day	2.0E+01	ug/l	5.16E-03	lbs/day
Toxephene	2.00E-04	ug/l	3.34E-05	lbs/day	7.3E-01	ug/l	1.88E-04	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	0.8	lbs/day
Nitrates as N	4.0	mg/l	0.7	lbs/day
Total Phosphorus as P	0.05	mg/l	0.0	lbs/day
Total Suspended Solids	90.0	mg/l	15.0	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	8.04E+04	ug/l	1.34E+01	lbs/day
Acrolein	2.32E+04	ug/l	3.87E+00	lbs/day
Acrylonitrile	1.96E+01	ug/l	3.28E-03	lbs/day
Benzene	2.11E+03	ug/l	3.52E-01	lbs/day
Benzidine		ug/l		lbs/day
Carbon tetrachloride	1.31E+02	ug/l	2.18E-02	lbs/day
Chlorobenzene	6.25E+05	ug/l	1.04E+02	lbs/day
1,2,4-Trichlorobenzene				
Hexachlorobenzene	2.29E-02	ug/l	3.82E-06	lbs/day
1,2-Dichloroethane	2.95E+03	ug/l	4.91E-01	lbs/day
1,1,1-Trichloroethane				
Hexachloroethane	2.65E+02	ug/l	4.42E-02	lbs/day
1,1-Dichloroethane				
1,1,2-Trichloroethane	1.25E+03	ug/l	2.08E-01	lbs/day
1,1,2,2-Tetrachloroethane	3.27E+02	ug/l	5.46E-02	lbs/day
Chloroethane				
Bis(2-chloroethyl) ether	4.17E+01	ug/l	6.95E-03	lbs/day
2-Chloroethyl vinyl ether				
2-Chloronaphthalene	1.28E+05	ug/l	2.13E+01	lbs/day
2,4,6-Trichlorophenol	1.93E+02	ug/l	3.23E-02	lbs/day
p-Chloro-m-cresol				
Chloroform (HM)	1.40E+04	ug/l	2.33E+00	lbs/day
2-Chlorophenol	1.19E+04	ug/l	1.99E+00	lbs/day
1,2-Dichlorobenzene	5.06E+05	ug/l	8.44E+01	lbs/day
1,3-Dichlorobenzene	7.74E+04	ug/l	1.29E+01	lbs/day
1,4-Dichlorobenzene	7.74E+04	ug/l	1.29E+01	lbs/day
3,3'-Dichlorobenzidine	2.29E+00	ug/l	3.82E-04	lbs/day
1,1-Dichloroethylene	9.52E+01	ug/l	1.59E-02	lbs/day
1,2-trans-Dichloroethylene1				
2,4-Dichlorophenol	2.35E+04	ug/l	3.92E+00	lbs/day
1,2-Dichloropropane	1.16E+03	ug/l	1.94E-01	lbs/day
1,3-Dichloropropylene	5.06E+04	ug/l	8.44E+00	lbs/day
2,4-Dimethylphenol	6.85E+04	ug/l	1.14E+01	lbs/day
2,4-Dinitrotoluene	2.71E+02	ug/l	4.52E-02	lbs/day
2,6-Dinitrotoluene				
1,2-Diphenylhydrazine	1.61E+01	ug/l	2.68E-03	lbs/day
Ethylbenzene	8.63E+05	ug/l	1.44E+02	lbs/day
Fluoranthene	1.10E+04	ug/l	1.84E+00	lbs/day
4-Chlorophenyl phenyl ether				
4-Bromophenyl phenyl ether				
Bis(2-chloroisopropyl) ether	5.06E+06	ug/l	8.44E+02	lbs/day
Bis(2-chloroethoxy) methane				
Methylene chloride (HM)	4.76E+04	ug/l	7.94E+00	lbs/day
Methyl chloride (HM)				
Methyl bromide (HM)				
Bromoform (HM)	1.07E+04	ug/l	1.79E+00	lbs/day

Dichlorobromomethane(HM)	6.55E+02	ug/l	1.09E-01	lbs/day
Chlorodibromomethane (HM)	1.01E+03	ug/l	1.69E-01	lbs/day
Hexachlorocyclopentadiene	5.06E+05	ug/l	8.44E+01	lbs/day
Isophorone	1.79E+04	ug/l	2.98E+00	lbs/day
Naphthalene				
Nitrobenzene	5.66E+04	ug/l	9.43E+00	lbs/day
2-Nitrophenol				
4-Nitrophenol				
2,4-Dinitrophenol	4.17E+05	ug/l	6.95E+01	lbs/day
4,6-Dinitro-o-cresol	2.28E+04	ug/l	3.80E+00	lbs/day
N-Nitrosodimethylamine	2.41E+02	ug/l	4.02E-02	lbs/day
N-Nitrosodiphenylamine	4.76E+02	ug/l	7.94E-02	lbs/day
N-Nitrosodi-n-propylamine	4.17E+01	ug/l	6.95E-03	lbs/day
Pentachlorophenol	2.44E+02	ug/l	4.07E-02	lbs/day
Phenol	1.37E+08	ug/l	2.28E+04	lbs/day
Bis(2-ethylhexyl)phthalate	1.76E+02	ug/l	2.93E-02	lbs/day
Butyl benzyl phthalate	1.55E+05	ug/l	2.58E+01	lbs/day
Di-n-butyl phthalate	3.57E+05	ug/l	5.96E+01	lbs/day
Di-n-octyl phthlate				
Diethyl phthalate	3.57E+06	ug/l	5.96E+02	lbs/day
Dimethyl phthlate	8.63E+07	ug/l	1.44E+04	lbs/day
Benzo(a)anthracene (PAH)	9.23E-01	ug/l	1.54E-04	lbs/day
Benzo(a)pyrene (PAH)	9.23E-01	ug/l	1.54E-04	lbs/day
Benzo(b)fluoranthene (PAH)	9.23E-01	ug/l	1.54E-04	lbs/day
Benzo(k)fluoranthene (PAH)	9.23E-01	ug/l	1.54E-04	lbs/day
Chrysene (PAH)	9.23E-01	ug/l	1.54E-04	lbs/day
Acenaphthylene (PAH)				
Anthracene (PAH)				
Dibenzo(a,h)anthracene (PAH)	9.23E-01	ug/l	1.54E-04	lbs/day
Indeno(1,2,3-cd)pyrene (PAH)	9.23E-01	ug/l	1.54E-04	lbs/day
Pyrene (PAH)	3.27E+05	ug/l	5.46E+01	lbs/day
Tetrachloroethylene	2.65E+02	ug/l	4.42E-02	lbs/day
Toluene	5.95E+06	ug/l	9.93E+02	lbs/day
Trichloroethylene	2.41E+03	ug/l	4.02E-01	lbs/day
Vinyl chloride	1.56E+04	ug/l	2.61E+00	lbs/day

Pesticides				
Aldrin	4.17E-03	ug/l	6.95E-07	lbs/day
Dieldrin	4.17E-03	ug/l	6.95E-07	lbs/day
Chlordane	1.76E-02	ug/l	2.93E-06	lbs/day
4,4'-DDT	1.76E-02	ug/l	2.93E-06	lbs/day
4,4'-DDE	1.76E-02	ug/l	2.93E-06	lbs/day
4,4'-DDD	2.50E-02	ug/l	4.17E-06	lbs/day
alpha-Endosulfan	5.95E+01	ug/l	9.93E-03	lbs/day
beta-Endosulfan	5.95E+01	ug/l	9.93E-03	lbs/day
Endosulfan sulfate	5.95E+01	ug/l	9.93E-03	lbs/day
Endrin	2.41E+01	ug/l	4.02E-03	lbs/day
Endrin aldehyde	2.41E+01	ug/l	4.02E-03	lbs/day
Heptachlor	6.25E-03	ug/l	1.04E-06	lbs/day
Heptachlor epoxide				
PCB's				
PCB 1242 (Arochlor 1242)	1.34E-03	ug/l	2.23E-07	lbs/day
PCB-1254 (Arochlor 1254)	1.34E-03	ug/l	2.23E-07	lbs/day
PCB-1221 (Arochlor 1221)	1.34E-03	ug/l	2.23E-07	lbs/day
PCB-1232 (Arochlor 1232)	1.34E-03	ug/l	2.23E-07	lbs/day
PCB-1248 (Arochlor 1248)	1.34E-03	ug/l	2.23E-07	lbs/day
PCB-1260 (Arochlor 1260)	1.34E-03	ug/l	2.23E-07	lbs/day
PCB-1016 (Arochlor 1016)	1.34E-03	ug/l	2.23E-07	lbs/day
Pesticide				
Toxaphene	2.23E-02	ug/l	3.72E-06	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)	4.17E-07	ug/l	6.95E-11	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		11267.8				11267.8	N/A
Antimony				127991.0		127991.0	
Arsenic	2976.5	5043.4			0.0	2976.5	5282.0
Barium						0.0	
Beryllium						0.0	
Cadmium	296.2	77.7			0.0	77.7	13.8
Chromium (III)		55933.8			0.0	55933.8	5104.5
Chromium (VI)	2904.6	189.0			0.0	188.95	213.08
Copper	5912.8	462.8				462.8	537.4
Cyanide		338.4	6548377.5			338.4	154.8
Iron		15166.9				15166.9	
Lead	2970.5	3737.2			0.0	2970.5	276.0
Mercury		35.48		4.46	0.0	4.46	-2.519
Nickel		14869.1		136920.6		14869.1	3134.7
Selenium	1473.9	300.5			0.0	300.5	122.5
Silver		250.7			0.0	250.7	
Thallium				187.5		187.5	
Zinc		3708.8				3708.8	7169.9
Boron	19974.5					19974.5	

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	11267.8	N/A	
Antimony	127991.01		
Arsenic	2976.5	5282.0	Acute Controls
Asbestos	0.00E+00		
Barium			
Beryllium			
Cadmium	77.7	13.8	
Chromium (III)	55933.8	5105	
Chromium (VI)	189.0	213.1	Acute Controls
Copper	462.8	537.4	Acute Controls
Cyanide	338.4	154.8	
Iron	15166.9		
Lead	2970.5	276.0	
Mercury	4.465	-2.519	
Nickel	14869.1	3135	
Selenium	300.5	122.5	
Silver	250.7	N/A	
Thallium	187.5		
Zinc	3708.8	7169.9	Acute Controls
Boron	19974.46		

Other Effluent Limitations are based upon R317-1.

E. coli	126.0	organisms per 100 ml

X. Antidegradation Considerations

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

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

An Antidegradation Level I Review was conducted on this discharge and its effect on the receiving water. Based upon that review, it has been determined that an Antidegradation Level II Review is required.

XI. Colorado River Salinity Forum Considerations

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

XII. Summary Comments

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

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
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APPENDIX - Coefficients and Other Model Information

CBOD Coeff. (Kd)20	CBOD Coeff. FORCED	CBOD Coeff. (Ka)T	REAER. Coeff. (Ka)20	REAER. Coeff. FORCED	REAER. (Ka)T	NBOD Coeff. (Kn)20	NBOD Coeff. (Kn)T
1/day	(Kd)/day	1/day	(Ka)/day	1/day	1/day	1/day	1/day
2.000	0.000	2.191	48.183	0.000	50.512	0.600	0.699

Open Coeff. (K4)20	Open Coeff. (K4)T	NH3 LOSS (K5)20	NH3 (K5)T	NO2+NO3 LOSS (K6)20	NO2+NO3 (K6)T	TRC Decay K(Cl)20	TRC K(Cl)(T)
1/day	1/day	1/day	1/day	1/day	1/day	1/day	1/day
0.000	0.000	4.000	4.383	0.000	0.000	32.000	35.934

BENTHIC DEMAND (SOD)20	BENTHIC DEMAND (SOD)T
gm/m2/day	gm/m2/day
1.000	1.134

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