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

Date:	October 3, 2019
Prepared by:	Dave Wham Standards and Technical Services
Facility:	Pacificorp Deer Creek Mine; Discharge 003 UPDES No. UT0023604
Receiving water:	Huntington Creek (1C, 2B, 3A, 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

UPDES Discharge Point 003, Mine water discharge with an estimated mean monthly discharge of 0.72 MGD (1.12 cfs).

Receiving Water

Huntington Creek. Per UAC R317-2-13.1(b), the designated beneficial uses of Huntington Creek and tributaries from Highway 10 crossing to USFS boundary are 1C, 2B, 3A, 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 3A Protected for cold water species of game fish and other cold water aquatic life, including the necessary aquatic organisms in their food chain.
- Class 4 Protected for agricultural uses including irrigation of crops and stock watering.

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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 was calculated for the period of record to approximate the 7Q10 low flow condition. Flow data for the receiving water was obtained from Emery Water Conservancy District for their site *Huntington River below Power Plant* from the period 2012-2017. This station is below the Power Plant diversion but above other significant diversions like Huntington North Reservoir. Ambient water quality was characterized using data from DWQ station #4930530, Huntington Creek above UP&L Diversion from the period 2007-2013.

The critical low flow condition for discharges 003 is 12.1 cfs.

TMDL

According to the Utah's 2016 303(d) Water Quality Assessment, the assessment unit for this section of Huntington Creek, Huntington Creek and tributaries from Highway 10 crossing to USFS boundary (UT14060009-004) was listed as impaired for pH (Classes 1C, 2B, 3A, 4), dissolved oxygen (Class 3A), temperature (Class 3A) and total dissolved solids (Class 4).

Review of the listing data show that the temperature impairment was based on results from stations located in Bear Creek, a tributary to Huntington Creek located upstream from the proposed discharge. As a result, the proposed discharge cannot cause or contribute to that impairment.

Data from two monitoring stations above and below Deer Creek on Huntington Creek show impairments for pH and dissolved oxygen (DO). As a result, the proposed discharge must meet applicable Water Quality Standards (WQS) at end of pipe for these constituents (6.5 mg/l DO, and pH 6.5-9.0 pH).

Review of the listing data show that the total dissolved solids (TDS) impairment was based on results from the Huntington Creek at U10 crossing monitoring station. In order to protect downstream uses, and to avoid causing or contributing to that impairment, effluent limits for TDS should be set at the WQS of 1200 mg/l TDS.

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.

Mixing zone modeling showed 100 % mixing within 15 minutes travel time, and acute limits defaulted to 50% of the seasonal critical low flow.

Parameters of Concern

4

The potential parameters of concern identified for the discharge/receiving water were temperature, pH, dissolved oxygen, TDS, and iron, as determined in consultation with the

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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.

LC50 WET Limits for Outfall 003 should be based on 100% effluent. IC25 WET limits for Outfalls 003 should be based on 8.4% 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 not required for this facility. The proposed permit is a simple renewal of an existing UPDES permit. No increase in flow or concentration of pollutants over those authorized in the the existing permit is being requested.

Documents:

WLA Document: DeerCk_003_WLADoc_10-3-19.docx Wasteload Analysis and Addendums: DeerCk_003_WLA_10-03-19.xlsm

References:

Emery County Water Conservancy District. http://www.ewcd.org/canals/huntington-drainage/ Utah Division of Water Quality. 2012. Utah Wasteload Analysis Procedures Version 1.0.

WASTELOAD ANALYSIS [WLA] Addendum: Statement of Basis

3-Oct-19

Facilities:	Deer Creek 003 Discharge		UPDES No: UT-0023604
Discharging to:	Huntington Creek	0.72 MGD	

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

Huntington Creek :	1C, 2B, 3A, 4
Antidegradation Review:	Level I review completed. Amended Level II review not require

III. Numeric Stream Standards for Protection of Aquatic Wildlife

Total Ammonia (TNH3)	Varies as a function of Temperature and pH Rebound. See Water Quality Standards
Chronic Total Residual Chlorine (TRC)	0.011 mg/l (4 Day Average) 0.019 mg/l (1 Hour Average)
Chronic Dissolved Oxygen (DO)	6.50 mg/l (30 Day Average) 5.00 mg/l (7Day Average) 4.00 mg/l (1 Day Average
Maximum Total Dissolved Solids	1200.0 mg/l

Acute and Chronic Heavy Metals (Dissolved)

	4 Day Average (Chronic) Standard		1 Hour Average (Acute) Standard					
Parameter	Concent	ration	Loa	d*	Concentratio	on –	Load*	
Aluminum	87.00	ua/l**	0.523	lbs/dav	750.00	ua/l	4.511	lbs/dav
Arsenic	190.00	ug/l	1.143	lbs/day	340.00	ug/l	2.045	lbs/day
Cadmium	0.52	ug/l	0.003	lbs/day	5.25	ug/l	0.032	lbs/day
Chromium III	178.07	ug/l	1.071	lbs/day	3725.58	ug/l	22.410	lbs/day
ChromiumVI	11.00	ug/l	0.066	lbs/day	16.00	ug/l	0.096	lbs/day
Copper	19.89	ug/l	0.120	lbs/day	32.26	ug/l	0.194	lbs/day
Iron					1000.00	ug/l	6.015	lbs/day
Lead	9.83	ug/l	0.059	lbs/day	252.25	ug/l	1.517	lbs/day
Mercury	0.0120	ug/l	0.000	lbs/day	2.40	ug/l	0.014	lbs/day
Nickel	110.39	ug/l	0.664	lbs/day	992.91	ug/l	5.973	lbs/day
Selenium	4.60	ug/l	0.028	lbs/day	20.00	ug/l	0.120	lbs/day
Silver	N/A	ug/l	N/A	lbs/day	17.38	ug/l	0.105	lbs/day
Zinc	253.86	ug/l	1.527	lbs/day	253.86	ug/l	1.527	lbs/day
* Allov	ved below disch	narge						

**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 242.57 mg/l as CaCO3

Organics [Pesticides]

	4 Day Average (Chronic) Standard		1 Hour	Average (Acute) Standard			
Parameter	Concent	ration	Loa	d*	Concentratio	on	Load*
Aldrin					1.500	ug/l	0.009 lbs/day
Chlordane	0.004	ug/l	0.306	lbs/day	1.200	ug/l	0.007 lbs/day
DDT, DDE	0.001	ug/l	0.071	lbs/day	0.550	ug/l	0.003 lbs/day
Dieldrin	0.002	ug/l	0.135	lbs/day	1.250	ug/l	0.008 lbs/day
Endosulfan	0.056	ug/l	3.988	lbs/day	0.110	ug/l	0.001 lbs/day
Endrin	0.002	ug/l	0.164	lbs/day	0.090	ug/l	0.001 lbs/day
Guthion					0.010	ug/ł	0.000 lbs/day
Heptachlor	0.004	ug/l	0.271	lbs/day	0.260	ug/l	0.002 lbs/day
Lindane	0.080	ug/l	5.698	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	0.997	lbs/day	2.000	ug/l	0.012 lbs/day
Pentachlorophenol	13.00	ug/l	925.894	lbs/day	20.000	ug/l	0.120 lbs/day
Toxephene	0.0002	ug/l	0.014	lbs/day	0.7300	ug/l	0.004 lbs/day

IV. Numeric Stream Standards for Protection of Agriculture

	4 Day Average (Chronic) St	andard	1 Hour Average	(Acute) Stand	lard
	Concentration	Load*	Concentration	Loa	ad*
Arsenic			100.0 ug/l		lbs/day
Boron			750.0 ug/l	2.	26 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.	61 tons/day

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

	4 Day Average (Chronic)	1 Hour Average (Acute) Standard				
Metals	Concentration	Load*	Concentratio	on		Load*
Arsenic			50.0	ug/l		3.561 lbs/day
Barium			1000.0	ug/l		71.223 lbs/day
Cadmium			10.0	ug/l		0.712 lbs/day
Chromium			50.0	ug/l		3.561 lbs/day
Lead			50.0	ug/l		3.561 lbs/day
Mercury			2.0	ug/l		0.142 lbs/day
Selenium			10.0	ug/l		0.712 lbs/day
Silver			50.0	ug/l		3.561 lbs/day
Fluoride (3)			1.4	ug/l		0.100 lbs/day
to			2.4	ug/l		0.171 lbs/day
Nitrates as N			10.0	ug/l		0.712 lbs/day
Chlorophenoxy Herbici	ides					
2,4-D			100.0	ug/l		7.122 lbs/day
2,4,5-TP			10.0	ug/l		0.712 lbs/day
Endrin			0.2	ug/l		0.014 lbs/day
ocyclohexane (Lindane)			4.0	ug/l		0.285 lbs/day
Methoxychlor			100.0	ug/l		7.122 lbs/day
Toxaphene			5.0	ug/l		0.356 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			3A, 3B		
Toxic Organics	[2 Liters/Day for 70	Kg Person over	70 Yr.]		[6.5 g	for 70	0 Kg Person over 70	Yr.]
Acenaphthene	1200.00 ug/l	85.47	lbs/day		2700.0	ug/l	192.30	lbs/day
Acrolein	320.00 ug/l	22.79	lbs/day		780.0	ug/l	55.55	lbs/day
Acrylonitrile	0.06 ug/l	0.00	lbs/day		0.7	ug/l	0.05	lbs/day
Benzene	1.20 ug/l	0.09	lbs/day		71.0	ug/l	5.06	lbs/day
Benzidine	0.00012 ug/i	0.00	lbs/day		0.0	ug/l	0.00	lbs/day
Carbon tetrachloride	0.25 ug/l	0.02	lbs/day		4.4	ug/l	0.31	lbs/day
Chlorobenzene	680.00 ug/l	48.43	lbs/day		21000.0	ug/l	1495.67	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	0.03	lbs/day		99.0	ug/l	7.05	lbs/day

1.1.1-Trichloroethane								
Hexachloroethane	1.90	ua/l	0 14	lbs/day	89	ua/l	0.63	lbs/day
1.1-Dichloroethane		- <u>g</u> , .	0.11	iso, ady	0.0	ugn	0.00	103/day
1.1.2-Trichloroethane	0.61	ua/l	0.04	lbs/dav	42.0	ua/l	2 99	lbs/dav
1,1,2,2-Tetrachloroethau	0.17	ua/l	0.01	lbs/dav	11.0	ua/l	0.78	lbs/day
Chloroethane		5		·····,	0.0	ua/l	0.00	lbs/day
Bis(2-chloroethyl) ether	0.03	uq/l	0.00	lbs/dav	1.4	ua/l	0.10	lbs/day
2-Chloroethyl vinyl ether	0.00	ug/l	0.00	lbs/dav	0.0	ua/l	0.00	lbs/day
2-Chloronaphthalene	1700.00	uq/l	121.08	lbs/dav	4300.0	ua/l	306.26	lbs/day
2,4,6-Trichlorophenol	2.10	ug/i	0.15	lbs/dav	6.5	ua/l	0.46	lbs/day
p-Chloro-m-cresol					0.0	ua/l	0.00	lbs/day
Chloroform (HM)	5.70	ug/l	0.41	lbs/dav	470.0	ua/l	33.47	lbs/day
2-Chlorophenol	120.00	uq/l	8.55	lbs/dav	400.0	ua/l	28 49	lbs/day
1,2-Dichlorobenzene	2700.00	ua/l	192.30	lbs/dav	17000.0	ua/l	1210 78	lbs/day
1,3-Dichlorobenzene	400.00	ua/l	28.49	lbs/day	2600.0	ua/l	185.18	lbs/day
1,4-Dichlorobenzene	400.00	ug/l	28.49	lbs/dav	2600.0	ua/l	185 18	lbs/day
3,3'-Dichlorobenzidine	0.04	uq/l	0.00	lbs/day	0.1	ua/l	0.01	lbs/day
1,1-Dichloroethylene	0.06	uq/l	0.00	lbs/dav	3.2	ua/l	0.23	lbs/day
1,2-trans-Dichloroethyle	700.00	uq/l	49.86	lbs/dav	0.0	ua/l	0.00	lbs/day
2,4-Dichlorophenol	93.00	ug/l	6.62	lbs/dav	790.0	ua/l	56.27	lbs/day
1,2-Dichloropropane	0.52	ug/l	0.04	lbs/day	39.0	ua/l	2.78	lbs/day
1,3-Dichloropropylene	10.00	ug/i	0.71	lbs/day	1700.0	ua/l	121.08	lbs/day
2,4-Dimethylphenol	540.00	ug/l	38.46	lbs/day	2300.0	ua/l	163.81	lbs/day
2,4-Dinitrotoluene	0.11	ug/l	0.01	lbs/dav	9.1	ua/l	0.65	lbs/day
2,6-Dinitrotoluene	0.00	ug/l	0.00	lbs/dav	0.0	ua/l	0.00	lbs/day
1,2-Diphenylhydrazine	0.04	ug/l	0.00	lbs/dav	0.5	ua/l	0.04	lbs/day
Ethylbenzene	3100.00	ug/l	220,79	lbs/dav	29000.0	ua/l	2065.46	lbs/day
Fluoranthene	300.00	ug/l	21.37	lbs/day	370.0	ua/l	26.35	lbs/day
4-Chlorophenyl phenyl ether		Ū		,				
4-Bromophenyl phenyl ether								
Bis(2-chloroisopropyl) e	1400.00	ug/l	99.71	lbs/dav	170000.0	ua/l	12107.84	lbs/dav
Bis(2-chloroethoxy) met	0.00	ug/l	0.00	lbs/day	0.0	ua/l	0.00	lbs/day
Methylene chloride (HM	4.70	ug/i	0.33	lbs/day	1600.0	ug/l	113.96	lbs/day
Methyl chloride (HM)	0.00	uq/l	0.00	lbs/day	0.0	ua/l	0.00	lbs/day
Methyl bromide (HM)	0.00	ug/l	0.00	lbs/day	0.0	ua/l	0.00	lbs/day
Bromoform (HM)	4.30	ug/l	0.31	lbs/day	360.0	ua/l	25.64	lbs/day
Dichlorobromomethane	0.27	ug/l	0.02	lbs/day	22.0	ua/l	1.57	lbs/day
Chlorodibromomethane	0.41	ug/l	0.03	lbs/day	34.0	ua/l	2.42	lbs/day
Hexachlorobutadiene(c)	0.44	ug/l	0.03	lbs/dav	50.0	ua/l	3.56	lbs/day
Hexachlorocyclopentadi	240.00	ug/l	17.09	lbs/day	17000.0	ua/l	1210.78	lbs/day
Isophorone	8.40	ug/l	0.60	lbs/day	600.0	ua/l	42.73	lbs/day
Naphthalene						5		
Nitrobenzene	17.00	ug/l	1.21	lbs/dav	1900.0	ua/l	135.32	lbs/dav
2-Nitrophenol	0.00	ug/l	0.00	lbs/day	0.0	ua/l	0.00	lbs/day
4-Nitrophenol	0.00	ug/l	0.00	lbs/day	0.0	ua/l	0.00	lbs/day
2,4-Dinitrophenol	70.00	uq/l	4.99	lbs/day	14000.0	ua/l	997 12	lbs/day
4,6-Dinitro-o-cresol	13.00	ua/l	0.93	lbs/dav	765.0	ua/l	54 49	lbs/day
N-Nitrosodimethylamine	0.00069	ug/l	0.00	lbs/dav	8.1	ua/l	0.58	lbs/day
N-Nitrosodiphenylamine	5.00	uq/l	0.36	lbs/dav	16.0	ua/l	1 14	lbs/day
N-Nitrosodi-n-propylami	0.01	ug/l	0.00	lbs/dav	14	ua/l	0.10	lbs/day
Pentachlorophenol	0.28	ug/i	0.02	lbs/day	8.2	uq/l	0.58	lbs/dav
		-				··		

Phenol	2.10E+04 ug	g/l 1.50E+03	lbs/day 4	.6E+06	uq/l	3.28E+05 lbs/	'dav
Bis(2-ethylhexyl)phthala	1.80 ug	g/l 0.13	lbs/day	5.9	ug/l	0.42 lbs/	'dav
Butyl benzyl phthalate	3000.00 ug	g/l 213.67	lbs/day	5200.0	uq/l	370.36 lbs/	dav
Di-n-butyl phthalate	2700.00 ug	g/l 192.30	lbs/day 1.	2000.0	ug/l	854.67 lbs/	day
Di-n-octyl phthlate	_				U		,
Diethyl phthalate	23000.00 ug	g/l 1638.12	lbs/day 12	0.0000	ua/l	8546.71 lbs/	'dav
Dimethyl phthlate	3.13E+05 ug	g/l 2.23E+04	lbs/day 2	.9E+06	uq/l	2.07E+05 lbs/	'dav
Benzo(a)anthracene (P/	0.0028 ug	g/l 0.00	lbs/day	0.0	uq/l	0.00 lbs/	'dav
Benzo(a)pyrene (PAH)	0.0028 ug	a/l 0.00	lbs/dav	0.0	ua/l	0.00 lbs/	'dav
Benzo(b)fluoranthene (F	0.0028 ug	a/l 0.00	lbs/day	0.0	ua/l	0.00 lbs/	'dav
Benzo(k)fluoranthene (F	0.0028 ug	a/l 0.00	lbs/dav	0.0	ua/l	0.00 lbs/	'dav
Chrysene (PAH)	0.0028 ug	g/l 0.00	lbs/day	0.0	ua/l	0.00 lbs/	'dav
Acenaphthylene (PAH)				0.0	u.g.	0.00 100/	auy
Anthracene (PAH)	9600.00 ua	a/l 683.74	lbs/dav	0.0	ua/i	0.00 lbs/	dav
Dibenzo(a.h)anthracene	0.0028 ug	a/l 0.00	lbs/day	0.0	ug/l	0.00 lbs/	/day
Indeno(1,2,3-cd)pyrene	0.0028 ug	a/l 0.00	lbs/day	0.0	ug/l	0.00 lbs/	/day
Pvrene (PAH)	960.00 ug	g/l 68.37	lbs/day 1	1000.0	ug/l	783 45 lbs/	/day
Tetrachloroethylene	0.80 ug	a/l 0.06	lbs/day	8.9	ug/l	0.63 lbs/	day
Toluene	6800.00 ug	n/l 484.31	lbs/day 2	0.00	ug/l	14244 52 lbs/	day
Trichloroethylene	2 70 ug	n/l 0.19	lbs/day 2	81 0	ug/l	5 77 lbs/	day
Vinvl chloride	2.00 ug	g/i 0.10 n/i 0.14	lbs/day	525.0	ug/l	37 30 lbs/	uay day
vinyi olilohao	2.00 ug	9/1 0.14	103/ddy	020.0	ugn	0.00 lbs/	day
Pesticides				0.0		0.00 lbs/	uay day
Aldrin	0.0001.ua	0.00	lbs/day	0.0	ua/l	0.00 lbs/	uay
Dieldrin	0.0001 ug	g/i 0.00	lbs/day	0.0	ug/l	0.00 Ibs/	uay
Chlordane		g/i 0.00	lbs/day	0.0	ug/l	0.00 lbs/	day
	0.0000 ug	g/i 0.00	lbs/uay	0.0	ug/l	0.00 lbs/	day
	0.0000 ug	g/l 0.00	lbs/day	0.0	ug/i	0.00 lbs/	day
	0.0000 ug	g/i 0.00	lbs/day	0.0	uy/i	0.00 lbs/	uay
alaba Endosulfan	0.0000 ug	y/i 0.00	lbs/day	0.0	ug/i	0.00 IDS/	day (day
bota Endosulfan	0.9300 ug	g/i 0.07	ibs/day	2.0	ug/i	0.14 IDS/	day
Endocultan sulfato	0.9300 ug	g/i 0.07	lbs/day	2.0	ug/i	0.14 IDS/	day
Endustrian	0.9300 ug	g/i 0.07	ibs/day	2.0	ug/i	0.14 lbs/	day
Englin oldobudo	0.7600 ug	J/I 0.05	ibs/day	0.8	ug/i	0.06 lbs/	day
Lienteebles	0.7600 ug	g/l 0.05	ibs/day	0.8	ug/I	0.06 lbs/	day
Heptachlor	0.0002 ug	J/I 0.00	lbs/day	0.0	ug/I	0.00 lbs/	day
neptachior epoxide							
PCB's							
PCB 12/2 (Arachlor 12/	0.000044.ug	0.00	lbc/dov	0.0	ua/I	0.00 lbs/	(da.,
PCB-1254 (Arochlor 12)	0.000044 ug	y/i 0.00	lbs/day	0.0	ug/i	0.00 lbs/	day
PCB-1221 (Arochior 12)	0.000044 ug	y/i 0.00	lbs/day	0.0	ug/i	0.00 Ibs/	uay day
PCB 1227 (Arochlor 12)	0.000044 ug	y/i 0.00	lbs/day	0.0	ug/i	0.00 lbs/	day
PCB-1232 (Arochlor 12)	0.000044 ug	y/i 0.00	lbs/day	0.0	ug/i	0.00 lbs/	day
PCB-1246 (Arochlor 124	0.000044 ug	y/i 0.00	ibs/day	0.0	ug/i	0.00 lbs/	day
PCB-1200 (Arochlor 12)	0.000044 ug	J/I 0.00	IDS/day	0.0	ug/i	0.00 lbs/	day
PCB-1016 (Arochior 10	0.000044 ug	g/i 0.00	ibs/day	0.0	ug/I	0.00 lbs/	day
Pesticide							
Toxaphene	0.000750 ug	g/l 0.00		0.0	ug/l	0.00 lbs/	day
Dioxin		-//	u				
DOXID (2,3,7,8-10DD)	1.30E-08 ug	g/i 0.00	ibs/day 1.	40E-08		0.00	

Metals					
Antimony		14.0 ug/l	1.00 lbs/day		
Arsenic		50.0 ug/l	3.56 lbs/day	4300.00 ug/l	306.26 lbs/day
Asbestos		7.00E+06 ug/l	4.99E+05 lbs/day		
Beryllium					
Cadmium					
Chromium (III)					
Chromium (VI)					
Copper					
Cyanide		1.30E+03 ug/l	92.59 lbs/day	2.2E+05 ug/l	15668.97 lbs/day
Lead	S7	700.0 ug/l	49.86 lbs/day		
Mercury				0.15 ug/l	0.01 lbs/day
Nickel				4600.00 ug/l	327.62 lbs/day
Selenium		0.1 ug/l	0.01 lbs/day		10 C
Silver		610.0 ug/l	43.45 lbs/day		
Thallium				6.30 ug/l	0.45 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.

Critical Low	TDS
	TDS
Flow Temp. pH T-NH3 BOD5 DO TRC	
cfs Deg. C mg/l as N mg/l mg/l mg/l	mg/l
Summer (Irrig. Season) 12.10 12.0 8.5 0.01 0.05 7.64 0.00	213.0
Fall 12.10 2.1 8.4 0.01 0.05 0.00	265.0
Winter 12.10 1.0 8.3 0.01 0.05 0.00	307.0
Spring 12.10 7.3 8.4 0.01 0.05 0.00	230.0
Dissolved AI As Cd CrIII CrVI Copper Fe	Pb
Metals ug/l ug/l ug/l ug/l ug/l ug/l ug/l	ug/l
All Seasons 13.67 0.50 0.06 1.77 3.975* 0.95 15.2	0.35
Dissolved Hg Ni Se Ag Zn Boron	
Metals ug/l ug/l ug/l ug/l ug/l ug/l	
All Seasons 0.0000 2.50 0.92 0.25 7.12 20.1 *~8	0% MDL

Projected Discharge Information

Season	Flow, MGD	Temp.	TDS mg/l	TDS tons/day
Summer	0.72000	13.9	542.00	1.62697
Fall	0.72000	13.9		
Winter	0.72000	13.9		
Spring	0.72000	13.9		

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:

Delle Accesses

Season	Dally Average	
Summer	0.720 MGD	1.114 cfs
Fall	0.720 MGD	1.114 cfs
Winter	0.720 MGD	1.114 cfs
Spring	0.720 MGD	1.114 cfs

Flow Requirement or Loading Requirement

0----

The calculations in this wasteload analysis utilize the maximum effluent discharge flow of 0.72 MGD. If the discharger is allowed to have a flow greater than 0.72 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 >	61.4% Effluent	[Acute]
	IC25 >	8.4% 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	150.1 lbs/day
Fall	25.0 mg/l as BOD5	150.1 lbs/day
Winter	25.0 mg/l as BOD5	150.1 lbs/day
Spring	25.0 mg/l as BOD5	150.1 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	6.50
Fall	6.50
Winter	6.50
Spring	6.50

Effluent Limitation for Total Ammonia based upon Water Quality Standards

In-stream criteria of downstream segments for Total Ammonia will be met with an effluent limitation (expressed as Total Ammonia as N) as follows:

Seaso	n				
	Load	ł			
Summer	4 Day Avg Chronic	16.2	mg/l as N	97.1	lbs/day
3	1 Hour Avg Acute	25.5	mg/I as N	153.2	lbs/day
Fall	4 Day Avg Chronic	18.2	mg/l as N	109.0	lbs/day
	1 Hour Avg Acute	25.0	mg/l as N	150.3	lbs/day
Winter	4 Day Avg Chronic	19.9	mg/l as N	119.2	lbs/day
	1 Hour Avg Acute	28.7	mg/l as N	172.2	lbs/day
Spring	4 Day Avg Chronic	17.2	mg/l as N	103.2	lbs/day
	1 Hour Avg Acute	25.0	mg/I as N	150.3	lbs/day
Spring	1 Hour Avg Acute 4 Day Avg Chronic 1 Hour Avg Acute	28.7 17.2 25.0	mg/I as N mg/I as N mg/I as N	172.2 103.2 150.3	lbs/day lbs/day 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		Concentra	ation	Load		
Summer	4 Day Avg Chronic	0.119	mg/l	0.72	lbs/day	
	1 Hour Avg Acute	0.117	mg/l	0.70	lbs/day	
Fall	4 Day Avg Chronic	0.119	mg/l	0.72	lbs/day	
	1 Hour Avg Acute	0.117	mg/l	0.70	lbs/day	
Winter	4 Day Avg Chronic	0.119	mg/l	0.72	lbs/day	
	1 Hour Avg Acute	0.117	mg/l	0.70	lbs/day	
Spring	4 Day Avg Chronic	0.119	mg/l	0.00	lbs/day	
	1 Hour Avg Acute	0.117	mg/l	0.00	lbs/day	

Effluent Limitations for Total Dissolved Solids based upon Water Quality Standards

Season		Concentration		Load	I
Summer Fall Winter Spring	Maximum, Acute Maximum, Acute Maximum, Acute 4 Day Avg Chronic	11922.1 11357.2 10900.9 11737.4	mg/l mg/l mg/l mg/l	35.79 34.09 32.72 35.23	tons/day tons/day tons/day tons/day
Colorado Sa	alinity Forum Limits	Determine	d by Permit	ting 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 242.57 mg/l):

		4 Day Average		1 Hour	Average			
	Concent	tration	Load	Concentration			Load	
Aluminum*	N/A		N/A	4,749.5	ug/i		28.6 I	bs/day
Arsenic*	2,248.60	ug/l	8.7 lbs/day	2,184.0	ug/l		13.1 ľ	bs/day
Cadmium	5.55	ug/l	0.0 lbs/day	33.5	ug/l		0.2 ľ	bs/day
Chromium III	2,093.33	ug/l	8.1 lbs/day	23,952.1	ug/l		144.1 ľ	bs/day
Chromium VI*	87.31	ug/l	0.3 lbs/day	81.3	ug/l		0.5 I	bs/day
Copper	225.72	ug/l	0.9 lbs/day	202.4	ug/l		1.2 ľ	bs/day
Iron*	N/A		N/A	7,072.1	ug/l		42.5 ľ	bs/day
Lead	112.87	ug/l	0.4 lbs/day	1,620.5	ug/l		9.7 I	bs/day
Mercury*	0.14	ug/l	0.0 lbs/day	15.4	ug/l	÷.	0.1 ľ	bs/day
Nickel	1,282.47	ug/l	5.0 lbs/day	6,372.5	ug/l		38.3	bs/day
Selenium*	44.61	ug/i	0.2 lbs/day	123.7	ug/l		0.7 I	bs/day
Silver	N/A	ug/l	N/A lbs/day	110.4	ug/l		0.7	bs/day

Zinc	2,934.28	ug/l	11.4 lbs/day	1,594.1	ug/l	9.6 lbs/day
Cyanide*	61.69	ug/l	0.2 lbs/day	141.5	ug/l	0.9 lbs/day

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

Effluent Limitations for Heat/Temperature based upon Water Quality Standards

Summer	35.7 Deg. C.	96.3 Deg. F
Fall	25.8 Deg. C.	78.5 Deg. F
Winter	24.7 Deg. C.	76.5 Deg. F
Spring	31.0 Deg. C.	87.8 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 Ave	erage	1 Hour	Average	
	Concentration	Load	Concentration		Load
Aldrin			1.5E+00	ug/l	1.40E-02 lbs/day
Chlordane	4.30E-03 ug/l	2.58E-02 lbs/day	1.2E+00	ug/l	1.12E-02 lbs/day
DDT, DDE	1.00E-03 ug/l	6.00E-03 lbs/day	5.5E-01	ug/l	5.12E-03 lbs/day
Dieldrin	1.90E-03 ug/l	1.14E-02 lbs/day	1.3E+00	ug/l	1.16E-02 lbs/day
Endosulfan	5.60E-02 ug/l	3.36E-01 lbs/day	1.1E-01	ug/l	1.02E-03 lbs/day
Endrin	2.30E-03 ug/l	1.38E-02 lbs/day	9.0E-02	ug/l	8.38E-04 lbs/day
Guthion	0.00E+00 ug/l	0.00E+00 lbs/day	1.0E-02	ug/l	9.31E-05 lbs/day
Heptachlor	3.80E-03 ug/l	2.28E-02 lbs/day	2.6E-01	ug/l	2.42E-03 lbs/day
Lindane	8.00E-02 ug/l	4.80E-01 lbs/day	1.0E+00	ug/l	9.31E-03 lbs/day
Methoxychlor	0.00E+00 ug/l	0.00E+00 lbs/day	3.0E-02	ug/l	2.79E-04 lbs/day
Mirex	0.00E+00 ug/l	0.00E+00 lbs/day	1.0E-02	ug/l	9.31E-05 lbs/day
Parathion	0.00E+00 ug/l	0.00E+00 lbs/day	4.0E-02	ug/l	3.72E-04 lbs/day
PCB's	1.40E-02 ug/l	8.41E-02 lbs/day	2.0E+00	ug/l	1.86E-02 lbs/day
Pentachlorophenol	1.30E+01 ug/l	7.80E+01 lbs/day	2.0E+01	ug/l	1.86E-01 lbs/day
Toxephene	2.00E-04 ug/l	1.20E-03 lbs/day	7.3E-01	ug/ł	6.79E-03 lbs/day

Effluent Targets for Pollution Indicators Based upon Water Quality Standards

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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	30.1 lbs/day
Nitrates as N	4.0 mg/l	24.1 lbs/day
Total Phosphorus as P	0.05 mg/l	0.3 lbs/day
Total Suspended Solids	90.0 mg/l	541.4 lbs/day

Note: Pollution indicator targets are for information purposes only.

Effluent Limitations for Protection of Human Health [Toxics Rule] Based upon Water Quality Standards (Most stringent of 1C or 3A & 3B as appropriate.)

In-stream criteria of downstream segments for Protection of Human Health [Toxics] will be met with an effluent limit as follows:

č.	Maximum C	Concentration
	Concentration	Load
Toxic Organics		
Acenaphthene	1.42E+04 ug/l	8.55E+01 lbs/day
Acrolein	3.80E+03 ug/l	2.28E+01 lbs/day
Acrylonitrile	7.00E-01 ug/l	4.20E-03 lbs/day
Benzene	1.42E+01 ug/l	8.55E-02 lbs/day
Benzidine	ug/l	lbs/day
Carbon tetrachloride	2.97E+00 ug/l	1.78E-02 lbs/day
Chlorobenzene	8.07E+03 ug/l	4.84E+01 lbs/day
1,2,4-Trichlorobenzene		
Hexachlorobenzene	8.90E-03 ug/l	5.34E-05 lbs/day
1,2-Dichloroethane	4.51E+00 ug/l	2.71E-02 lbs/day
1,1,1-Trichloroethane		
Hexachloroethane	2.25E+01 ug/l	1.35E-01 lbs/day
1,1-Dichloroethane		
1,1,2-Trichloroethane	7.24E+00 ug/l	4.34E-02 lbs/day
1,1,2,2-Tetrachloroethane	2.02E+00 ug/l	1.21E-02 lbs/day
Chloroethane		
Bis(2-chloroethyl) ether	3.68E-01 ug/l	2.21E-03 lbs/day
2-Chloroethyl vinyl ether		
2-Chloronaphthalene	2.02E+04 ug/l	1.21E+02 lbs/day
2,4,6-Trichlorophenol	2.49E+01 ug/l	1.50E-01 lbs/day
p-Chloro-m-cresol		
Chloroform (HM)	6.76E+01 ug/l	4.06E-01 lbs/day
2-Chlorophenol	1.42E+03 ug/l	8.55E+00 lbs/day
1,2-Dichlorobenzene	3.20E+04 ug/l	1.92E+02 lbs/day
1,3-Dichlorobenzene	4.75E+03 ug/l	2.85E+01 lbs/day

3,3'-Dichlorobenzidine 4.75E-01 ug/l 2.85E-03 lbs/day 1,1-Dichloroethylene 6.76E-01 ug/l 4.06E-03 lbs/day 1,2-trans-Dichloroethylene1 2.4-Dichlorophenol 1.10E+03 ug/l 6.62E+00 lbs/day 1,2-Dichlorophenol 1.10E+03 ug/l 6.62E+00 lbs/day 3.70E-02 lbs/day 1,2-Dichloropropane 6.17E+00 ug/l 3.70E-02 lbs/day 1,3-Dichloropropylene 1.19E+02 ug/l 7.12E-01 lbs/day 2,4-Dimethylphenol 6.41E+03 ug/l 3.85E+01 lbs/day 2,4-Dinitrotoluene 1.30E+00 ug/l 7.83E-03 lbs/day 2,4-Dinitrotoluene 1.30E+00 ug/l 2.85E-03 lbs/day 2,4-Dinitrotoluene 1.30E+00 ug/l 2.85E-03 lbs/day 2,4-Dinitrotoluene 3.68E+04 ug/l 2.21E+02 lbs/day 1,2-Diphenylhydrazine 4.75E-01 ug/l 2.85E-03 lbs/day 2,4-Chlorophenyl phenyl ether 3.56E+03 ug/l 2.14E+01 lbs/day 4-Chlorophenyl phenyl ether 3.56E+03 ug/l 9.97E+01 lbs/day Bis(2-chloroethoxy) methane Methylene chloride (HM) 5.58E+01 ug/l 3.35E-01 lbs/day Methyl bromide (HM) 5.10E+01 ug/l 3.06E-01 lbs/day 1.92E-02 lbs/day Di
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Nurobenzene 2.02E+02 ug/l 1.21E+00 lbs/day 0 Nitrank and
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4,6-Dinitro-o-cresol 1.54E+02 ug/l 9.26E-01 lbs/day
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N-Nitrosodiphenylamine 5.93E+01 ug/l 3.56E-01 lbs/day
N-Nitrosodi-n-propylamine 5.93E-02 ug/l 3.56E-04 lbs/day
Pentachlorophenol 3.32E+00 ug/l 1.99E-02 lbs/day
Phenol 2.49E+05 ug/l 1.50E+03 lbs/day
Bis(2-ethylhexyl)phthalate 2.14E+01 ug/l 1.28E-01 lbs/day
Butyl benzyl phthalate 3.56E+04 ug/l 2.14E+02 lbs/day
Di-n-butyl phthalate 3.20E+04 ug/l 1.92E+02 lbs/day
Di-n-octyl phthlate
Diethyl phthalate 2.73E+05 ug/l 1.64E+03 lbs/day
Dimethyl phthlate 3.71E+06 ug/l 2.23E+04 lbs/day
Benzo(a)anthracene (PAH) 3.32E-02 ug/l 1.99E-04 lbs/day
Benzo(a)pyrene (PAH) 3.32F-02 ug/l 1.99F-04 lbs/day
Benzo(b)fluoranthene (PAH) 3.32E-02 ug/l 1.99E-04 lbs/day
Benzo(b)fluoranthene (PAH)3.32E-02 ug/l1.99E-04 lbs/dayBenzo(k)fluoranthene (PAH)3.32E-02 ug/l1.99E-04 lbs/day
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Pyrene (PAH)	1.14E+04 ug/l	6.84E+01 lbs/day
Tetrachloroethylene	9.49E+00 ug/l	5.70E-02 lbs/day
Toluene	8.07E+04 ug/l	4.84E+02 lbs/day
Trichloroethylene	3.20E+01 ug/l	1.92E-01 lbs/day
Vinyl chloride	2.37E+01 ug/l	1.42E-01 lbs/day
Pesticides		
Aldrin	1.54E-03 ug/l	9.26E-06 lbs/day
Dieldrin	1.66E-03 ug/l	9.97E-06 lbs/day
Chlordane	6.76E-03 ug/l	4.06E-05 lbs/day
4,4'-DDT	7.00E-03 ug/l	4.20E-05 lbs/day
4,4'-DDE	7.00E-03 ug/l	4.20E-05 lbs/day
4,4'-DDD	9.85E-03 ug/l	5.91E-05 lbs/day
alpha-Endosulfan	1.10E+01 ug/l	6.62E-02 lbs/day
beta-Endosulfan	1.10E+01 ug/l	6.62E-02 lbs/day
Endosulfan sulfate	1.10E+01 ug/l	6.62E-02 lbs/day
Endrin	9.02E+00 ug/l	5.41E-02 lbs/day
Endrin aldehyde	9.02E+00 ug/l	5.41E-02 lbs/day
Heptachlor	2.49E-03 ug/l	1.50E-05 lbs/day
Heptachlor epoxide		
PCB's		
PCB 1242 (Arochlor 1242)	5.22E-04 ug/l	3.13E-06 lbs/dav
PCB-1254 (Arochlor 1254)	5.22E-04 ug/l	3.13E-06 lbs/day
PCB-1221 (Arochlor 1221)	5.22E-04 ug/l	3.13E-06 lbs/day
PCB-1232 (Arochlor 1232)	5.22E-04 ug/l	3.13E-06 lbs/day
PCB-1248 (Arochlor 1248)	5.22E-04 ug/l	3.13E-06 lbs/day
PCB-1260 (Arochlor 1260)	5.22E-04 ug/l	3.13E-06 lbs/day
PCB-1016 (Arochlor 1016)	5.22E-04 ug/l	3.13E-06 lbs/day
Pesticide		
Toxaphene	8.66E-03 ug/l	5.20E-05 lbs/day
Metals		
Antimony	166 09 ug/l	1.00 lbs/day
Arsenic	587 73 ug/l	3 53 lbs/day
Asbestos	8 30F+07 ug/l	4 99E+05 lbs/day
Bervllium		1.002 00 150,003
Cadmium		
Chromium (III)		×
Chromium (VI)		
Copper	15422 32 ug/l	92.59 lbs/day
Cvanide	8304.32 ug/l	49.86 lbs/day
Lead	0.00	0.00
Mercury	1.66 µg/l	0.01 lbs/day
Nickel	7236 63 ug/l	43 45 lbs/day
Selenium	0.00	0.00
Silver	0.00	0.00
Thallium	20 17 ug/l	0.12 lbs/day
Zinc	g/i	still isolady

Dioxin Dioxin (2,3,7,8-TCDD)

1.54E-07 ug/l

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

			Acute				
	Class 4 Acute Agricultural ug/l	Class 3 Acute Aquatic Wildlife	Toxics Drinking Water Source	Acute Toxics Wildlife	1C Acute Health Criteria	Acute Most Stringent	Class 3 Chronic Aquatic Wildlife
Aluminum	9	4749.5	-9/1	-9	-9.1	4749.5	N/A
Antimony			166.1	51012.3		166.1	
Arsenic	1186.3	2184.0	587,7		0.0	587.7	2248.6
Barium			,		11863.3	11863.3	
Beryllium						0.0	
Cadmium	118.0	33.5		-	0.0	33.5	5.5
Chromium (III)		23952.1			0.0	23952.1	2093.3
Chromium (VI)	1167.2	81.3			0.0	81.32	87.31
Copper	2362.4	202.4	15422.3			202.4	225.7
Cyanide		141.5	2609930.3			141.5	61.7
Iron		7072.1				7072.1	
Lead	1182.6	1620.5			0.0	1182.6	112.9
Mercury		15.44	1.7	1.78	0.0	1.66	0.142
Nickel		6372.5	7236.6	54571.3		6372.5	1282.5
Selenium	583.2	123.7			0.0	123.7	44.6
Silver		110.4			0.0	110.4	
Thallium			20.2	74.7		20.2	
Zinc		1594.1				1594.1	2934.3
Boron	8679.1					8679.1	
Sulfate	23726.6					23726.6	

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	WLA Chron	ic
	ug/l	ug/l	
Aluminum	4749.5	N/A	
Antimony	166.09		
Arsenic	587.7	2248.6	Acute Controls
Asbestos	8.30E+07		
Barium			
Beryllium			
Cadmium	33.5	5.5	
Chromium (III)	23952.1	2093	
Chromium (VI)	81.3	87.3	Acute Controls
Copper	202.4	225.7	Acute Controls

Acute Controls

N/A at this Waterbody

Cyanide	141.5	61.7	
Iron	7072.1		
Lead	1182.6	112.9	
Mercury	1.661	0.142	
Nickel	6372.5	1282	
Selenium	123.7	44.6	
Silver	110.4	N/A	
Thallium	20.2		
Zinc	1594.1	2934.3	
Boron	 8679.14		
Sulfate	23726.6		

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 because the receiving water for the discharge is a Class 1C Drinking Water Source.

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.

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

Date:	October 3, 2019
Prepared by:	Dave Whan Standards and Technical Services
Facility:	Pacificorp Deer Creek Mine; Discharge 002 UPDES No. UT0023604

Receiving water: Deer Creek => Huntington Creek (1C, 2B, 3A, 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

UPDES Discharge Point 002, Mine water discharge with an estimated mean monthly discharge of 5.0 MGD (7.74 cfs).

Receiving Water

Deer Creek thence to Huntington Creek. Per UAC R317-2-13.1(b), the designated beneficial uses of Huntington Creek and tributaries from Highway 10 crossing to USFS boundary are 1C, 2B, 3A, 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 3A Protected for cold water species of game fish and other cold water aquatic life, including the necessary aquatic organisms in their food chain.

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

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).). Deer Creek is an intermittent stream that has no flow for large parts of the year. As a result, the annual critical low flow was determined to be zero. As a result, water quality based effluent limits revert to end-of-pipe water quality standards. Ambient water quality was characterized using data from DWQ station #4930530, Huntington Creek above UP&L Diversion from the period 2007-2013.

TMDL

According to the Utah's 2016 303(d) Water Quality Assessment, the assessment unit for this section of Huntington Creek, Huntington Creek and tributaries from Highway 10 crossing to USFS boundary (UT14060009-004) was listed as impaired for pH (Classes 1C, 2B, 3A, 4), dissolved oxygen (Class 3A), temperature (Class 3A) and total dissolved solids (Class 4).

Review of the listing data show that the temperature impairment was based on results from stations located in Bear Creek, a tributary to Huntington Creek located upstream from the proposed discharge. As a result, the proposed discharge cannot cause or contribute to that impairment.

Data from two monitoring stations above and below Deer Creek on Huntington Creek show impairments for pH and dissolved oxygen (DO). As a result, the proposed discharge must meet applicable Water Quality Standards (WQS) at end of pipe for these constituents (6.5 mg/l DO, and pH 6.5-9.0 pH).

Review of the listing data show that the total dissolved solids (TDS) impairment was based on results from the Huntington Creek at U10 crossing monitoring station. In order to protect downstream uses, and to avoid causing or contributing to that impairment, effluent limits for TDS should be set at the WQS of 1200 mg/l TDS.

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.

Because the critical low flow for the receiving water is zero, no mixing zone was considered.

Parameters of Concern

The potential parameters of concern identified for the discharge/receiving water were temperature, pH, dissolved oxygen, TDS, and iron, as determined in consultation with 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

Utah Division of Water Quality Wasteload Analysis Pacificorp Deer Creek Mine UPDES No. UT0023604

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.

LC50 WET Limits for Outfall 002 should be based on 100% effluent. IC25 WET limits for Outfalls 002 should be based on 100% 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 not required for this facility. The proposed permit is a simple renewal of an existing UPDES permit. No increase in flow or concentration of pollutants over those authorized in the the existing permit is being requested.

Documents:

WLA Document: DeerCk_002_WLADoc_10-3-19.docx Wasteload Analysis and Addendums: DeerCk_002_WLA_10-3-19.xlsm

References:

Emery County Water Conservancy District. http://www.ewcd.org/canals/huntington-drainage/ Utah Division of Water Quality. 2012. *Utah Wasteload Analysis Procedures Version 1.0.*

WASTELOAD ANALYSIS [WLA] Addendum: Statement of Basis

Facilities:Deer Creek 002 DischargeDischarging to:Deer Creek=>Huntingtor5.00 MGD

UPDES No: UT-0023604

3-Oct-19

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

Deer Creek=>Huntington Creek :	1C, 2B, 3A, 4
Antidegradation Review:	Level I review completed. Amended Level II review not require

III. Numeric Stream Standards for Protection of Aquatic Wildlife

Total Ammonia (TNH3)	Varies as a function of Temperature and pH Rebound. See Water Quality Standards
Chronic Total Residual Chlorine (TRC)	0.011 mg/l (4 Day Average) 0.019 mg/l (1 Hour Average)
Chronic Dissolved Oxygen (DO)	6.50 mg/l (30 Day Average) 5.00 mg/l (7Day Average) 4.00 mg/l (1 Day Average
	1000 0

Maximum Total Dissolved Solids

1200.0 mg/l

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Acute and Chronic Heavy Metals (Dissolved)

4 Day Average (Chroni	ic) Standard	1 Hour Av	erage (Acut	e) Standard
Concentration	Load*	Concentration		Load*
n 87.00 ug/l**	3.634 lbs/day	750.00	ug/l	31.329 lbs/day
c 190.00 ug/l	7.937 lbs/day	340.00	ug/l	14.203 lbs/day
0.63 ug/l	0.026 lbs/day	6.83	ug/l	0.285 lbs/day
l 219.98 ug/l	9.189 lbs/day	4602.34	ug/l	192.251 lbs/day
11.00 ug/l	0.459 lbs/day	16.00	ug/l	0.668 lbs/day
r 24.80 ug/l	1.036 lbs/day	41.14	ug/l	1.719 lbs/day
ı		1000.00	ug/l	41.773 lbs/day
d 13.65 ug/l	0.570 lbs/day	350.35	ug/l	14.635 lbs/day
0.0120 ug/l	0.001 lbs/day	2.40	ug/l	0.100 lbs/day
l 137.33 ug/l	5.736 lbs/day	1235.16	ug/l	51.596 lbs/day
1 4.60 ug/l	0.192 lbs/day	20.00	ug/l	0.835 lbs/day
r N/A ug/l	N/A lbs/day	27.08	ug/l	1.131 lbs/day
c 315.90 ug/l	13.196 lbs/day	315.90	ug/l	13.196 lbs/day
wed below discharge				
	4 Day Average (Chron Concentration 87.00 ug/l** 190.00 ug/l 10.63 ug/l 1219.98 ug/l 11.00 ug/l 11.00 ug/l 11.00 ug/l 13.65 ug/l 137.33 ug/l 137.33 ug/l 137.33 ug/l 137.33 ug/l 137.39 ug/l 137.90 ug/l 137.90 ug/l 1315.90 ug/l	4 Day Average (Chronic) Standard Concentration Load* a 87.00 ug/l** 3.634 lbs/day a 97.00 ug/l 7.937 lbs/day b 190.00 ug/l 7.937 lbs/day c 190.00 ug/l 7.937 lbs/day a 0.63 ug/l 0.026 lbs/day l 219.98 ug/l 9.189 lbs/day l 11.00 ug/l 0.459 lbs/day r 24.80 ug/l 1.036 lbs/day d 13.65 ug/l 0.570 lbs/day d 13.65 ug/l 0.570 lbs/day d 13.65 ug/l 0.570 lbs/day d 13.65 ug/l 0.5736 lbs/day d 137.33 ug/l 5.736 lbs/day d 137.33 ug/l 0.192 lbs/day n 4.60 ug/l 0.192 lbs/day n N/A ug/l N/A lbs/day c 315.90 ug/l 13.196 lbs/day	4 Day Average (Chronic) Standard Concentration 1 Hour Average Concentration a 87.00 ug/l** 3.634 lbs/day 750.00 a 87.00 ug/l** 3.634 lbs/day 750.00 b 190.00 ug/l 7.937 lbs/day 340.00 c 199.00 ug/l 0.026 lbs/day 6.83 l 219.98 ug/l 9.189 lbs/day 4602.34 l 11.00 ug/l 0.459 lbs/day 16.00 r 24.80 ug/l 1.036 lbs/day 41.14 n 1000.00 13.65 ug/l 0.570 lbs/day 350.35 y 0.0120 ug/l 0.001 lbs/day 2.40 l 137.33 ug/l 5.736 lbs/day 1235.16 n 4.60 ug/l 0.192 lbs/day 20.00 r N/A ug/l N/A lbs/day 27.08 c 315.90 ug/l 13.196 lbs/day 315.90	4 Day Average (Chronic) Standard Concentration 1 Hour Average (Acut Concentration 87.00 ug/l** 3.634 lbs/day 750.00 ug/l 190.00 ug/l 7.937 lbs/day 340.00 ug/l 0.63 ug/l 0.026 lbs/day 6.83 ug/l 1 11.00 ug/l 9.189 lbs/day 4602.34 ug/l 1 11.00 ug/l 0.459 lbs/day 16.00 ug/l 1 13.65 ug/l 0.570 lbs/day 350.35 ug/l 1 13.65 ug/l 0.570 lbs/day 2.40 ug/l 1 137.33 ug/l 5.736 lbs/day 1235.16 ug/l 1 137.33 ug/l 5.736 lbs/day 20.00 ug/l 1 137.90 ug/l N/A lbs/day 27.08 ug/l 1 13.196 lbs/day 315.90 ug/l 315.90 ug/l

**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 313.99 mg/l as CaCO3

Organi	cs [Pes	sticides]
organn		, ciolacol

	4 Day Average (Chronic) Standard			1 Hour	Average (Ac	ute) Standard		
Parameter	Concent	tration	Loa	d*	Concentratio	n	Load*	
Aldrin					1.500	ug/l	0.063 lbs/d	lay
Chlordane	0.004	ug/l	0.179	lbs/day	1.200	ug/l	0.050 lbs/d	lay
DDT, DDE	0.001	ug/l	0.042	lbs/day	0.550	ug/l	0.023 lbs/d	lay
Dieldrin	0.002	ug/l	0.079	lbs/day	1.250	ug/l	0.052 lbs/d	lay
Endosulfan	0.056	ug/l	2.335	lbs/day	0.110	ug/l	0.005 lbs/d	lay
Endrin	0.002	ug/l	0.096	lbs/day	0.090	ug/l	0.004 lbs/d	Jay
Guthion					0.010	ug/l	0.000 lbs/d	lay
Heptachlor	0.004	ug/l	0.158	lbs/day	0.260	ug/l	0.011 lbs/d	Jay
Lindane	0.080	ug/l	3.336	lbs/day	1.000	ug/l	0.042 lbs/d	lay
Methoxychlor					0.030	ug/l	0.001 lbs/d	lay
Mirex					0.010	ug/l	0.000 lbs/d	łay
Parathion					0.040	ug/l	0.002 lbs/d	Jay
PCB's	0.014	ug/l	0.584	lbs/day	2.000	ug/l	0.084 lbs/d	lay
Pentachlorophenol	13.00	ug/l	542.062	lbs/day	20.000	ug/l	0.835 lbs/d	lay
Toxephene	0.0002	ug/l	0.008	lbs/day	0.7300	ug/l	0.030 lbs/d	Jay

IV. Numeric Stream Standards for Protection of Agriculture

	4 Day Average (Chronic) Si	tandard	1 Hour Average (Acute) Standard		
	Concentration	Load*	Concentration	Load*	
Arsenic			100.0 ug/l	lbs/day	
Boron			750.0 ug/l	15.66 lbs/day	
Cadmium			10.0 ug/l	0.21 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	25.06 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*	Concentratio	on	Load*	
Arsenic			50.0	ug/l	2.085 lbs/day	
Barium			1000.0	ug/l	41.697 lbs/day	
Cadmium			10.0	ug/l	0.417 lbs/day	
Chromium			50.0	ug/l	2.085 lbs/day	
Lead			50.0	ug/l	2.085 lbs/day	
Mercury			2.0	ug/l	0.083 lbs/day	
Selenium			10.0	ug/l	0.417 lbs/day	
Silver			50.0	ug/l	2.085 lbs/day	
Fluoride (3)			1.4	ug/l	0.058 lbs/day	
to			2.4	ug/l	0.100 lbs/day	
Nitrates as N			10.0	ug/l	0.417 lbs/day	
Chlorophenoxy Herbic	ides					
2,4-D			100.0	ug/l	4.170 lbs/day	
2,4,5-TP			10.0	ug/l	0.417 lbs/day	
Endrin			0.2	ug/l	0.008 lbs/day	
ocyclohexane (Lindane)			4.0	ug/l	0.167 lbs/day	
Methoxychlor			100.0	ug/l	4.170 lbs/day	
Toxaphene			5.0	ug/l	0.208 lbs/day	

VI. Numeric Stream Standards the Protection of Human Health from Water & Fish Consumption [Toxics]

	Maximum Conc., ug/I - Acute Standards						
	Class	1C		Class 3A, 3B			
Toxic Organics	[2 Liters/Day for	70 Kg Person over	70 Yr.]	[6.5 g	g for 7	0 Kg Person over 70 Yr.]	
Acenaphthene	1200.00 ug/l	50.04	lbs/day	2700.0	ug/l	112.58 lbs/day	
Acrolein	320.00 ug/l	13.34	lbs/day	780.0	ug/l	32.52 lbs/day	
Acrylonitrile	0.06 ug/l	0.00	lbs/day	0.7	ug/l	0.03 lbs/day	
Benzene	1.20 ug/l	0.05	lbs/day	71.0	ug/l	2.96 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	0.01	lbs/day	4.4	ug/l	0.18 lbs/day	
Chlorobenzene	680.00 ug/l	28.35	lbs/day	21000.0	ug/l	875.64 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	0.02	lbs/day	99.0	ug/l	4.13 lbs/day	

1.90 ug	/I	C	.08	lbs/dav	8.9	ua/l			0.37	lbs/dav
0										
0.61 ug	/1	C	.03	lbs/day	42.0	ug/l			1.75	lbs/dav
0.17 ug	4	C	0.01	lbs/day	11.0	uq/l			0.46	lbs/dav
					0.0	ug/l			0.00	lbs/dav
0.03 ug/	/1	C	.00	lbs/day	1.4	ug/l			0.06	lbs/day
0.00 ug	/1	C	00.0	lbs/day	0.0	ug/l			0.00	lbs/dav
1700.00 ug/	/1	70	.88	lbs/day	4300.0	ug/l			179.30	lbs/day
2.10 ug/	/1	» с	.09	lbs/day	6.5	ug/l			0.27	lbs/day
				-	0.0	ug/l			0.00	lbs/day
5.70 ug/	/1	· C	.24	lbs/day	470.0	ug/ł			19.60	lbs/day
120.00 ug	/1	5	00.	lbs/day	400.0	ug/l			16.68	lbs/day
2700.00 ug/	/1	112	.58	lbs/day	17000.0	ug/l			708.85	lbs/day
400.00 ug/	/1	16	68.	lbs/day	2600.0	ug/l			108.41	lbs/day
400.00 ug/	/1	16	.68	lbs/day	2600.0	ug/l			108.41	lbs/day
0.04 ug/	/1	C	.00	lbs/day	0.1	ug/l			0.00	lbs/day
0.06 ug/	/1	C	.00	lbs/day	3.2	ug/ł			0.13	lbs/day
700.00 ug/	/1	29	.19	lbs/day	0.0	ug/l			0.00	lbs/day
93.00 ug/	/1	3	.88	lbs/day	790.0	ug/l			32.94	lbs/day
0.52 ug/	/1	C	.02	lbs/day	39.0	ug/l			1.63	lbs/day
10.00 ug/	/}	C	.42	lbs/day	1700.0	ug/l			70.88	lbs/day
540.00 ug/	/1	22	.52	lbs/day	2300.0	ug/l			95.90	lbs/day
0.11 ug/	/1	C	.00	lbs/day	9.1	ug/l			0.38	lbs/day
0.00 ug/	/1	C	.00	lbs/day	0.0	ug/l			0.00	lbs/day
0.04 ug/	/1	C	.00	lbs/day	0.5	ug/l			0.02	lbs/day
3100.00 ug/	/	129	.26	lbs/day	29000.0	ug/l			1209.21	lbs/day
300.00 ug/	/	12	.51	lbs/day	370.0	ug/l			15.43	lbs/day
1400.00 ug/	/1	58	.38	lbs/day	170000.0	ug/l			7088.50	lbs/day
0.00 ug/	/	C	.00	lbs/day	0.0	ug/l			0.00	lbs/day
4.70 ug/	/	C	.20	lbs/day	1600.0	ug/l			66.72	lbs/day
0.00 ug/	/	C	.00	lbs/day	0.0	ug/l			0.00	lbs/day
0.00 ug/	4	C	.00	lbs/day	0.0	ug/l			0.00	lbs/day
4.30 ug/	/	C	.18	lbs/day	360.0	ug/l			15.01	lbs/day
0.27 ug/	/	C	.01	lbs/day	22.0	ug/l			0.92	lbs/day
0.41 ug/	(1	C	.02	lbs/day	34.0	ug/l			1.42	lbs/day
0.44 ug/	4	C	.02	lbs/day	50.0	ug/l			2.08	lbs/day
240.00 ug/	4	10	.01	lbs/day	17000.0	ug/l			708.85	lbs/day
8.40 ug/	4	C	.35	lbs/day	600.0	ug/l		2	25.02	lbs/day
		_								
17.00 ug/	4	C	.71	lbs/day	1900.0	ug/l			79.22	lbs/day
0.00 ug/	4	- C	.00	lbs/day	0.0	ug/l			0.00	lbs/day
0.00 ug/	'l 	C	.00	lbs/day	0.0	ug/l			0.00	lbs/day
70.00 ug/	4	2	.92	lbs/day	14000.0	ug/l			583.76	lbs/day
13.00 ug/	'l	C	.54	lbs/day	765.0	ug/l			31.90	lbs/day
0.00069 ug/	1	C	.00	lbs/day	8.1	ug/l			0.34	lbs/day
5.00 ug/	1	C	.21	lbs/day	16.0	ug/l			0.67	lbs/day
0.01 ug/	1	C	.00	lbs/day	1.4	ug/l			0.06	lbs/day
0.28 ug/	1	C	.01	ibs/day	8.2	ug/l			0.34	lbs/day
	1.90 ug 0.61 ug 0.17 ug 0.03 ug 0.00 ug 1700.00 ug 2.10 ug 5.70 ug 120.00 ug 2700.00 ug 400.00 ug 400.00 ug 0.04 ug 0.04 ug 0.06 ug 700.00 ug 0.52 ug 10.00 ug 0.52 ug 10.00 ug 0.52 ug 10.00 ug 0.11 ug 0.00 ug 0.04 ug 3100.00 ug 0.00 ug 4.70 ug 0.00 ug 0.00 ug 4.70 ug 0.00 ug 4.30 ug 0.00 ug 5.00 ug 0.00 ug 5.00 ug 5	1.90 ug/l 0.61 ug/l 0.17 ug/l 0.03 ug/l 0.00 ug/l 1700.00 ug/l 2.10 ug/l 2.10 ug/l 2700.00 ug/l 400.00 ug/l 400.00 ug/l 0.04 ug/l 0.06 ug/l 700.00 ug/l 93.00 ug/l 0.52 ug/l 10.00 ug/l 0.52 ug/l 10.00 ug/l 0.11 ug/l 0.04 ug/l 3100.00 ug/l 3100.00 ug/l 3100.00 ug/l 0.04 ug/l 0.04 ug/l 0.04 ug/l 0.04 ug/l 0.00 ug/l 0.04 ug/l 1400.00 ug/l 0.00 ug/l 4.70 ug/l 0.27 ug/l 0.27 ug/l 0.27 ug/l 0.27 ug/l 0.41 ug/l 0.27 ug/l 0.44 ug/l 240.00 ug/l 17.00 ug/l 13.00 ug/l 13.00 ug/l 0.00 ug/l 13.00 ug/l 0.27 ug/l 0.28 ug/l 0.00 ug/l	1.90 ug/l 0 0.61 ug/l 0 0.17 ug/l 0 0.03 ug/l 0 0.00 ug/l 0 1700.00 ug/l 70 2.10 ug/l 0 5.70 ug/l 0 120.00 ug/l 112 400.00 ug/l 112 400.00 ug/l 16 400.00 ug/l 16 0.04 ug/l 0 0.06 ug/l 0 700.00 ug/l 29 93.00 ug/l 22 0.11 ug/l 0 0.00 ug/l 0 <td>$1.90 \ ug/l$$0.08$$0.61 \ ug/l$$0.03$$0.17 \ ug/l$$0.01$$0.03 \ ug/l$$0.00$$0.00 \ ug/l$$0.00$$1700.00 \ ug/l$$0.09$$5.70 \ ug/l$$0.24$$120.00 \ ug/l$$5.00$$2700.00 \ ug/l$$112.58$$400.00 \ ug/l$$16.68$$400.00 \ ug/l$$0.00$$0.06 \ ug/l$$0.00$$0.06 \ ug/l$$0.00$$700.00 \ ug/l$$29.19$$93.00 \ ug/l$$0.02$$10.00 \ ug/l$$0.02$$10.00 \ ug/l$$0.02$$10.00 \ ug/l$$0.02$$10.00 \ ug/l$$0.02$$10.00 \ ug/l$$0.02$$0.11 \ ug/l$$0.00$$0.00 \ ug/l$$0.01$$0.00 \ ug/l$$0.02$$0.00 \ ug/l$$0.02$$0.00 \ ug/l$$0.00$$0.00 \ ug/l$$0.00$</td> <td>1.90 ug/l 0.08 lbs/day 0.61 ug/l 0.03 lbs/day 0.17 ug/l 0.01 lbs/day 0.00 ug/l 0.00 lbs/day 0.00 ug/l 0.00 lbs/day 1700.00 ug/l 70.88 lbs/day 2.10 ug/l 0.09 lbs/day 120.00 ug/l 0.24 lbs/day 2700.00 ug/l 12.58 lbs/day 400.00 ug/l 16.68 lbs/day 400.00 ug/l 16.68 lbs/day 400.00 ug/l 0.00 lbs/day 0.00 lbs/day 0.00 lbs/day 0.00 ug/l 16.68 lbs/day 0.04 ug/l 0.00 lbs/day 0.052 ug/l 0.00 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Phenol	2.10E+04 ua/l	8.76E+02	lbs/dav	4.6E+06	ua/l	1.92E+05 lbs/da	v
Bis(2-ethylhexyl)phthala	1.80 ug/l	0.08	lbs/day	5.9	ua/l	0.25 lbs/da	J IV
Butyl benzyl phthalate	3000.00 ug/l	125.09	lbs/day	5200.0	ua/l	216.82 lbs/da	IV.
Di-n-butyl phthalate	2700.00 ug/l	112.58	lbs/day	12000.0	ug/l	500.36 lbs/da	N
Di-n-octyl phthlate	0						,
Diethyl phthalate	23000.00 ug/l	959.03	lbs/dav	120000.0	ua/l	5003.64 lbs/da	v
Dimethyl phthlate	3.13E+05 ug/l	1.31E+04	lbs/dav	2.9E+06	ua/l	1.21E+05 lbs/da	iv.
Benzo(a)anthracene (P/	0.0028 ug/l	0.00	lbs/dav	0.0	ua/l	0.00 lbs/da	v
Benzo(a)pyrene (PAH)	0.0028 ug/l	0.00	lbs/dav	0.0	ua/l	0.00 lbs/da	iv.
Benzo(b)fluoranthene (F	0.0028 ua/l	0.00	lbs/day	0.0	ua/l	0.00 lbs/da	iv
Benzo(k)fluoranthene (F	0.0028 ug/l	0.00	lbs/day	0.0	ua/l	0.00 lbs/da	iy iV
Chrysene (PAH)	0.0028 ug/l	0.00	lbs/dav	0.0	ua/l	0.00 lbs/da	J IV
Acenaphthylene (PAH)							,
Anthracene (PAH)	9600.00 ug/l	400.29	lbs/dav	0.0	ua/l	0.00 lbs/da	N
Dibenzo(a,h)anthracene	0.0028 ug/l	0.00	lbs/day	0.0	ug/l	0.00 lbs/da	y iv
Indeno(1,2,3-cd)pyrene	0.0028 ug/l	0.00	lbs/day	0.0	ug/l	0.00 lbs/da	.y 1./
Pyrene (PAH)	960 00 ug/l	40.03	lbs/day	11000.0	ug/l	458 67 lbs/da	.y .v
Tetrachloroethylene	0.80 ug/l	0.03	lbs/day	8.9	ug/l	0.37 lbs/da	y 1/
Toluene	6800.00 ug/l	283 54	lbs/day	200000	ug/l	8339.41 lbs/da	y 1
Trichloroethylene	2 70 ug/l	0.11	lhs/day	81.0	ug/l	3 38 lbs/da	y N
Vinvl chloride	2.00 ug/l	0.08	lbs/day	525.0	ug/l	21.80 lbs/da	y
viny, enerice	2.00 ug/i	0.00	ibbiddy	0.0	ugn	21.09 lbs/da	y
Pesticides				0.0		0.00 lbs/da	.y
Aldrin	0.0001.ug/i	0.00	lbs/day	0.0	ua/i	0.00 lbs/da	y v
Dieldrin		0.00	lbs/day	0.0	ug/l	0.00 lbs/da	y
Chlordane		0.00	lbs/day	0.0	ug/l	0.00 lbs/da	y
		0.00	lbs/day	0.0	ug/i	0.00 lbs/da	y
4 <i>4</i> '-DDF		0.00	lbs/day	0.0	ug/l		y
		0.00	lbs/day	0.0	ug/l		y
alpha-Endosulfan	0.0000 ug/l	0.00	lbs/day	0.0	ug/l		y
beta-Endosulfan	0.9300 ug/l	0.04	lbs/day	2.0	ug/i		y
Endosulfan sulfate	0.9300 ug/l	0.04	lbs/day	2.0	ug/l		y
Endrin	0.3500 ug/l	0.04	lbs/day	2.0	ug/i		y
Endrin aldebyde	0.7600 ug/l	0.03	lbs/day	0.8	ug/i		y
Hontachlor	0.7000 ug/l	0.03	lbs/day	0.0	ug/i		ÿ
Hentachlor enovide	0.0002 ug/i	0.00	ibs/uay	0.0	ugn	0.00 lbs/ua	y
PCB's							
PCB 1242 (Arochlor 124	0.000044.ug/l	0.00	lbs/day	0.0	ua/l		
PCB-1254 (Arochlor 12)	0.000044.ug/l	0.00	lbs/day	0.0	ug/l	0.00 lbs/da	y
PCB-1221 (Arochlor 12)	0.000044 ug/l	0.00	lbs/day	0.0	ug/l	0.00 lbs/da	y v
PCB-1232 (Arochlor 12)	0.000044 ug/l	0.00	lbs/day	0.0	ug/l	0.00 lbs/da	y y
PCB-1248 (Arochlor 124	0.000044 ug/l	0.00	lbs/day	0.0	ug/l	0.00 lbs/da	y v
PCB-1260 (Arochlor 12)	0.000044 ug/l	0.00	lbs/day	0.0	ug/l		y
PCB-1016 (Arochlor 10)	0.000044 ug/l	0.00	lbs/day	0.0	ug/l		y v
	0.000044 ug/i	0.00	ib5/uay	0.0	ugn	0.00 105/04	y
Pesticide							4
Toxaphene	0.000750 ug/l	0.00		0.0	ua/l	0.00 lbs/da	IV
and a second second second second						0.00	.,
Dioxin							
Dioxin (2,3,7,8-TCDD)	1.30E-08 ug/ł	0.00	lbs/day	1.40E-08		0.00	

Metals				
Antimony	14.0 ug/l	0.58 lbs/day		
Arsenic	50.0 ug/l	2.08 lbs/day	4300.00 ug/l	179.30 lbs/day
Asbestos	7.00E+06 ug/l	2.92E+05 lbs/day		
Beryllium				
Cadmium				
Chromium (III)				
Chromium (VI)				
Copper				
Cyanide	1.30E+03 ug/l	54.21 lbs/day	2.2E+05 ug/l	9173.35 lbs/day
Lead	700.0 ug/l	29.19 lbs/day		
Mercury	.*		0.15 ug/l	0.01 lbs/day
Nickel			4600.00 ug/l	191.81 lbs/day
Selenium	0.1 ug/l	0.01 lbs/day		
Silver	610.0 ug/i	25.44 lbs/day		
Thallium			6.30 ug/l	0.26 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.

nformation Stream								
Critical Low								
Flow	Temp.		pН	T-NH3	BOD5	DO	TRC	TDS
cfs	Deg. C			mg/l as N	mg/l	mg/l	mg/l	mg/l
0.00	12.0		8.5	0.01	0.05	10.38	0.00	213.0
0.00	2.1		8.4	0.01	0.05		0.00	265.0
0.00	1.0		8.3	0.01	0.05		0.00	307.0
0.00	7.3		8.4	0.01	0.05		0.00	230.0
AI	As		Cd	CrIII	CrVI	Copper	Fe	Pb
ug/l	ug/l	7.e.	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
13.67	0.50		0.06	1.77	3.975*	0.95	15.2	0.35
Hg	Ni		Se	Ag	Zn	Boron		
ug/l	ug/l		ug/l	ug/l	ug/l	ug/l		
0.0000	2.50		0.92	0.25	7.12	20.1	*~	80% MDL
	nformation Stream Critical Low Flow cfs 0.00 0.00 0.00 0.00 0.00 Al ug/l 13.67 Hg ug/l 0.0000	Anformation Stream Critical Low Flow Temp. cfs Deg. C 0.00 12.0 0.00 2.1 0.00 1.0 0.00 7.3 Al As ug/l ug/l 13.67 0.50 Hg Ni ug/l ug/l 0.0000 2.50	Anformation Stream Critical Low Flow Temp. cfs Deg. C 0.00 12.0 0.00 2.1 0.00 1.0 0.00 7.3 Al As ug/l ug/l 13.67 0.50 Hg Ni ug/l ug/l 0.0000 2.50	All As Cd 0.00 12.0 8.5 0.00 12.0 8.5 0.00 2.1 8.4 0.00 1.0 8.3 0.00 7.3 8.4 1.0 8.3 0.00 1.0 8.3 0.00 1.0 8.3 0.00 1.0 8.3 0.00 1.0 8.3 0.00 1.0 8.3 0.00 1.0 8.4 0.00 1.0 8.4 0.00 1.0 8.5 0.00 1.0 8.4 0.00 1.1 0.50 0.06 Hg Ni Se ug/l ug/l ug/l 0.0000 2.50 0.92	All As Cd Crilling Control Contro Contro	Anformation Stream Stream Critical Low Flow Temp. pH T-NH3 BOD5 cfs Deg. C mg/l as N mg/l 0.00 12.0 8.5 0.01 0.05 0.00 2.1 8.4 0.01 0.05 0.00 1.0 8.3 0.01 0.05 0.00 7.3 8.4 0.01 0.05 0.00 7.3 8.4 0.01 0.05 0.00 7.3 8.4 0.01 0.05 1.00 7.3 8.4 0.01 0.05 0.10 7.3 8.4 0.01 0.05 1.3.67 0.50 0.06 1.77 3.975* Hg Ni Se Ag Zn ug/l ug/l ug/l ug/l ug/l 0.0000 2.50 0.92 0.25 7.12	Aformation Stream Stream Critical Low Flow Temp. pH T-NH3 BOD5 DO cfs Deg. C mg/l as N mg/l mg/l mg/l 0.00 12.0 8.5 0.01 0.05 10.38 0.00 2.1 8.4 0.01 0.05 0.00 1.0 8.3 0.01 0.05 0.00 7.3 8.4 0.01 0.05 0.00 7.3 8.4 0.01 0.05 0.00 7.3 8.4 0.01 0.05 1.00 7.3 8.4 0.01 0.05 0.10 7.3 8.4 0.01 0.05 1.3.67 0.50 0.06 1.77 3.975* 0.95 Hg Ni Se Ag Zn Boron ug/l ug/l ug/l ug/l ug/l ug/l <	Information Stream Stream Critical Low Flow Temp. pH T-NH3 BOD5 DO TRC cfs Deg. C mg/l as N mg/l mg/l mg/l mg/l 0.00 12.0 8.5 0.01 0.05 10.38 0.00 0.00 2.1 8.4 0.01 0.05 0.00 0.00 1.0 8.3 0.01 0.05 0.00 0.00 7.3 8.4 0.01 0.05 0.00 0.00 7.3 8.4 0.01 0.05 0.00 AI As Cd CrIII CrVI Copper Fe ug/l ug/l

Projected Discharge Information

Season	Flow, MGD	Temp.	TDS mg/l	TDS tons/day
Summer	5.00000	13.9	542.00	11.29844
Fall	5.00000	13.9		
Winter	5.00000	13.9		
Spring	5.00000	13.9		

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	e
Summer	5.000 MGD	7.735 cfs
Fall	5.000 MGD	7.735 cfs
Winter	5.000 MGD	7.735 cfs
Spring	5.000 MGD	7.735 cfs

Flow Requirement or Loading Requirement

The calculations in this wasteload analysis utilize the maximum effluent discharge flow of 5 MGD. If the discharger is allowed to have a flow greater than 5 MGD during 7Q10 conditions, and effluent limit concentrations as indicated, then water quality standards will be violated. In order to prevent this from occuring, the permit writers must include the discharge flow limititation as indicated above; or, include loading effluent limits in the permit.

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

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

WET Requirements	LC50 >	EOP Effluent	[Acute]
	IC25 >	100.0% 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	1042.3 lbs/day
Fall	25.0 mg/l as BOD5	1042.3 lbs/day
Winter	25.0 mg/l as BOD5	1042.3 lbs/day
Spring	25.0 mg/l as BOD5	1042.3 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	6.50
Fall	6.50
Winter	6.50
Spring	6.50

Effluent Limitation for Total Ammonia based upon Water Quality Standards

In-stream criteria of downstream segments for Total Ammonia will be met with an effluent limitation (expressed as Total Ammonia as N) as follows:

Seaso	on				
	Load				
Summer	4 Day Avg Chronic	4.0	mg/l as N	166.0	lbs/day
	1 Hour Avg Acute	10.3	mg/l as N	430.4	lbs/day
Fall	4 Day Avg Chronic	4.1	mg/l as N	169.0	lbs/day
	1 Hour Avg Acute	9.8	mg/l as N	409.5	lbs/day
Winter	4 Day Avg Chronic	4.4	mg/l as N	182.5	lbs/day
	1 Hour Avg Acute	10.8	mg/I as N	451.8	lbs/day
Spring	4 Day Avg Chronic	4.1	mg/i as N	169.0	lbs/day
	1 Hour Avg Acute	9.8	mg/I as N	409.5	lbs/day

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

Effluent Limitation for Total Residual Chlorine based upon Water Quality Standards

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

Season		Concentration		Load	Load	
Summer	4 Day Avg Chronic	0.011	mg/l	0.46	lbs/day	
	1 Hour Avg Acute	0.019	mg/l	0.79	lbs/day	
Fall	4 Day Avg Chronic	0.011	mg/l	0.46	lbs/day	
	1 Hour Avg Acute	0.019	mg/i	0.79	lbs/day	
Winter	4 Day Avg Chronic	0.011	mg/l	0.46	lbs/day	
	1 Hour Avg Acute	0.019	mg/l	0.79	lbs/day	
Spring	4 Day Avg Chronic	0.011	mg/l	0.00	lbs/day	
	1 Hour Avg Acute	0.019	mg/l	0.00	lbs/day	

Effluent Limitations for Total Dissolved Solids based upon Water Quality Standards

Season		Concentra	ation	Load	
Summer Fall Winter Spring	Maximum, Acute Maximum, Acute Maximum, Acute 4 Day Avg Chronic	1200.1 1200.1 1200.1 1200.1	mg/l mg/l mg/l mg/l	25.02 25.02 25.02 25.02	tons/day tons/day tons/day tons/day
Colorado Sa	alinity Forum Limits	Determine	d by Permi	tting 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 313.99 mg/l):

	•	4 Day Average		1 Hour	Average	
	Concen	tration	Load	Concentration		Load
Aluminum*	N/A		N/A	750.0	ug/l	31.3 lbs/day
Arsenic*	190.02	ug/l	5.1 lbs/day	340.0	ug/l	14.2 lbs/day
Cadmium	0.63	ug/l	0.0 lbs/day	6.8	ug/l	0.3 lbs/day
Chromium III	220.01	ug/l	5.9 lbs/day	4,602.3	ug/l	192.3 lbs/day
Chromium VI*	11.00	ug/l	0.3 lbs/day	16.0	ug/l	0.7 lbs/day
Copper	24.80	ug/l	0.7 lbs/day	41.1	ug/l	1.7 lbs/day
Iron*	N/A		N/A	7,735.0	ug/l	323.1 lbs/day
Lead	13.65	ug/l	0.4 lbs/day	350.3	ug/l	14.6 lbs/day
Mercury*	0.01	ug/l	0.0 lbs/day	2.4	ug/l	0.1 lbs/day
Nickel	137.34	ug/l	3.7 lbs/day	1,235.2	ug/l	51.6 lbs/day
Selenium*	4.60	ug/l	0.1 lbs/day	20.0	ug/l	0.8 lbs/day
Silver	N/A	ug/l	N/A lbs/day	27.1	ug/l	1.1 lbs/day

Zinc	315.94	ug/l	8.5 lbs/day	315.9	ug/l	13.2 lbs/day
Cyanide*	5.20	ug/l	0.1 lbs/day	22.0	ug/l	0.9 lbs/day

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

Effluent Limitations for Heat/Temperature based upon Water Quality Standards

Summer	14.0 Deg. C.	57.2 Deg. F
Fall	4.1 Deg. C.	39.4 Deg. F
Winter	3.0 Deg. C.	37.4 Deg. F
Spring	9.3 Deg. C.	48.7 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
		1.5E+00	ug/l	9.69E-02 lbs/day
4.30E-03 ug/l	1.79E-01 lbs/day	1.2E+00	ug/l	7.75E-02 lbs/day
1.00E-03 ug/l	4.17E-02 lbs/day	5.5E-01	ug/l	3.55E-02 lbs/day
1.90E-03 ug/l	7.92E-02 lbs/day	1.3E+00	ug/i	8.08E-02 lbs/day
5.60E-02 ug/l	- 2.33E+00 lbs/day	1.1E-01	ug/l	7.11E-03 lbs/day
2.30E-03 ug/l	9.59E-02 lbs/day	9.0E-02	ug/l	5.82E-03 lbs/day
0.00E+00 ug/l	0.00E+00 lbs/day	1.0E-02	ug/l	6.46E-04 lbs/day
3.80E-03 ug/l	1.58E-01 lbs/day	2.6E-01	ug/l	1.68E-02 lbs/day
8.00E-02 ug/l	3.34E+00 lbs/day	1.0E+00	ug/l	6.46E-02 lbs/day
0.00E+00 ug/l	0.00E+00 lbs/day	3.0E-02	ug/l	1.94E-03 lbs/day
0.00E+00 ug/l	0.00E+00 lbs/day	1.0E-02	ug/l	6.46E-04 lbs/day
0.00E+00 ug/l	0.00E+00 lbs/day	4.0E-02	ug/l	2.58E-03 lbs/day
1.40E-02 ug/l	5.84E-01 lbs/day	2.0E+00	ug/l	1.29E-01 lbs/day
1.30E+01 ug/l	5.42E+02 lbs/day	2.0E+01	ug/l	1.29E+00 lbs/day
2.00E-04 ug/l	8.34E-03 lbs/day	7.3E-01	ug/l	4.72E-02 lbs/day
	4 Day Av Concentration	4 Day Average ConcentrationLoad4.30E-03 ug/l1.79E-01 lbs/day1.00E-03 ug/l4.17E-02 lbs/day1.90E-03 ug/l7.92E-02 lbs/day1.90E-03 ug/l2.33E+00 lbs/day5.60E-02 ug/l2.33E+00 lbs/day2.30E-03 ug/l9.59E-02 lbs/day0.00E+00 ug/l0.00E+00 lbs/day3.80E-03 ug/l1.58E-01 lbs/day8.00E-02 ug/l3.34E+00 lbs/day0.00E+00 ug/l0.00E+00 lbs/day0.00E+00 ug/l0.00E+00 lbs/day0.00E+00 ug/l0.00E+00 lbs/day0.00E+00 ug/l0.00E+00 lbs/day0.00E+00 ug/l0.00E+00 lbs/day1.40E-02 ug/l5.84E-01 lbs/day1.30E+01 ug/l5.42E+02 lbs/day2.00E-04 ug/l8.34E-03 lbs/day	4 Day Average 1 Hour A Concentration Load Concentration A 4.30E-03 ug/l 1.79E-01 lbs/day 1.2E+00 1.00E-03 ug/l 1.2E+00 1.00E-03 ug/l 4.17E-02 lbs/day 5.5E-01 1.90E-03 ug/l 2.33E+00 lbs/day 1.1E-01 2.30E-03 ug/l 9.59E-02 lbs/day 1.1E-01 2.30E-02 ug/l 2.33E+00 lbs/day 1.0E-02 0.00E+00 ug/l 0.00E+00 lbs/day 1.0E-02 3.80E-03 ug/l 1.58E-01 lbs/day 1.0E-02 0.00E+00 ug/l 0.00E+00 lbs/day 1.0E-02 3.80E-03 ug/l 1.58E-01 lbs/day 1.0E-02 0.00E+00 ug/l 0.00E+00 lbs/day 1.0E-02 3.80E-02 0.00E+00 lbs/day 1.0E+00 0.00E+00 ug/l 0.00E+00 lbs/day 1.0E-02 0.00E+00 ug/l 0.00E+00 lbs/day 1.0E-02 0.00E+00 ug/l 0.00E+00 lbs/day 1.0E-02 1.40E-02 ug/l 5.84E-01 lbs/day 2.0E+00 1.30E+01 ug/l 5.42E+02 lbs/day 2.0E+01 2.00E-04 ug/l 8.34E-03 lbs/day 7.3E-01	4 Day Average Concentration Load 1 Hour Average Concentration 1.5E+00 ug/l 4.30E-03 ug/l 1.79E-01 lbs/day 1.2E+00 ug/l 1.00E-03 ug/l 4.17E-02 lbs/day 5.5E-01 ug/l 1.90E-03 ug/l 7.92E-02 lbs/day 1.3E+00 ug/l 5.60E-02 ug/l 2.33E+00 lbs/day 1.1E-01 ug/l 2.30E-03 ug/l 9.59E-02 lbs/day 9.0E-02 ug/l 0.00E+00 ug/l 0.00E+00 lbs/day 1.0E-02 ug/l 3.80E-03 ug/l 1.58E-01 lbs/day 1.0E-02 ug/l 0.00E+00 ug/l 0.00E+00 lbs/day 1.0E-02 ug/l 0.00E+00 ug/l 0.00E+00 lbs/day 1.0E+00 ug/l 0.00E+00 ug/l 0.00E+00 lbs/day 1.0E+00 ug/l 0.00E+00 ug/l 0.00E+00 lbs/day 1.0E-02 ug/l 0.00E+00 ug/l 0.00E+00 lbs/day 1.0E-02 ug/l 1.40E-02 ug/l 0.84E-01 lbs/day 2.0E+00 ug/l 1.30E+01 ug/l 5.42E+02 lbs/day 2.0E+01 ug/l

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	208.9 lbs/day	
Nitrates as N	4.0 mg/l	167.1 lbs/day	
Total Phosphorus as P	0.05 mg/l	2.1 lbs/day	
Total Suspended Solids	90.0 mg/l	3759.5 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	1.20E+03 ug/l	5.00E+01 lbs/day		
Acrolein	3.20E+02 ug/l	1.33E+01 lbs/day		
Acrylonitrile	5.90E-02 ug/l	2.46E-03 lbs/day		
Benzene	1.20E+00 ug/l	5.00E-02 lbs/day		
Benzidine	ug/l	lbs/day		
Carbon tetrachloride	2.50E-01 ug/l	1.04E-02 lbs/day		
Chlorobenzene	6.80E+02 ug/l	2.84E+01 lbs/day		
1,2,4-Trichlorobenzene				
Hexachlorobenzene	7.50E-04 ug/l	3.13E-05 lbs/day		
1,2-Dichloroethane	3.80E-01 ug/l	1.58E-02 lbs/day		
1,1,1-Trichloroethane				
Hexachloroethane	1.90E+00 ug/l	7.92E-02 lbs/day		
1,1-Dichloroethane				
1,1,2-Trichloroethane	6.10E-01 ug/l	2.54E-02 lbs/day		
1,1,2,2-Tetrachloroethane	1.70E-01 ug/l	7.09E-03 lbs/day		
Chloroethane				
Bis(2-chloroethyl) ether	3.10E-02 ug/l	1.29E-03 lbs/day		
2-Chloroethyl vinyl ether				
2-Chloronaphthalene	1.70E+03 ug/l	7.09E+01 lbs/day		
2,4,6-Trichlorophenol	2.10E+00 ug/l	8.76E-02 lbs/day		
p-Chloro-m-cresol				
Chloroform (HM)	5.70E+00 ug/l	2.38E-01 lbs/day		
2-Chlorophenol	1.20E+02 ug/l	5.00E+00 lbs/day		
1,2-Dichlorobenzene	2.70E+03 ug/l	1.13E+02 lbs/day		
1,3-Dichlorobenzene	4.00E+02 ug/l	1.67E+01 lbs/day		

1,4-Dichlorobenzene	4.00E+02 ua/l	1.67E+01 lbs/day
3,3'-Dichlorobenzidine	4.00E-02 ug/l	1.67E-03 lbs/day
1,1-Dichloroethylene	5.70E-02 ug/l	2.38E-03 lbs/day
1,2-trans-Dichloroethylene1	0	,
2,4-Dichlorophenol	9.30E+01 ug/l	3.88E+00 lbs/dav
1,2-Dichloropropane	5.20E-01 ug/l	2.17E-02 lbs/day
1,3-Dichloropropylene	1.00E+01 ug/l	4.17E-01 lbs/day
2,4-Dimethylphenol	5.40E+02 ug/l	2.25E+01 lbs/day
2,4-Dinitrotoluene	1.10E-01 ug/l	4.59E-03 lbs/day
2.6-Dinitrotoluene	5	,
1.2-Diphenvlhvdrazine	4.00E-02 ug/l	1.67E-03 lbs/day
Ethylbenzene	3.10E+03 ug/l	1 29F+02 lbs/day
Fluoranthene	3.00E+02 ug/l	1 25E+01 lbs/day
4-Chlorophenyl phenyl ether		1.202.01 1.00/004
4-Bromophenyl phenyl ether		
Bis(2-chloroisopropyl) ether	1 40E+03 ug/l	5 84E+01 lbs/day
Bis(2-chloroethoxy) methane	1.102.00 49/1	0.04E. OT Ibbrudy
Methylene chloride (HM)	4 70E+00 µg/l	1 96E-01 lbs/day
Methyl chloride (HM)		1.00E 01 103/00y
Methyl bromide (HM)		
Bromoform (HM)	4 30E+00 ug/l	1 70E-01 lbs/day
Dichlorobromomethane(HM)	2 70E-01 ug/l	1.13E-01 lbs/day
Chlorodibromomethane (HM)	4 10E-01 ug/	1.13E-02 lbs/day
Hexachlorocyclopentadiene	2 40E+02 ug/l	1.00E±01 lbs/day
Isophorope		3 50E 01 lbs/day
Nanhthalene		J.JUE-UT IDS/day
Nitrobenzene	1 705+01 40/	7 00E 01 lbc/dov
2-Nitronhenol		7.09E-01 IDS/day
A-Nitrophenol		
2 1-Dinitrophenol	7 005+01 40/	2 02ELOO lbo/dov
4.6 Dinitro o crosol	1.00E+01 ug/l	2.92E+00 IDS/0ay
N Nitrosodimothylamina		2.42E-01 IDS/day
N Nitrosodinhenvlamine	6.90E-04 ug/l	2.88E-05 IDS/day
N Nitrosodi p propulamino		2.08E-01 IDS/day
Rentablerenhenel		2.08E-04 IDS/day
Pentachiorophenoi	2.80E-01 ug/l	1.1/E-02 lbs/day
Pic(2 othylhovyl)phtholoto	2.10E+04 ug/l	8.76E+02 IDS/day
Bis(2-euryinexyi)phinalale	1.80E+00 ug/l	7.51E-02 IDS/day
Di p butyl phthalate	3.00E+03 ug/l	1.25E+02 lbs/day
Di-n-butyi philialate	2.70E+03 ug/l	1.13E+02 lbs/day
Di-n-octyr phimate		
Directly philalate	2.30E+04 ug/l	9.59E+02 IDS/day
Dimethyl prinate	3.13E+05 ug/l	1.31E+04 lbs/day
Benzo(a)anthracene (PAH)	2.80E-03 ug/l	1.17E-04 lbs/day
Benzo(a)pyrene (PAH)	2.80E-03 ug/l	1.1/E-04 lbs/day
Benzo(b)fluoranthene (PAH)	2.80E-03 ug/l	1.1/E-04 lbs/day
Benzo(K)fluoranthene (PAH)	2.80E-03 ug/l	1.17E-04 lbs/day
	2.80E-03 ug/l	1.17E-04 lbs/day
Acenaphthylene (PAH)		
Anthracene (PAH)		
Dipenzo(a,n)anthracene (PAH)	2.80E-03 ug/l	1.17E-04 lbs/day
indeno(1,2,3-cd)pyrene (PAH)	2.80E-03 ug/l	1.17E-04 lbs/day

Pyrene (PAH) Tetrachloroethylene Toluene	9.60E+02 ug/l 8.00E-01 ug/l 6.80E+03 ug/l	4.00E+01 lbs/day 3.34E-02 lbs/day 2.84E+02 lbs/day
Trichloroethylene	2.70E+00 ug/l	1.13E-01 lbs/day
Vinyl chloride	2.00E+00 ug/l	8.34E-02 lbs/day
	Ū	
Pesticides		
Aldrin	1.30E-04 ug/l	5.42E-06 lbs/day
Dieldrin	1.40E-04 ug/l	5.84E-06 lbs/day
Chlordane	5.70E-04 ug/l	2.38E-05 lbs/day
4,4'-DDT	5.90E-04 ug/l	2.46E-05 lbs/day
4,4'-DDE	5.90E-04 ug/l	2.46E-05 lbs/day
4,4'-DDD	8.30E-04 ug/l	3.46E-05 lbs/day
alpha-Endosulfan	9.30E-01 ug/l	3.88E-02 lbs/day
beta-Endosulfan	9.30E-01 ug/l	3.88E-02 lbs/day
Endosulfan sulfate	9.30E-01 ug/l	3.88E-02 lbs/day
Endrin	7.60E-01 ug/l	3.17E-02 lbs/day
Endrin aldehvde	7 60E-01 ug/l	3 17E-02 lbs/day
Heptachlor	2 10E-04 ug/l	8 76E-06 lbs/day
Heptachlor epoxide	2.10E 04 ug/1	0.702-00 103/049
PCB's		
PCB 1242 (Arochlor 1242)	4.40E-05 ug/l	1.83E-06 lbs/day
PCB-1254 (Arochlor 1254)	4.40E-05 µg/l	1.83E-06 lbs/day
PCB-1221 (Arochlor 1221)	4.40E-05 ug/l	1.83E-06 lbs/day
PCB-1232 (Arochlor 1232)	4 40E-05 ug/l	1.83E-06 lbs/day
PCB-1248 (Arochlor 1248)	4 40E-05 ug/l	1.83E-06 lbs/day
PCB-1260 (Arochlor 1260)	4 40E-05 ug/l	1.83E-06 lbs/day
PCB-1016 (Arochlor 1016)	4 40E-05 ug/l	1.83E-06 lbs/day
	n toe oo agn	1.002 00 100/004
Pesticide		
Toxaphene	7.30E-04 ug/l	3.04E-05 lbs/day
Metals		
Antimony	14.00 ug/l	0.58 lbs/day
Arsenic	50.01 ug/l	2.08 lbs/day
Asbestos	7.00E+06 ug/l	2.92E+05 lbs/day
Beryllium		
Cadmium		
Chromium (III)		
Chromium (VI)		
Copper	1300.17 ug/l	54.21 lbs/day
Cyanide	700.09 ug/l	29.19 lbs/day
Lead	0.00	0.00
Mercury	0.14 ug/l	0.01 lbs/dav
Nickel	610.08 ua/l	25.44 lbs/dav
Selenium	0.00	0.00
Silver	0.00	0.00
Thallium	1.70 ua/l	0.07 lbs/dav
Zinc		

Dioxin Dioxin (2,3,7,8-TCDD)

1.30E-08 ug/l

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

			Acute				
		Class 3	Toxics				Class 3
	Class 4	Acute	Drinking	Acute	1C Acute	Acute	Chronic
	Acute	Aquatic	Water	Toxics	Health	Most	Aquatic
	Agricultural	Wildlife	Source	Wildlife	Criteria	Stringent	Wildlife
	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Aluminum		750.0				750.0	N/A
Antimony			14.0	4300.6		14.0	
Arsenic	100.0	340.0	50.0		0.0	50.0	190.0
Barium					1000.1	1000.1	
Beryllium						0.0	
Cadmium	10.0	6.8			0.0	6.8	0.6
Chromium (III)		4602.3			0.0	4602.3	220.0
Chromium (VI)	100.0	16.0			0.0	16.00	11.00
Copper	200.0	41.1	1300.2			41.1	24.8
Cyanide		22.0	220028.4			22.0	5.2
Iron		7735.0				7735.0	7
Lead	100.0	350.3			0.0	100.0	13.7
Mercury		2.40	0.1	0.15	0.0	0.14	0.012
Nickel		1235.2	610.1	4600.6		610.1	137.3
Selenium	50.0	20.0			0.0	20.0	4.6
Silver		27.1			0.0	27.1	
Thallium			1.7	6.3		1.7	
Zinc		315.9				315.9	315.9
Boron	750.1					750.1	
Sulfate	2000.3					2000.3	

Summary Effluent Limitations for Metals [Wasteload Allocation, TMDL]

[If Acute is more stringent than Chronic, then the Chronic takes on the Acute value.]

	WLA Acute ug/l	WLA Chronic ug/l	
Aluminum	750.0	N/A	
Antimony	14.00		
Arsenic	50.0	190.0	Acute Controls
Asbestos	7.00E+06		
Barium			
Beryllium			
Cadmium	6.8	0.6	
Chromium (III)	4602.3	220	
Chromium (VI)	16.0	11.0	
Copper	41.1	24.8	

Cyanide	22.0	5.2	
Iron	7735.0		
Lead	100.0	13.7	
Mercury	0.140	0.012	
Nickel	610.1	137	
Selenium	20.0	4.6	
Silver	27.1	N/A	
Thallium	1.7		
Zinc	315.9	315.9	Acute Controls
Boron	750.09		
Sulfate	2000.3		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.

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 because the receiving water for the discharge is a Class 1C Drinking Water Source.

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.